

## DRV5053-Q1 車載用アナログ・バイポーラ、ホール効果センサ

### 1 特長

- 線形出力ホール・センサ
- 車載アプリケーション用にAEC-Q100認定済み
  - グレード1:  $T_A = -40^{\circ}\text{C} \sim 125^{\circ}\text{C}$  (Q、[図17](#)を参照)
  - グレード0:  $T_A = -40^{\circ}\text{C} \sim 150^{\circ}\text{C}$  (E、[図17](#)を参照)
- 優れた温度安定性
  - 温度範囲の全体で感度 $\pm 10\%$
- 高感度オプション
  - 11mV/mT (OA、[図17](#)を参照)
  - 23mV/mT (PA)
  - 45mV/mT (RA)
  - 90mV/mT (VA)
  - +23mV/mT (CA)
  - +45mV/mT (EA)
- 広い範囲の電圧をサポート
  - 2.7~38V
  - 外部レギュレータ不要
- 出力段の増幅
  - 2.3mAシンク、300 $\mu$ Aソース
- 出力電圧: 0.2~1.8V
  - $B = 0\text{mT}$ 、 $\text{OUT} = 1\text{V}$
- 高速パワーオン: 35 $\mu$ s
- 小さなパッケージと占有面積
  - 表面実装の3ピンSOT-23 (DBZ)
    - 2.92mm $\times$ 2.37mm
  - スルーホールの3ピンTO-92 (LPG)
    - 4.00mm $\times$ 3.15mm
- 保護機能
  - 逆電圧保護(最大-22V)
  - 40Vまでの負荷ダンプをサポート
  - 出力短絡保護
  - 出力電流制限
  - OUTからバッテリーへの短絡保護

### 2 アプリケーション

- 流量計
- ドッキング調整
- 振動補正
- ダンパー制御

### 3 概要

DRV5053-Q1デバイスはチョップ安定化されたホールICで、全温度範囲で優れた感度安定性を持ち、保護機能が内蔵された磁気センシング・ソリューションです。

0~2Vのアナログ出力は、印加された磁束密度に対して線形的に応答し、磁界方向の極性を区別します。このデバイスは2.7~38Vの広い動作電圧範囲と、-22Vまでの逆極性保護を持つため、広範な車載用および民生用アプリケーションに適しています。

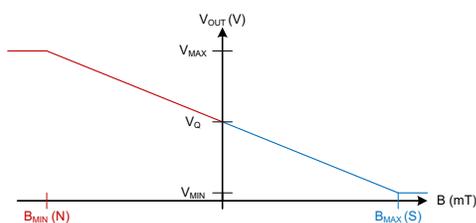
逆電圧の状態、負荷ダンプ、および出力短絡や過電流に対して、内部的な保護機能が搭載されています。

#### 製品情報<sup>(1)</sup>

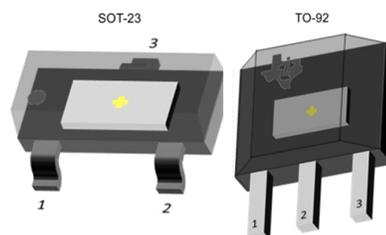
型番	パッケージ	本体サイズ(公称)
DRV5053-Q1	SOT-23 (3)	2.92mm $\times$ 1.30mm
	TO-92 (3)	4.00mm $\times$ 3.15mm

(1) 提供されているすべてのパッケージについては、巻末の注文情報を参照してください。

#### 出力状態



#### デバイスのパッケージ



## 目次

1	特長	1	7.1	Overview	8
2	アプリケーション	1	7.2	Functional Block Diagram	8
3	概要	1	7.3	Feature Description	9
4	改訂履歴	2	7.4	Device Functional Modes	11
5	<b>Pin Configuration and Functions</b>	3	<b>8</b>	<b>Application and Implementation</b>	12
6	<b>Specifications</b>	4	8.1	Application Information	12
6.1	Absolute Maximum Ratings	4	8.2	Typical Applications	12
6.2	ESD Ratings	4	<b>9</b>	<b>Power Supply Recommendations</b>	14
6.3	Recommended Operating Conditions	4	<b>10</b>	<b>デバイスおよびドキュメントのサポート</b>	15
6.4	Thermal Information	4	10.1	デバイス・サポート	15
6.5	Electrical Characteristics	5	10.2	コミュニティ・リソース	16
6.6	Switching Characteristics	5	10.3	商標	16
6.7	Magnetic Characteristics	5	10.4	静電気放電に関する注意事項	16
6.8	Typical Characteristics	7	10.5	Glossary	16
7	<b>Detailed Description</b>	8	<b>11</b>	<b>メカニカル、パッケージ、および注文情報</b>	16

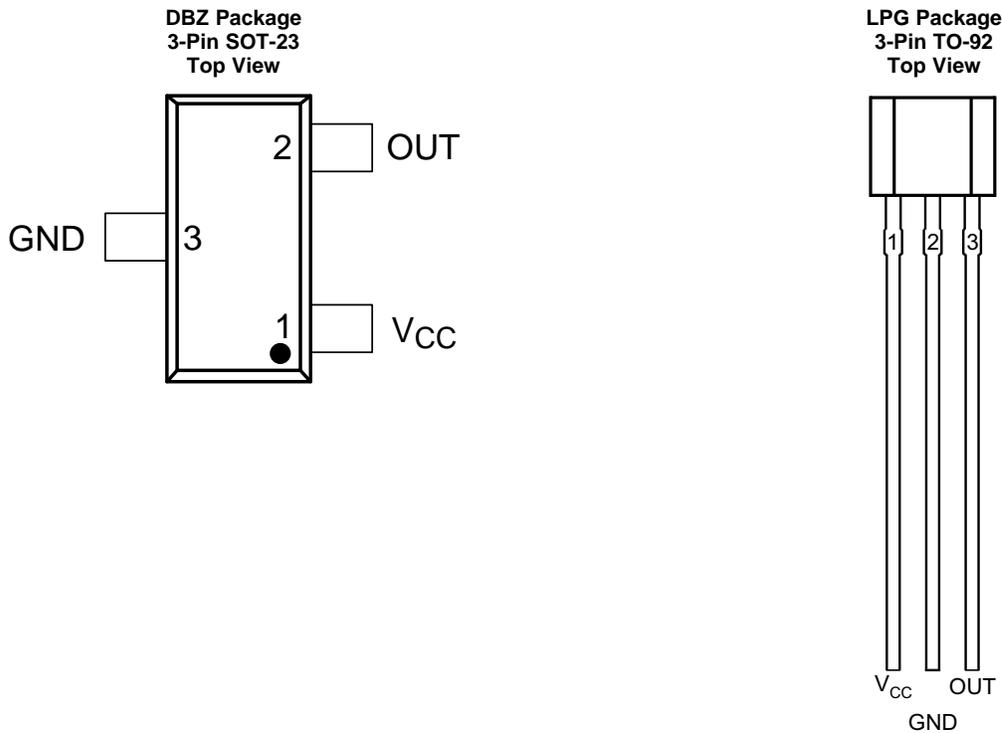
## 4 改訂履歴

### 2014年12月発行のものから更新

	Page
• SOT-23パッケージの本体サイズを訂正し、SIPパッケージ名をTO-92に訂正	1
• Added $B_{MAX}$ to <i>Absolute Maximum Ratings</i>	4
• Removed table notes regarding testing for the operating junction temperature in <i>Absolute Maximum Ratings</i>	4
• Updated the typical value for $B_N$ and $V_N$ for each version	5
• Updated <a href="#">Figure 6</a>	7
• Updated the <i>Functional Block Diagram</i>	8
• Updated <i>Output Stage</i>	11
• パッケージのテープ&リールに関するMとブランクのオプションを更新	15
• <a href="#">コミュニティ・リソース</a> を追加	16

## 5 Pin Configuration and Functions

For additional configuration information, see [デバイスのマーキング](#) and [メカニカル、パッケージ、および注文情報](#).



Pin Functions

NAME	PIN		TYPE	DESCRIPTION
	DBZ	LPG		
GND	3	2	GND	Ground pin
V <sub>CC</sub>	1	1	Power	2.7 to 38 V power supply. Bypass this pin to the GND pin with a 0.01- $\mu$ F (minimum) ceramic capacitor rated for V <sub>CC</sub> .
OUT	2	3	Output	Hall sensor analog output. 1 V output corresponds to B = 0 mT

## 6 Specifications

### 6.1 Absolute Maximum Ratings

 over operating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

		MIN	MAX	UNIT
Power supply voltage	V <sub>CC</sub>	-22 <sup>(2)</sup>	40	V
	Voltage ramp rate (V <sub>CC</sub> ), V <sub>CC</sub> < 5 V	Unlimited		V/μs
	Voltage ramp rate (V <sub>CC</sub> ), V <sub>CC</sub> > 5 V	0	2	
Output pin voltage		-0.5	2.5	V
Output pin reverse current during reverse supply condition		0	-20	mA
Magnetic flux density, B <sub>MAX</sub>		Unlimited		
Operating junction temperature, T <sub>J</sub>	Q, see <a href="#">17</a>	-40	150	°C
	E, see <a href="#">17</a>	-40	175	
Storage temperature, T <sub>stg</sub>		-65	150	°C

- (1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) Ensured by design. Only tested to -20 V.

### 6.2 ESD Ratings

			VALUE	UNIT
V <sub>(ESD)</sub>	Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins <sup>(1)</sup>	±2500	V
		Charged device model (CDM), per JEDEC specification JESD22-C101, all pins <sup>(2)</sup>	±500	

- (1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
- (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

### 6.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)

		MIN	MAX	UNIT	
V <sub>CC</sub>	Power supply voltage	2.7	38	V	
V <sub>OUT</sub>	Output pin voltage (OUT)	0	2	V	
I <sub>SOURCE</sub>	Output pin current source (OUT)	0	300	μA	
I <sub>SINK</sub>	Output pin current sink (OUT)	0	2.3	mA	
T <sub>A</sub>	Operating ambient temperature	Q, see <a href="#">17</a>	-40	125	°C
		E, see <a href="#">17</a>	-40	150	

### 6.4 Thermal Information

THERMAL METRIC <sup>(1)</sup>		DRV5053-Q1		UNIT
		DBZ (SOT-23)	LPG (TO-92)	
		3 PINS	3 PINS	
R <sub>θJA</sub>	Junction-to-ambient thermal resistance	333.2	180	°C/W
R <sub>θJC(top)</sub>	Junction-to-case (top) thermal resistance	99.9	98.6	°C/W
R <sub>θJB</sub>	Junction-to-board thermal resistance	66.9	154.9	°C/W
ψ <sub>JT</sub>	Junction-to-top characterization parameter	4.9	40	°C/W
ψ <sub>JB</sub>	Junction-to-board characterization parameter	65.2	154.9	°C/W

- (1) For more information about traditional and new thermal metrics, see the *Semiconductor and IC Package Thermal Metrics* application report, [SPRA953](#).

## 6.5 Electrical Characteristics

over operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>POWER SUPPLIES (V<sub>CC</sub>)</b>						
V <sub>CC</sub>	V <sub>CC</sub> operating voltage		2.7		38	V
I <sub>CC</sub>	Operating supply current	V <sub>CC</sub> = 2.7 to 38 V, T <sub>A</sub> = 25°C		2.7		mA
		V <sub>CC</sub> = 2.7 to 38 V, T <sub>A</sub> = T <sub>A, MAX</sub> <sup>(1)</sup>		3	3.6	
t <sub>on</sub>	Power-on time			35	50	μs
<b>PROTECTION CIRCUITS</b>						
V <sub>CCR</sub>	Reverse supply voltage		-22			V
I <sub>OCP,SOURCE</sub>	Overcurrent protection level	Sourcing current		300		μA
I <sub>OCP,SINK</sub>	Overcurrent protection level	Sinking current		2.3		mA

(1) T<sub>A, MAX</sub> is 125°C for Q Grade 1 devices and 150°C for E Grade 0 devices (see [Figure 17](#))

## 6.6 Switching Characteristics

over operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>ANALOG OUTPUT (OUT)</b>						
t <sub>d</sub>	Output delay time	T <sub>A</sub> = 25°C		13	25	μs

## 6.7 Magnetic Characteristics

over operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT <sup>(1)</sup>
V <sub>Q</sub>	Quiescent output	B = 0 mT	0.9	1.02	1.15	V
f <sub>BW</sub>	Bandwidth <sup>(2)</sup>		20			kHz
B <sub>N</sub>	Input-referred noise <sup>(3)</sup>	C <sub>OUT</sub> = 50 pF	0.40	0.49	0.79	mT <sub>pp</sub>
Le	Linearity <sup>(4)</sup>	-B <sub>SAT</sub> < B < B <sub>SAT</sub>		1%		
V <sub>OUT MIN</sub>	Output saturation voltage (min)	B < -B <sub>SAT</sub>			0.2	V
V <sub>OUT MAX</sub>	Output saturation voltage (max)	B > B <sub>SAT</sub>	1.8			V
<b>DRV5053OA: -11 mV/mT</b>						
S	Sensitivity	V <sub>CC</sub> = 3.3 V	-17.5	-11	-5	mV/mT
V <sub>N</sub>	Output-referred noise	V <sub>CC</sub> = 3.3 V; R <sub>OUT</sub> = 10 kΩ; C <sub>OUT</sub> = 50 pF		5		mV <sub>pp</sub>
B <sub>SAT</sub>	Input saturation field	V <sub>CC</sub> = 3.3 V		73		mT
<b>DRV5053PA: -23 mV/mT</b>						
S	Sensitivity	V <sub>CC</sub> = 3.3 V	-35	-23	-10	mV/mT
V <sub>N</sub>	Output-referred noise	V <sub>CC</sub> = 3.3 V; R <sub>OUT</sub> = 10 kΩ; C <sub>OUT</sub> = 50 pF		11		mV <sub>pp</sub>
B <sub>SAT</sub>	Input saturation field	V <sub>CC</sub> = 3.3 V		35		mT

(1) 1 mT = 10 Gauss

(2) Bandwidth describes the fastest changing magnetic field that can be detected and translated to the output.

(3) Not tested in production; limits are based on characterization data.

(4) Linearity describes the change in sensitivity across the B-range. The sensitivity near B<sub>SAT</sub> is typically within 1% of the sensitivity near B = 0.

**DRV5053-Q1**

JAJSCY7A – DECEMBER 2014 – REVISED DECEMBER 2015

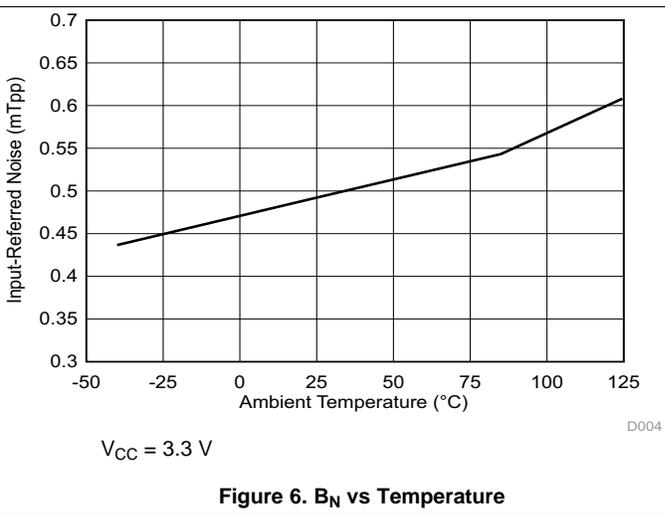
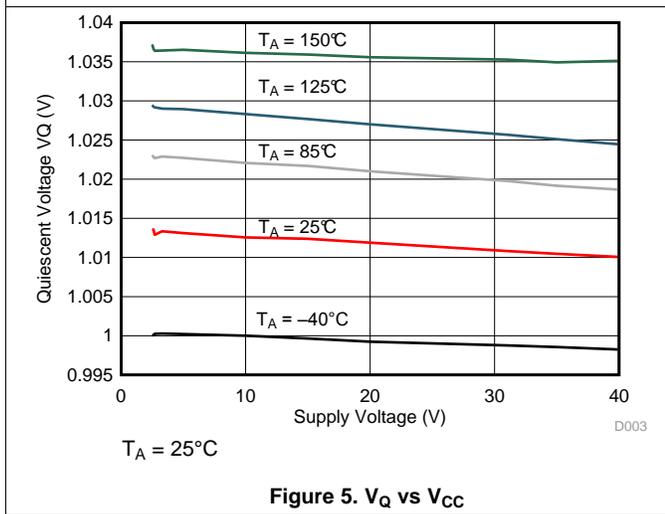
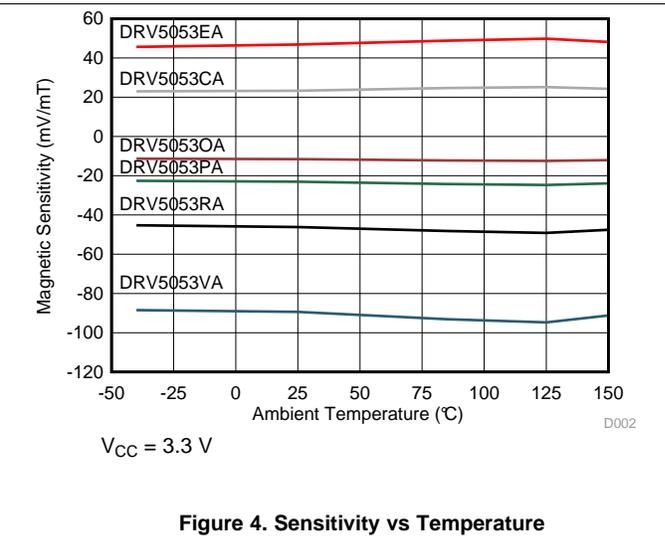
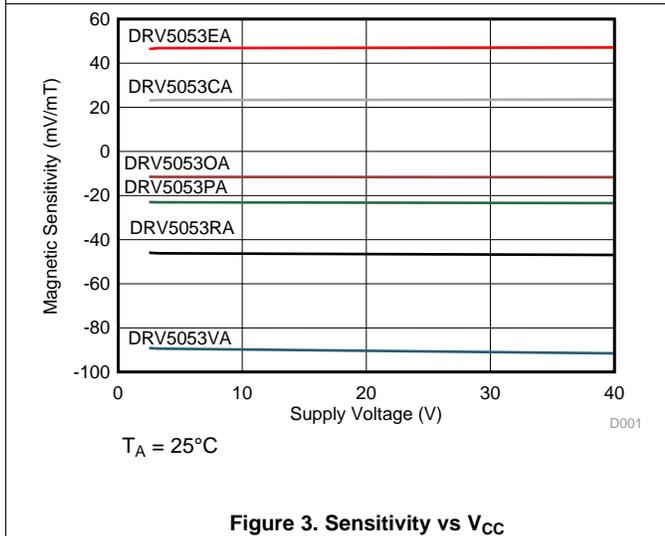
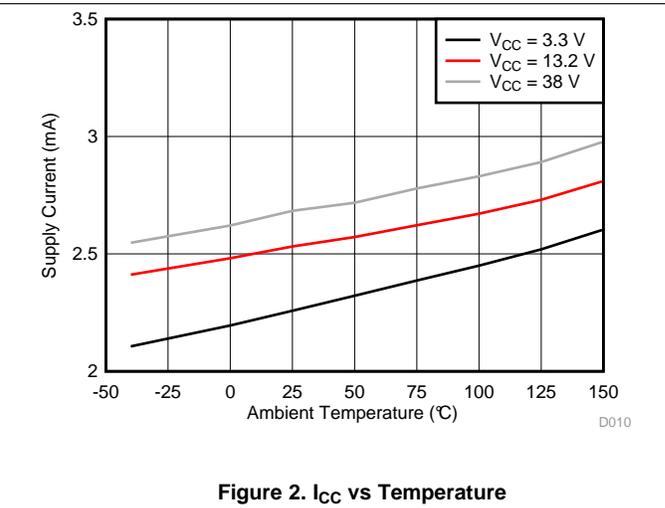
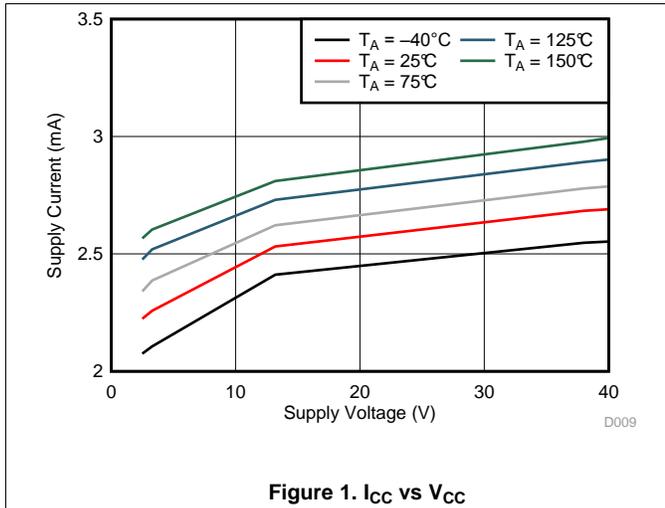
[www.ti.com](http://www.ti.com)
**Magnetic Characteristics (continued)**

over operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT <sup>(1)</sup>
<b>DRV5053RA: –45 mV/mT</b>						
S	Sensitivity	$V_{CC} = 3.3\text{ V}$	–70	–45	–20	mV/mT
$V_N$	Output-referred noise	$V_{CC} = 3.3\text{ V}; R_{OUT} = 10\text{ k}\Omega;$ $C_{OUT} = 50\text{ pF}$		22		mV <sub>pp</sub>
$B_{SAT}$	Input saturation field	$V_{CC} = 3.3\text{ V}$		18		mT
<b>DRV5053VA: –90 mV/mT</b>						
S	Sensitivity	$V_{CC} = 3.3\text{ V}$	–140	–90	–45	mV/mT
$V_N$	Output-referred noise	$V_{CC} = 3.3\text{ V}; R_{OUT} = 10\text{ k}\Omega;$ $C_{OUT} = 50\text{ pF}$		44		mV <sub>pp</sub>
$B_{SAT}$	Input saturation field	$V_{CC} = 3.3\text{ V}$		9		mT
<b>DRV5053CA: 23 mV/mT</b>						
S	Sensitivity	$V_{CC} = 3.3\text{ V}$	10	23	35	mV/mT
$V_N$	Output-referred noise	$V_{CC} = 3.3\text{ V}; R_{OUT} = 10\text{ k}\Omega;$ $C_{OUT} = 50\text{ pF}$		11		mV <sub>pp</sub>
$B_{SAT}$	Input saturation field	$V_{CC} = 3.3\text{ V}$		35		mT
<b>DRV5053EA: 45 mV/mT</b>						
S	Sensitivity	$V_{CC} = 3.3\text{ V}$	20	45	70	mV/mT
$V_N$	Output-referred noise	$V_{CC} = 3.3\text{ V}; R_{OUT} = 10\text{ k}\Omega;$ $C_{OUT} = 50\text{ pF}$		22		mV <sub>pp</sub>
$B_{SAT}$	Input saturation field	$V_{CC} = 3.3\text{ V}$		18		mT

### 6.8 Typical Characteristics

$T_A > 125^\circ\text{C}$  data is valid for Grade 0 devices only (E, see 17)



## 7 Detailed Description

### 7.1 Overview

The DRV5053-Q1 device is a chopper-stabilized Hall sensor with an analog output for magnetic sensing applications. The DRV5053-Q1 device can be powered with a supply voltage between 2.7 and 38 V, and will survive  $-22$  V reverse battery conditions continuously. Note that the DRV5053-Q1 device will not be operating when approximately  $-22$  to 2.4 V is applied to  $V_{CC}$  (with respect to GND). In addition, the device can withstand supply voltages up to 40 V for transient durations.

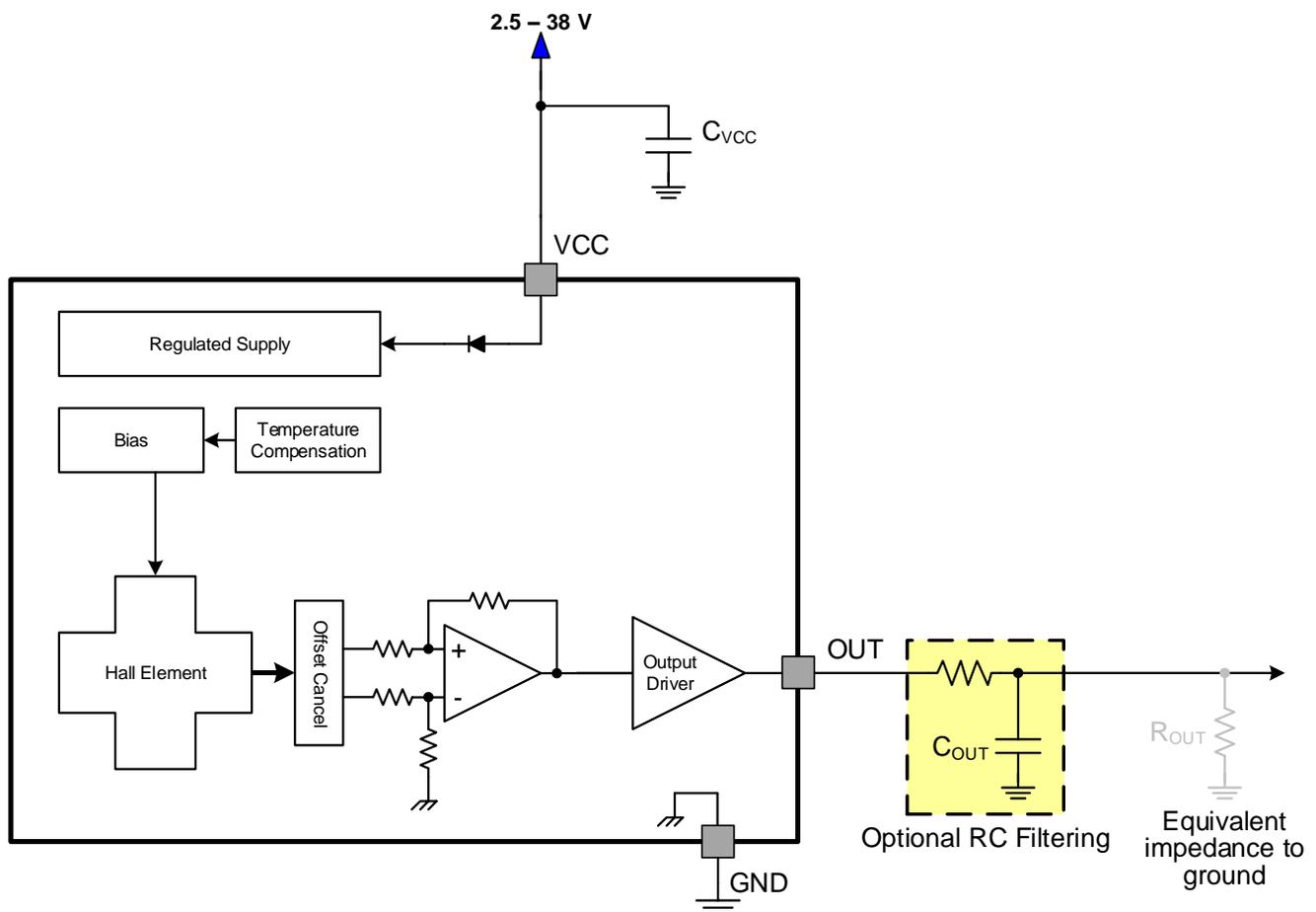
The output voltage is dependent on the magnetic field perpendicular to the package. The absence of a magnetic field will result in  $OUT = 1$  V. A magnetic field will cause the output voltage to change linearly with the magnetic field.

The field polarity is defined as follows: a **south pole** near the marked side of the package is a positive magnetic field. A **north pole** near the marked side of the package is a negative magnetic field.

For devices with a negative sensitivity (that is, DRV5053RA:  $-40$  mV/mT), a **south pole** will cause the output voltage to drop below 1 V, and a north pole will cause the output to rise above 1 V.

For devices with a positive sensitivity (that is, DRV5053EA:  $+40$  mV/mT), a **south pole** will cause the output voltage to rise above 1 V, and a north pole will cause the output to drop below 1 V.

### 7.2 Functional Block Diagram



### 7.3 Feature Description

#### 7.3.1 Field Direction Definition

A positive magnetic field is defined as a **south pole** near the marked side of the package as shown in [Figure 7](#).

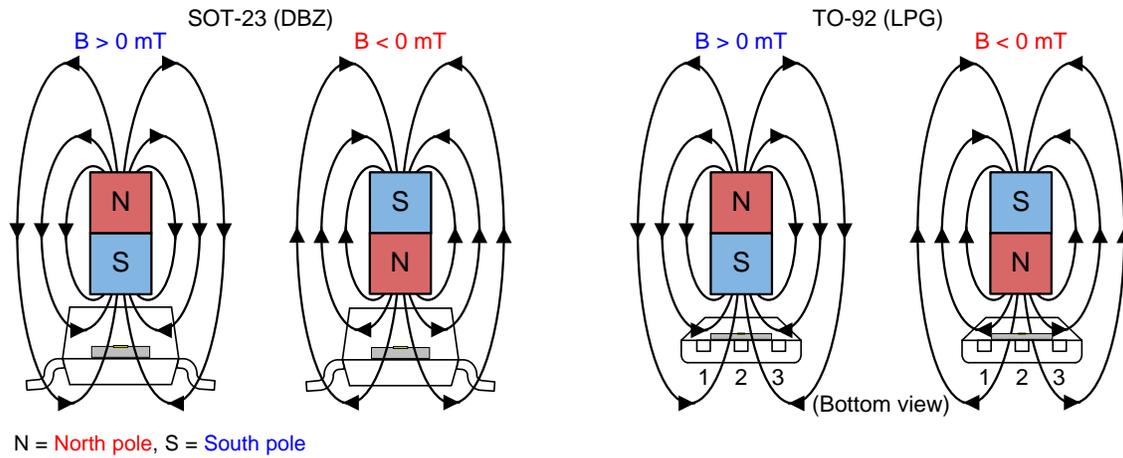


Figure 7. Field Direction Definition

#### 7.3.2 Device Output

The DRV5053-Q1 device output is defined below for negative sensitivity (that is,  $-45 \text{ mV/mT}$ , RA) and positive sensitivity (that is,  $+45 \text{ mV/mT}$ , EA):

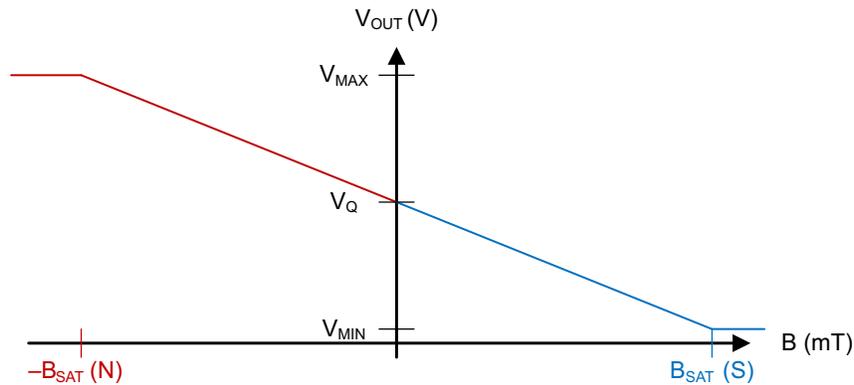


Figure 8. DRV5053-Q1 – Negative Sensitivity

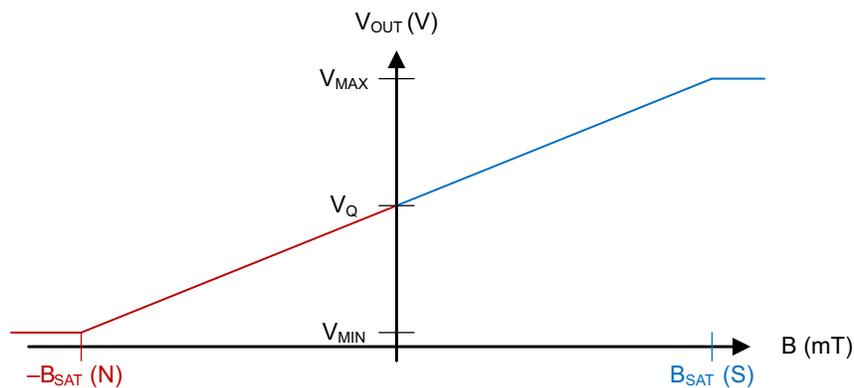
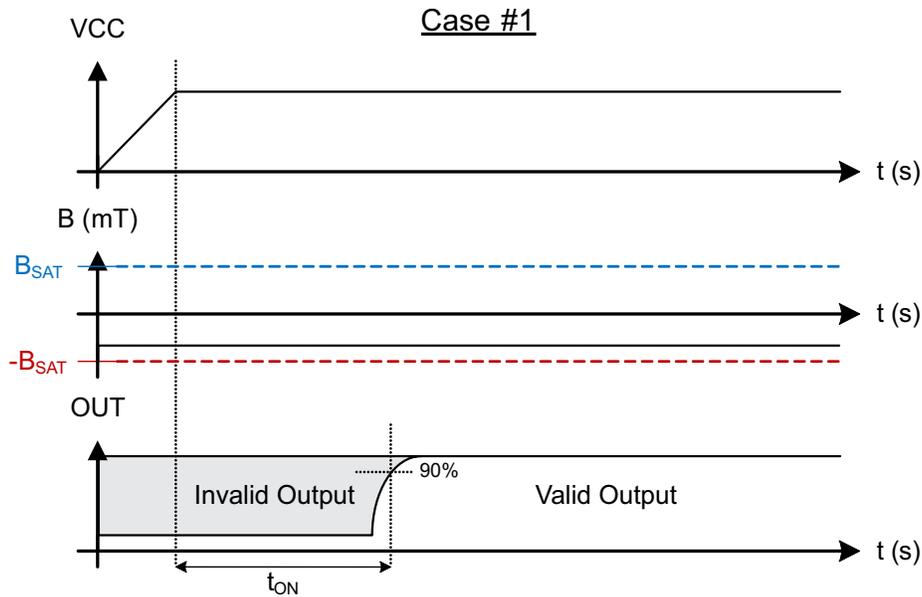
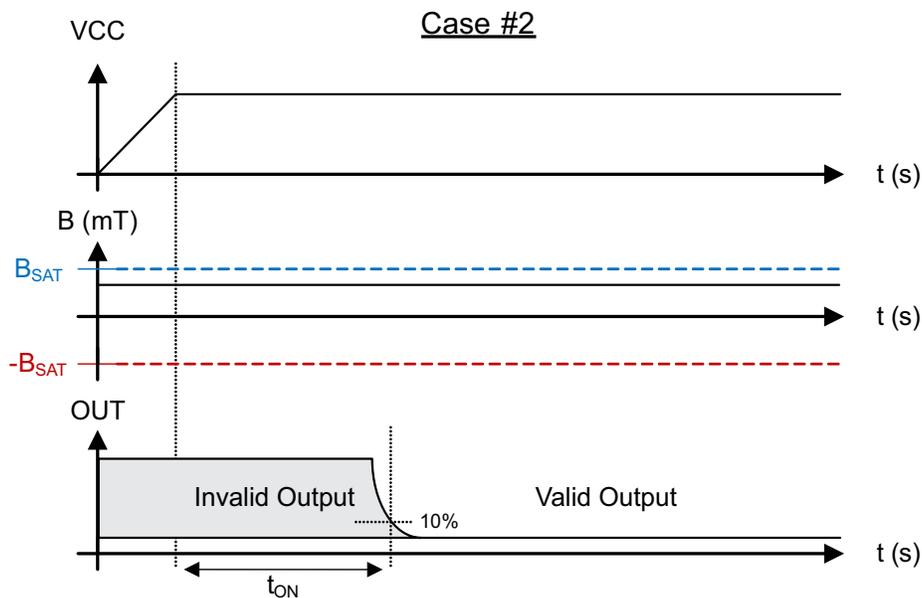


Figure 9. DRV5053-Q1 – Positive Sensitivity

**Feature Description (continued)**
**7.3.3 Power-On Time**

After applying  $V_{CC}$  to the DRV5053-Q1 device,  $t_{on}$  must elapse before OUT is valid. Figure 10 shows Case 1 and Figure 11 shows case 2; the output is defined assuming a negative sensitivity device and a constant magnetic field  $-B_{SAT} < B < B_{SAT}$ .


**Figure 10. Case 1: Power On When  $B < 0$ , North**

**Figure 11. Case 2: Power On When  $B > 0$ , South**

## Feature Description (continued)

### 7.3.4 Output Stage

The DRV5053-Q1 output stage is capable of up to 300- $\mu$ A of current source or 2.3-mA sink. For proper operation, ensure that equivalent output load  $R_{OUT} > 10\text{ k}\Omega$ .

The capacitive load directly present on the OUT pin should be less than 10 nF to ensure the internal operational amplifier is stable. If an external RC filter is added to reduce noise, it is acceptable to use a resistor  $\geq 200\ \Omega$  with a capacitor  $\leq 0.1\ \mu\text{F}$ . For an application example, see [Filtered Typical Application](#).

### 7.3.5 Protection Circuits

An analog current limit circuit limits the current through the output driver. The driver current will be clamped to  $I_{OCP}$ .

#### 7.3.5.1 Overcurrent Protection (OCP)

An analog current-limit circuit limits the current through the FET. The driver current is clamped to  $I_{OCP}$ . During this clamping, the  $r_{DS(on)}$  of the output FET is increased from the nominal value.

#### 7.3.5.2 Load Dump Protection

The DRV5053-Q1 device operates at DC  $V_{CC}$  conditions up to 38 V nominally, and can additionally withstand  $V_{CC} = 40\text{ V}$ . No current-limiting series resistor is required for this protection.

#### 7.3.5.3 Reverse Supply Protection

The DRV5053-Q1 device is protected in the event that the  $V_{CC}$  pin and the GND pin are reversed (up to  $-22\text{ V}$ ).

---

#### NOTE

In a reverse supply condition, the OUT pin reverse-current must not exceed the ratings specified in the [Absolute Maximum Ratings](#).

---

**Table 1.**

FAULT	CONDITION	DEVICE	DESCRIPTION	RECOVERY
FET overload (OCP)	$I_{SINK} \geq I_{OCP}$	Operating	Output current is clamped to $I_{OCP}$	$I_O < I_{OCP}$
Load Dump	$38\text{ V} < V_{CC} < 40\text{ V}$	Operating	Device will operate for a transient duration	$V_{CC} \leq 38\text{ V}$
Reverse Supply	$-22\text{ V} < V_{CC} < 0\text{ V}$	Disabled	Device will survive this condition	$V_{CC} \geq 2.7\text{ V}$

## 7.4 Device Functional Modes

The DRV5053-Q1 device is active only when  $V_{CC}$  is between 2.7 and 38 V.

When a reverse supply condition exists, the device is inactive.

## 8 Application and Implementation

### NOTE

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

### 8.1 Application Information

The DRV5053-Q1 device is used in magnetic-field sensing applications.

### 8.2 Typical Applications

#### 8.2.1 Typical Application With No Filter

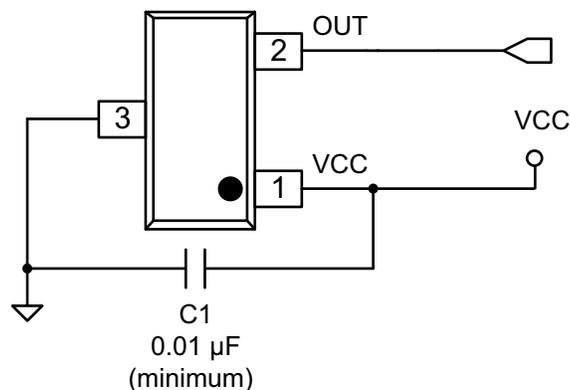


Figure 12. Typical Application Schematic – No Filter

##### 8.2.1.1 Design Requirements

For this design example, use the parameters listed in Table 2 as the input parameters.

Table 2. Design Parameters

DESIGN PARAMETER	REFERENCE	EXAMPLE VALUE
System bandwidth	$f_{BW}$	15 kHz

##### 8.2.1.2 Detailed Design Procedure

The DRV5053-Q1 has internal filtering that limits the bandwidth to at least 20 kHz. For this application no external components are required other than the C1 bypass capacitor, which is 0.01  $\mu$ F minimum. If the analog output OUT is tied to a microcontroller ADC input, the equivalent load must be  $R > 10$  k $\Omega$  and  $C < 10$  nF.

Table 3. External Components

COMPONENT	PIN 1	PIN 2	RECOMMENDED
C1	V <sub>CC</sub>	GND	A 0.01- $\mu$ F (minimum) ceramic capacitor rated for V <sub>CC</sub>

### 8.2.1.3 Application Curve

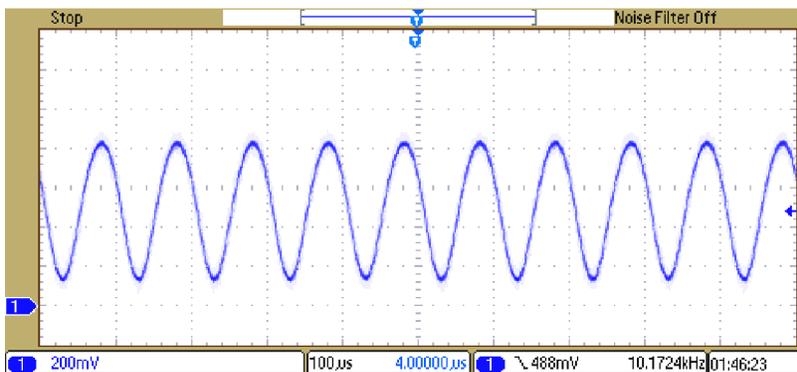


Figure 13. 10-kHz Switching Magnetic Field

### 8.2.2 Filtered Typical Application

For lower noise on the analog output OUT, additional RC filtering can be added to further reduce the bandwidth.

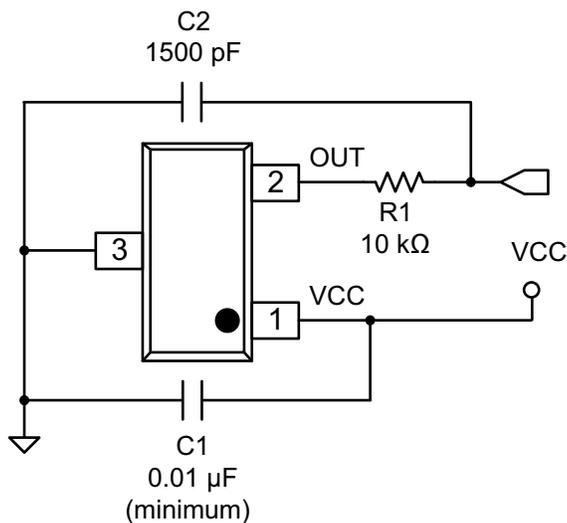


Figure 14. Filtered Typical Application Schematic

#### 8.2.2.1 Design Requirements

For this design example, use the parameters listed in Table 4 as the input parameters.

Table 4. Design Parameters

DESIGN PARAMETER	REFERENCE	EXAMPLE VALUE
System bandwidth	$f_{BW}$	5 kHz

### 8.2.2.2 Detailed Design Procedure

In this example we will add an external RC filter in order to reduce the output bandwidth.

In order to preserve the signal at the frequencies of interest, we will conservatively select a low-pass filter bandwidth (–3-dB point) at twice the system bandwidth (10 kHz).

$$10 \text{ kHz} < \frac{1}{2\pi \times R_1 \times C_2} \tag{1}$$

If we guess R1 = 10 kΩ, then C2 < 1590 pF. So we select C2 = 1500 pF.

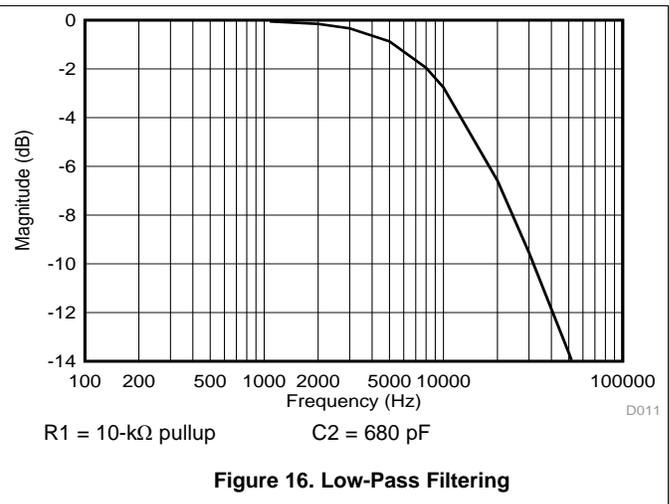
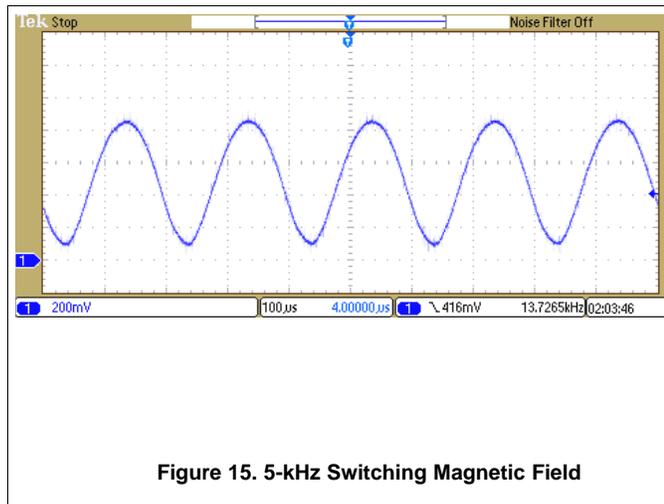
#### 8.2.2.2.1 Typical Noise Versus Cutoff Frequency

RC filters are an effective way to reduce the noise present on OUT. The following shows typical noise measurements for different cutoff frequencies using the DRV5053VA.

**Table 5. DRV5053VA Typical Noise Data**

R (Ω)	C (μF)	f <sub>CUTOFF</sub> (kHz)	NOISE (mVpp)
163	0.1	9.8	30.4
349	0.1	4.6	22.8
750	0.1	2.1	15.2
1505	0.1	1.1	9.7
3322	0.1	0.5	5.3
7510	0.1	0.2	2.5

### 8.2.2.3 Application Curves



## 9 Power Supply Recommendations

The DRV5053-Q1 device is designed to operate from an input voltage supply (VM) range between 2.7 and 38 V. A 0.01-μF (minimum) ceramic capacitor rated for V<sub>CC</sub> must be placed as close to the DRV5053-Q1 device as possible.

## 10 デバイスおよびドキュメントのサポート

### 10.1 デバイス・サポート

#### 10.1.1 デバイスの項目表記

DRV5053-Q1デバイスの完全なデバイス名を読むための凡例を、[図 17](#)に示します。

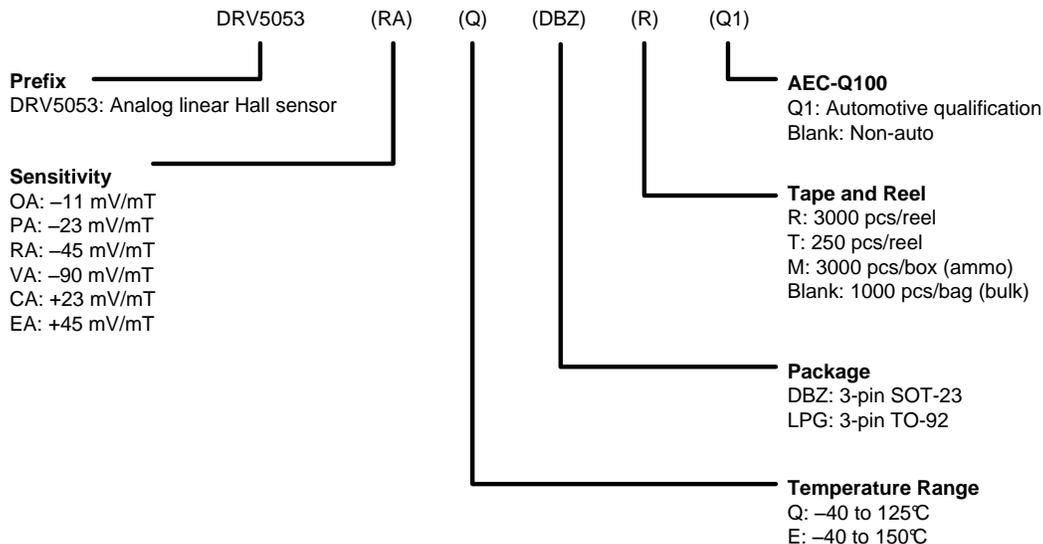


図 17. デバイス名の見方

#### 10.1.2 デバイスのマーキング

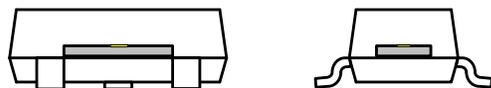
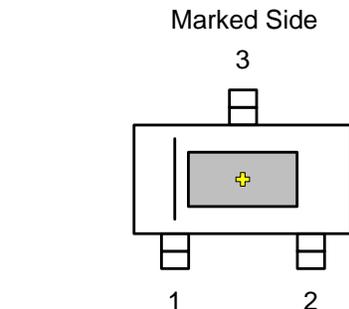


図 18. SOT-23 (DBZ)パッケージ

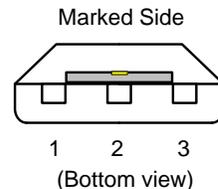
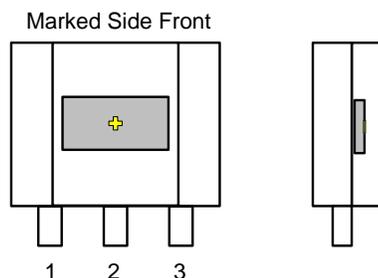


図 19. TO-92 (LPG)パッケージ

✦はホール効果センサを示します(実際の大きさに比例してはいません)。ホール素子はパッケージの中心に、許容誤差 $\pm 100\mu\text{m}$ で配置されています。ホール素子の高さは、パッケージの底面から計測して、DBZパッケージでは $0.7\text{mm}\pm 50\mu\text{m}$ 、LPGパッケージでは $0.987\text{mm}\pm 50\mu\text{m}$ です。

## 10.2 コミュニティ・リソース

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

**TI E2E™オンライン・コミュニティ** *TIのE2E ( Engineer-to-Engineer )* コミュニティ。エンジニア間の共同作業を促進するために開設されたものです。e2e.ti.comでは、他のエンジニアに質問し、知識を共有し、アイデアを検討して、問題解決に役立てることができます。

**設計サポート** *TIの設計サポート* 役に立つE2Eフォーラムや、設計サポート・ツールをすばやく見つけることができます。技術サポート用の連絡先情報も参照できます。

## 10.3 商標

E2E is a trademark of Texas Instruments.  
All other trademarks are the property of their respective owners.

## 10.4 静電気放電に関する注意事項



これらのデバイスは、限定的なESD (静電破壊) 保護機能を内蔵しています。保存時または取り扱い時は、MOSゲートに対する静電破壊を防止するために、リード線同士をショートさせておくか、デバイスを導電フォームに入れる必要があります。

## 10.5 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

## 11 メカニカル、パッケージ、および注文情報

以降のページには、メカニカル、パッケージ、および注文に関する情報が記載されています。この情報は、そのデバイスについて利用可能な最新のデータです。このデータは予告なく変更されることがあり、ドキュメントが改訂される場合もあります。本データシートのブラウザ版を使用されている場合は、画面左側の説明をご覧ください。

**PACKAGING INFORMATION**

Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
<a href="#">DRV5053CAEDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJCA
DRV5053CAEDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJCA
<a href="#">DRV5053CAEDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 150	+AJCA
<a href="#">DRV5053CAELPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJCA
DRV5053CAELPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJCA
<a href="#">DRV5053CAELPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJCA
DRV5053CAELPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJCA
<a href="#">DRV5053CAQDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	+AKCA
DRV5053CAQDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	+AKCA
<a href="#">DRV5053CAQDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 125	+AKCA
<a href="#">DRV5053CAQLPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 125	+AKCA
DRV5053CAQLPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 125	+AKCA
<a href="#">DRV5053CAQLPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 125	+AKCA
DRV5053CAQLPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 125	+AKCA
<a href="#">DRV5053EAEDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJEA
DRV5053EAEDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJEA
<a href="#">DRV5053EAEDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 150	+AJEA
<a href="#">DRV5053EAELPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJEA
DRV5053EAELPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJEA
<a href="#">DRV5053EAELPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJEA
DRV5053EAELPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJEA
<a href="#">DRV5053EAQDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AKEA
DRV5053EAQDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AKEA
<a href="#">DRV5053EAQDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 150	+AKEA
<a href="#">DRV5053EAQLPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AKEA
DRV5053EAQLPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AKEA
<a href="#">DRV5053EAQLPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 125	+AKEA
DRV5053EAQLPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 125	+AKEA
<a href="#">DRV5053OAEDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJOA

Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
DRV5053OAEDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJOA
<a href="#">DRV5053OAEDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 150	+AJOA
<a href="#">DRV5053OAELPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJOA
DRV5053OAELPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJOA
<a href="#">DRV5053OAELPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJOA
DRV5053OAELPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJOA
<a href="#">DRV5053OAQDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	+AKOA
DRV5053OAQDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	+AKOA
<a href="#">DRV5053OAQDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 125	+AKOA
<a href="#">DRV5053OAQLPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 125	+AKOA
DRV5053OAQLPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 125	+AKOA
<a href="#">DRV5053OAQLPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 125	+AKOA
DRV5053OAQLPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 125	+AKOA
<a href="#">DRV5053PAEDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJPA
DRV5053PAEDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJPA
<a href="#">DRV5053PAEDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 150	+AJPA
<a href="#">DRV5053PAELPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJPA
DRV5053PAELPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJPA
<a href="#">DRV5053PAELPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJPA
DRV5053PAELPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJPA
<a href="#">DRV5053PAQDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	+AKPA
DRV5053PAQDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	+AKPA
<a href="#">DRV5053PAQDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 125	+AKPA
<a href="#">DRV5053PAQLPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 125	+AKPA
DRV5053PAQLPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 125	+AKPA
<a href="#">DRV5053PAQLPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 125	+AKPA
DRV5053PAQLPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 125	+AKPA
<a href="#">DRV5053RAEDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJRA
DRV5053RAEDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJRA
<a href="#">DRV5053RAEDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 150	+AJRA
<a href="#">DRV5053RAELPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJRA

Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
DRV5053RAELPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJRA
<a href="#">DRV5053RAELPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJRA
DRV5053RAELPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJRA
<a href="#">DRV5053RAQDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	+AKRA
DRV5053RAQDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	+AKRA
<a href="#">DRV5053RAQDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 125	+AKRA
<a href="#">DRV5053RAQLPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 125	+AKRA
DRV5053RAQLPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 125	+AKRA
<a href="#">DRV5053RAQLPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-	+AKRA
DRV5053RAQLPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AKRA
<a href="#">DRV5053VAEDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJVA
DRV5053VAEDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 150	+AJVA
<a href="#">DRV5053VAEDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 150	+AJVA
<a href="#">DRV5053VAELPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJVA
DRV5053VAELPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 150	+AJVA
<a href="#">DRV5053VAELPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJVA
DRV5053VAELPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 150	+AJVA
<a href="#">DRV5053VAQDBZRQ1</a>	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	+AKVA
DRV5053VAQDBZRQ1.A	Active	Production	SOT-23 (DBZ)   3	3000   LARGE T&R	Yes	NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	+AKVA
<a href="#">DRV5053VAQDBZTQ1</a>	Obsolete	Production	SOT-23 (DBZ)   3	-	-	Call TI	Call TI	-40 to 125	+AKVA
<a href="#">DRV5053VAQLPGMQ1</a>	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 125	+AKVA
DRV5053VAQLPGMQ1.A	Active	Production	TO-92 (LPG)   3	3000   AMMO	Yes	SN	N/A for Pkg Type	-40 to 125	+AKVA
<a href="#">DRV5053VAQLPGQ1</a>	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 125	+AKVA
DRV5053VAQLPGQ1.A	Active	Production	TO-92 (LPG)   3	1000   BULK	Yes	SN	N/A for Pkg Type	-40 to 125	+AKVA

<sup>(1)</sup> **Status:** For more details on status, see our [product life cycle](#).

<sup>(2)</sup> **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

<sup>(3)</sup> **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

**Important Information and Disclaimer:** The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

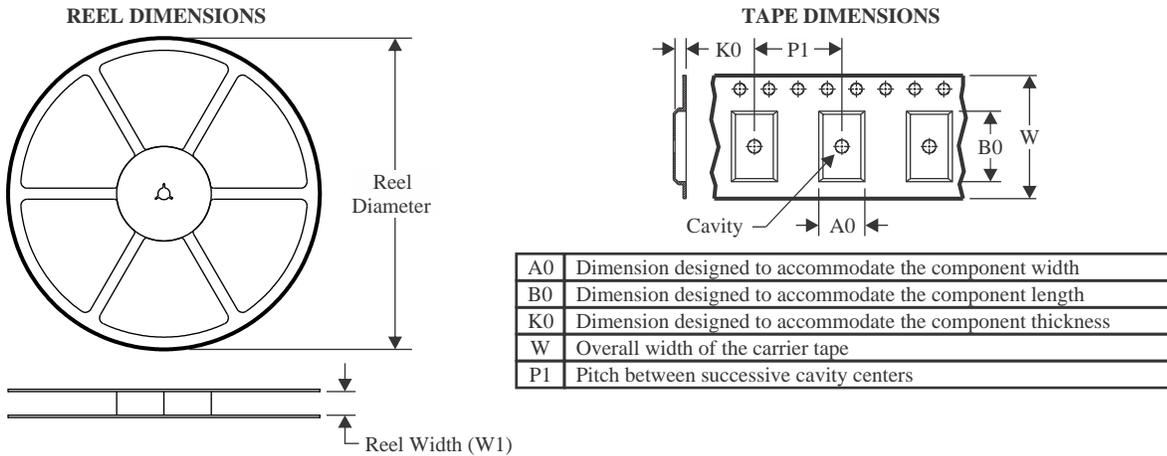
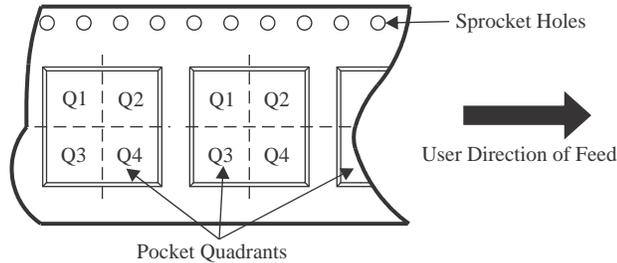
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

**OTHER QUALIFIED VERSIONS OF DRV5053-Q1 :**

- Catalog : [DRV5053](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product

**TAPE AND REEL INFORMATION**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
DRV5053CAEDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3
DRV5053CAQDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3
DRV5053EAEDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3
DRV5053EAQDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3
DRV5053OAEDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3
DRV5053OAQDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3
DRV5053PAEDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3
DRV5053PAQDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3
DRV5053RAEDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3
DRV5053RAQDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3
DRV5053VAEDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3
DRV5053VAQDBZRQ1	SOT-23	DBZ	3	3000	180.0	8.4	3.15	2.77	1.22	4.0	8.0	Q3

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
DRV5053CAEDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0
DRV5053CAQDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0
DRV5053EAEDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0
DRV5053EAQDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0
DRV5053OAEDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0
DRV5053OAQDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0
DRV5053PAEDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0
DRV5053PAQDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0
DRV5053RAEDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0
DRV5053RAQDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0
DRV5053VAEDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0
DRV5053VAQDBZRQ1	SOT-23	DBZ	3	3000	202.0	201.0	28.0

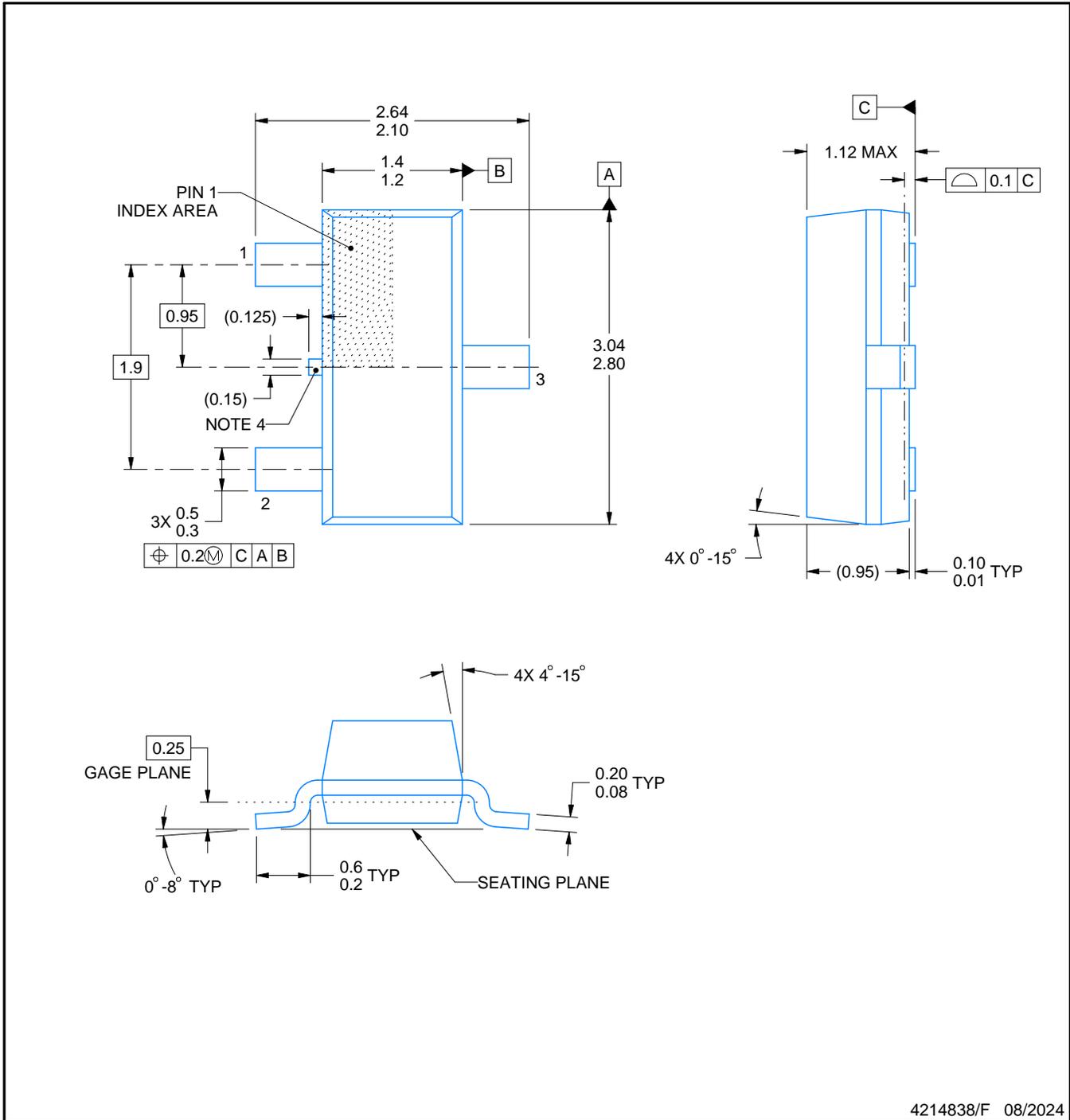
# DBZ0003A



# PACKAGE OUTLINE

## SOT-23 - 1.12 mm max height

SMALL OUTLINE TRANSISTOR



4214838/F 08/2024

### NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Reference JEDEC registration TO-236, except minimum foot length.
4. Support pin may differ or may not be present.
5. Body dimensions do not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.25mm per side

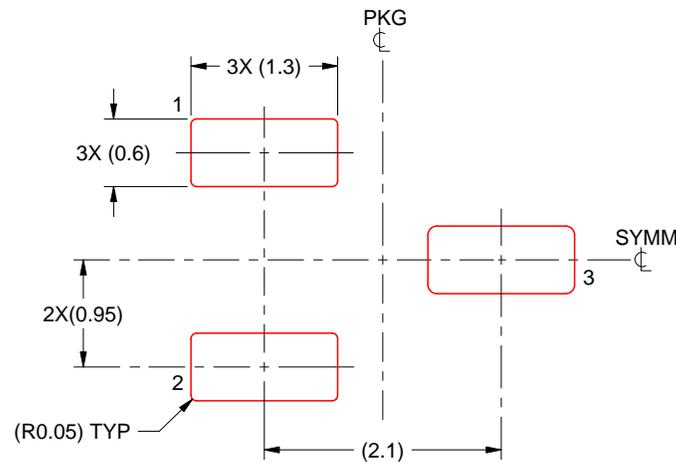


# EXAMPLE STENCIL DESIGN

DBZ0003A

SOT-23 - 1.12 mm max height

SMALL OUTLINE TRANSISTOR



SOLDER PASTE EXAMPLE  
BASED ON 0.125 THICK STENCIL  
SCALE:15X

4214838/F 08/2024

NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

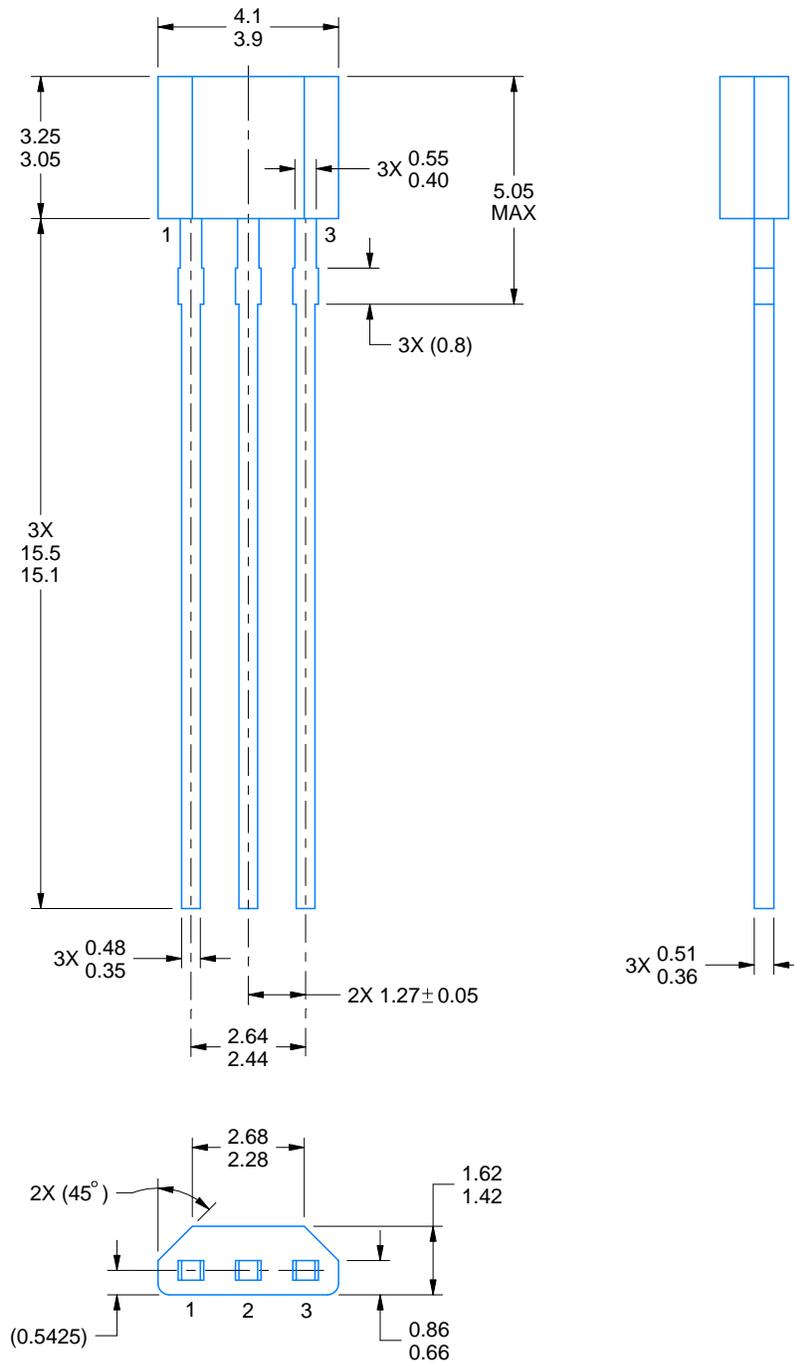
# LPG0003A



# PACKAGE OUTLINE

## TO-92 - 5.05 mm max height

TRANSISTOR OUTLINE



4221343/C 01/2018

### NOTES:

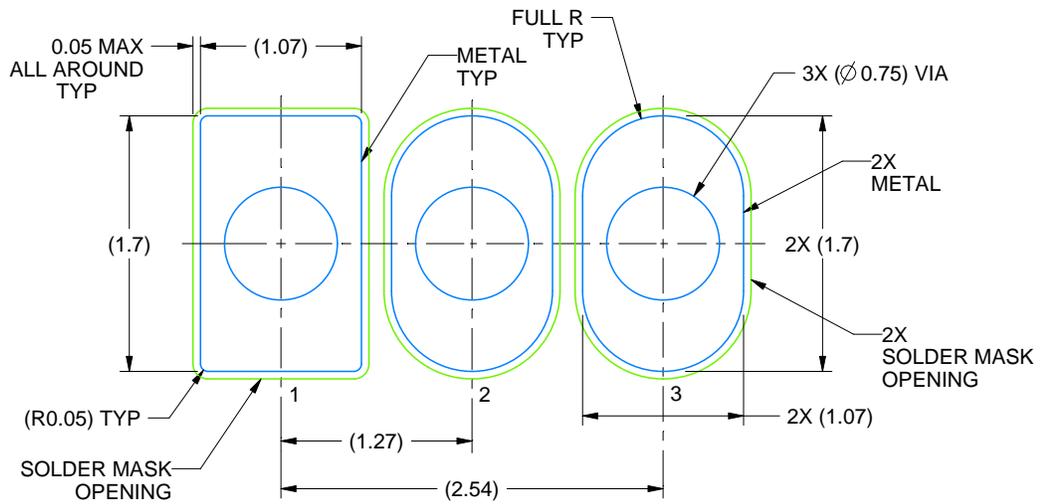
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

# EXAMPLE BOARD LAYOUT

LPG0003A

TO-92 - 5.05 mm max height

TRANSISTOR OUTLINE



LAND PATTERN EXAMPLE  
NON-SOLDER MASK DEFINED  
SCALE:20X

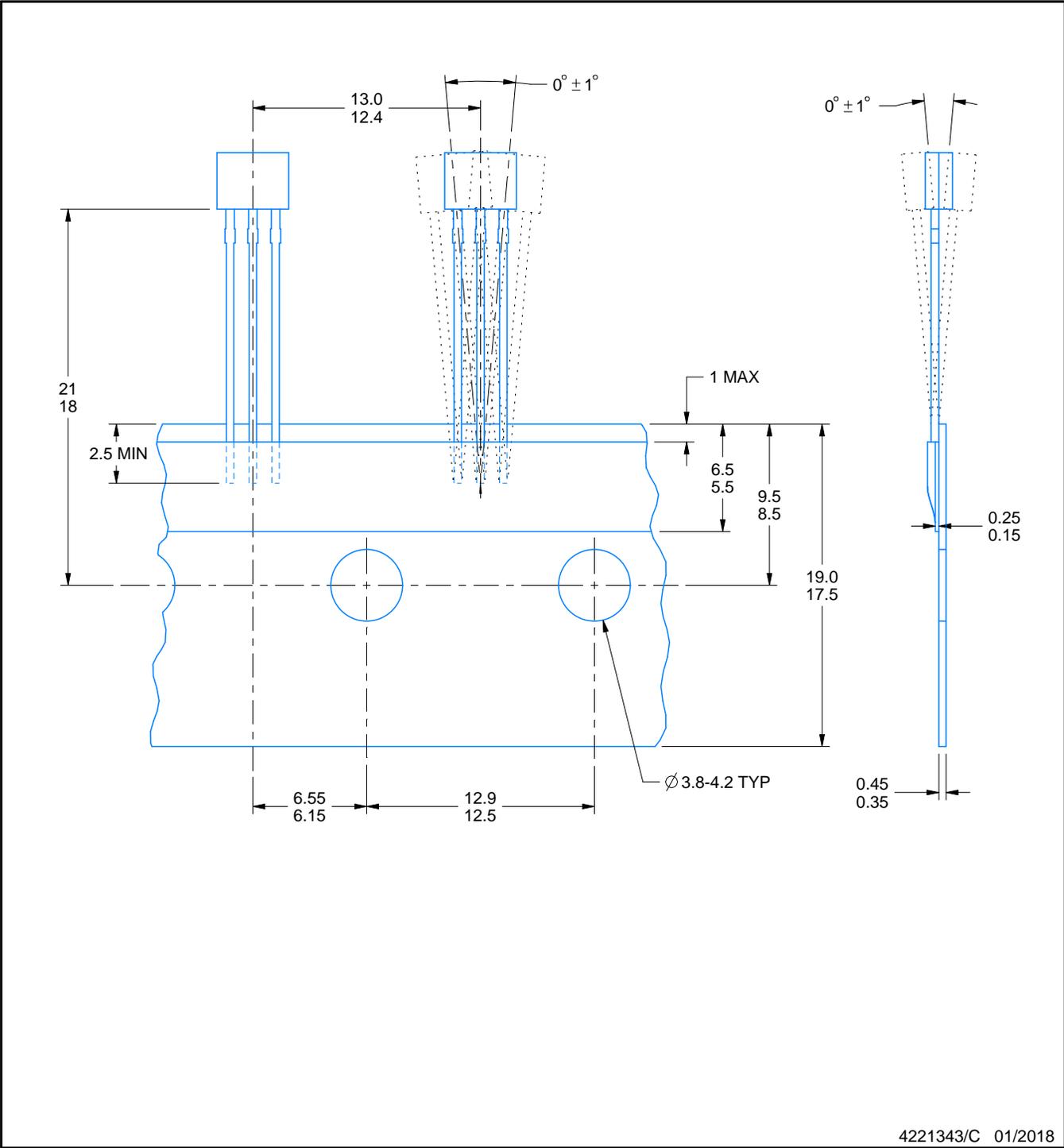
4221343/C 01/2018

# TAPE SPECIFICATIONS

LPG0003A

TO-92 - 5.05 mm max height

TRANSISTOR OUTLINE



4221343/C 01/2018

## 重要なお知らせと免責事項

TI は、技術データと信頼性データ (データシートを含みます)、設計リソース (リファレンス デザインを含みます)、アプリケーションや設計に関する各種アドバイス、Web ツール、安全性情報、その他のリソースを、欠陥が存在する可能性のある「現状のまま」提供しており、商品性および特定目的に対する適合性の黙示保証、第三者の知的財産権の非侵害保証を含むいかなる保証も、明示的または黙示的にかかわらず拒否します。

これらのリソースは、TI 製品を使用する設計の経験を積んだ開発者への提供を意図したものです。(1) お客様のアプリケーションに適した TI 製品の選定、(2) お客様のアプリケーションの設計、検証、試験、(3) お客様のアプリケーションに該当する各種規格や、その他のあらゆる安全性、セキュリティ、規制、または他の要件への確実な適合に関する責任を、お客様のみが単独で負うものとし、

上記の各種リソースは、予告なく変更される可能性があります。これらのリソースは、リソースで説明されている TI 製品を使用するアプリケーションの開発の目的でのみ、TI はその使用をお客様に許諾します。これらのリソースに関して、他の目的で複製することや掲載することは禁止されています。TI や第三者の知的財産権のライセンスが付与されている訳ではありません。お客様は、これらのリソースを自身で使用した結果発生するあらゆる申し立て、損害、費用、損失、責任について、TI およびその代理人を完全に補償するものとし、TI は一切の責任を拒否します。

TI の製品は、[TI の販売条件](#)、[TI の総合的な品質ガイドライン](#)、[ti.com](#) または TI 製品などに関連して提供される他の適用条件に従い提供されます。TI がこれらのリソースを提供することは、適用される TI の保証または他の保証の放棄の拡大や変更を意味するものではありません。TI がカスタム、またはカスタマー仕様として明示的に指定していない限り、TI の製品は標準的なカタログに掲載される汎用機器です。

お客様がいかなる追加条項または代替条項を提案する場合も、TI はそれらに異議を唱え、拒否します。

Copyright © 2026, Texas Instruments Incorporated

最終更新日 : 2025 年 10 月