

SGLS227C - DECEMBER 2003 - REVISED JUNE 2007

VOLTAGE DETECTOR

FEATURES

- Controlled Baseline
 - One Assembly/Test Site, One Fabrication Site
- Extended Temperature Performance of Up to -55°C to +125°C
- Enhanced Diminishing Manufacturing Sources (DMS) Support
- Enhanced Product-Change Notification
- Qualification Pedigree⁽¹⁾
- Single Voltage Detector (TPS3803): Adjustable/1.5 V
- Dual Voltage Detector (TPS3805): Adjustable/3.3 V
- High ±1.5% Threshold Voltage Accuracy
- Supply Current: 3 μA Typical at V_{DD} = 3.3 V
- Push/Pull Reset Output (TPS3805) Open-Drain Reset Output (TPS3803)
- 5-Pin SC-70 Package
- (1) Component qualification in accordance with JEDEC and industry standards to ensure reliable operation over an extended temperature range. This includes, but is not limited to, Highly Accelerated Stress Test (HAST) or biased 85/85, temperature cycle, autoclave or unbiased HAST, electromigration, bond intermetallic life, and mold compound life. Such qualification testing should not be viewed as justifying use of this component beyond specified performance and environmental limits.

APPLICATIONS

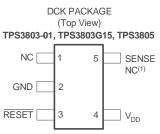
- Applications Using DSPs, Microcontrollers, or Microprocessors
- Wireless Communication Systems
- Portable/Battery-Powered Equipment
- Programmable Controls
- Intelligent Instruments
- Industrial Equipment
- Notebook/Desktop Computers
- Automotive Systems

DESCRIPTION

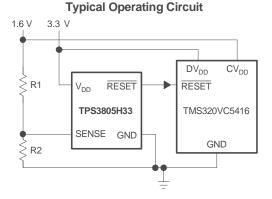
The TPS3803 and TPS3805 families of supervisory circuits provide circuit initialization and timing supervision, primarily for DSPs and processor-based systems.

The TPS3803G15 device has a fixed-sense threshold voltage V_{IT} set by an internal voltage divider, whereas the TPS3803–01 has an adjustable SENSE input that can be configured by two external resistors. In addition to the fixed sense threshold monitored at V_{DD} , the TPS3805 devices provide a second adjustable SENSE input. RESET is asserted in case any of the two voltages drops below V_{IT} .

During power on, RESET is asserted when supply voltage V_{DD} becomes higher than 0.8 V. Thereafter, the supervisory circuit monitors V_{DD} (and/or SENSE) and keeps RESET active as long as V_{DD} or SENSE remains below the threshold voltage V_{IT} . As soon as V_{DD} (SENSE) rises above the threshold voltage V_{IT} , RESET is deasserted again. The product spectrum is designed for 1.5 V, 3.3 V, and adjustable supply voltages. The devices are available in a 5-pin SC-70 package.



(1) NC = No Connection on TPS3803G15



53

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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SGLS227C - DECEMBER 2003 - REVISED JUNE 2007

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

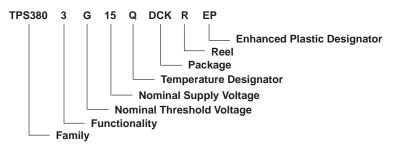
ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

-		THRESHOL					
TA	DEVICE NAME	V _{DD}	SENSE	MARKING			
	TPS3803-01QDCKREP ⁽²⁾	NA	1.226 V	AWH			
-40°C to +125°C	TPS3803G15QDCKREP(2)	1.4 V	NA	AXT			
	TPS3805H33QDCKREP ⁽²⁾	3.05 V	1.226 V	AWY			
	TPS3803-01MDCKREP ⁽²⁾	NA	1.226 V	BAY			
–55°C to +125°C	TPS3803G15MDCKREP ⁽²⁾	1.40 V	NA	ARH			
	TPS3805H33MDCKREP ⁽²⁾	3.05 V	1.226 V	ARJ			

PACKAGE INFORMATION

(2) The DCKR passive indicates tape and reel containing 3000 parts.

ORDERING INFORMATION



Function/Truth Tables

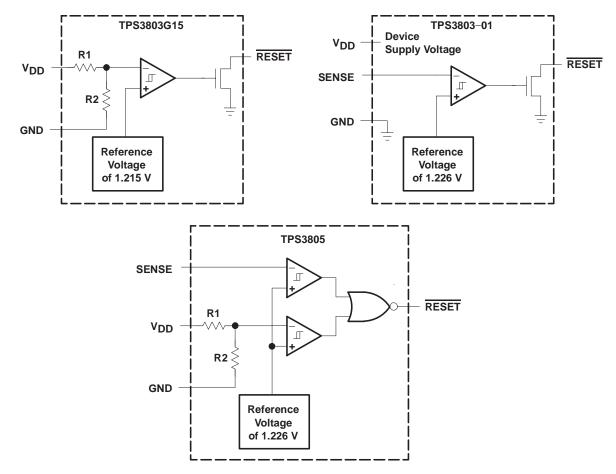
TPS3803-	01	TPS3803G15 V _{DD} > V _{IT} RESET 0 L 1 H		
SENSE > V _{IT}	RESET	$V_{DD} > V_{IT}$	RESET	
0	L	0	L	
1	Н	1	Н	

	TPS3805H33								
V _{DD} > V _{IT} SENSE > V _{IT} RESET									
0	0	L							
0	1	L							
1	0	L							
1	1	Н							



SGLS227C - DECEMBER 2003 - REVISED JUNE 2007

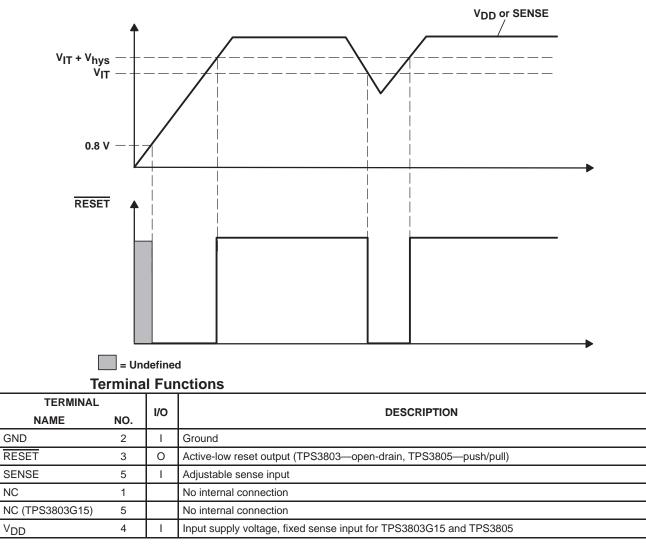
FUNCTIONAL BLOCK DIAGRAM



SGLS227C - DECEMBER 2003 - REVISED JUNE 2007



TIMING REQUIREMENTS



NC

SGLS227C - DECEMBER 2003 - REVISED JUNE 2007

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

Over operating free-air temperature, unless otherwise noted.

\mathbf{O} and \mathbf{I} (2)	
Supply voltage, V _{DD} ⁽²⁾	
All other pins ⁽²⁾	–0.3 V to +7 V
Maximum low-output current, I _{OL}	
Maximum high-output current, IOH	–5 mA
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{DD}$)	±10 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{DD}$)	
Continuous total power dissipation	
Operating free-air temperature range, T _A	–55°C to +125°C
Storage temperature range, T _{stg} , ⁽³⁾	–65°C to +150°C
Stresses beyond those listed under "absolute maximum ratings" may cause permanent	damage to the device. These are stress ratings only

(1) Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) All voltage values are with respect to GND. For reliable operation the device should not be continuously operated at 7 V for more than t = 1000 h.

(3) Long-term high-temperature storage and/or extended use at maximum recommended operating conditions may result in a reduction of overall device life. See www.ti.com/ep_quality for additional information on enhanced plastic packaging.

DISSIPATION RATING TABLE

PACKAGE	T _A < +25°C	DERATING FACTOR	T _A = +70°C	T _A = +85°C
	POWER RATING	ABOVE T _A = +25°C	POWER RATING	POWER RATING
DCK	321 mW	2.6 mW/°C	206 mW	167 mW

RECOMMENDED OPERATING CONDITIONS

		MIN	MAX	UNIT
Supply voltage, V _{DD}		1.3	6	V
Input voltage, VI		0	V _{DD} +0.3	V
On avoting free air termoreture rooms. To	Q suffix devices	-40	+125	°C
Operating free-air temperature range, T _A	M suffix devices	-55	+125	-0

SGLS227C - DECEMBER 2003 - REVISED JUNE 2007



ELECTRICAL CHARACTERISTICS

Over recommended operating free-air temperature range, unless otherwise noted.

	PARAMETER		TEST CO	ONDITIONS	MIN	TYP	MAX	UNIT
VOH	High-level output voltage (TPS3805 or	nly)	V _{DD} = 1.5 V, V _{DD} = 3.3 V, V _{DD} = 6 V,	$I_{OH} = -0.5 \text{ mA}$ $I_{OH} = -1 \text{ mA}$ $I_{OH} = -1.5 \text{ mA}$	0.8 x V _{DD}			V
V _{OL}	Low-level output voltage		V _{DD} = 1.5 V, V _{DD} = 3.3 V, V _{DD} = 6 V,	$I_{OL} = 1 \text{ mA}$ $I_{OL} = 2 \text{ mA}$ $I_{OL} = 3 \text{ mA}$			0.3	V
	Dower up react voltage(1)	VIT > 1.5 V, TA =	+25°C		0.8			V
	Power-up reset voltage ⁽¹⁾	VIT \leq 1.5 V, TA =	+25°C		1			V
		SENSE			1.2	1.226	1.244	
VIT	Negative-going input threshold voltage ⁽²⁾	TPS3803G15		1.379	1.4	1.421	V	
	Voluge	TPS3805H33			3.004	3.05	3.096	
			1.2 V < V _{IT} < 2	.5 V		15		
V _{hys}	Hysteresis		$2.5 V < V_{IT} < 3$.5 V		30		mV
lj	Input current	SENSE			-25		25	nA
ЮН	High-level output current at RESET	Open-drain only	$V_{DD} = V_{IT} + 0$	2V, V _{OH} = V _{DD}			300	nA
		TPS3803-01				2	4	
		TPS3805, TPS3803G15	V _{DD} = 3.3 V, or	utput unconnected		3	5	
IDD	Supply current	TPS3803-01				2	4	μA
		TPS3805, TPS3803G15	V _{DD} = 6 V, out		4	6		
CI	Input capacitance		$V_{I} = 0 V to V_{DI}$)		1		pF

(1) The lowest supply voltage at which $\overline{\text{RESET}}$ (VOL(max) = 0.2 V, IOL = 50 μ A) becomes active. $t_{r(VDD)} \ge 15 \,\mu$ s/V (2) To ensure the best stability of the threshold voltage, place a bypass capacitor (ceramic, 0.1 μ F) near the supply terminals.

TIMING REQUIREMENTS

AT $R_L = 1 M\Omega$, $C_L = 50 PF$, over recommended operating free-air temperature range.

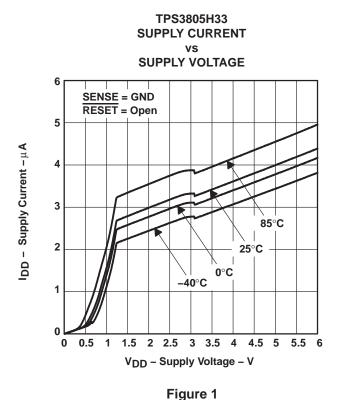
	PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
	Deles a fille	At V _{DD}					_
τ _W	Pulse width	At SENSE	V _{IH} = 1.05 x V _{IT} , V _{IL} = 0.95 x V _{IT}	5.5			μs

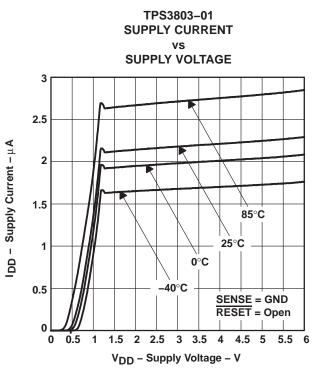
SWITCHING CHARACTERISTICS

AT $R_L = 1 M\Omega$, $C_L = 50 PF$, over recommended operating free-air temperature range.

	PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
^t PHL	Propagation (delay) time, high-to-low-level output	V _{DD} to RESET delay SENSE to RESET delay	VIH = 1.05 x VIT,		5	100	
^t PLH	Propagation (delay) time, low-to-high-level output	V _{DD} to RESET delay SENSE to RESET delay	V _{IL} = 0.95 x V _{IT}		5	100	μs

TYPICAL CHARACTERISTICS







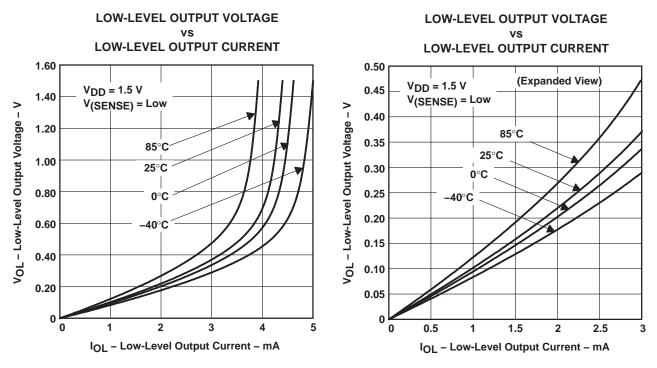


Figure 3





TYPICAL CHARACTERISTICS

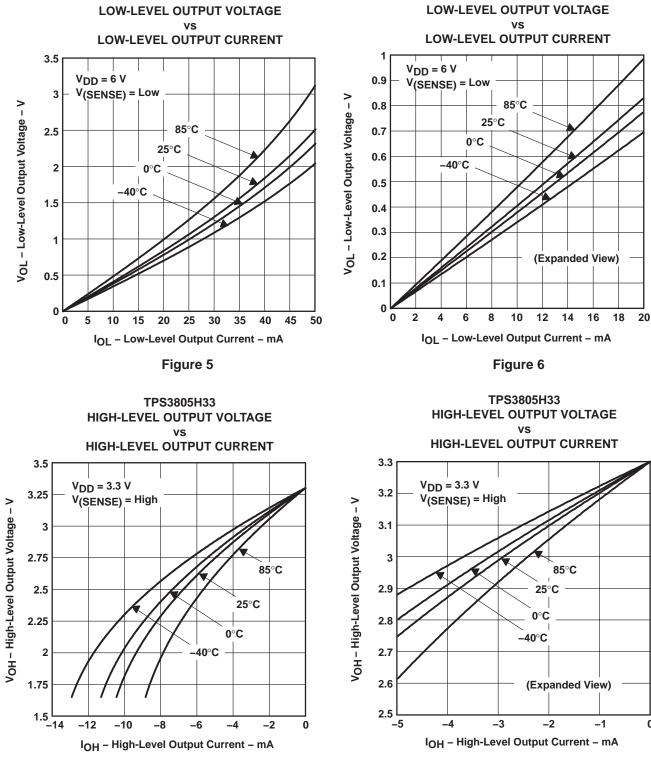
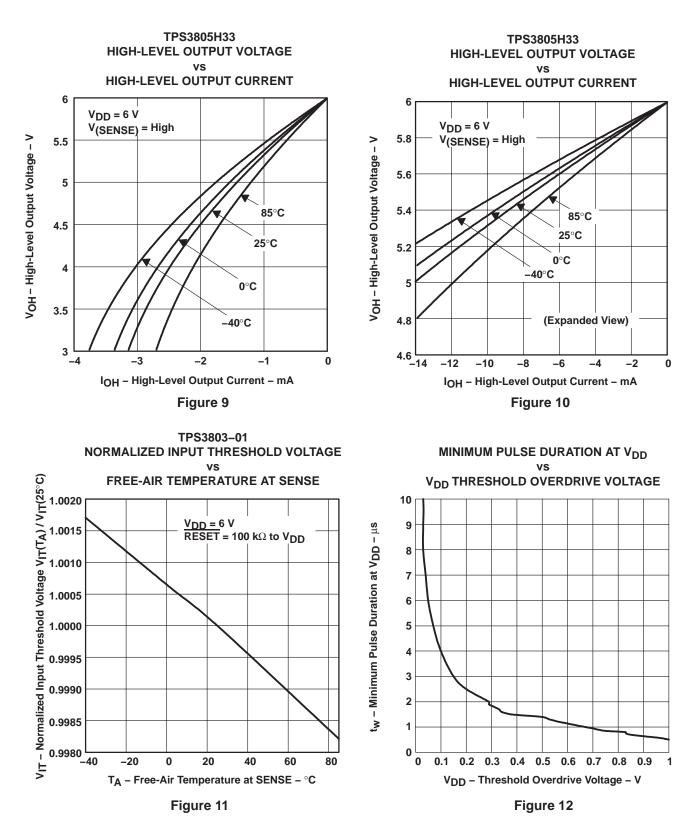


Figure 7



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TYPICAL CHARACTERISTICS



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SGLS227C - DECEMBER 2003 - REVISED JUNE 2007

TYPICAL CHARACTERISTICS

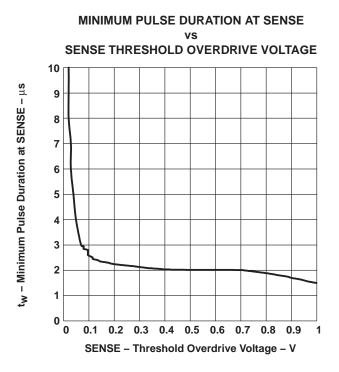


Figure 13

Revision History

DATE	REV	PAGE	PAGE SECTION DESCRIPTION					
6/07	C	Front Page	—	Updated front page.				
0/07	C	3	—	Functional block diagram change.				

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.



26-Jun-2014

PACKAGING INFORMATION

Orderable Device	Status	Package Type	Package	Pins	Package	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)	(6)	(3)		(4/5)	
TPS3803-01MDCKREP	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	BAY	Samples
TPS3803-01QDCKREP	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	AWH	Samples
TPS3803G15MDCKREP	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAUAG	Level-1-260C-UNLIM	-55 to 125	ARH	Samples
TPS3803G15QDCKREP	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	AXT	Samples
TPS3805H33MDCKREP	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAUAG	Level-1-260C-UNLIM	-55 to 125	ARJ	Samples
TPS3805H33QDCKREP	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	AWY	Samples
V62/04648-01XE	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	AWH	Samples
V62/04648-02XE	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	AXT	Samples
V62/04648-03XE	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAUAG	Level-1-260C-UNLIM	-40 to 125	AWY	Samples
V62/04648-04XE	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	BAY	Samples
V62/04648-05XE	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAUAG	Level-1-260C-UNLIM	-55 to 125	ARH	Samples
V62/04648-06XE	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAUAG	Level-1-260C-UNLIM	-55 to 125	ARJ	Samples

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.



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PACKAGE OPTION ADDENDUM

26-Jun-2014

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes. Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and package, or 2) lead-based die adhesive used between the die and package, or 2) lead-based die adhesive used between the die and package.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

⁽⁴⁾ There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

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

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OTHER QUALIFIED VERSIONS OF TPS3803-01-EP, TPS3803G15-EP, TPS3805H33-EP :

• Catalog: TPS3803-01, TPS3803G15, TPS3805H33

• Automotive: TPS3803-01-Q1, TPS3803G15-Q1, TPS3805H33-Q1

NOTE: Qualified Version Definitions:

- Catalog TI's standard catalog product
- Automotive Q100 devices qualified for high-reliability automotive applications targeting zero defects

PACKAGE MATERIALS INFORMATION

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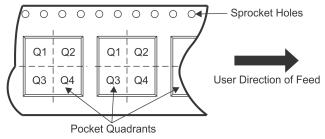
Texas Instruments

TAPE AND REEL INFORMATION





QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal												
Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TPS3803-01MDCKREP	SC70	DCK	5	3000	180.0	8.4	2.4	2.5	1.2	4.0	8.0	Q3
TPS3803-01QDCKREP	SC70	DCK	5	3000	180.0	8.4	2.4	2.5	1.2	4.0	8.0	Q3
TPS3803G15MDCKREP	SC70	DCK	5	3000	180.0	8.4	2.41	2.41	1.2	4.0	8.0	Q3
TPS3803G15QDCKREP	SC70	DCK	5	3000	180.0	8.4	2.41	2.41	1.2	4.0	8.0	Q3
TPS3805H33MDCKREP	SC70	DCK	5	3000	180.0	8.4	2.41	2.41	1.2	4.0	8.0	Q3
TPS3805H33QDCKREP	SC70	DCK	5	3000	180.0	8.4	2.41	2.41	1.2	4.0	8.0	Q3

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PACKAGE MATERIALS INFORMATION

6-Sep-2016



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TPS3803-01MDCKREP	SC70	DCK	5	3000	202.0	201.0	28.0
TPS3803-01QDCKREP	SC70	DCK	5	3000	202.0	201.0	28.0
TPS3803G15MDCKREP	SC70	DCK	5	3000	202.0	201.0	28.0
TPS3803G15QDCKREP	SC70	DCK	5	3000	202.0	201.0	28.0
TPS3805H33MDCKREP	SC70	DCK	5	3000	202.0	201.0	28.0
TPS3805H33QDCKREP	SC70	DCK	5	3000	202.0	201.0	28.0

DCK (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES: A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
 - D. Falls within JEDEC MO-203 variation AA.



LAND PATTERN DATA



NOTES:

- A. All linear dimensions are in millimeters.B. This drawing is subject to change without notice.
- C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
- D. Publication IPC-7351 is recommended for alternate designs.
- E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.



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TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products		Applications			
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive		
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications		
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers		
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps		
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy		
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial		
Interface	interface.ti.com	Medical	www.ti.com/medical		
Logic	logic.ti.com	Security	www.ti.com/security		
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense		
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video		
RFID	www.ti-rfid.com				
OMAP Applications Processors	www.ti.com/omap	TI E2E Community	e2e.ti.com		
Wireless Connectivity	www.ti.com/wirelessconnectivity				

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