

features

- Qualification in Accordance With AEC-Q100†
- Qualified for Automotive Applications
- Customer-Specific Configuration Control Can Be Supported Along With Major-Change Approval
- Single Voltage Detector (TPS3803): Adjustable/1.5 V
- Dual Voltage Detector (TPS3805): Adjustable/3.3 V
- High $\pm 1.5\%$ Threshold Voltage Accuracy
- Supply Current: 3 μA Typical at $V_{\text{DD}} = 3.3 \text{ V}$

† Contact factory for details. Q100 qualification data available on request.

- Push/Pull Reset Output (TPS3805)
Open-Drain Reset Output (TPS3803)
- Temperature Range . . . -40°C to 125°C
- Five-Pin SC-70 Package

typical applications

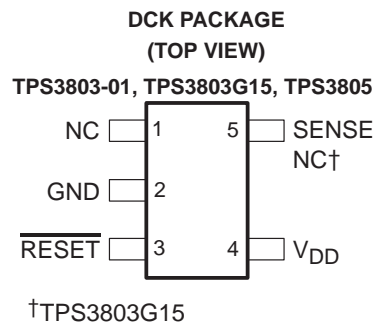
- Applications Using DSPs, Microcontrollers, or Microprocessors
- Wireless Communication Systems
- Portable/Battery-Powered Equipment
- Programmable Controls
- Intelligent Instruments
- Industrial Equipment
- Notebook/Desktop Computers
- Automotive Systems

description

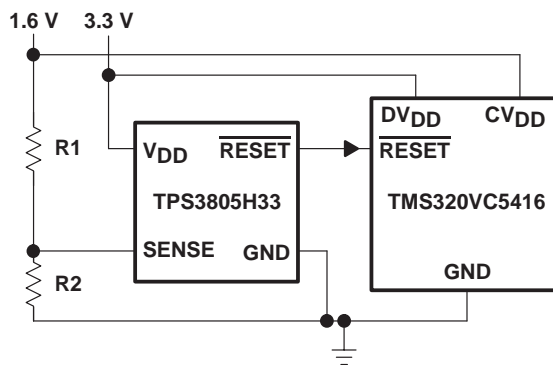
The TPS3803 and TPS3805 families of supervisory circuits provide circuit initialization and timing supervision, primarily for DSPs and processor-based systems.

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. $\overline{\text{RESET}}$ is asserted in case any of the two voltages drops below V_{IT} .

During power on, $\overline{\text{RESET}}$ 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 $\overline{\text{RESET}}$ 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} , $\overline{\text{RESET}}$ 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 five-pin SC-70 package. The TPS3803 and TPS3805 devices are characterized for operation over a temperature range of -40°C to 125°C .



typical operating circuit



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.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 2003 Texas Instruments Incorporated

TPS3803-01-Q1, TPS3803G15-Q1, TPS3805H33-Q1
VOLTAGE DETECTOR

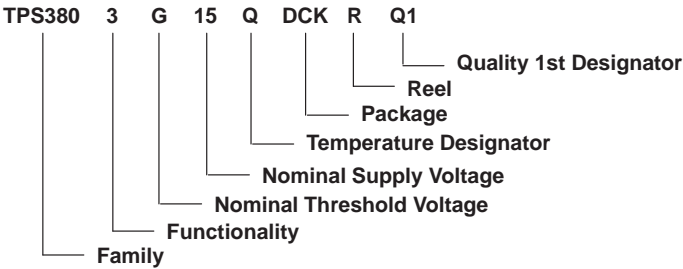
SGLS228 – DECEMBER 2003

PACKAGE INFORMATION

T _A	DEVICE NAME	THRESHOLD VOLTAGE		MARKING
		V _{DD}	SENSE	
-40°C to 125°C	TPS3803-01QDCKRQ1†	NA	1.226 V	AWJ
	TPS3803G15QDCKRQ1†	1.40 V	NA	AXU
	TPS3805H33QDCKRQ1†	3.05 V	1.226 V	AWZ

† The DCKR passive indicates tape and reel containing 3000 parts.

ordering information

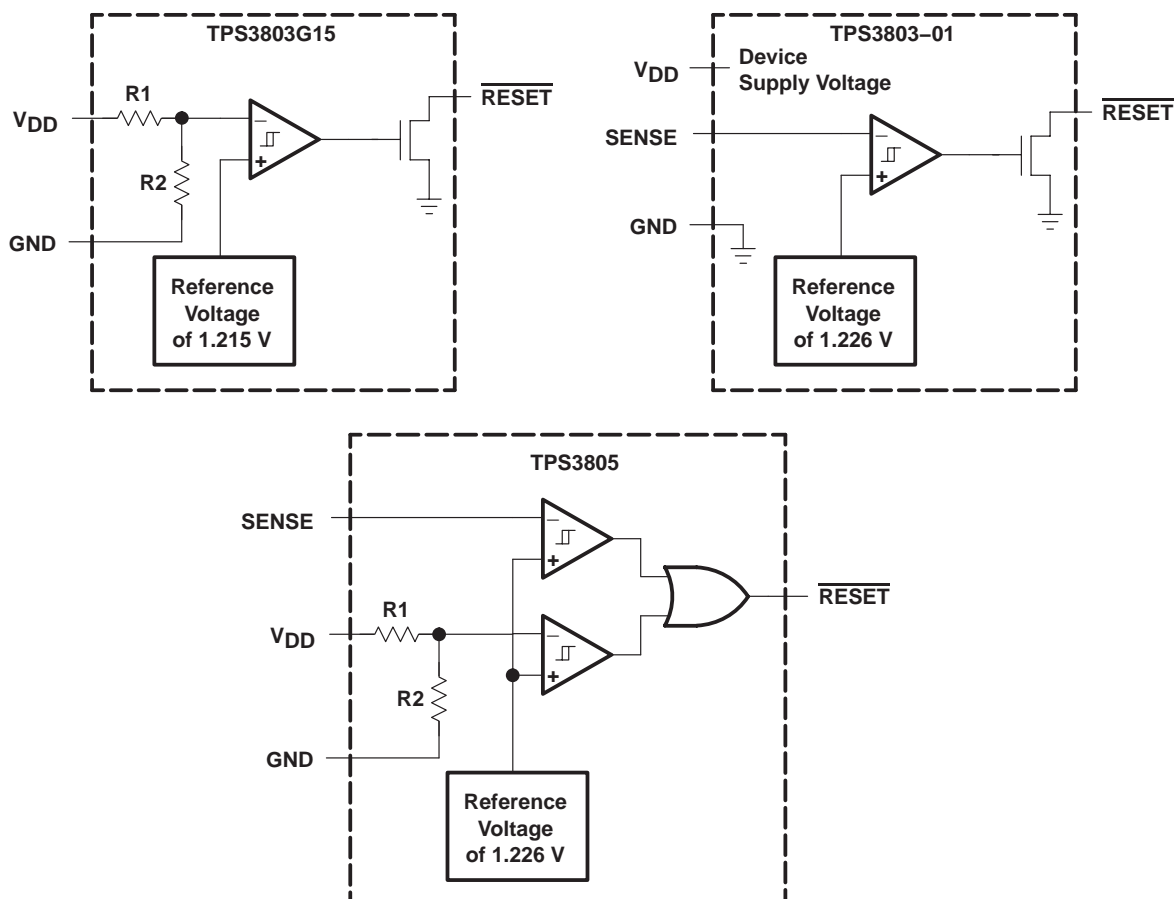


Function/Truth Tables

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

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

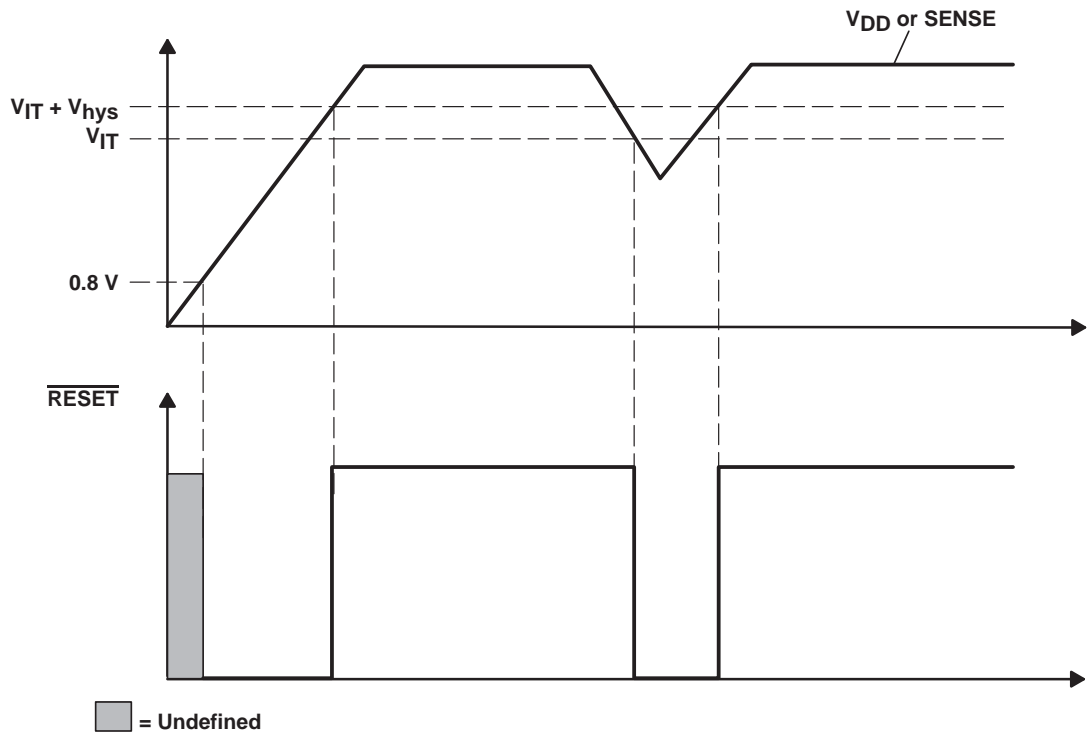
functional block diagram



TPS3803-01-Q1, TPS3803G15-Q1, TPS3805H33-Q1
VOLTAGE DETECTOR

SGLS228 – DECEMBER 2003

timing requirements



Terminal Functions

TERMINAL NAME	NO.	I/O	DESCRIPTION
GND	2	I	Ground
$\overline{\text{RESET}}$	3	O	Active-low reset output (TPS3803—open-drain, TPS3805—push/pull)
SENSE	5	I	Adjustable sense input
NC	1		No internal connection
NC (TPS3803G15)	5		No internal connection
V_{DD}	4	I	Input supply voltage, fixed sense input for TPS3803G15 and TPS3805

absolute maximum ratings over operating free-air temperature (unless otherwise noted)[†]

Supply voltage, V_{DD} (see Note1)	7 V
All other pins (see Note 1)	–0.3 V to 7 V
Maximum low-output current, I_{OL}	5 mA
Maximum high-output current, I_{OH}	–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 $V_O > V_{DD}$)	± 10 mA
Continuous total power dissipation	See Dissipation Rating Table
Operating free-air temperature range, T_A	–40°C to 125°C
Storage temperature range, T_{stg}	–65°C to 150°C
Soldering temperature	260°C

[†] 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.

NOTE 1: 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.

DISSIPATION RATING TABLE

PACKAGE	$T_A < 25^\circ\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$	$T_A = 70^\circ\text{C}$ POWER RATING	$T_A = 85^\circ\text{C}$ 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, V_I	0	$V_{DD} + 0.3$	V
Operating free-air temperature range, T_A	–40	125	°C

TPS3803-01-Q1, TPS3803G15-Q1, TPS3805H33-Q1 VOLTAGE DETECTOR

SGLS228 – DECEMBER 2003

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

PARAMETER			TEST CONDITIONS		MIN	TYP	MAX	UNIT	
V _{OH}	High-level output voltage (TPS3805 only)		V _{DD} = 1.5 V, I _{OH} = −0.5 mA		0.8xV _{DD}			V	
			V _{DD} = 3.3 V, I _{OH} = −1.0 mA						
			V _{DD} = 6 V, I _{OH} = −1.5 mA						
V _{OL}	Low-level output voltage		V _{DD} = 1.5 V, I _{OL} = 1.0 mA		0.3			V	
			V _{DD} = 3.3 V, I _{OL} = 2 mA						
			V _{DD} = 6 V, I _{OL} = 3 mA						
Power-up reset voltage (see Note 2)			V _{IT} > 1.5 V, T _A = 25°C		0.8			V	
			V _{IT} ≤ 1.5 V, T _A = 25°C		1.0			V	
V _{IT}	Negative-going input threshold voltage (see Note 3)		SENSE	T _A = −40°C to 125°C	1.200	1.226	1.244	V	
			TPS3803G15		1.379	1.4	1.421		
			TPS3805H33		3.004	3.05	3.096		
V _{hys}	Hysteresis		1.2 V < V _{IT} < 2.5 V		15			mV	
			2.5 V < V _{IT} < 3.5 V		30				
I _I	Input current	SENSE			−25			25	nA
I _{OH}	High-level output current at RESET	Open drain only	V _{DD} = V _{IT} + 0.2V, V _{OH} = V _{DD}		300			nA	
I _{DD}	Supply current		TPS3803−01	V _{DD} = 3.3 V, output unconnected	2			4	μA
			TPS3805, TPS3803G15		3			5	
			TPS3803−01	V _{DD} = 6 V, output unconnected	2			4	
			TPS3805, TPS3803G15		4			6	
C _I	Input capacitance		V _I = 0 V to V _{DD}		1			pF	

NOTES: 2. The lowest supply voltage at which $\overline{\text{RESET}}$ (VOL(max) = 0.2 V, I_{OL} = 50 μA) becomes active. t_r(V_{DD}) ≥ 15 μs/V
3. To ensure the best stability of the threshold voltage, place a bypass capacitor (ceramic, 0.1 μF) near the supply terminals.

timing requirements at R_L = 1 MΩ, C_L = 50 pF, T_A = -40°C to 125°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _w	At V _{DD}	V _{IH} = 1.05 x V _{IT} , V _{IL} = 0.95 x V _{IT}	5.5			μs
	At SENSE					

switching characteristics at R_L = 1 MΩ, C_L = 50 pF, T_A = -40°C to 125°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PHL}	Propagation (delay) time, high-to-low-level output	V _{DD} to $\overline{\text{RESET}}$ delay		5	100	μs
		SENSE to $\overline{\text{RESET}}$ delay				
t _{PLH}	Propagation (delay) time, low-to-high-level output	V _{DD} to $\overline{\text{RESET}}$ delay		5	100	μs
		SENSE to $\overline{\text{RESET}}$ delay				



TYPICAL CHARACTERISTICS

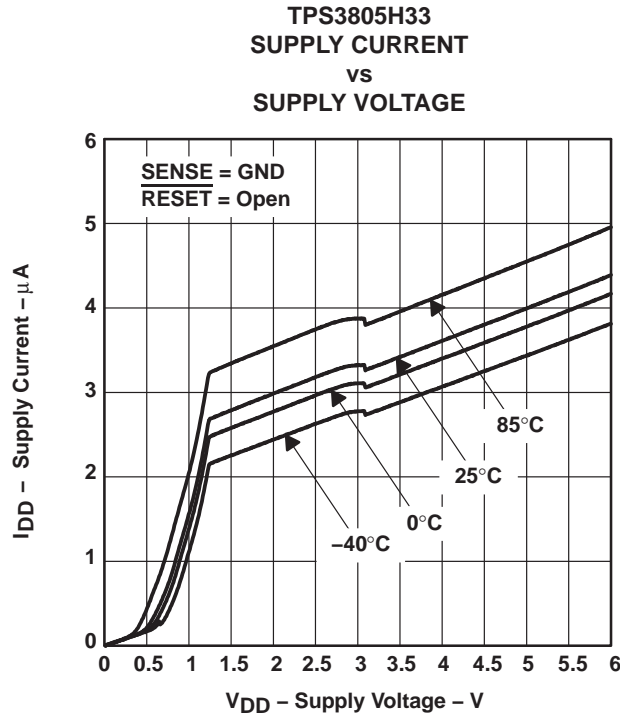


Figure 1

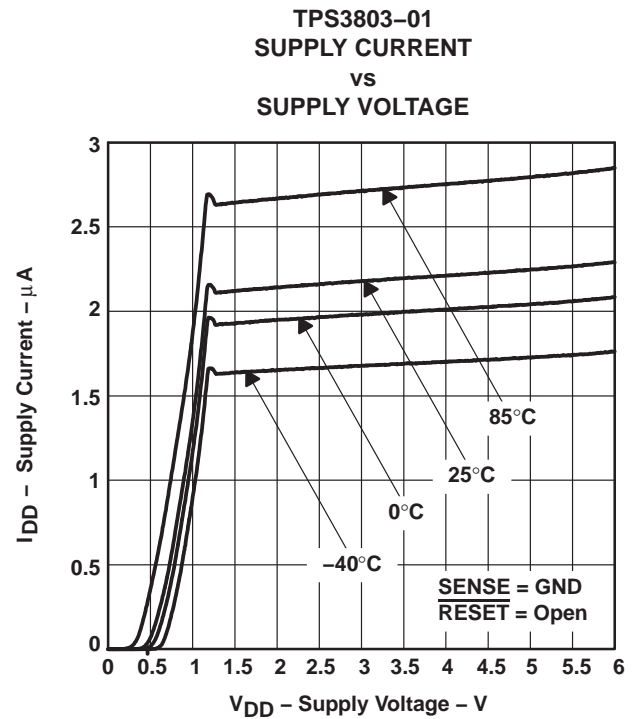


Figure 2

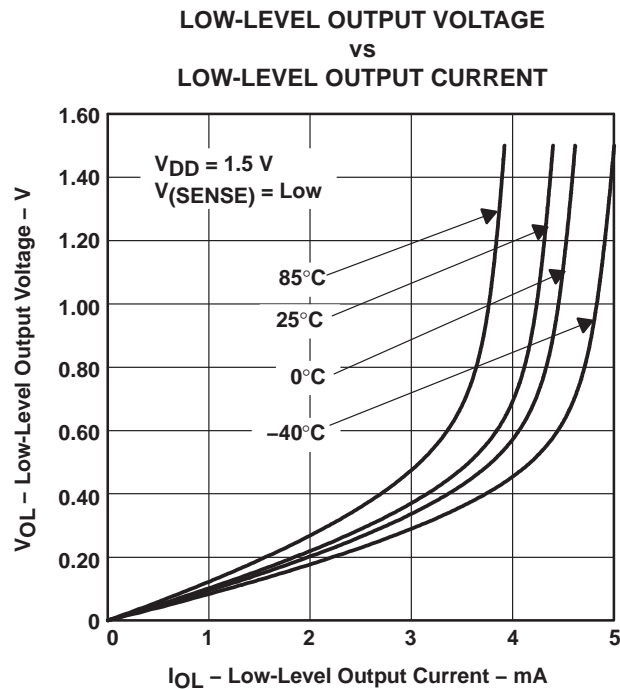


Figure 3

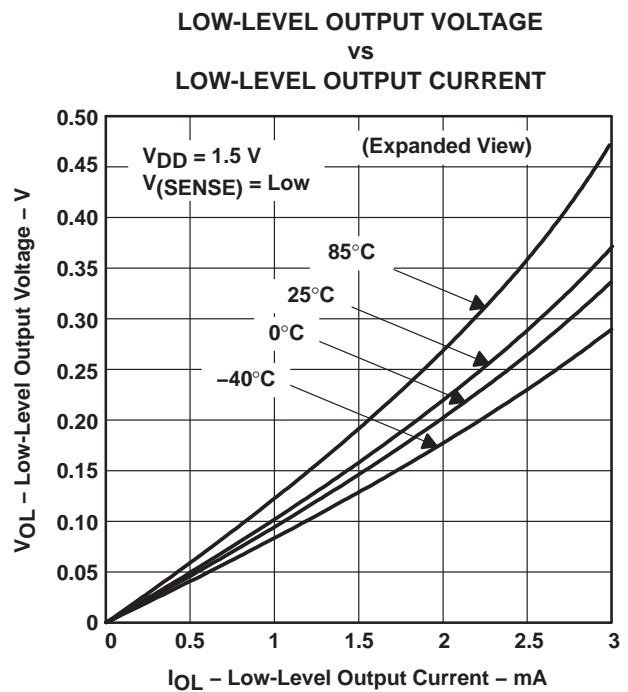


Figure 4

TPS3803-01-Q1, TPS3803G15-Q1, TPS3805H33-Q1 VOLTAGE DETECTOR

SGLS228 – DECEMBER 2003

TYPICAL CHARACTERISTICS

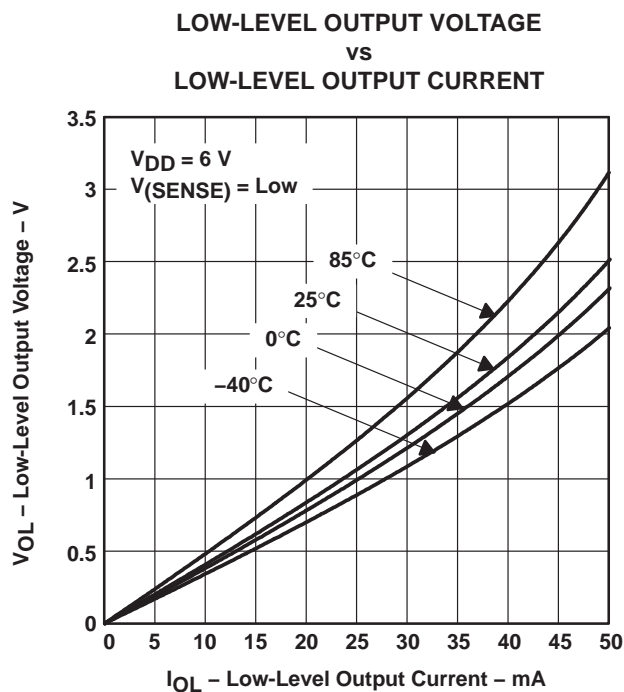


Figure 5

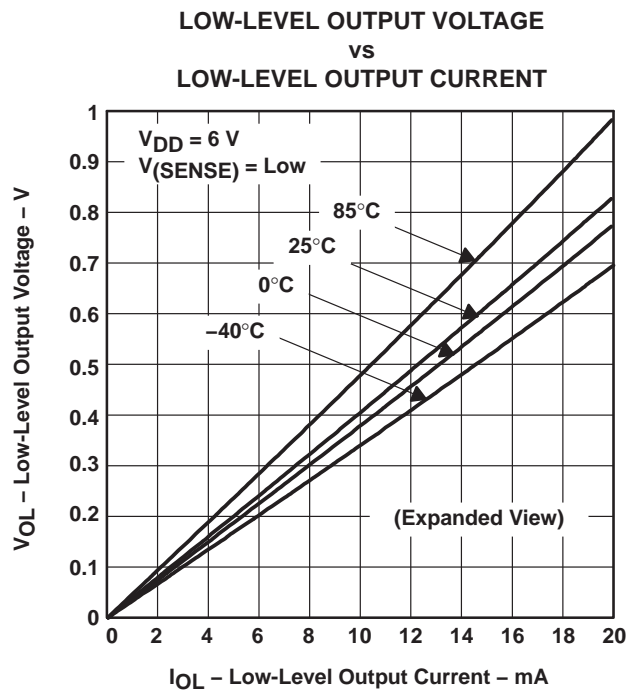


Figure 6

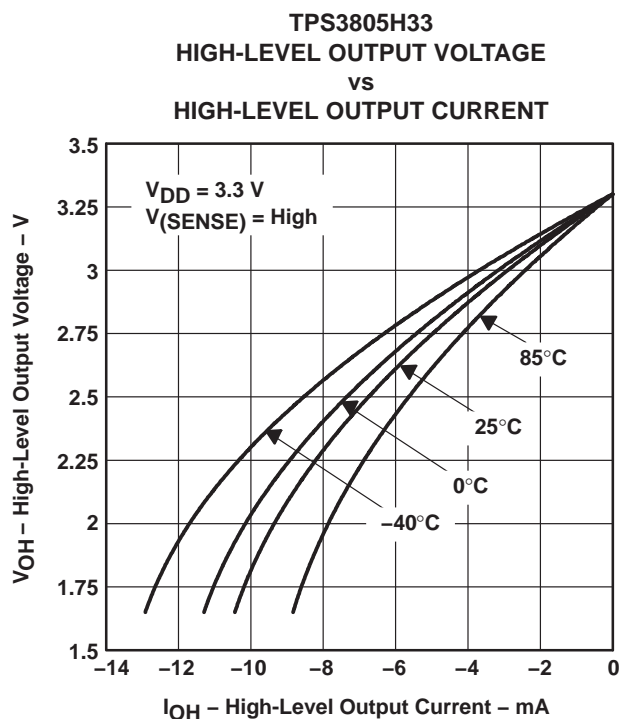


Figure 7

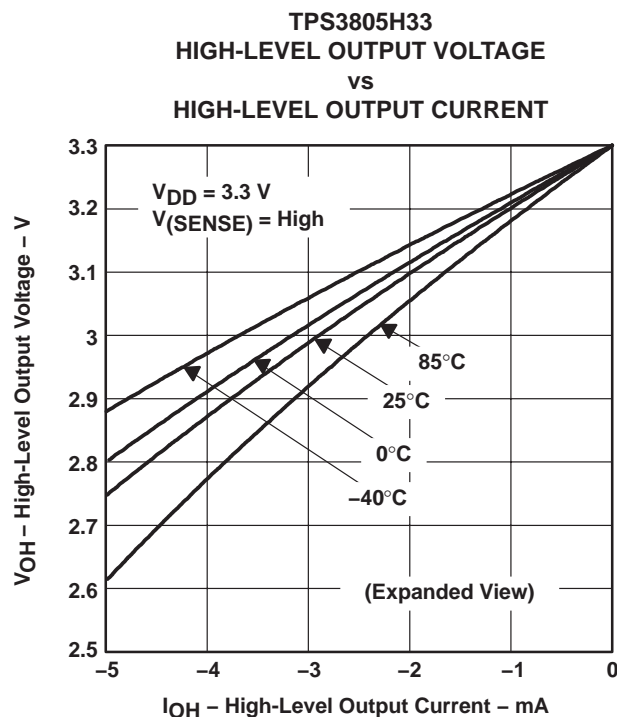


Figure 8

TYPICAL CHARACTERISTICS

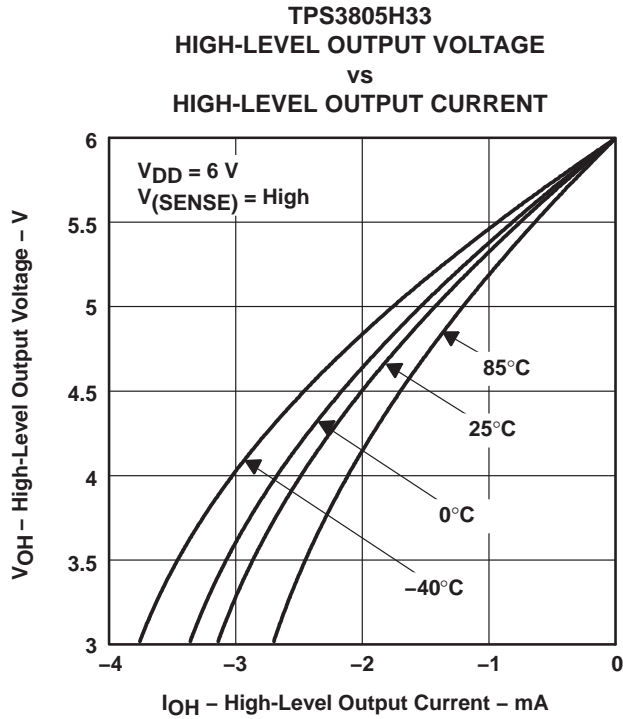


Figure 9

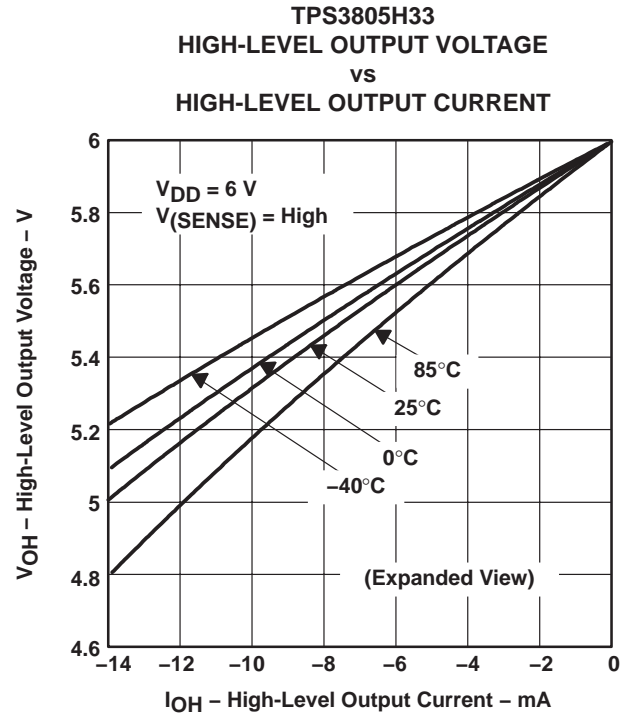


Figure 10

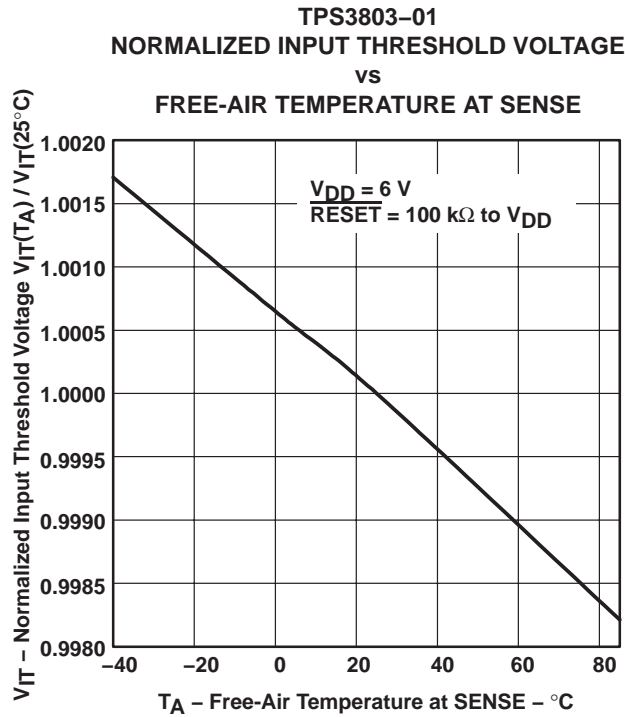


Figure 11

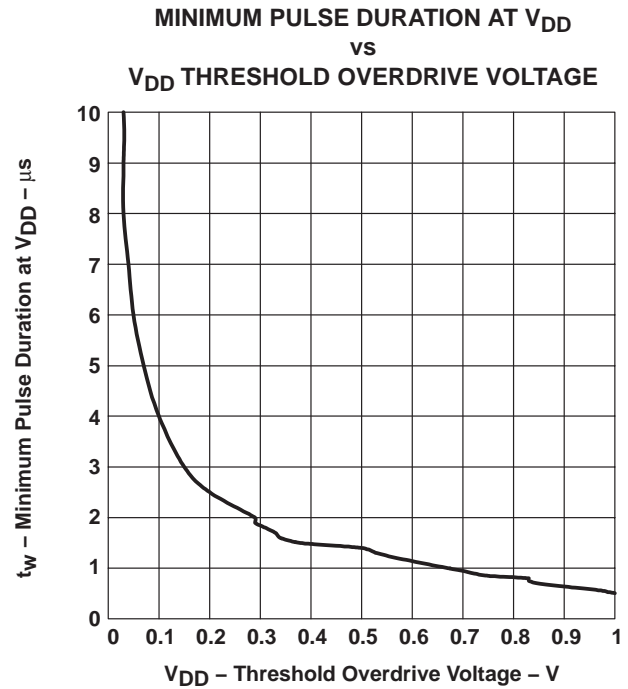


Figure 12

TYPICAL CHARACTERISTICS

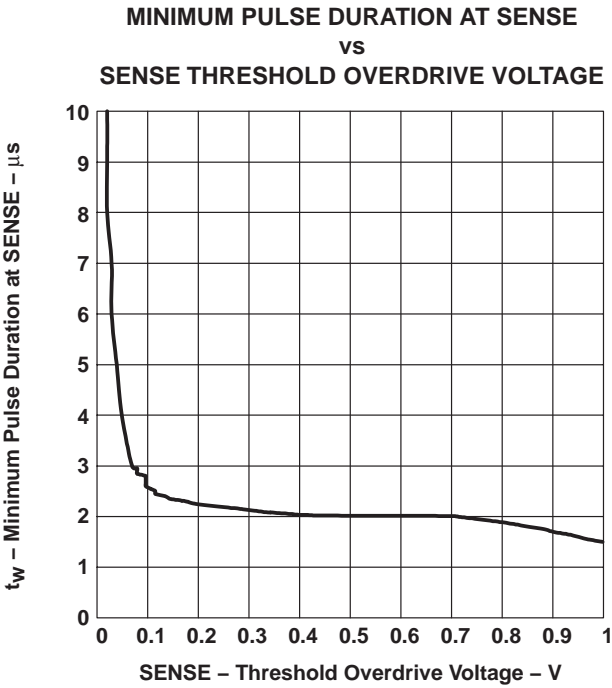


Figure 13

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
TPS3803-01QDCKRQ1	ACTIVE	SC70	DCK	5	3000	None	CU	Level-1-260C-UNLIM
TPS3803G15QDCKRQ1	ACTIVE	SC70	DCK	5	3000	None	CU	Level-1-260C-UNLIM
TPS3805H33QDCKRQ1	ACTIVE	SC70	DCK	5	3000	None	CU	Level-1-260C-UNLIM

⁽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 - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

None: Not yet available Lead (Pb-Free).

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.

Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

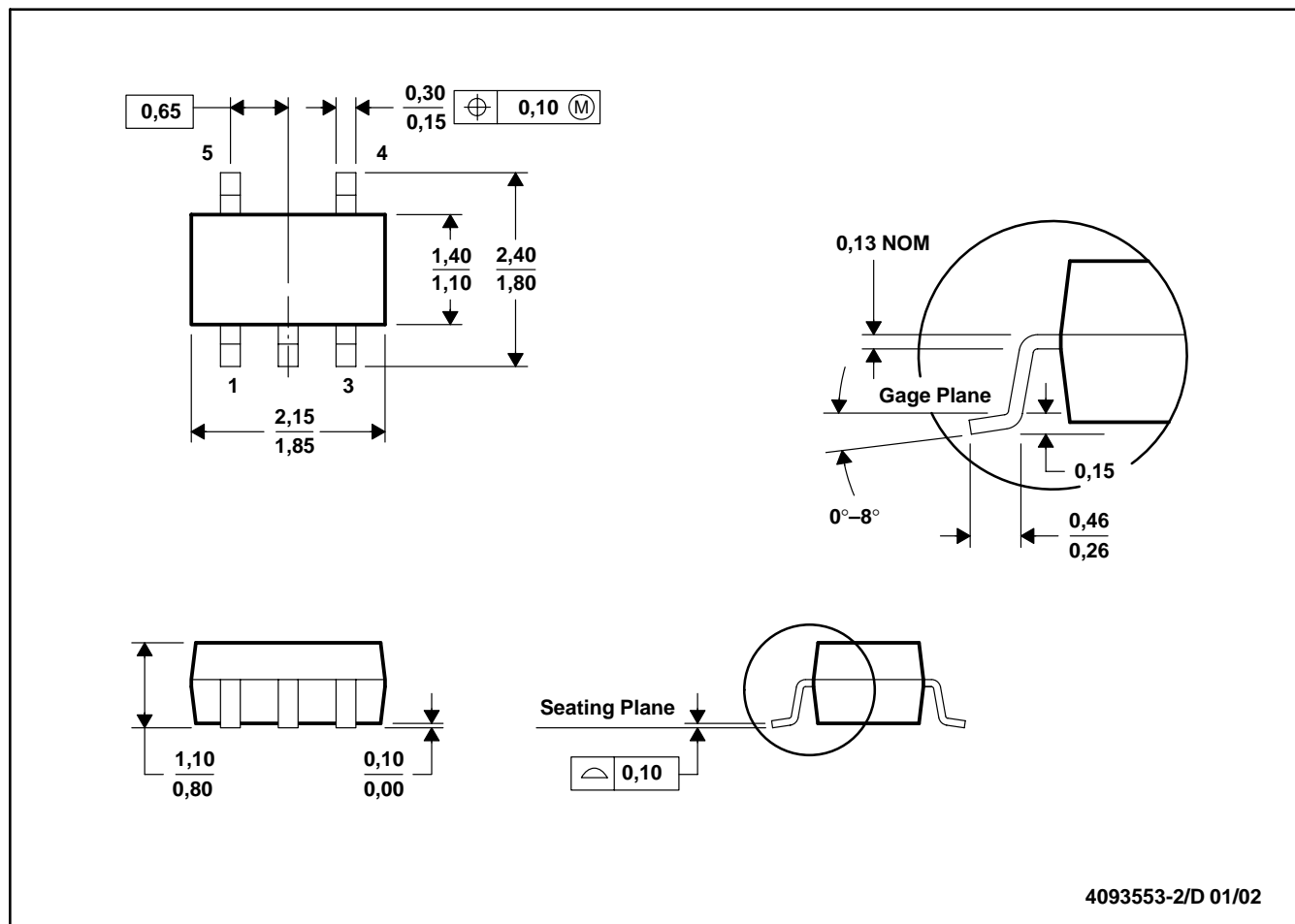
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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.

DCK (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
		Telephony	www.ti.com/telephony
		Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265

Copyright © 2005, Texas Instruments Incorporated