LM2936Q Ultra-Low Quiescent Current LDO Voltage Regulator

Check for Samples: LM2936Q

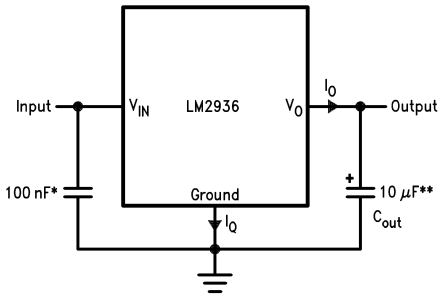
FEATURES

- **AEC-Q100 Grade 1 Qualified (-40°C to 125°C)**
- **Ultra Low Quiescent Current (I_Q ≤ 15 µA for I_O = 100 µA)**
- **Fixed 3.0V, 3.3V or 5.0V with 50 mA Output**
- **±2% Initial Output Tolerance**
- **±3% Output Tolerance Over Line, Load, and Temperature**
- **Dropout Voltage Typically 200 mV @ I_O = 50 mA**
- **Reverse Battery Protection**
- **−50V Reverse Transient Protection**
- **Internal Short Circuit Current Limit**
- **Internal Thermal Shutdown Protection**
- **40V Operating Voltage Limit**
- **60V Operating Voltage Limit for LM2936HV**
- **Shutdown Pin Available with the LM2936BM Package**

DESCRIPTION

The LM2936Q ultra-low quiescent current regulator features low dropout voltage and low current in the standby mode. With less than 15 µA quiescent current at a 100 µA load, the LM2936Q is ideally suited for automotive and other battery operated systems. The LM2936Q retains all of the features that are common to low dropout regulators including a low dropout PNP pass device, short circuit protection, reverse battery protection, and thermal shutdown. The LM2936Q has a 40V maximum operating voltage limit, a −40°C to +125°C operating temperature range, and ±3% output voltage tolerance over the entire output current, input voltage, and temperature range. The LM2936Q is available in a SOIC-8 package, SOT-223 surface mount package and PFM surface mount package.

Typical Application



* Required if regulator is located more than 2″ from power supply filter capacitor.

** Required for stability. See Electrical Characteristics table for required values. Must be rated over intended operating temperature range. Effective series resistance (ESR) is critical, see curve. Locate capacitor as close as possible to the regulator output and ground pins. Capacitance may be increased without bound.

Connection Diagram

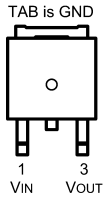


Figure 1. PFM Top View

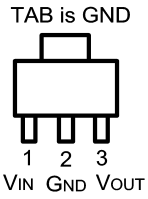


Figure 2. SOT-223 Top View

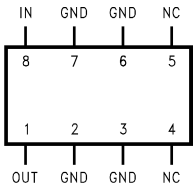


Figure 3. 8-Pin SOIC (D) Top View

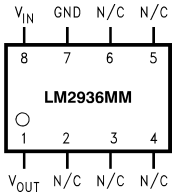


Figure 4. 8-Pin VSSOP (MM) Top View

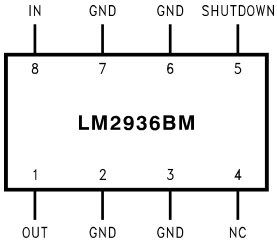


Figure 5. 8-Pin SOIC (D) Top View

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Absolute Maximum Ratings (1)(2)

Input Voltage (Survival)	+60V, −50V
ESD Susceptibility (3)	2000V
Power Dissipation (4)	Internally limited
Junction Temperature (T_{Jmax})	150°C
Storage Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 10 sec.)	260°C

(1) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. DC and AC electrical specifications do not apply when operating the device beyond its specified operating ratings.
(2) If Military/Aerospace specified devices are required, please contact the Texas Instruments Sales Office/ Distributors for availability and specifications.
(3) Human body model, 100 pF discharge through a 1.5 kΩ resistor.
(4) The maximum power dissipation is a function of T_{Jmax}, θ_{JA}, and T_A. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{Jmax} - T_A)/\theta_{JA}$. If this dissipation is exceeded, the die temperature will rise above 150°C and the LM2936Q will go into thermal shutdown.

Operating Ratings

Operating Temperature Range	−40°C to +125°C
Maximum Operating Input Voltage - LM2936Q	+40V
Maximum Operating Input Voltage - LM2936QH Only	+60V
Maximum Shutdown Pin Voltage - LM2936QH Only	0V to +40V
SOIC-8 (D0008A) θ_{JA}	140°C/W
SOIC-8 (D0008A) θ_{JC}	45°C/W

Operating Ratings (continued)

VSSOP-8 (DGK0008A) θ_{JA}	200°C/W
PFM (NDP0003B) θ_{JA}	136°C/W
PFM (NDP0003B) θ_{JC}	6°C/W
SOT-223 (DCY0004A) θ_{JA}	149°C/W
SOT-223 (DCY0004A) θ_{JC}	36°C/W

Electrical Characteristics for LM2936Q–3.0

V_{IN} = 14V, I_O = 10 mA, T_J = 25°C, unless otherwise specified. **Boldface** limits apply over entire operating temperature range

Parameter	Conditions	Min (1)	Typical (2)	Max (1)	Units
All LM2936Q–3.0					
Output Voltage		2.940	3.000	3.060	V
	4.0V ≤ V_{IN} ≤ 26V, 100 µA ≤ I_O ≤ 50 mA (3)	**2.910**	**3.000**	**3.090**	
Quiescent Current	I_O = 100 µA, 8V ≤ V_{IN} ≤ 24V		15	20	µA
	I_O = 10 mA, 8V ≤ V_{IN} ≤ 24V		0.20	0.50	mA
	I_O = 50 mA, 8V ≤ V_{IN} ≤ 24V		1.5	2.5	mA
Line Regulation	9V ≤ V_{IN} ≤ 16V		5	10	mV
	6V ≤ V_{IN} ≤ 40V, I_O = 1 mA		10	30	
Load Regulation	100 µA ≤ I_O ≤ 5 mA		10	30	mV
	5 mA ≤ I_O ≤ 50 mA		10	30	
Dropout Voltage	I_O = 100 µA		0.05	0.10	V
	I_O = 50 mA		0.20	0.40	V
Short Circuit Current	V_O = 0V	65	120	250	mA
Output Impedance	I_O = 30 mAdc and 10 mArms ,$_f$ = 1000 Hz		450		mΩ
Output Noise Voltage	10 Hz–100 kHz		500		µV
Long Term Stability			20		mV/1000 Hr
Ripple Rejection	V_{ripple} = 1V_{rms}, f_{ripple} = 120 Hz	−40	−60		dB
Reverse Polarity Transient Input Voltage	R_L = 500Ω, T = 1 ms	−50	−80		V
Output Voltage with Reverse Polarity Input	V_{IN} = −15V, R_L = 500Ω		0.00	−0.30	V
Maximum Line Transient	R_L = 500Ω, V_O ≤ 3.30V, T = 40ms	60			V
Output Bypass Capacitance (C_{OUT}) ESR	C_{OUT} = 22µF 0.1mA ≤ I_{OUT} ≤ 50mA	0.3		8	Ω

(1) Datasheet min/max specification limits are guaranteed by design, test, or statistical analysis.
(2) Typicals are at 25°C (unless otherwise specified) and represent the most likely parametric norm.
(3) To ensure constant junction temperature, pulse testing is used.

Electrical Characteristics for LM2936Q–3.3

V_{IN} = 14V, I_O = 10 mA, T_J = 25°C, unless otherwise specified. **Boldface** limits apply over entire operating temperature range

Parameter	Conditions	Min (1)	Typical (2)	Max (1)	Units
All LM2936Q–3.3					
Output Voltage		3.234	3.300	3.366	V
	4.0V ≤ V_{IN} ≤ 26V, 100 µA ≤ I_O ≤ 50 mA (3)	**3.201**	**3.300**	**3.399**	
Quiescent Current	I_O = 100 µA, 8V ≤ V_{IN} ≤ 24V		15	20	µA
	I_O = 10 mA, 8V ≤ V_{IN} ≤ 24V		0.20	0.50	mA
	I_O = 50 mA, 8V ≤ V_{IN} ≤ 24V		1.5	2.5	mA
Line Regulation	9V ≤ V_{IN} ≤ 16V		5	10	mV
	6V ≤ V_{IN} ≤ 40V, I_O = 1 mA		10	30	
Load Regulation	100 µA ≤ I_O ≤ 5 mA		10	30	mV
	5 mA ≤ I_O ≤ 50 mA		10	30	
Dropout Voltage	I_O = 100 µA		0.05	0.10	V
	I_O = 50 mA		0.20	0.40	V
Short Circuit Current	V_O = 0V	65	120	250	mA
Output Impedance	I_O = 30 mAdc and 10 mArms, $_f$ = 1000 Hz		450		mΩ
Output Noise Voltage	10 Hz–100 kHz		500		µV
Long Term Stability			20		mV/1000 Hr
Ripple Rejection	V_{ripple} = 1V_{rms}, fripple = 120 Hz	−40	−60		dB
Reverse Polarity Transient Input Voltage	R_L = 500Ω, T = 1 ms	−50	−80		V
Output Voltage with Reverse Polarity Input	V_{IN} = −15V, R_L = 500Ω		0.00	−0.30	V
Maximum Line Transient	R_L = 500Ω, V_O ≤ 3.63V, T = 40ms	60			V
Output Bypass Capacitance (C_{OUT}) ESR	C_{OUT} = 22µF 0.1mA ≤ I_{OUT} ≤ 50mA	0.3		8	Ω

(1) Datasheet min/max specification limits are guaranteed by design, test, or statistical analysis.
(2) Typicals are at 25°C (unless otherwise specified) and represent the most likely parametric norm.
(3) To ensure constant junction temperature, pulse testing is used.

Electrical Characteristics for LM2936Q–5.0

V_{IN} = 14V, I_O = 10 mA, T_J = 25°C, unless otherwise specified. **Boldface** limits apply over entire operating temperature range

Parameter	Conditions	Min (1)	Typical (2)	Max (1)	Units
All LM2936QH–5.0 Only					
Output Voltage	5.5V ≤ V_{IN} ≤ 48V, 100 µA ≤ I_O ≤ 50 mA (3)	**4.85**	**5.00**	**5.15**	V
Line Regulation	6V ≤ V_{IN} ≤ 60V, I_O = 1 mA		15	35	mV
All LM2936Q–5.0					
Output Voltage		4.90	5.00	5.10	V
	5.5V ≤ V_{IN} ≤ 26V, 100 µA ≤ I_O ≤ 50 mA (3)	**4.85**	**5.00**	**5.15**	
Quiescent Current	I_O = 100 µA, 8V ≤ V_{IN} ≤ 24V		9	15	µA
	I_O = 10 mA, 8V ≤ V_{IN} ≤ 24V		0.20	0.50	mA
	I_O = 50 mA, 8V ≤ V_{IN} ≤ 24V		1.5	2.5	mA

(1) Datasheet min/max specification limits are guaranteed by design, test, or statistical analysis.
(2) Typicals are at 25°C (unless otherwise specified) and represent the most likely parametric norm.
(3) To ensure constant junction temperature, pulse testing is used.

Electrical Characteristics for LM2936Q–5.0 (continued)

V_{IN} = 14V, I_O = 10 mA, T_J = 25°C, unless otherwise specified. **Boldface** limits apply over entire operating temperature range

Parameter	Conditions	Min (1)	Typical (2)	Max (1)	Units
Line Regulation	9V ≤ V_{IN} ≤ 16V		5	10	mV
	6V ≤ V_{IN} ≤ 40V, I_O = 1 mA		10	30	
Load Regulation	100 µA ≤ I_O ≤ 5 mA		10	30	mV
	5 mA ≤ I_O ≤ 50 mA		10	30	
Dropout Voltage	I_O = 100 µA		0.05	0.10	V
	I_O = 50 mA		0.20	0.40	
Short Circuit Current	V_O = 0V	65	120	250	mA
Output Impedance	I_O = 30 mAdc and 10 mArms, $_f$ = 1000 Hz		450		mΩ
Output Noise Voltage	10 Hz–100 kHz		500		µV
Long Term Stability			20		mV/1000 Hr
Ripple Rejection	V_{ripple} = 1V_{rms}, $_{fripple}$ = 120 Hz	−40	−60		dB
Reverse Polarity Transient Input Voltage	R_L = 500Ω, T = 1 ms	−50	−80		V
Output Voltage with Reverse Polarity Input	V_{IN} = −15V, R_L = 500Ω		0.00	−0.30	V
Maximum Line Transient	R_L = 500Ω, V_O ≤ 5.5V, T = 40ms	60			V
Output Bypass Capacitance (C_{OUT}) ESR	C_{OUT} = 10µF 0.1mA ≤ I_{OUT} ≤ 50mA	0.3		8	Ω
Shutdown Input LM2936QH–5.0					
Output Voltage, V_{OUT}	Output Off, V_{SD}=2.4V, R_{LOAD}=500Ω		0	0.010	V
Shutdown High Threshold Voltage, V_{IH}	Output Off, R_{LOAD}=500Ω	2.00	1.1		V
Shutdown Low Threshold Voltage, V_{IL}	Output On, R_{LOAD}=500Ω		1.1	0.60	V
Shutdown High Current, I_{IH}	Output Off, V_{SD}=2.4V, R_{LOAD}=500Ω		12		µA
Quiescent Current	Output Off, V_{SD}=2.4V, R_{LOAD}=500Ω Includes I_{IH}Current		30		µA

Typical Performance Characteristics

Dropout Voltage

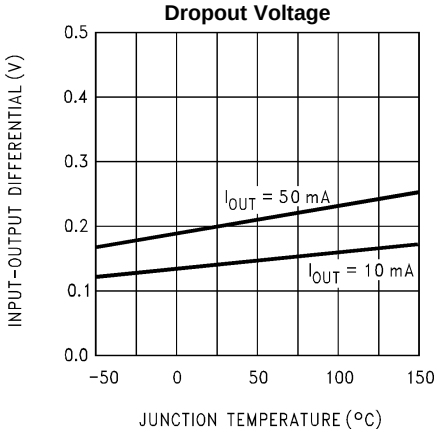


Figure 6.

Dropout Voltage

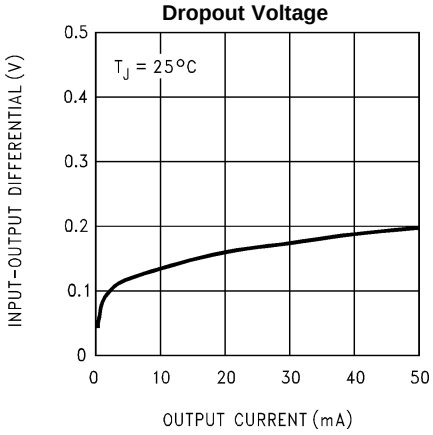


Figure 7.

Quiescent Current

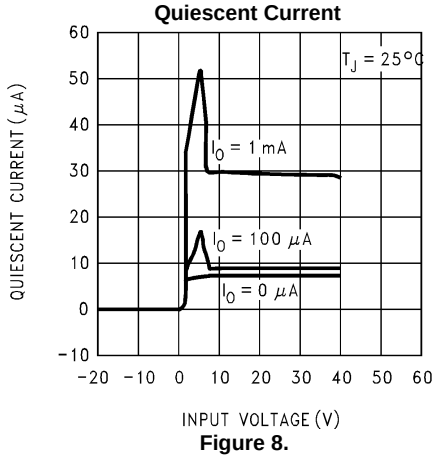


Figure 8.

Quiescent Current

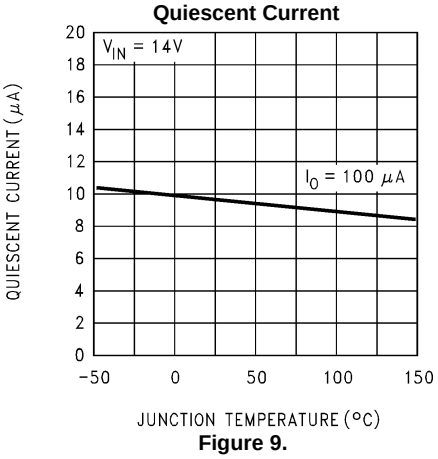


Figure 9.

Quiescent Current

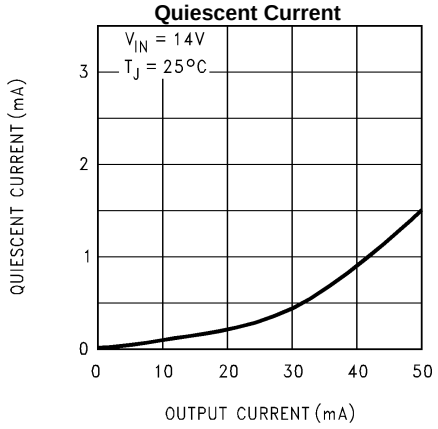


Figure 10.

Quiescent Current

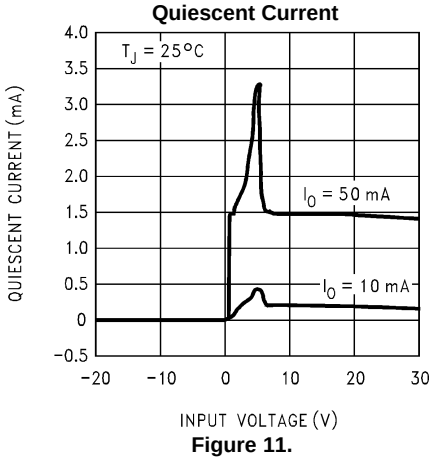


Figure 11.

Typical Performance Characteristics (continued)

Quiescent Current

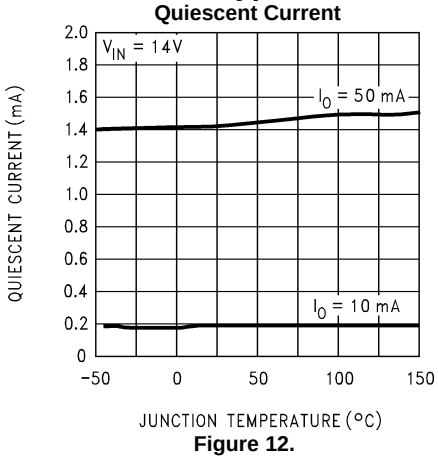


Figure 12.

LM2936Q–3.0 C_{OUT} ESR

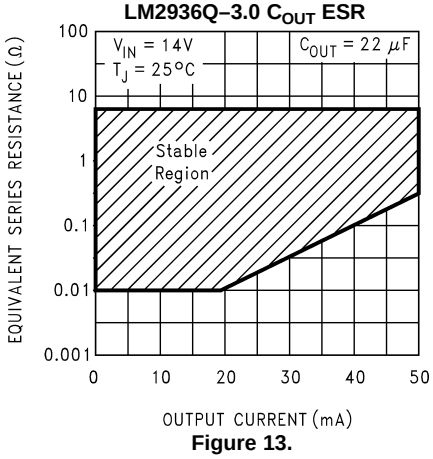


Figure 13.

LM2936Q–5.0 C_{OUT} ESR

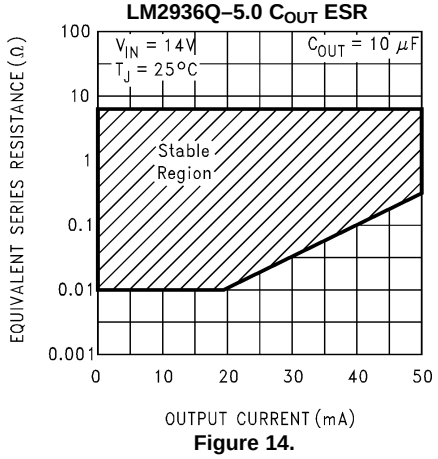


Figure 14.

LM2936Q–3.3 C_{OUT} ESR

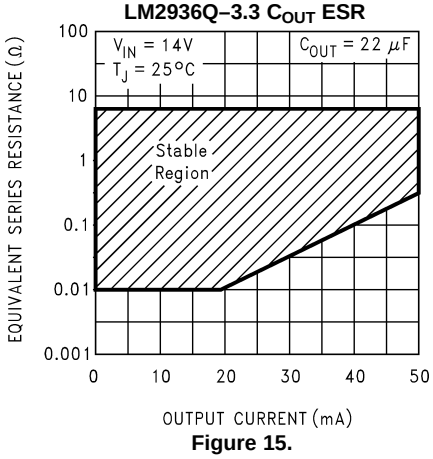


Figure 15.

Peak Output Current

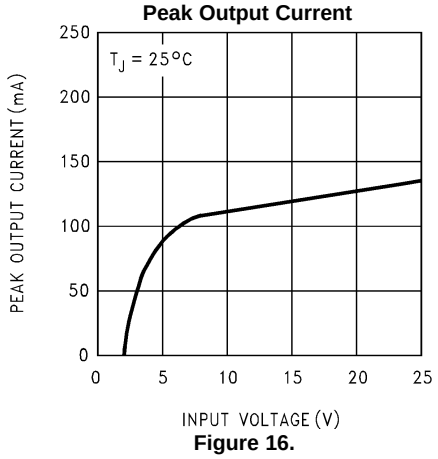


Figure 16.

Peak Output Current

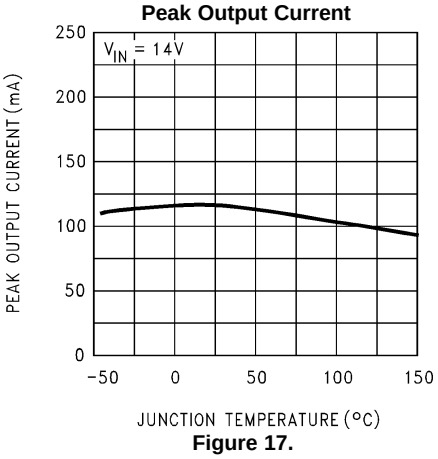


Figure 17.

Typical Performance Characteristics (continued)

LM2936Q–5.0 Current Limit

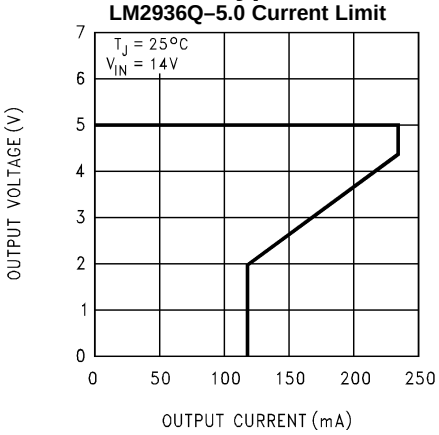


Figure 18.

LM2936Q–5.0 Line Transient Response

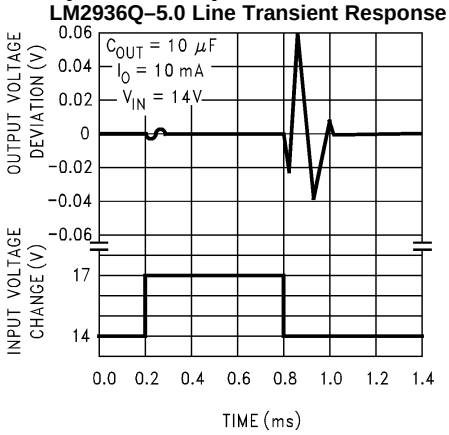


Figure 19.

LM2936Q–5.0 Output at Voltage Extremes

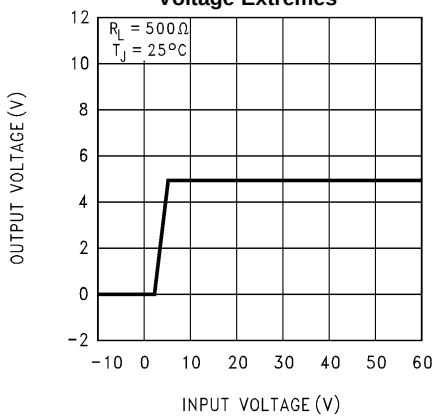


Figure 20.

LM2936Q–5.0 Ripple Rejection

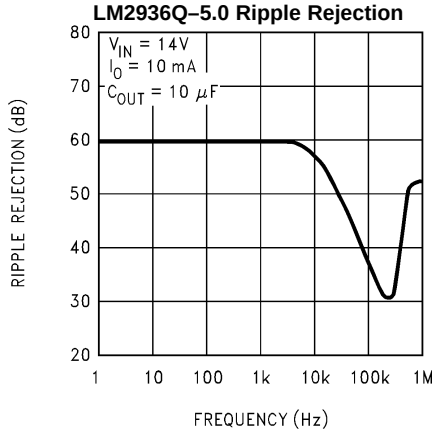


Figure 21.

LM2936Q–5.0 Load Transient Response

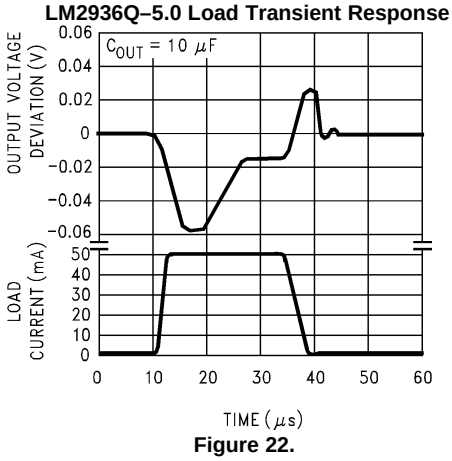


Figure 22.

LM2936Q–5.0 Low Voltage Behavior

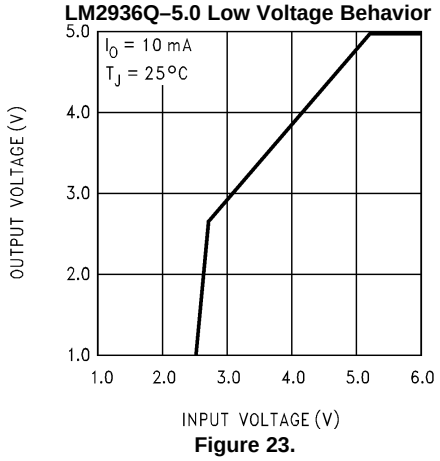


Figure 23.

Typical Performance Characteristics (continued)

LM2936Q–5.0 Output Impedance

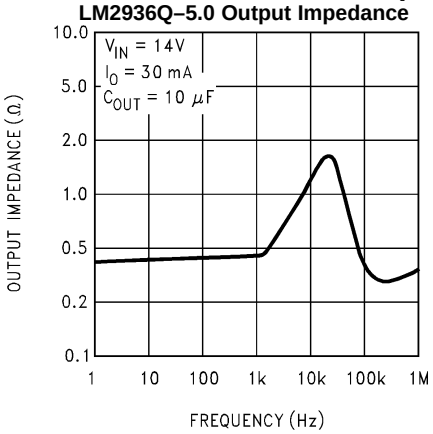


Figure 24.

APPLICATION INFORMATION

Unlike other PNP low dropout regulators, the LM2936Q remains fully operational to 40V. Owing to power dissipation characteristics of the available packages, full output current cannot be guaranteed for all combinations of ambient temperature and input voltage.

The junction to ambient thermal resistance θ_{JA} rating has two distinct components: the junction to case thermal resistance rating θ_{JC}; and the case to ambient thermal resistance rating θ_{CA}. The relationship is defined as: $\theta_{JA} = \theta_{JC} + \theta_{CA}$.

For the SOIC-8 and PFM surface mount packages the θ_{JA} rating can be improved by using the copper mounting pads on the printed circuit board as a thermal conductive path to extract heat from the package.

On the SOIC-8 package the four ground pins are thermally connected to the backside of the die. Adding approximately 0.04 square inches of 2 oz. copper pad area to these four pins will improve the θ_{JA} rating to approximately 110°C/W. If this extra pad are is placed directly beneath the package there should not be any impact on board density.

On the PFM package the ground tab is thermally connected to the backside of the die. Adding 1 square inch of 2 oz. copper pad area directly under the ground tab will improve the θ_{JA} rating to approximately 50°C/W.

While the LM2936Q has an internally set thermal shutdown point of typically 160°C, this is intended as a safety feature only. Continuous operation near the thermal shutdown temperature should be avoided as it may have a negative affect on the life of the device.

While the LM2936Q maintains regulation to 60V, it will not withstand a short circuit above 40V because of safe operating area limitations in the internal PNP pass device. Above 60V the LM2936EP will break down with catastrophic effects on the regulator and possibly the load as well. Do not use this device in a design where the input operating voltage may exceed 40V, or where transients are likely to exceed 60V.

Shutdown Pin

The LM2936QHBMA–5.0 has a pin for shutting down the regulator output. Applying a Logic Level High (>2.0V) to the Shutdown pin will cause the output to turn off. Leaving the Shutdown pin open, connecting it to Ground, or applying a Logic Level Low (<0.6V) will allow the regulator output to turn on.

Equivalent Schematic Diagram

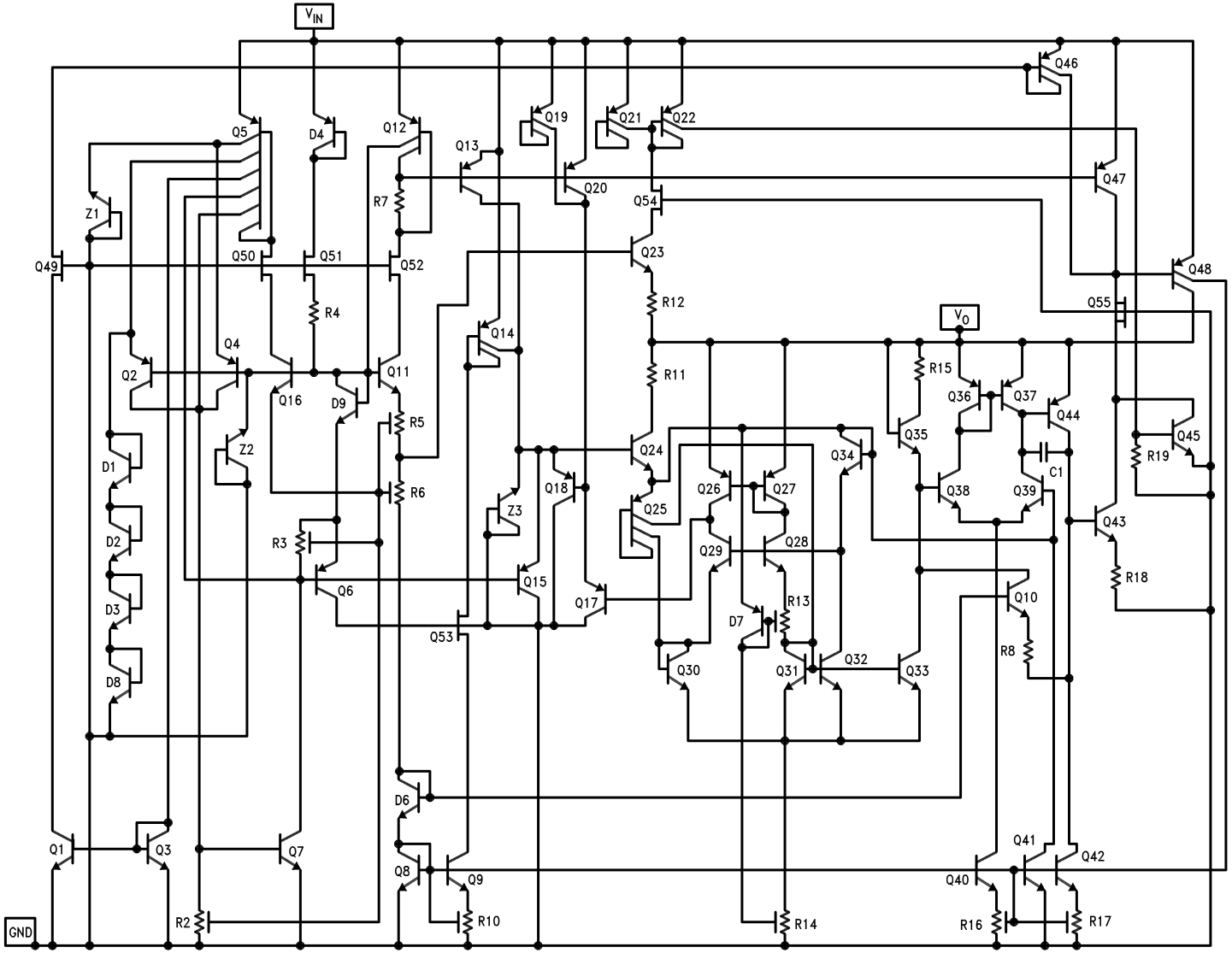


Figure 25.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
LM2936QDT-3.0/NOPB	ACTIVE	PFM	NDP	3	75	Green (RoHS & no Sb/Br)	CU SN	Level-2-260C-1 YEAR	-40 to 125	LM2936Q DT-3.0	Samples
LM2936QDT-3.3/NOPB	ACTIVE	PFM	NDP	3	75	Green (RoHS & no Sb/Br)	CU SN	Level-2-260C-1 YEAR	-40 to 125	LM2936Q DT-3.3	Samples
LM2936QDT-5.0/NOPB	ACTIVE	PFM	NDP	3	75	Green (RoHS & no Sb/Br)	CU SN	Level-2-260C-1 YEAR	-40 to 125	LM2936Q DT-5.0	Samples
LM2936QDTX-3.0/NOPB	ACTIVE	PFM	NDP	3	2500	Green (RoHS & no Sb/Br)	CU SN	Level-2-260C-1 YEAR	-40 to 125	LM2936Q DT-3.0	Samples
LM2936QDTX-3.3/NOPB	ACTIVE	PFM	NDP	3	2500	Green (RoHS & no Sb/Br)	CU SN	Level-2-260C-1 YEAR	-40 to 125	LM2936Q DT-3.3	Samples
LM2936QDTX-5.0/NOPB	ACTIVE	PFM	NDP	3	2500	Green (RoHS & no Sb/Br)	CU SN	Level-2-260C-1 YEAR	-40 to 125	LM2936Q DT-5.0	Samples
LM2936QHBMA-5.0/NOPB	ACTIVE	SOIC	D	8	95	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM		2936H QBM5.0	Samples
LM2936QHBMAX5.0/NOPB	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM		2936H QBM5.0	Samples
LM2936QM-3.3/NOPB	ACTIVE	SOIC	D	8	95	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	LM293 6Q-3.3	Samples
LM2936QM-5.0/NOPB	ACTIVE	SOIC	D	8	95	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	LM293 6QM-5	Samples
LM2936QMM-3.0/NOPB	ACTIVE	VSSOP	DGK	8	1000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	KBCQ	Samples
LM2936QMM-3.3/NOPB	ACTIVE	VSSOP	DGK	8	1000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	KBBQ	Samples
LM2936QMM-5.0/NOPB	ACTIVE	VSSOP	DGK	8	1000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	KBAQ	Samples
LM2936QMMX-3.3/NOPB	ACTIVE	VSSOP	DGK	8	3500	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	KBBQ	Samples
LM2936QMMX-5.0/NOPB	ACTIVE	VSSOP	DGK	8	3500	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	KBAQ	Samples
LM2936QMP-5.0/NOPB	ACTIVE	SOT-223	DCY	4	1000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM		KAAQ	Samples
LM2936QMPX-5.0/NOPB	ACTIVE	SOT-223	DCY	4	2000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM		KAAQ	Samples

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
LM2936QMX-3.3/NOPB	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	LM2936Q-3.3	Samples
LM2936QMX-5.0/NOPB	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	LM2936QM-5	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.
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 leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
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) Only one of markings shown within the brackets will appear on the physical device.

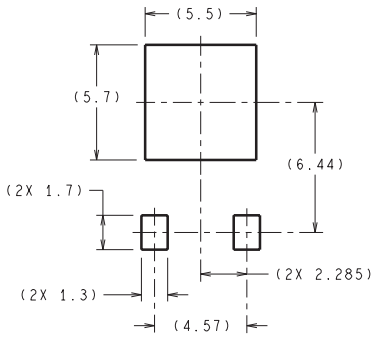
OTHER QUALIFIED VERSIONS OF LM2936Q, LM2936Q-Q1 :

- Catalog: LM2936Q
- Automotive: LM2936Q-Q1

NOTE: Qualified Version Definitions:

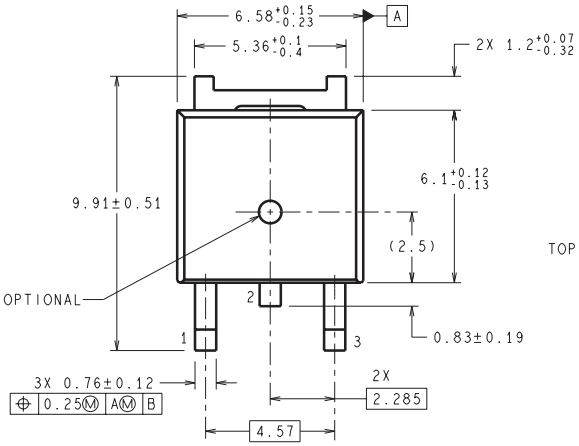
- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

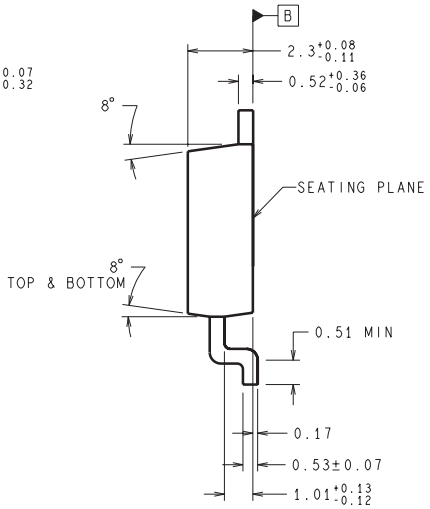
NDP0003B

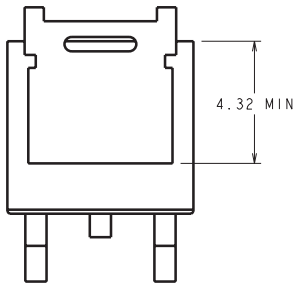


LAND PATTERN RECOMMENDATION

DIMENSIONS ARE IN MILLIMETERS
DIMENSIONS IN ( ) FOR REFERENCE ONLY

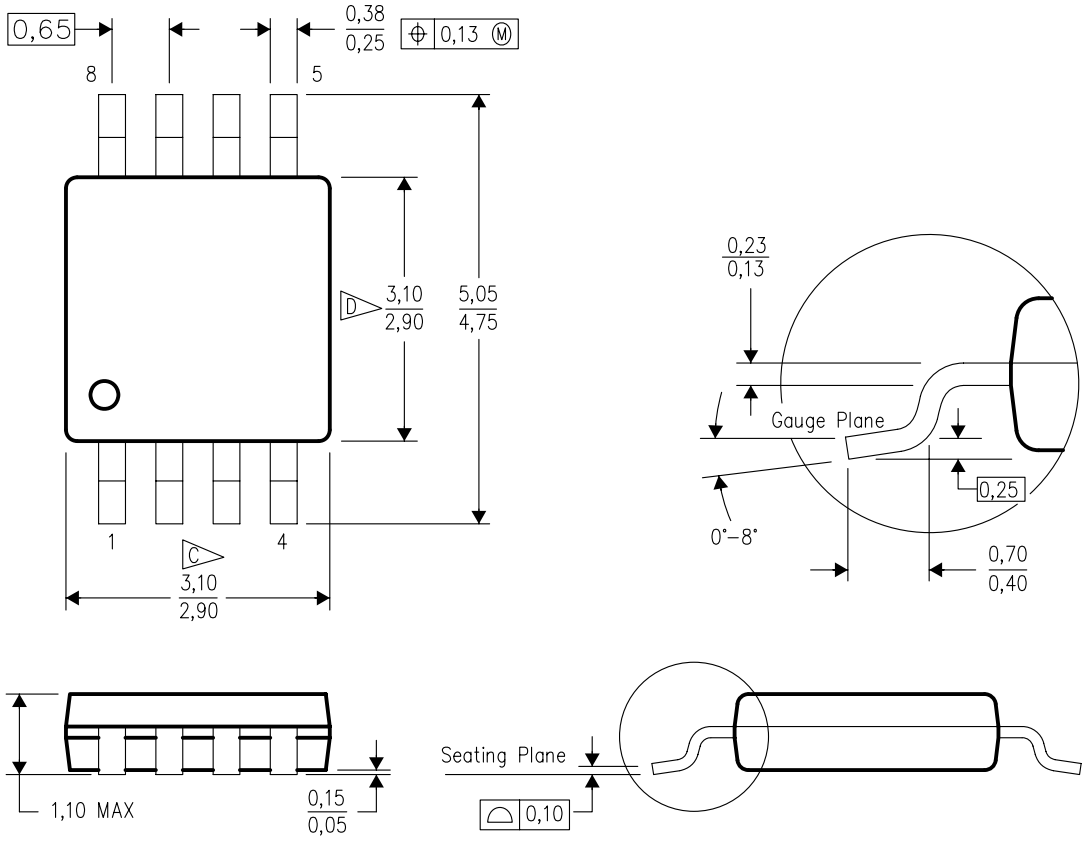






TD03B (Rev F)

DGK (S–PDSO–G8) PLASTIC SMALL–OUTLINE PACKAGE



4073329/E 05/06

NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 per end.
D. Body width does not include interlead flash. Interlead flash shall not exceed 0.50 per side.
E. Falls within JEDEC MO–187 variation AA, except interlead flash.

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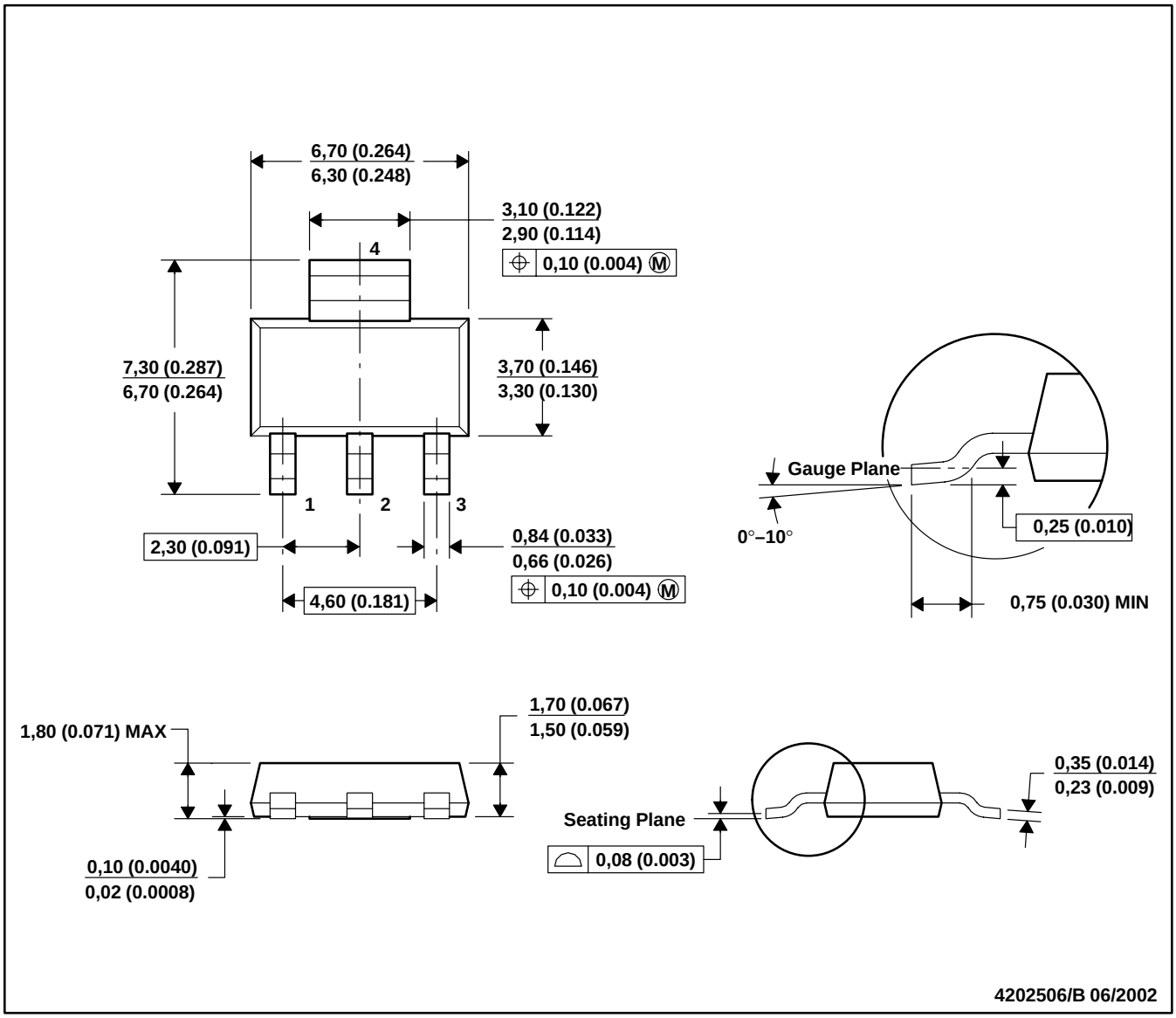
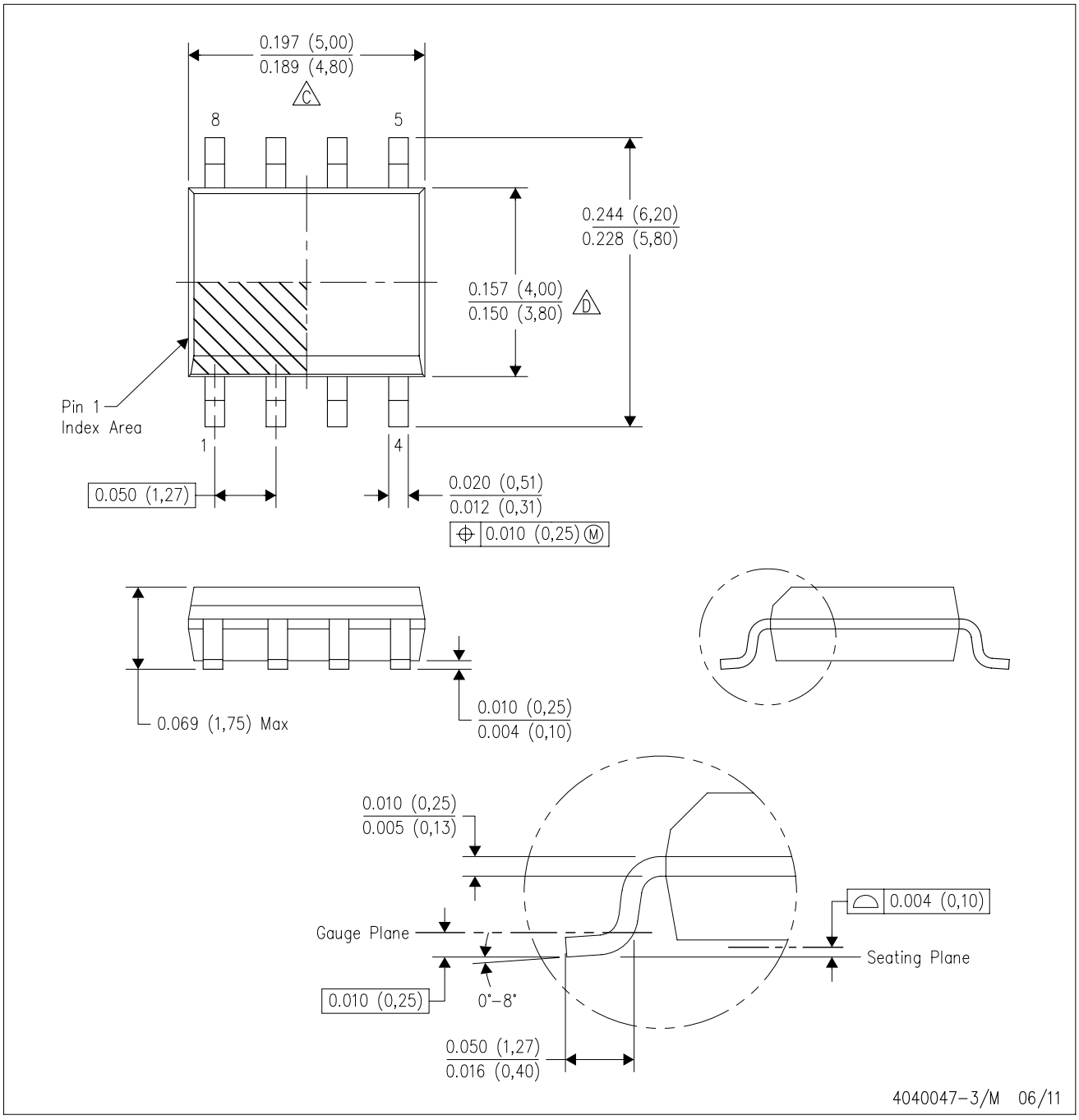
DCY (R-PDSO-G4) **PLASTIC SMALL-OUTLINE**



NOTES: A. All linear dimensions are in millimeters (inches).
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion.
D. Falls within JEDEC TO-261 Variation AA.

D (R–PDSO–G8) PLASTIC SMALL OUTLINE



NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
E. Reference JEDEC MS–012 variation AA.

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