

LM2940/LM2940C

1A Low Dropout Regulator

General Description

The LM2940/LM2940C positive voltage regulator features the ability to source 1A of output current with a dropout voltage of typically 0.5V and a maximum of 1V over the entire temperature range. Furthermore, a quiescent current reduction circuit has been included which reduces the ground current when the differential between the input voltage and the output voltage exceeds approximately 3V. The quiescent current with 1A of output current and an input-output differential of 5V is therefore only 30 mA. Higher quiescent currents only exist when the regulator is in the dropout mode ($V_{IN} - V_{OUT} \leq 3V$).

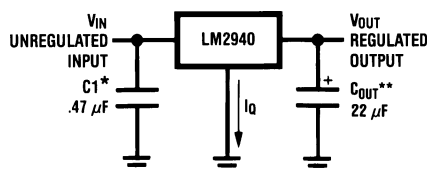
Designed also for vehicular applications, the LM2940/LM2940C and all regulated circuitry are protected from reverse battery installations or 2-battery jumps. During line transients, such as load dump when the input voltage can

momentarily exceed the specified maximum operating voltage, the regulator will automatically shut down to protect both the internal circuits and the load. The LM2940/LM2940C cannot be harmed by temporary mirror-image insertion. Familiar regulator features such as short circuit and thermal overload protection are also provided.

Features

- Dropout voltage typically 0.5V @ $I_O = 1A$
- Output current in excess of 1A
- Output voltage trimmed before assembly
- Reverse battery protection
- Internal short circuit current limit
- Mirror image insertion protection
- P+ Product Enhancement tested

Typical Application



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*Required if regulator is located far from power supply filter.

** C_{OUT} must be at least 22 μF to maintain stability. May be increased without bound to maintain regulation during transients. Locate as close as possible to the regulator. This capacitor must be rated over the same operating temperature range as the regulator and the ESR is critical; see curve.

Ordering Information

Temperature Range	Output Voltage						Package
	5.0	8.0	9.0	10	12	15	
$0^{\circ}C \leq T_J \leq 125^{\circ}C$	LM2940CT-5.0		LM2940CT-9.0		LM2940CT-12	LM2940CT-15	TO-220
	LM2940CS-5.0		LM2940CS-9.0		LM2940CS-12	LM2940CS-15	TO-263
$-40^{\circ}C \leq T_J \leq 125^{\circ}C$	LM2940LD-5.0	LM2940LD-8.0	LM2940LD-9.0	LM2940LD-10	LM2940LD-12	LM2940LD-15	LLP 1k Units Tape and Reel
	LM2940LDX-5.0	LM2940LDX-8.0	LM2940LDX-9.0	LM2940LDX-10	LM2940LDX-12	LM2940LDX-15	LLP 4.5k Units Tape and Reel
$-40^{\circ}C \leq T_J \leq 125^{\circ}C$	LM2940T-5.0	LM2940T-8.0	LM2940T-9.0	LM2940T-10	LM2940T-12		TO-220
	LM2940S-5.0	LM2940S-8.0	LM2940S-9.0	LM2940S-10	LM2940S-12		TO-263
$-40^{\circ}C \leq T_J \leq 85^{\circ}C$	LM2940IMP-5.0	LM2940IMP-8.0	LM2940IMP-9.0	LM2940IMP-10	LM2940IMP-12	LM2940IMP-15	SOT-223
	LM2940IMPX-5.0	LM2940IMPX-8.0	LM2940IMPX-9.0	LM2940IMPX-10	LM2940IMPX-12	LM2940IMPX-15	SOT-223 in Tape and Reel
SOT-223 Package Marking	L53B	L54B	L0EB	L55B	L56B	L70B	

The physical size of the SOT-223 is too small to contain the full device part number. The package markings indicated are what will appear on the actual device.

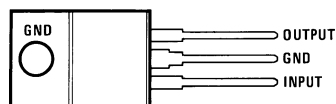
Ordering Information (Continued)

Temperature Range	Output Voltage				Package
	5.0	8.0	12	15	
$-55^{\circ}\text{C} \leq T_J \leq 125^{\circ}\text{C}$	LM2940J-5.0/883 5962-8958701EA	LM2940J-8.0/883 5962-9088301QEA	LM2940J-12/883 5962-9088401QEA	LM2940J-15/883 5962-9088501QEA	J16A
	LM2940WG5.0/883 5962-8958701XA				WG16A

For information on military temperature range products, please go to the Mil/Aero Web Site at <http://www.national.com/appinfo/milaero/index.html>.

Connection Diagrams

(TO-220) Plastic Package

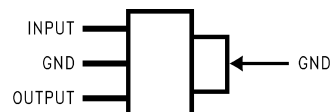


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Front View

Order Number LM2940CT-5.0, LM2940CT-9.0,
LM2940CT-12, LM2940CT-15, LM2940T-5.0,
LM2940T-8.0, LM2940T-9.0,
LM2940T-10 or LM2940T-12
See NS Package Number TO3B

3-Lead SOT-223

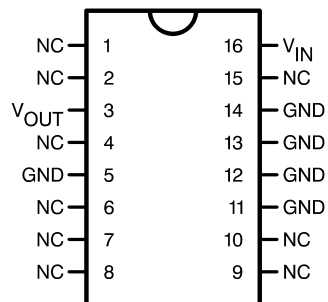


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Front View

Order Part Number LM2940IMP-5.0,
LM2940IMP-8.0, LM2940IMP-9.0,
LM2940IMP-10, LM2940IMP-12 or LM2940IMP-15
See NS Package Number MP04A

16-Lead Dual-in-Line Package (J)

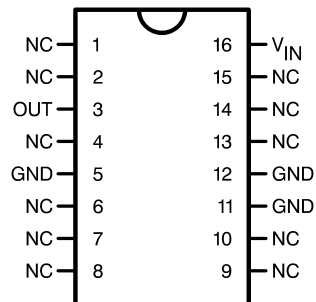


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Top View

Order Number LM2940J-5.0/883 (5962-8958701EA),
LM2940J-8.0/883 (5962-9088301QEA),
LM2940J-12/883 (5962-9088401QEA),
LM2940J-15/883 (5962-9088501QEA)
See NS Package Number J16A

16-Lead Ceramic Surface-Mount Package (WG)



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Top View

Order Number LM2940WG5.0/883 (5962-8958701XA)
See NS Package Number WG16A