



Power MOSFET

PRODUCT SUMMARY	
V _{DS} (V)	250
R _{DS(on)} (Ω)	V _{GS} = 10 V 2.0
Q _g (Max.) (nC)	8.2
Q _{gs} (nC)	1.8
Q _{gd} (nC)	4.5
Configuration	Single

FEATURES

- Surface mount
- Available in tape and reel
- Dynamic dV/dt rating
- Repetitive avalanche rated
- Fast switching
- Ease of paralleling
- Simple drive requirements
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

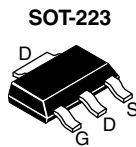


RoHS
COMPLIANT
HALOGEN
FREE
Available

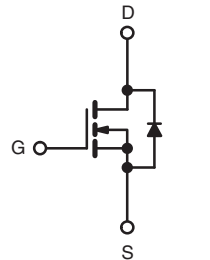
DESCRIPTION

Third generation power MOSFETs from Vishay provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The SOT-223 package is designed for surface-mounting using vapor phase, infrared, or wave soldering techniques. Its unique package design allows for easy automatic pick-and-place as with other SOT or SOIC packages but has the added advantage of improved thermal performance due to an enlarged tab for heatsinking. Power dissipation of greater than 1.25 W is possible in a typical surface mount application.



SOT-223



N-Channel MOSFET

Marking code: FD

ORDERING INFORMATION		
Package	SOT-223	SOT-223
Lead (Pb)-free and Halogen-free	SiHFL214-GE3	SiHFL214TR-GE3 ^a
Lead (Pb)-free	IRFL214PbF	IRFL214TRPbF ^a
	SiHFL214-E3	SiHFL214T-E3 ^a

Note

a. See device orientation.

ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)				
PARAMETER	SYMBOL		LIMIT	UNIT
Drain-Source Voltage	V _{DS}		250	V
Gate-Source Voltage	V _{GS}		± 20	
Continuous Drain Current	V _{GS} at 10 V	T _C = 25 °C	0.79	A
		T _C = 100 °C	0.50	
Pulsed Drain Current ^a	I _{DM}		6.3	W/°C
Linear Derating Factor			0.025	
Linear Derating Factor (PCB Mount) ^e			0.017	
Single Pulse Avalanche Energy ^b	E _{AS}		50	mJ
Repetitive Avalanche Current ^a	I _{AR}		0.79	A
Repetitive Avalanche Energy ^a	E _{AR}		0.31	mJ
Maximum Power Dissipation	T _C = 25 °C		3.1	W
	T _A = 25 °C		2.0	
Peak Diode Recovery dV/dt ^c	dV/dt		4.8	V/ns
Operating Junction and Storage Temperature Range	T _J , T _{stg}		-55 to +150	°C
Soldering Recommendations (Peak Temperature) ^d	for 10 s		300	

Notes

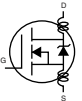

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- V_{DD} = 50 V, starting T_J = 25 °C, L = 128 mH, R_g = 25 Ω, I_{AS} = 0.79 A (see fig. 12).
- I_{SD} ≤ 2.7 A, di/dt ≤ 65 A/μs, V_{DD} ≤ V_{DS}, T_J ≤ 150 °C.
- 1.6 mm from case.
- When mounted on 1" square PCB (FR-4 or G-10 material).



THERMAL RESISTANCE RATINGS					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient (PCB Mount) ^a	R _{thJA}	-	-	60	°C/W
Maximum Junction-to-Case (Drain)	R _{thJC}	-	-	40	

Note

a. When mounted on 1" square PCB (FR-4 or G-10 material).

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA		250	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = 1 mA		-	0.39	-	V/°C
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		2.0	-	4.0	V
Gate-Source Leakage	I _{GSS}	V _{GS} = ± 20 V		-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 250 V, V _{GS} = 0 V		-	-	25	μA
		V _{DS} = 200 V, V _{GS} = 0 V, T _J = 125 °C		-	-	250	
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 10 V	I _D = 0.47 A ^b	-	-	2.0	Ω
Forward Transconductance	g _{fs}	V _{DS} = 50 V, I _D = 0.47 A		0.50	-	-	S
Dynamic							
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1.0 MHz, see fig. 5		-	140	-	pF
Output Capacitance	C _{oss}			-	42	-	
Reverse Transfer Capacitance	C _{rss}			-	9.6	-	
Total Gate Charge	Q _g	V _{GS} = 10 V	I _D = 2.7 A, V _{DS} = 200 V, see fig. 6 and 13 ^b	-	-	8.2	nC
Gate-Source Charge	Q _{gs}			-	-	1.8	
Gate-Drain Charge	Q _{gd}			-	-	4.5	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 125 V, I _D = 2.7 A, R _g = 24 Ω, R _D = 45 Ω, see fig. 10 ^b		-	7.0	-	ns
Rise Time	t _r			-	7.6	-	
Turn-Off Delay Time	t _{d(off)}			-	16	-	
Fall Time	t _f			-	7.0	-	
Internal Drain Inductance	L _D	Between lead, 6 mm (0.25") from package and center of die contact 		-	4.0	-	nH
Internal Source Inductance	L _S			-	6.0	-	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	MOSFET symbol showing the integral reverse p - n junction diode 		-	-	0.79	A
Pulsed Diode Forward Current ^a	I _{SM}			-	-	6.3	
Body Diode Voltage	V _{SD}	T _J = 25 °C, I _S = 0.79 A, V _{GS} = 0 V ^b		-	-	2.0	V
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = 2.7 A, dI/dt = 100 A/μs ^b		-	190	390	ns
Body Diode Reverse Recovery Charge	Q _{rr}			-	0.64	1.3	μC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L _S and L _D)					

Notes

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- b. Pulse width ≤ 300 μs; duty cycle ≤ 2 %.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

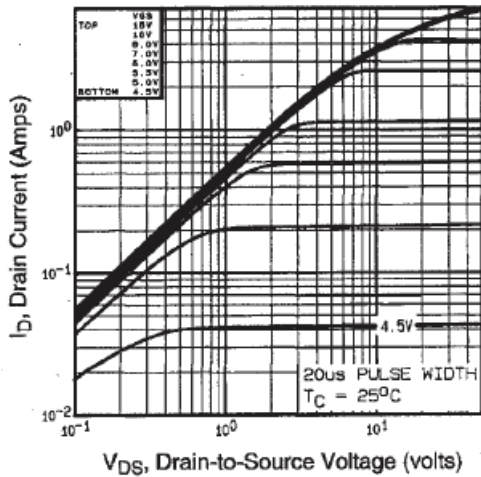


Fig. 1 - Typical Output Characteristics

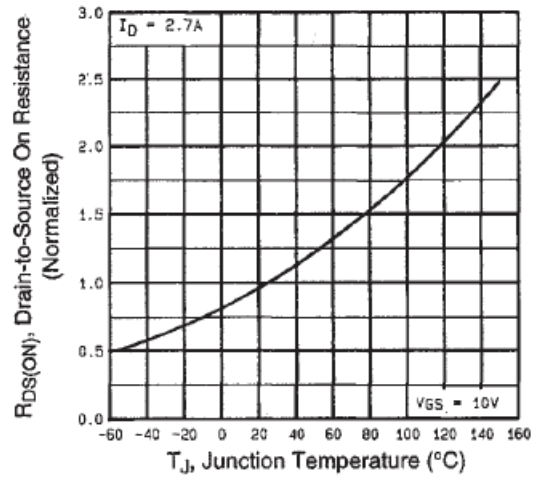


Fig. 4 - Normalized On-Resistance vs. Temperature

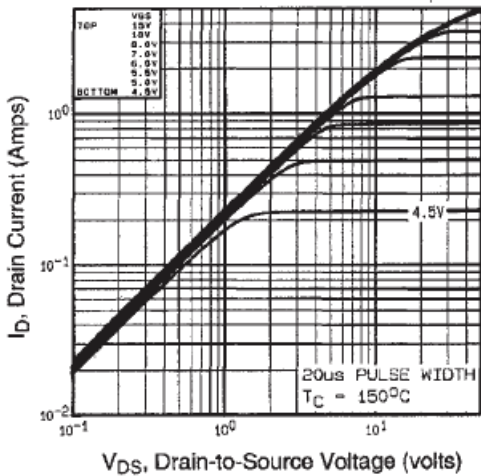


Fig. 2 - Typical Output Characteristics

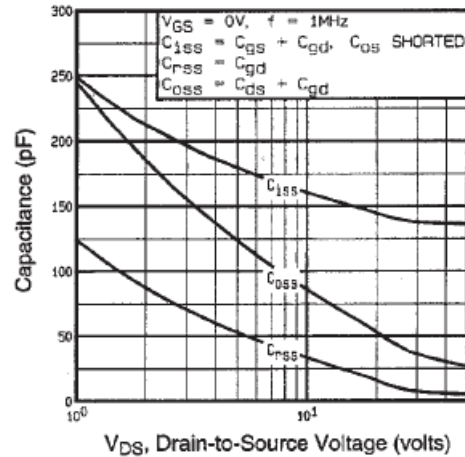


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

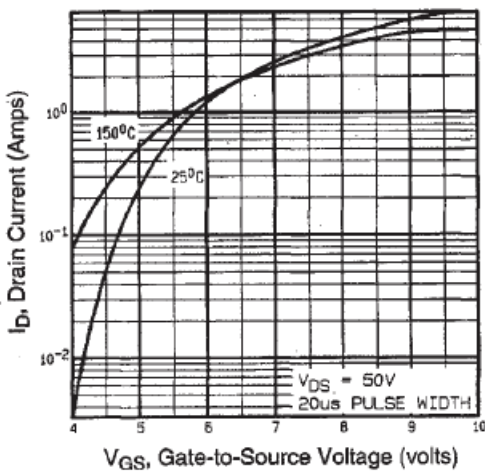


Fig. 3 - Typical Transfer Characteristics

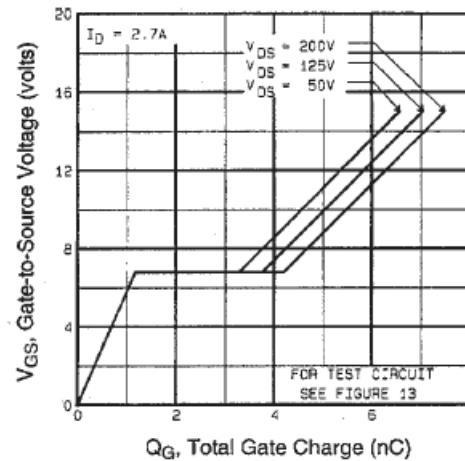


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

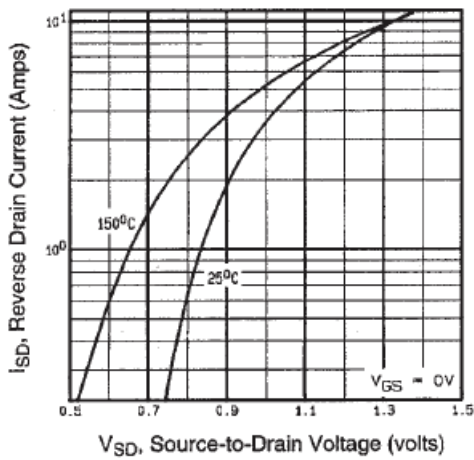


Fig. 7 - Typical Source-Drain Diode Forward Voltage

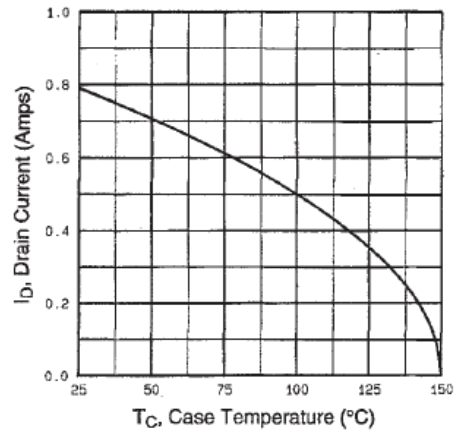


Fig. 9 - Maximum Drain Current vs. Case Temperature

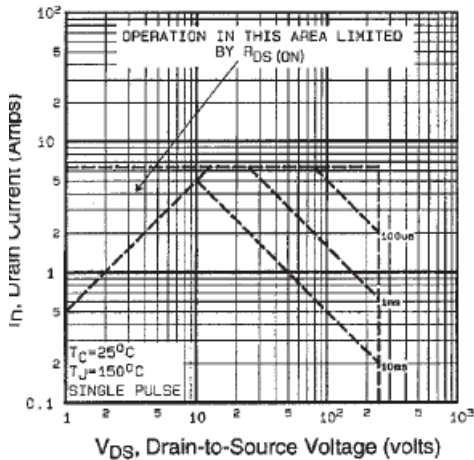


Fig. 8 - Maximum Safe Operating Area

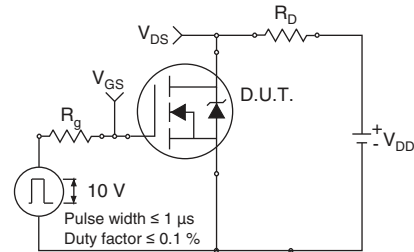


Fig. 10a - Switching Time Test Circuit

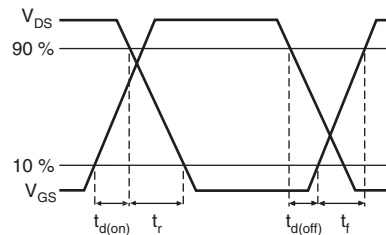


Fig. 10b - Switching Time Waveforms

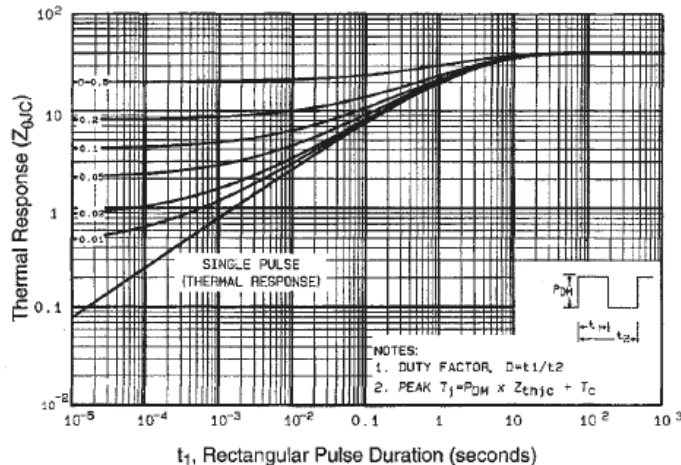


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

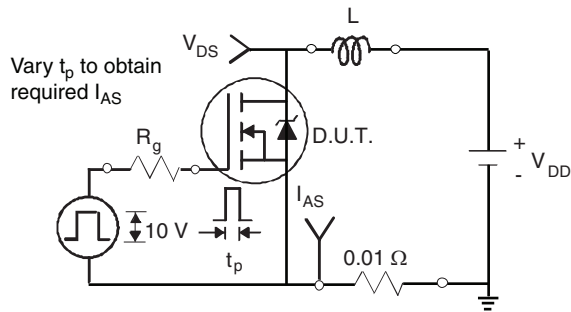


Fig. 12a - Unclamped Inductive Test Circuit

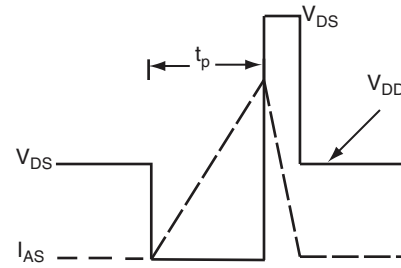


Fig. 12b - Unclamped Inductive Waveforms

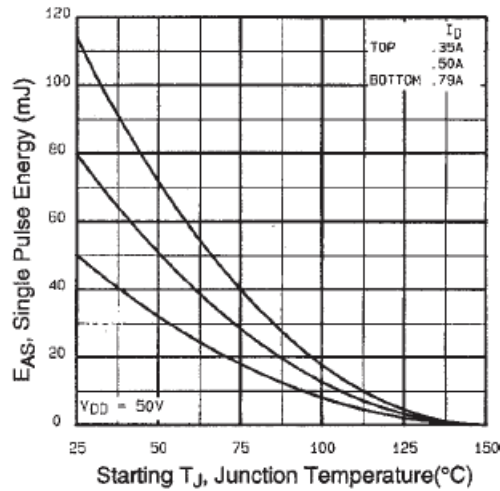


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

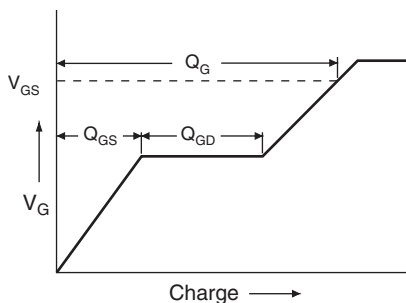


Fig. 13a - Basic Gate Charge Waveform

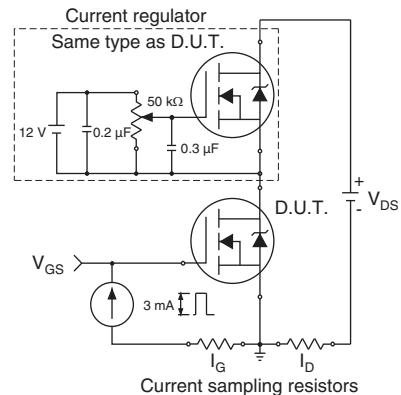


Fig. 13b - Gate Charge Test Circuit

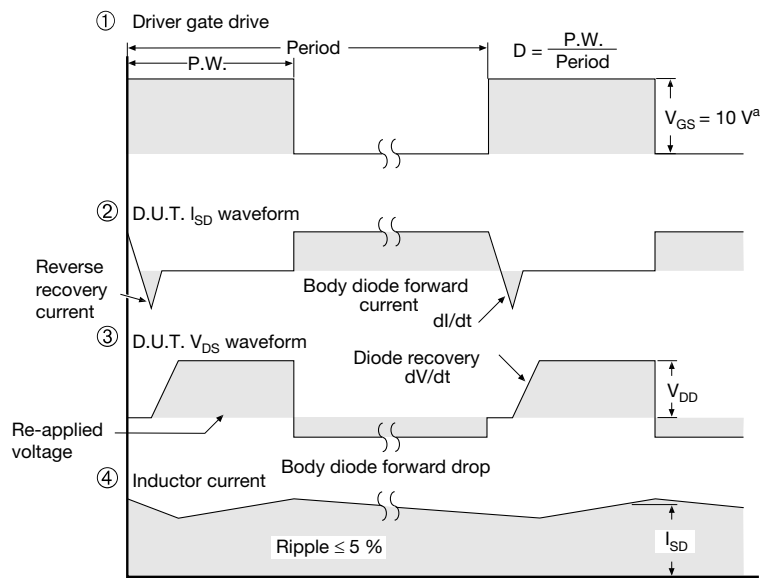
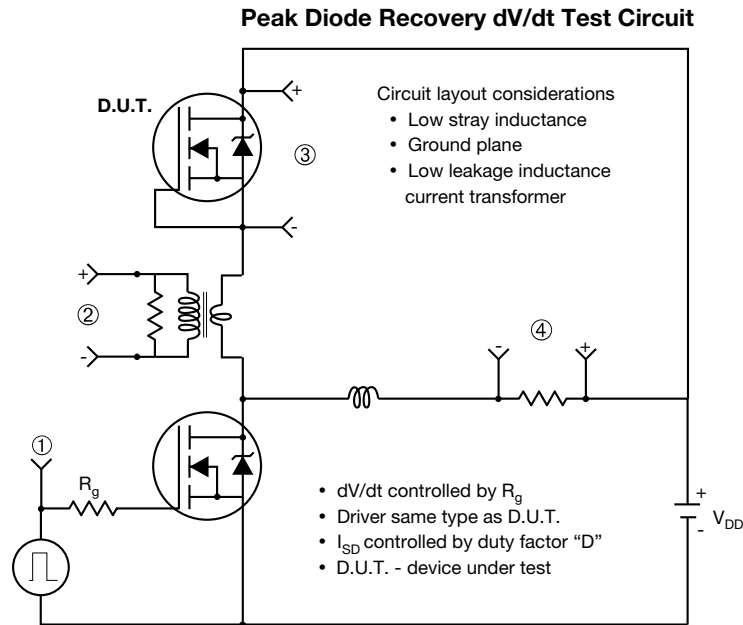
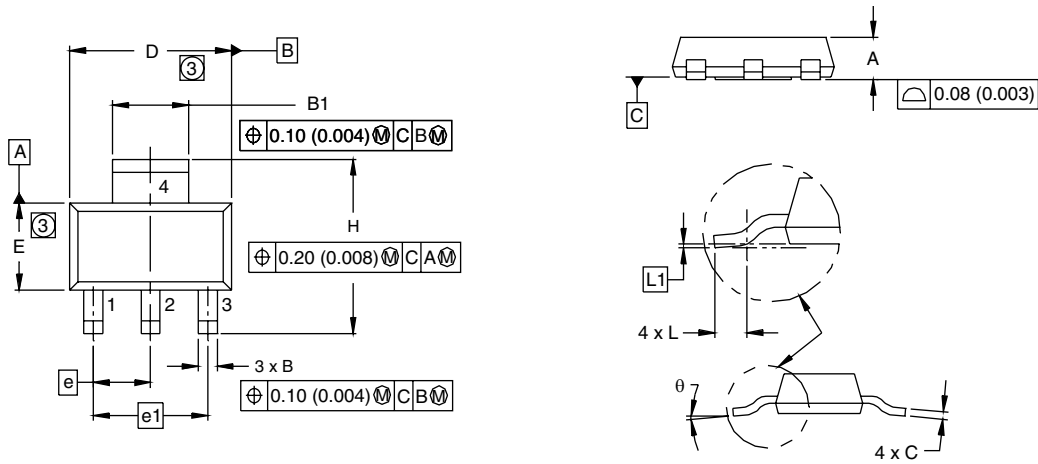


Fig.14 - For N-Channel

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SOT-223 (HIGH VOLTAGE)



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	1.55	1.80	0.061	0.071
B	0.65	0.85	0.026	0.033
B1	2.95	3.15	0.116	0.124
C	0.25	0.35	0.010	0.014
D	6.30	6.70	0.248	0.264
E	3.30	3.70	0.130	0.146
e	2.30 BSC		0.0905 BSC	
e1	4.60 BSC		0.181 BSC	
H	6.71	7.29	0.264	0.287
L	0.91	-	0.036	-
L1	0.061 BSC		0.0024 BSC	
θ	-	10°	-	10°
ECN: S-82109-Rev. A, 15-Sep-08 DWG: 5969				

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.
2. Dimensions are shown in millimeters (inches).
3. Dimension do not include mold flash.
4. Outline conforms to JEDEC outline TO-261AA.



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