

P-Channel 200V (D-S) MOSFET

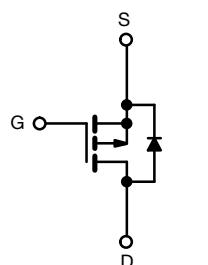
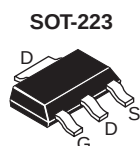
PRODUCT SUMMARY		
V_{DS} (V)	-200	
$R_{DS(on)}$ (Ω)	$V_{GS} = -10$ V	2.0
Q_g max. (nC)	29	
Q_{gs} (nC)	5.4	
Q_{gd} (nC)	15	
Configuration	Single	

FEATURES

- Surface mount
- Available in tape and reel
- Dynamic dV/dt rating
- Repetitive avalanche rated
- P-channel
- Fast switching
- Ease of paralleling



RoHS*
Available
HALOGEN
FREE
Available



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)					
PARAMETER			SYMBOL	LIMIT	UNIT
Drain-Source Voltage			V _{DS}	-200	V
Gate-Source Voltage			V _{GS}	± 20	
Continuous Drain Current	V _{GS} at -10 V	T _C = 25 °C	I _D	-3.0	A
		T _C = 100 °C		-2.0	
Pulsed Drain Current ^a			I _{DM}	-10	W/°C
Linear Derating Factor				0.59	
Linear Derating Factor (PCB mount) ^e				0.025	
Single Pulse Avalanche Energy ^b			E _{AS}	500	mJ
Avalanche Current ^a			I _{AR}	-6.4	A
Repetitive Avalanche Energy ^a			E _{AR}	7.4	mJ
Maximum Power Dissipation	T _C = 25 °C		P _D	74	W
Maximum Power Dissipation (PCB mount) ^e	T _A = 25 °C			3.0	
Peak Diode Recovery dV/dt ^c			dV/dt	-5.0	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	

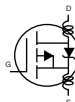
Notes

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- $V_{DD} = -50$ V, starting $T_J = 25\text{ }^{\circ}\text{C}$, $L = 17$ mH, $R_g = 25\text{ }\Omega$, $I_{AS} = -6.5$ A (see fig. 12).
- $I_{SD} \leq -6.5$ A, $dI/dt \leq 120$ A/ μs , $V_{DD} \leq V_{DS}$, $T_J \leq 150\text{ }^{\circ}\text{C}$.
- 1.6 mm from case.
- When mounted on 1" square PCB (FR-4 or G-10 material).

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R_{thJA}	-	62	°C/W
Maximum Junction-to-Ambient (PCB mount) ^a	R_{thJA}	-	40	
Maximum Junction-to-Case (Drain)	R_{thJC}	-	1.7	

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, I _D = -250 μA		-200	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = -1 mA		-	-0.24	-	V/°C
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA		-1.5	-	-4.0	V
Gate-Source Leakage	I _{GSS}	V _{GS} = ± 20 V		-	-	± 10	μA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -200 V, V _{GS} = 0 V		-	-	- 100	μA
		V _{DS} = -160 V, V _{GS} = 0 V, T _J = 125 °C		-	-	-500	
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = -10 V	I _D = -1.0 A ^b	-	2.00	-	Ω
Forward Transconductance	g _{fs}	V _{DS} = -50 V, I _D = -1.0 A ^b		2.8	-	-	S
Dynamic							
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = -25 V, f = 1.0 MHz, see fig. 5		-	700	-	pF
Output Capacitance	C _{oss}			-	200	-	
Reverse Transfer Capacitance	C _{rss}			-	40	-	
Total Gate Charge	Q _g	V _{GS} = -10 V	I _D = -3.5A, V _{DS} = -160 V, see fig. 6 and 13 ^b	-	-	29	nC
Gate-Source Charge	Q _{gs}			-	-	5.4	
Gate-Drain Charge	Q _{gd}			-	-	15	
Turn-On Delay Time	t _{d(on)}	V _{DD} = -100 V, I _D = -3.5A, R _g = 12 Ω, R _D = 15 Ω, see fig. 10 ^b		-	12	-	ns
Rise Time	t _r			-	27	-	
Turn-Off Delay Time	t _{d(off)}			-	28	-	
Fall Time	t _f			-	24	-	
Internal Drain Inductance	L _D	Between lead, 6 mm (0.25") from package and center of die contact 		-	4.5	-	nH
Internal Source Inductance	L _S			-	7.5	-	
Gate Input Resistance	R _g	f = 1 MHz, open drain		0.6	-	3.7	Ω
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	MOSFET symbol showing the integral reverse p - n junction diode 		-	-	-2	A
Pulsed Diode Forward Current ^a	I _{SM}			-	-	-4	
Body Diode Voltage	V _{SD}	T _J = 25 °C, I _S = -3.5A, V _{GS} = 0 V ^b		-	-	-6.5	V
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = -3.5A, dI/dt = 100 A/μs ^b		-	200	300	ns
Body Diode Reverse Recovery Charge	Q _{rr}			-	1.9	2.9	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 $\leq 300\text{ }\mu\text{s}$; duty cycle $\leq 2\%$.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

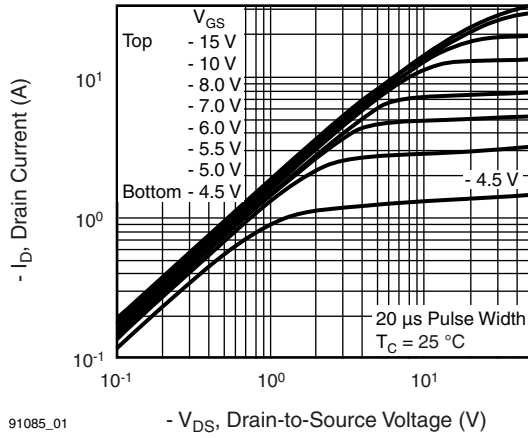


Fig. 1 - Typical Output Characteristics, $T_C = 25\text{ °C}$

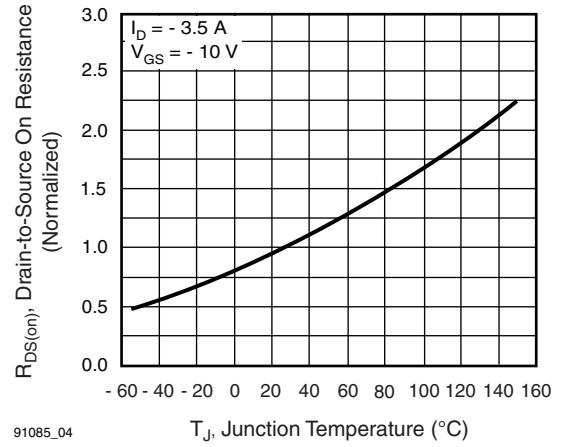


Fig. 4 - Normalized On-Resistance vs. Temperature

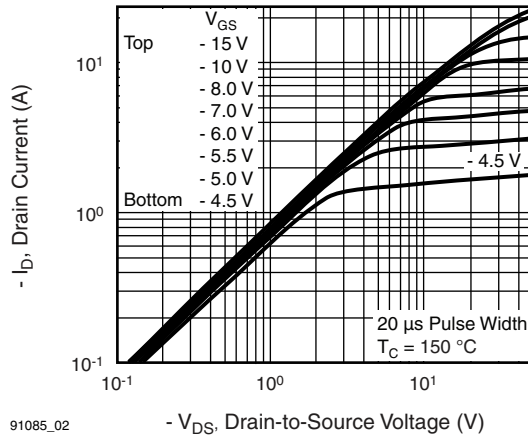


Fig. 2 - Typical Output Characteristics, $T_C = 150\text{ °C}$

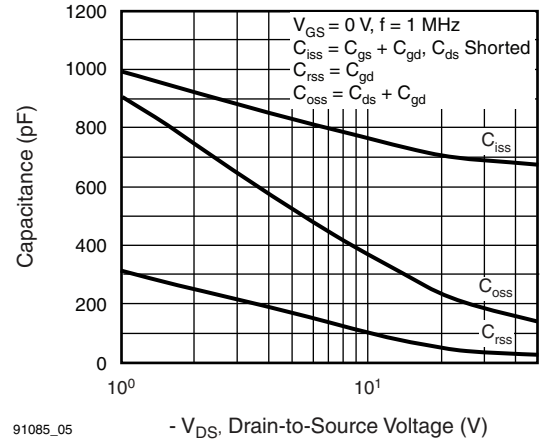


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

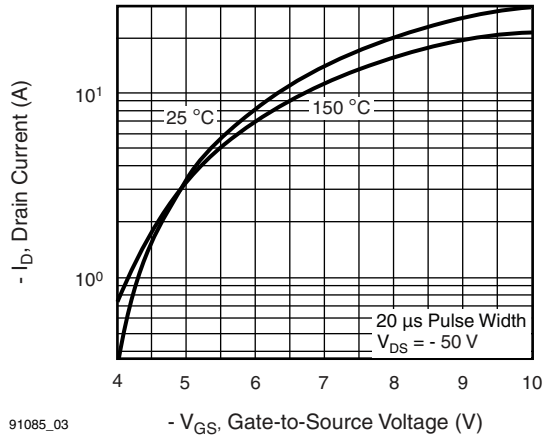


Fig. 3 - Typical Transfer Characteristics

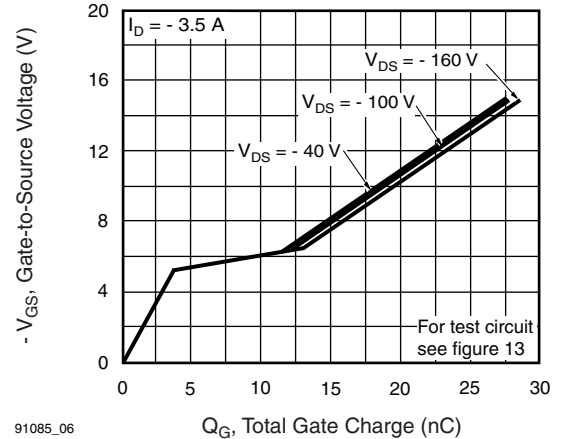


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

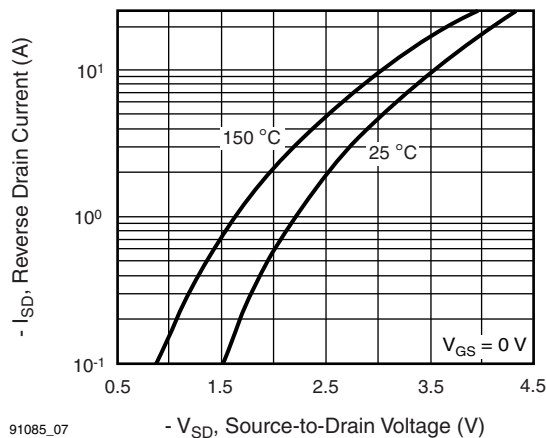


Fig. 7 - Typical Source-Drain Diode Forward Voltage

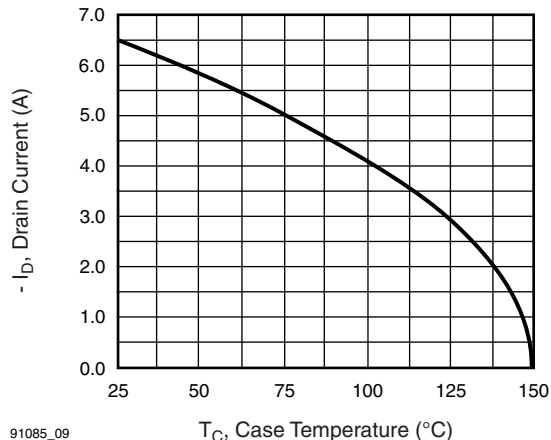


Fig. 9 - Maximum Drain Current vs. Case Temperature

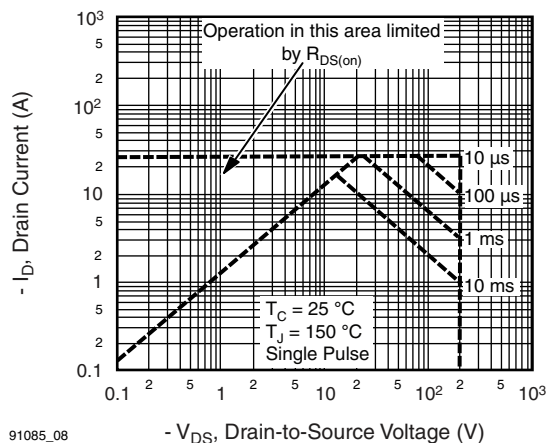


Fig. 8 - Maximum Safe Operating Area

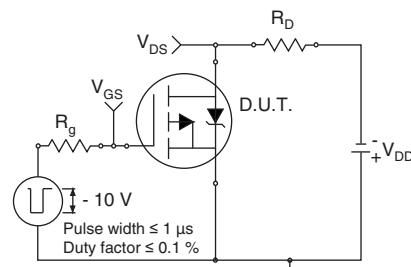


Fig. 10a - Switching Time Test Circuit

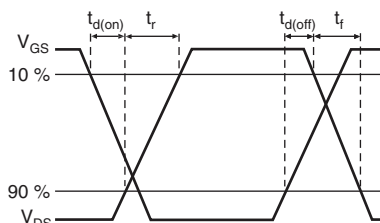


Fig. 10b - Switching Time Waveforms

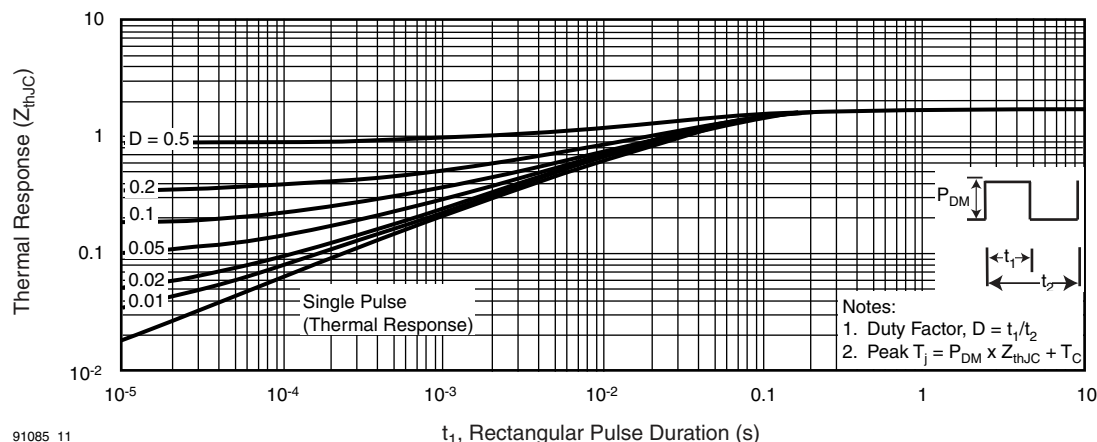


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

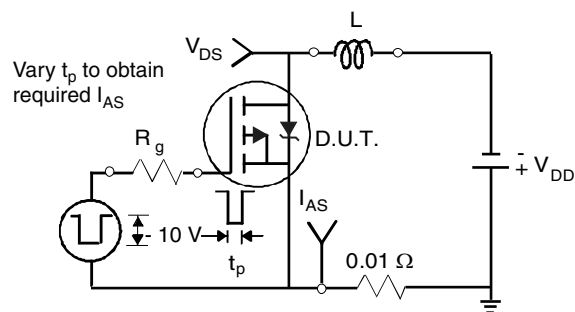


Fig. 12a - Unclamped Inductive Test Circuit

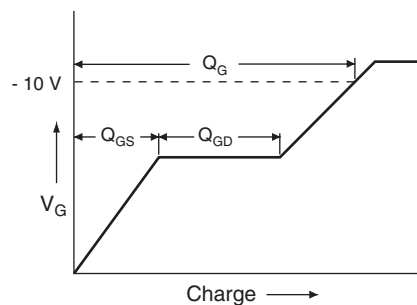


Fig. 13a - Basic Gate Charge Waveform

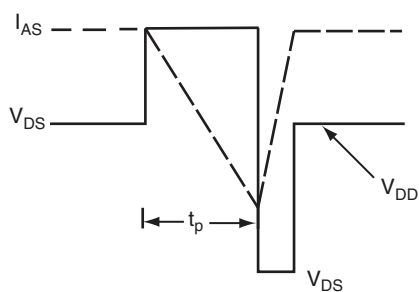


Fig. 12b - Unclamped Inductive Waveforms

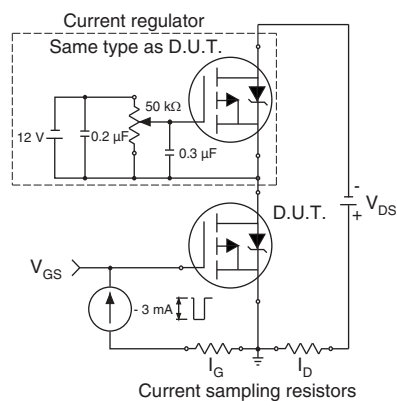


Fig. 13b - Gate Charge Test Circuit

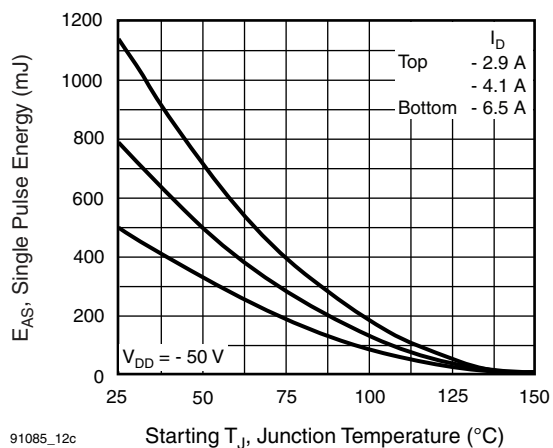


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

Peak Diode Recovery dV/dt Test Circuit

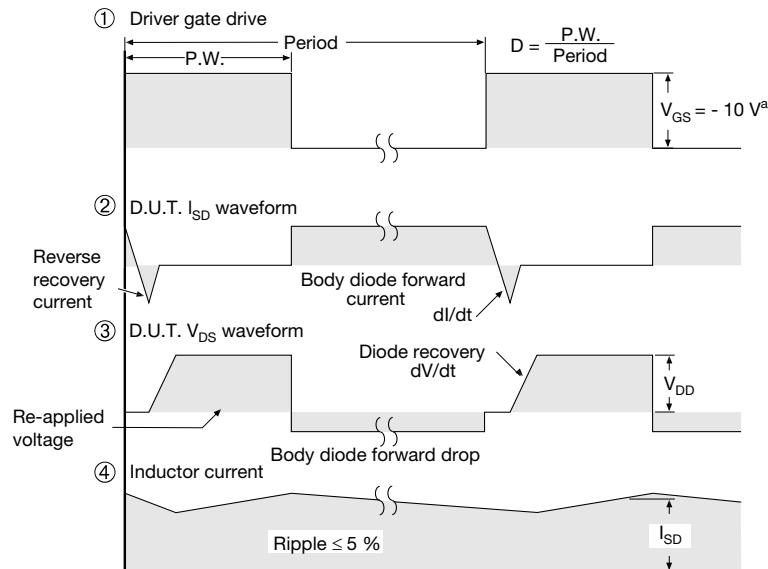
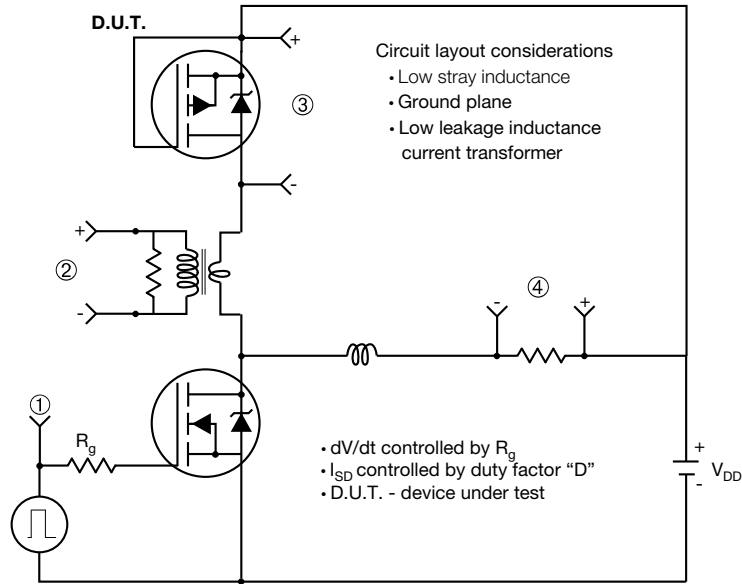
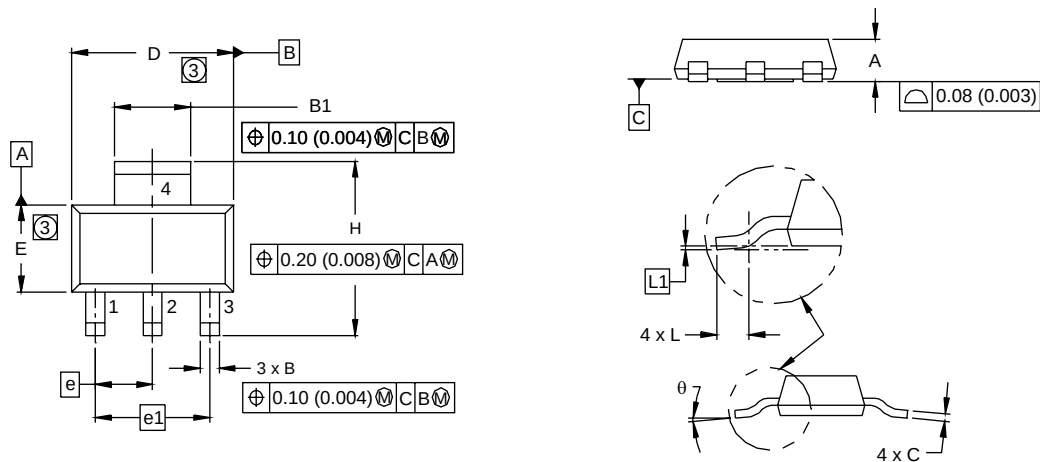


Fig. 14 - For P-Channel

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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