P-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)[a]	Q_g (Typ.)
- 60	0.055 at V_{GS} = - 10 V	- 7.0	30 nC
	0.065 at V_{GS} = - 4.5 V	- 6.0	

FEATURES

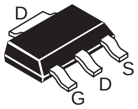
- TrenchFET® Power MOSFET
- 100 % UIS Tested

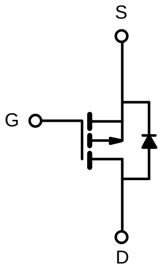
APPLICATIONS

- Load Switch

RoHS
COMPLIANT
HALOGEN
FREE

SOT-223





P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	- 60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	- 7.0[a]	A
	T_C = 70 °C		- 5.2	
	T_A = 25 °C		- 4.8[b]	
	T_A = 70 °C		- 4.1[b]	
Pulsed Drain Current		I_{DM}	- 25	
Avalanche Current Pulse	L = 0.1 mH	I_{AS}	- 4.5	
Single Pulse Avalanche Energy		E_{AS}	10.1	mJ
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	6.9[a]	A
	T_A = 25 °C		3.5[b]	
Maximum Power Dissipation	T_C = 25 °C	P_D	10.4[a]	W
	T_C = 70 °C		6.6[a]	
	T_A = 25 °C		2.1[b]	
	T_A = 70 °C		1.1[b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient[b]	Steady State	R_{thJA}	33	40	°C/W
Maximum Junction-to-Case	Steady State	R_{thJC}	0.98	1.2	

Notes:
a. Based on T_C = 25 °C.
b. Surface mounted on 1" x 1" FR4 board.

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	- 60			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		68		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 5.2		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 1.0		- 2.5	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 60 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 60 V, V_{GS} = 0 V, T_J = 55 °C			- 10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = - 5 V, V_{GS} = - 10 V	- 25			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 3 A		0.055		Ω
		V_{GS} = - 4.5 V, I_D = - 2 A		0.065		
Forward Transconductance[a]	g_{fs}	V_{DS} = - 15 V, I_D = - 5 A	20			S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = - 25 V, V_{GS} = 0 V, f = 1 MHz		1500		pF
Output Capacitance	C_{oss}			200		
Reverse Transfer Capacitance	C_{rss}			150		
Total Gate Charge	Q_g	V_{DS} = - 30 V, V_{GS} = - 10 V, I_D = - 5 A		38	56	nC
		V_{DS} = - 30 V, V_{GS} = - 4.5 V, I_D = - 5 A		19	30	
Gate-Source Charge	Q_{gs}			9		
Gate-Drain Charge	Q_{gd}			10		
Gate Resistance	R_g	f = 1 MHz		5.2		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 2 V, R_L = 2 Ω I_D ≅ - 5 A, V_{GEN} = - 10 V, R_g = 1 Ω		10	15	ns
Rise Time	t_r			7	15	
Turn-Off Delay Time	$t_{d(off)}$			70	110	
Fall Time	t_f			40	60	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			- 6.9	A
Pulse Diode Forward Current[a]	I_{SM}				- 15	
Body Diode Voltage	V_{SD}	I_S = - 3 A		- 1	- 1.5	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = - 5 A, di/dt = 10 A/µs, T_J = 25 °C		45	68	ns
Body Diode Reverse Recovery Charge	Q_{rr}			59	120	nC
Reverse Recovery Fall Time	t_a			29		ns
Reverse Recovery Rise Time	t_b			16		

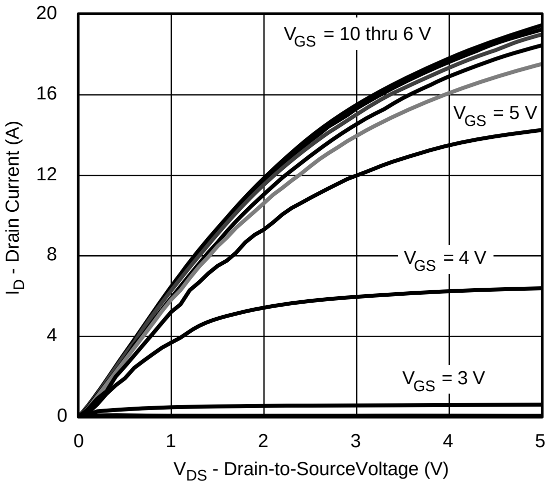
Notes:

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

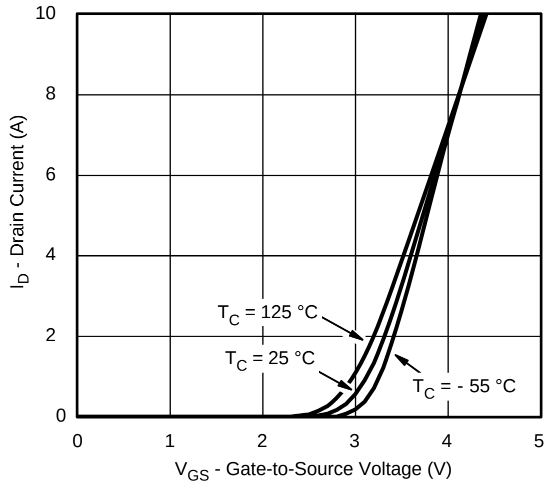
b. Guaranteed by design, not subject to production testing.

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 in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

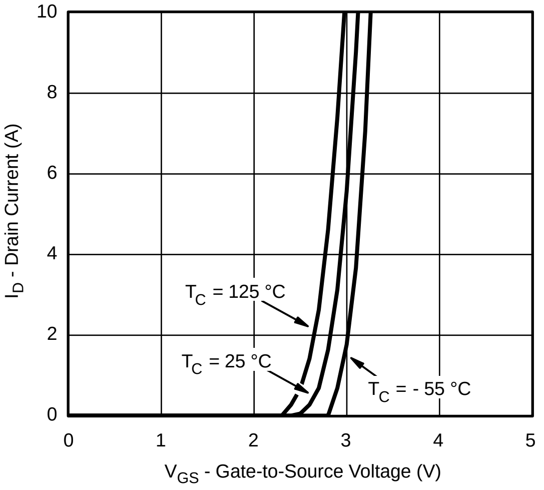
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



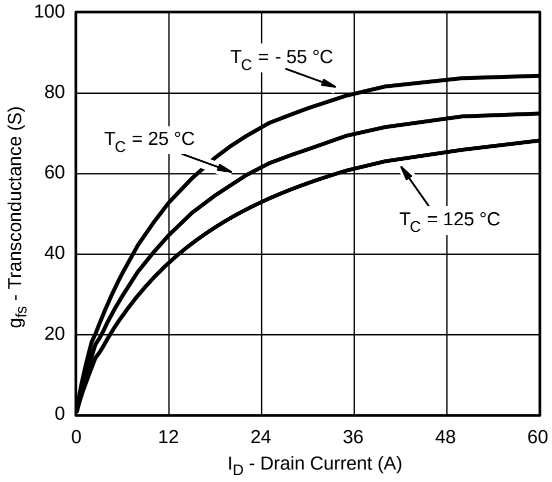
Output Characteristics



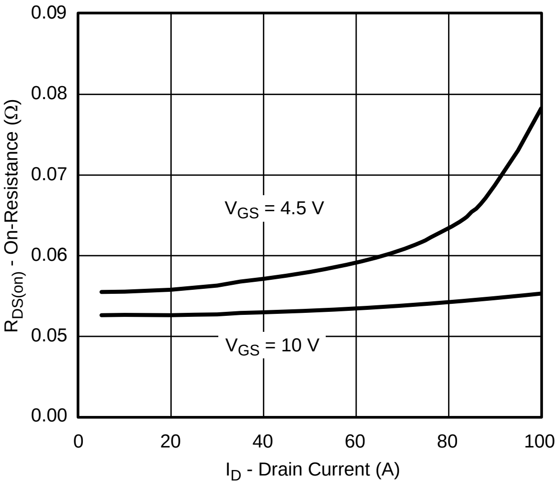
Transfer Characteristics



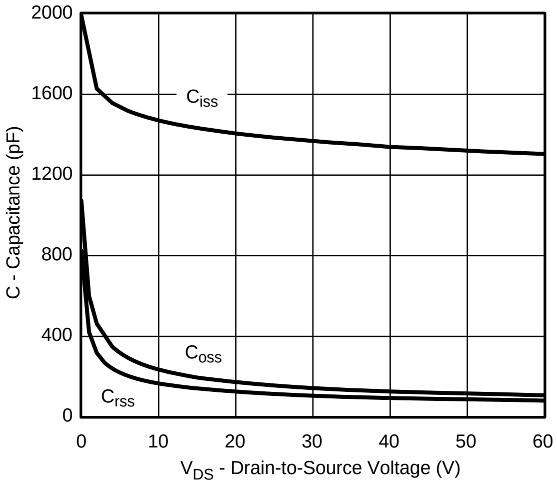
Transfer Characteristics



Transconductance

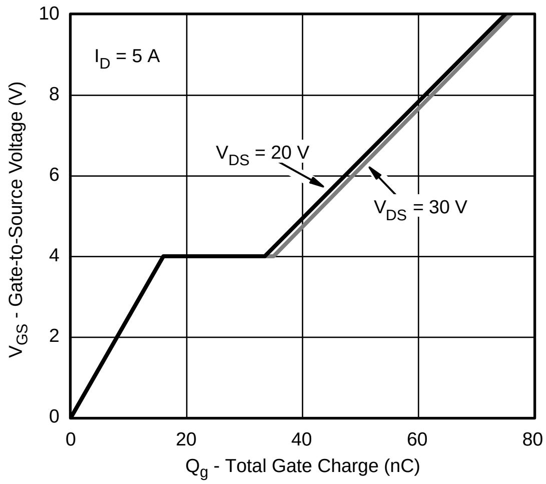


On-Resistance vs. Drain Current

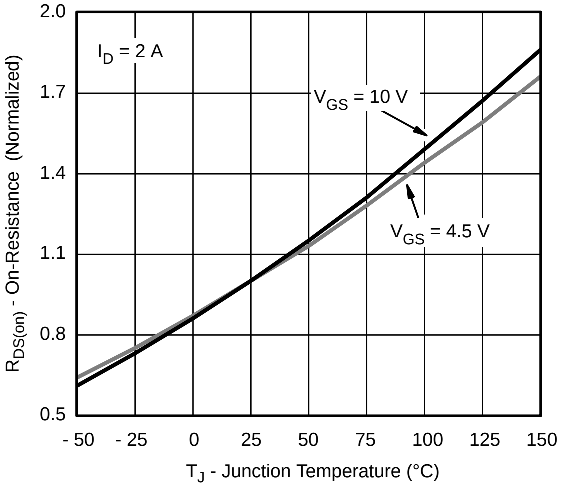


Capacitance

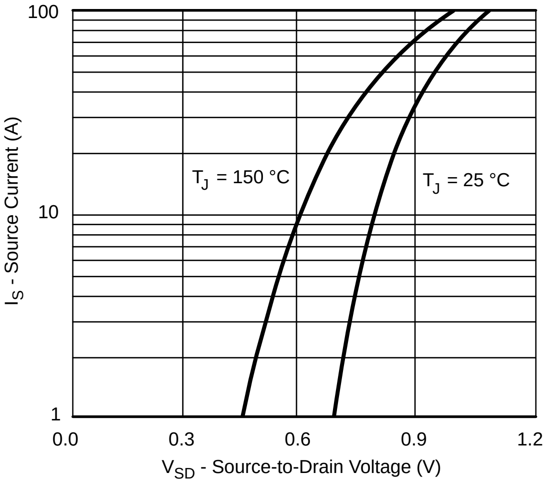
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



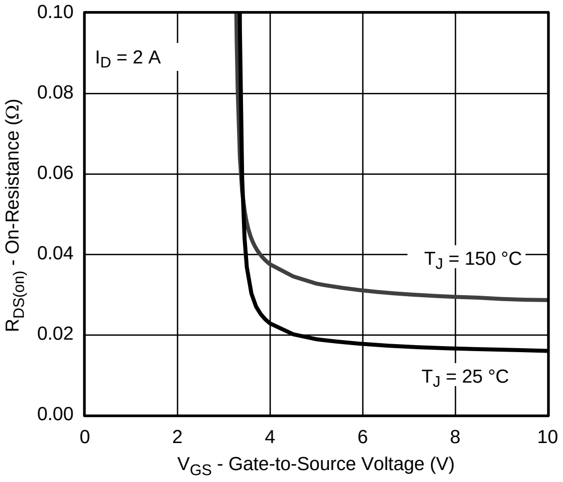
Gate Charge



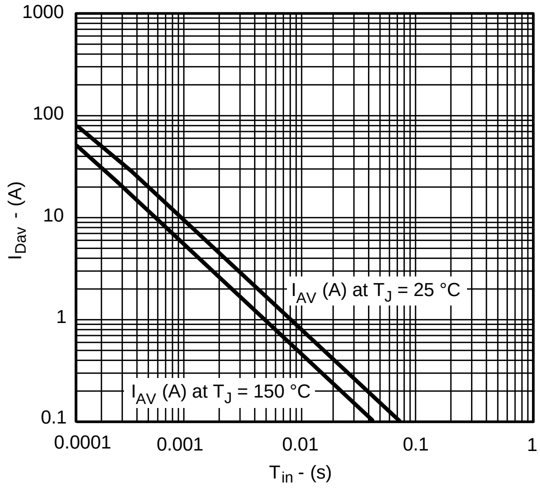
On-Resistance vs. Gate-to-Source Voltage



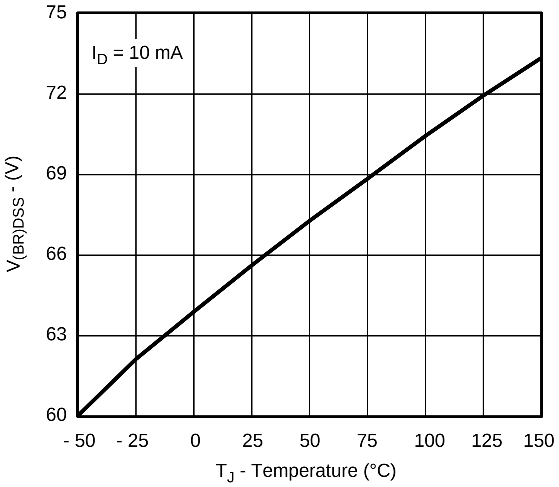
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

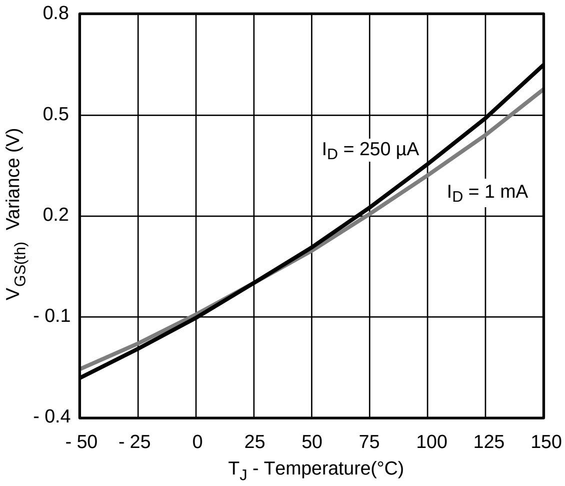


Single Pulse Avalanche Current Capability vs. Time

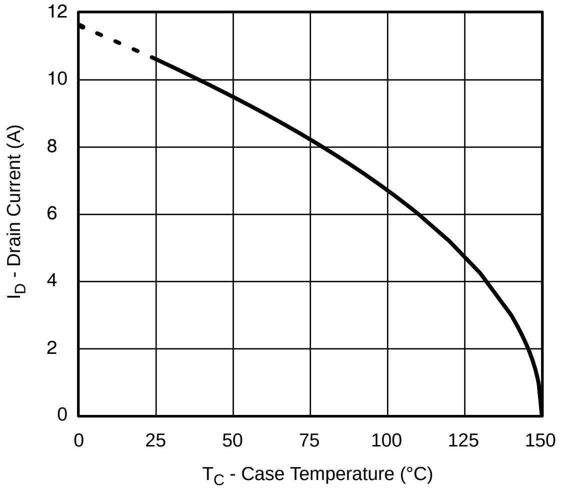


Drain-Source Breakdown Voltage vs. Junction Temperature

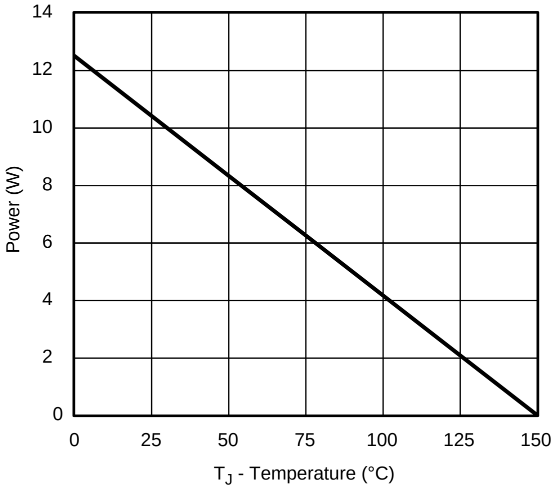
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



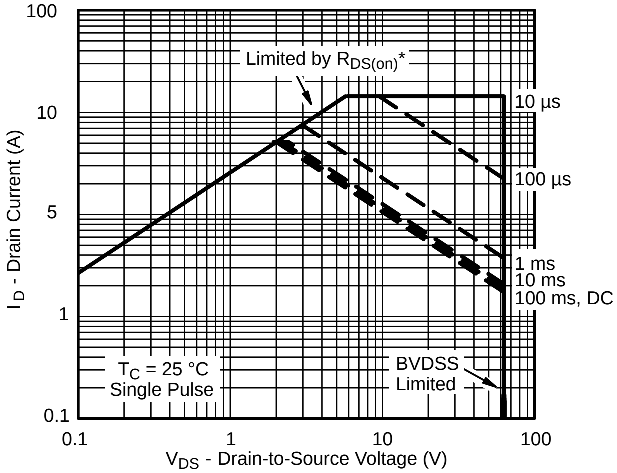
Threshold Voltage



Max. Drain Current vs. Case Temperature

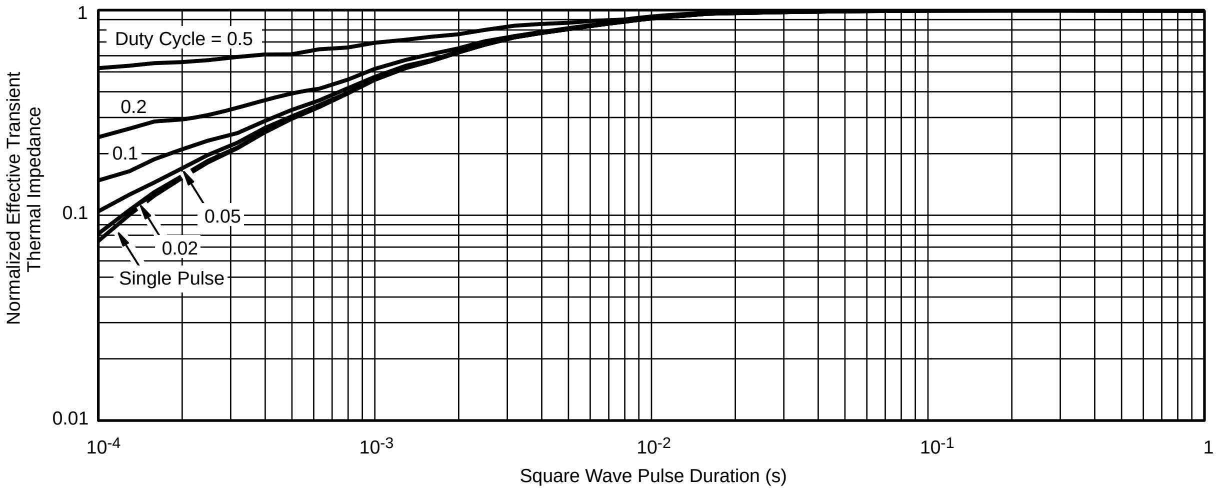


Power Derating, Junction-to-Case



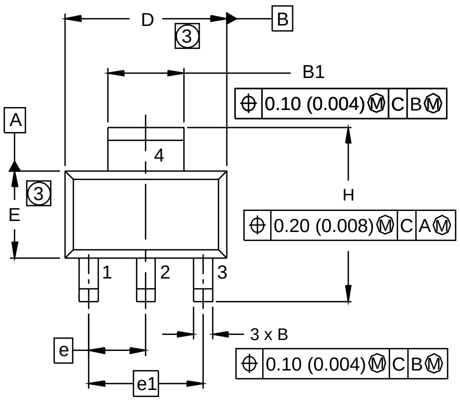
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

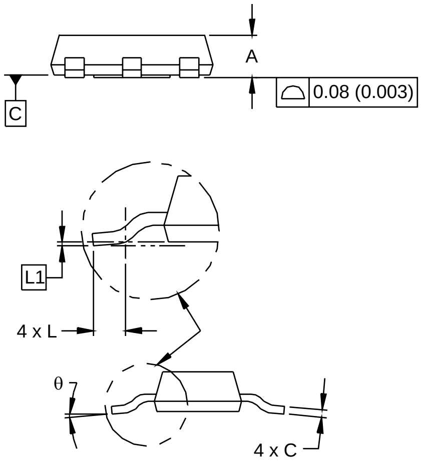
Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Case

SOT-223 (HIGH VOLTAGE)





	MILLIMETERS		INCHES	
DIM.	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.