

P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
- 30	0.043 at $V_{GS} = -10$ V	-8 ^a	15 nC
	0.046 at $V_{GS} = -4.5$ V	-7 ^a	

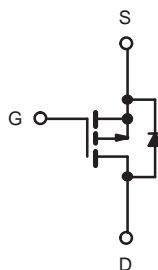
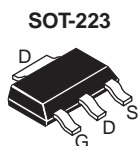
FEATURES

- Halogen-free
- Trench Power MOSFET
- 100 % R_g Tested


RoHS
 COMPLIANT

APPLICATIONS

- DC/DC Converter
- Load Switch
- Adaptor Switch



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	$T_C = 25^\circ\text{C}$	- 8 ^a	A
	$T_C = 85^\circ\text{C}$	- 6	
	$T_A = 25^\circ\text{C}$	- 7 ^{a, b, c}	
	$T_A = 85^\circ\text{C}$	- 6.2 ^{b, c}	
Pulsed Drain Current	I_{DM}	-20	
Continuous Source-Drain Diode Current	$T_C = 25^\circ\text{C}$	- 5.3	
	$T_A = 25^\circ\text{C}$	- 2.1 ^{b, c}	
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	6.3	W
	$T_C = 85^\circ\text{C}$	3.3	
	$T_A = 25^\circ\text{C}$	2.5 ^{b, c}	
	$T_A = 85^\circ\text{C}$	1.3 ^{b, c}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	$^\circ\text{C}$
Soldering Recommendations (Peak Temperature)		260	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient	R_{thJA}	40	50	$^\circ\text{C}/\text{W}$
Maximum Junction-to-Foot (Drain)	R_{thJF}	15	20	

Notes:

a. Package limited.

b. Surface Mounted on 1" x 1" FR4 board.

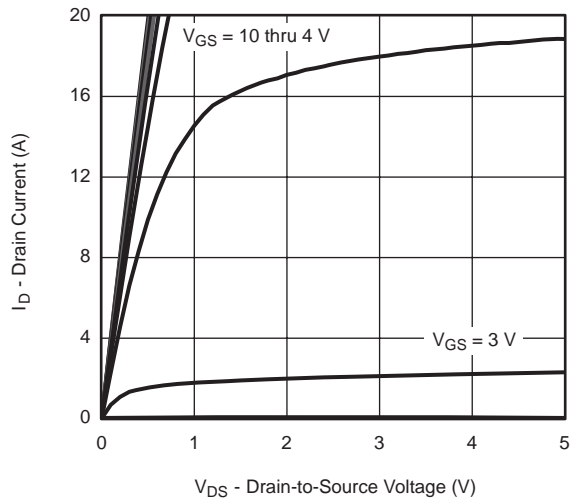
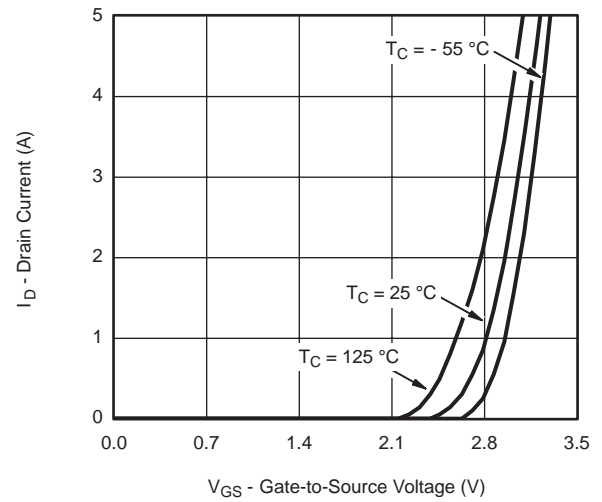
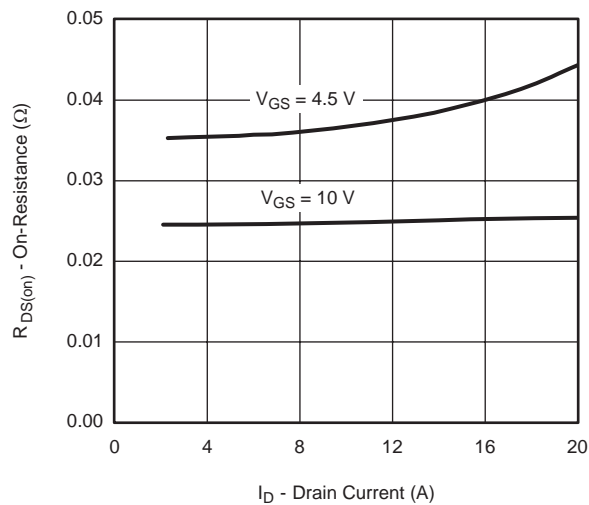
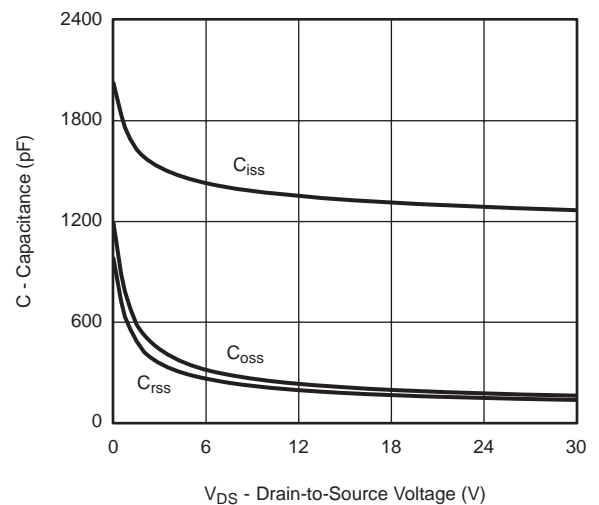
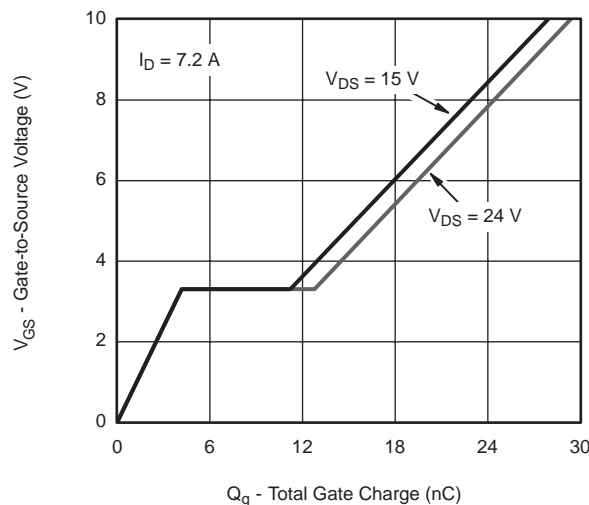
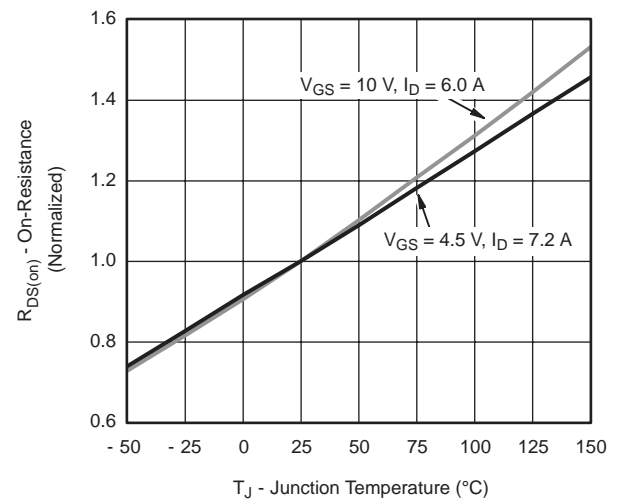
 c. $t = 5$ s.

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	- 30			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = - 250 μA		- 30		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			5		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA	- 0.7		- 3	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} = - 30 V, V _{GS} = 0 V			- 1	μA
		V _{DS} = - 30 V, V _{GS} = 0 V, T _J = 85 °C			- 5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≤ - 5 V, V _{GS} = - 10 V	- 20			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 7.2 A		0.043		Ω
		V _{GS} = - 4.5 V, I _D = - 6.0 A		0.046		
Forward Transconductance ^a	g _{fs}	V _{DS} = - 15 V, I _D = - 7.2 A		18		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = - 15 V, V _{GS} = 0 V, f = 1 MHz		1340		pF
Output Capacitance	C _{oss}			215		
Reverse Transfer Capacitance	C _{rss}			185		
Total Gate Charge	Q _g	V _{DS} = - 15 V, V _{GS} = - 10 V, I _D = - 7.2 A		28	42	nC
		V _{DS} = - 15 V, V _{GS} = - 4.5 V, I _D = - 7.2 A		15	23	
Gate-Source Charge	Q _{gs}			4.5		
Gate-Drain Charge	Q _{gd}			7.2		
Gate Resistance	R _g	f = 1 MHz	1.2	6	12	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = - 15 V, R _L = 2.6 Ω I _D ≅ - 5.8 A, V _{GEN} = - 4.5 V, R _g = 1 Ω		50	75	ns
Rise Time	t _r			140	210	
Turn-Off Delay Time	t _{d(off)}			30	45	
Fall Time	t _f			18	27	
Turn-On Delay Time	t _{d(on)}	V _{DD} = - 15 V, R _L = 2.6 Ω I _D ≅ - 5.8 A, V _{GEN} = - 10 V, R _g = 1 Ω		11	17	
Rise Time	t _r			11	17	
Turn-Off Delay Time	t _{d(off)}			37	56	
Fall Time	t _f			12	18	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			- 5.3	A
Pulse Diode Forward Current	I _{SM}				- 20	
Body Diode Voltage	V _{SD}	I _S = - 5.8 A, V _{GS} = 0 V		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = - 5.8 A, di/dt = - 100 A/μs, T _J = 25 °C		22	33	ns
Body Diode Reverse Recovery Charge	Q _{rr}			15	25	nC
Reverse Recovery Fall Time	t _a			13		ns
Reverse Recovery Rise Time	t _b			9		

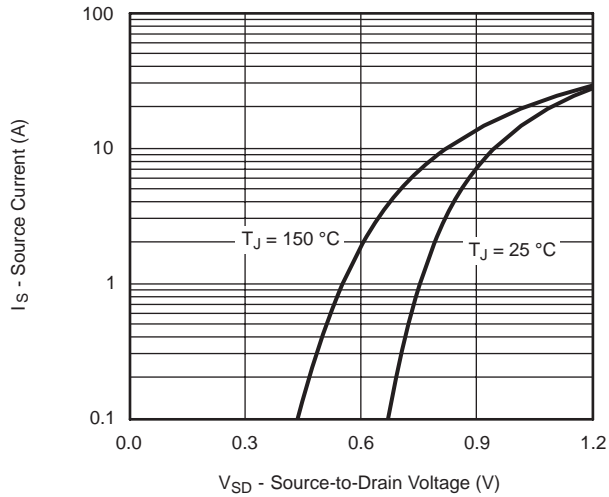
Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

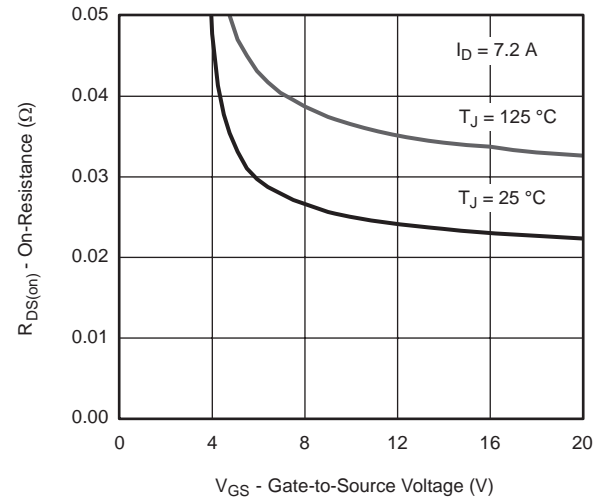
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Output Characteristics

Transfer Characteristics

On Resistance vs. Drain Current

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature

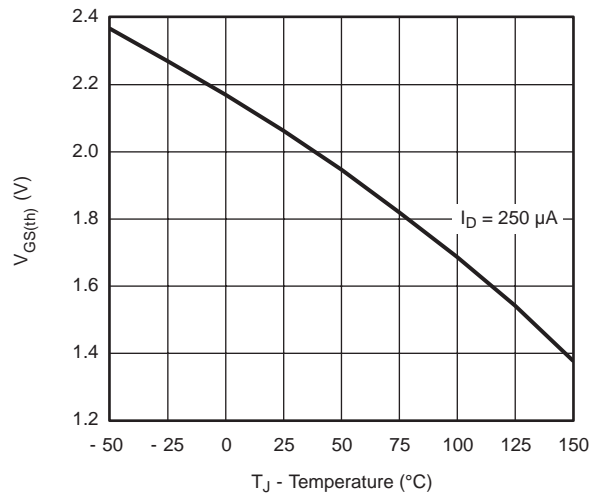
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



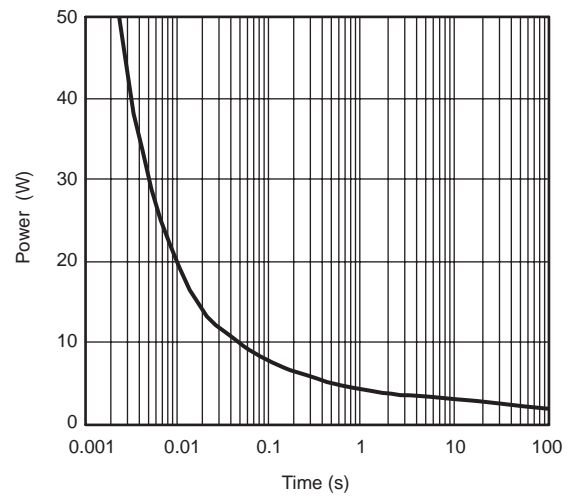
Forward Diode Voltage vs. Temp.



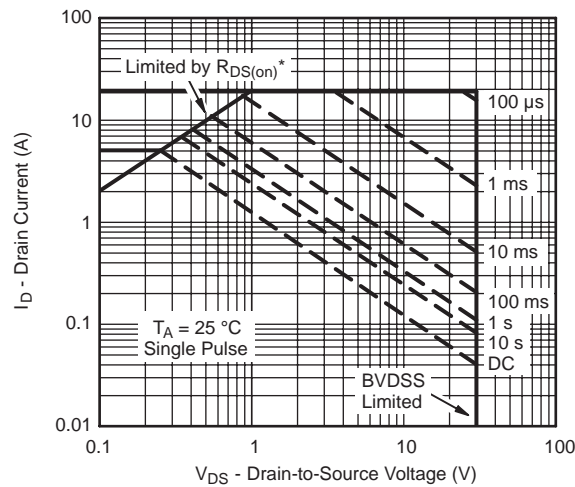
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



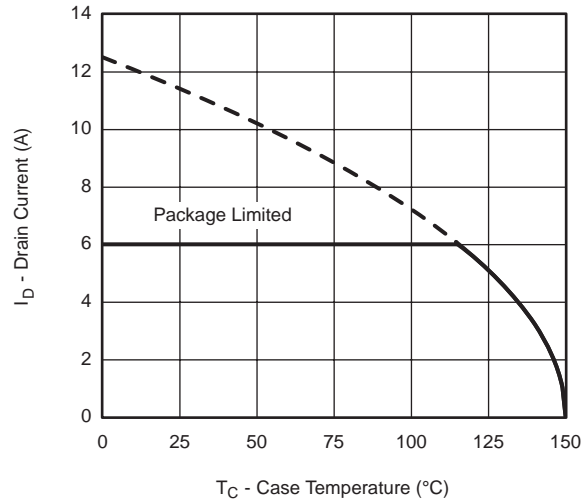
Single Pulse Power



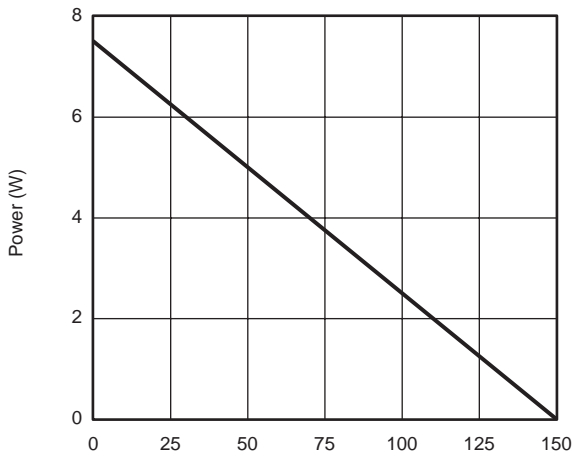
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

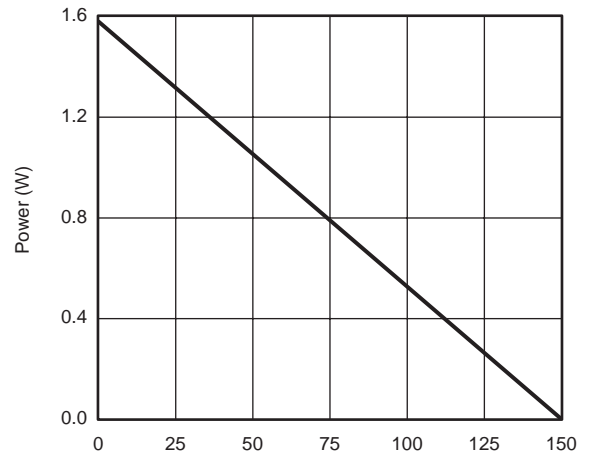
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Current Derating*

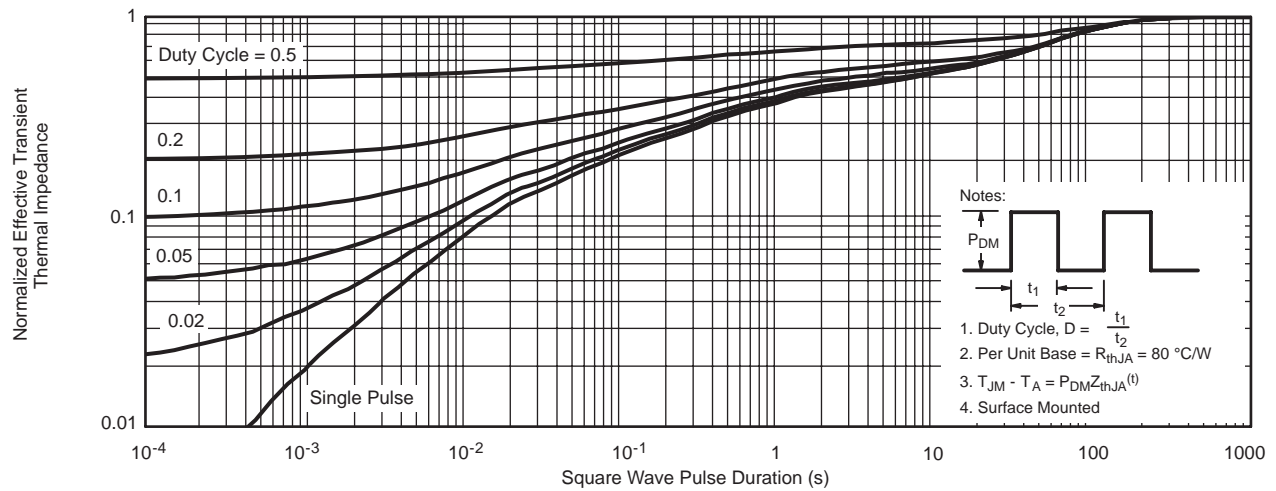
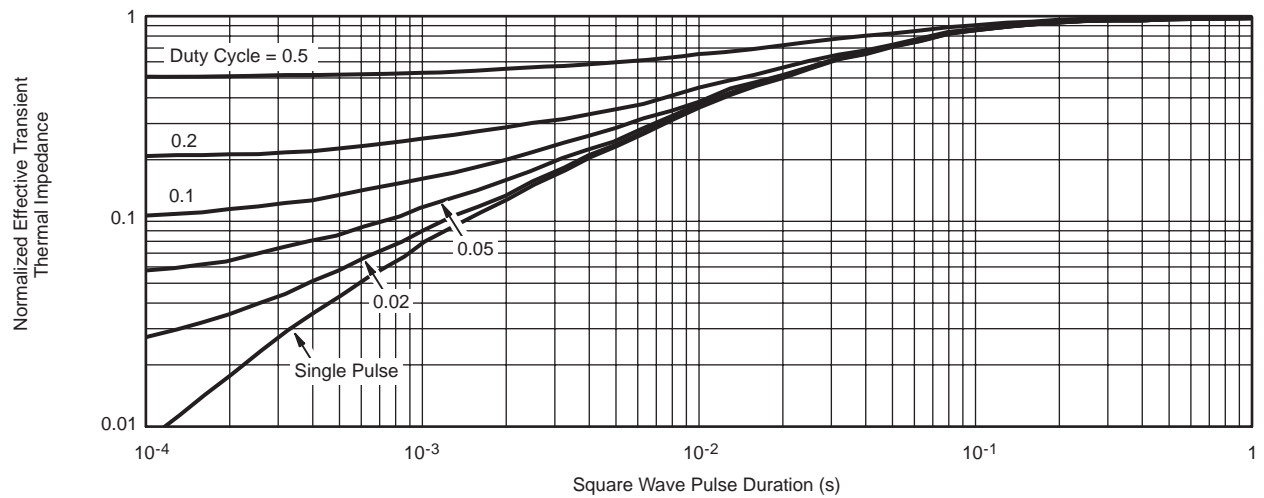


Power, Junction-to-Case

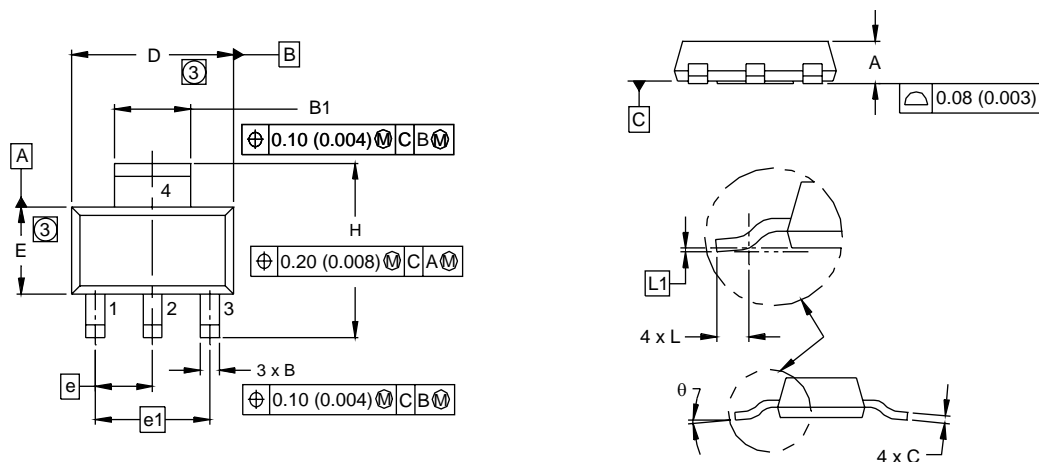


Power, Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Normalized Thermal Transient Impedance, Junction-to-Ambient

Normalized Thermal Transient Impedance, Junction-to-Foot

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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