P-Channel 100-V (D-S) MOSFET

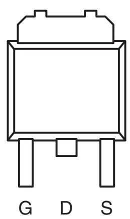
PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
- 100	0.019 at V_{GS} = - 10 V	- 90	97 nC
	0.021 at V_{GS} = - 4.5 V	- 85	

FEATURES

- TrenchFET® Power MOSFET
- Compliant to RoHS Directive 2002/95/EC

RoHS
COMPLIANT

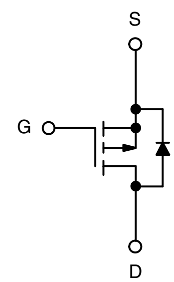
TO-263



Drain Connected to Tab

Top View

Ordering Information: SUM90P10-19L-E3 (Lead (Pb)-free)



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	- 100	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	- 90	A
	T_C = 125 °C		- 52	
	T_A = 25 °C		- 17.2[b, c]	
	T_A = 125 °C		- 9.9[b, c]	
Pulsed Drain Current		I_{DM}	- 90	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	- 250	
	T_A = 25 °C		- 9[b, c]	
Avalanche Current	L = 0.1 mH	I_{AS}	- 70	
Single-Pulse Avalanche Energy		E_{AS}	245	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	375	W
	T_C = 125 °C		125	
	T_A = 25 °C		13.6[b, c]	
	T_A = 125 °C		4.5[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient[b, d]	t ≤ 10 s	R_{thJA}	8	11	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	0.33	0.4	

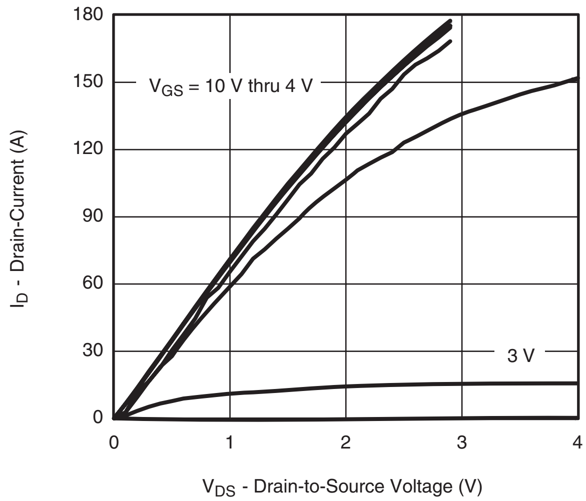
Notes:
a. Package Limited.
b. Surface Mounted on 1" x 1" FR4 board.
c. t = 10 s.
d. Maximum under Steady State conditions is 40 °C/W.

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	- 100			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		- 125		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			5.9		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = - 250 µA	- 1		- 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} = - 100 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 100 V, V_{GS} = 0 V, T_J = 175 °C			- 500	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 10 V, V_{GS} = - 10 V	- 90			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 20 A		0.0156	0.019	Ω
		V_{GS} = - 4.5 V, I_D = - 15 A		0.0173	0.021	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 15 V, I_D = - 20 A		80		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = - 50 V, V_{GS} = 0 V, f = 1 MHz		11100		pF
Output Capacitance	C_{oss}			700		
Reverse Transfer Capacitance	C_{rss}			1690		
Total Gate Charge	Q_g	V_{DS} = - 50 V, V_{GS} = - 10 V, I_D = - 90 A		217	326	nC
		V_{DS} = - 50 V, V_{GS} = - 4.5 V, I_D = - 90 A		97	146	
Gate-Source Charge	Q_{gs}			42		
Gate-Drain Charge	Q_{gd}			51		
Gate Resistance	R_g	f = 1 MHz		3.5		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 50 V, R_L = 0.56 Ω $I_D \cong$ - 90 A, V_{GEN} = - 10 V, R_g = 1 Ω		20	30	ns
Rise Time	t_r			510	855	
Turn-Off Delay Time	$t_{d(off)}$			145	220	
Fall Time	t_f			870	1300	
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I_S	T_C = 25 °C			- 90	A
Pulse Diode Forward Current[a]	I_{SM}				- 250	
Body Diode Voltage	V_{SD}	I_S = - 20 A		- 0.8	- 1.5	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = - 20 A, dI/dt = 100 A/µs, T_J = 25 °C		80	120	ns
Body Diode Reverse Recovery Charge	Q_{rr}			220	330	nC
Reverse Recovery Fall Time	t_a			56		ns
Reverse Recovery Rise Time	t_b			24		

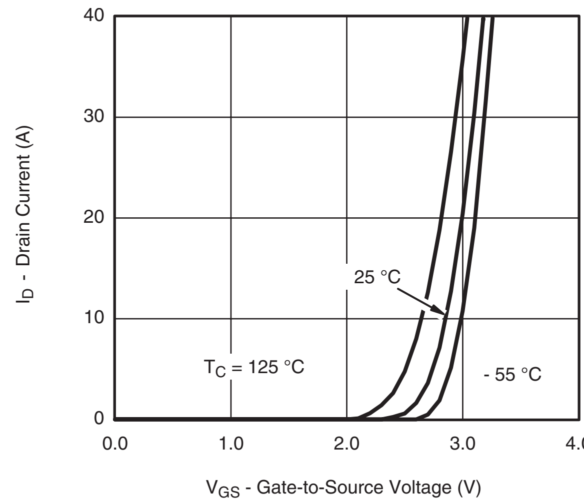
Notes
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

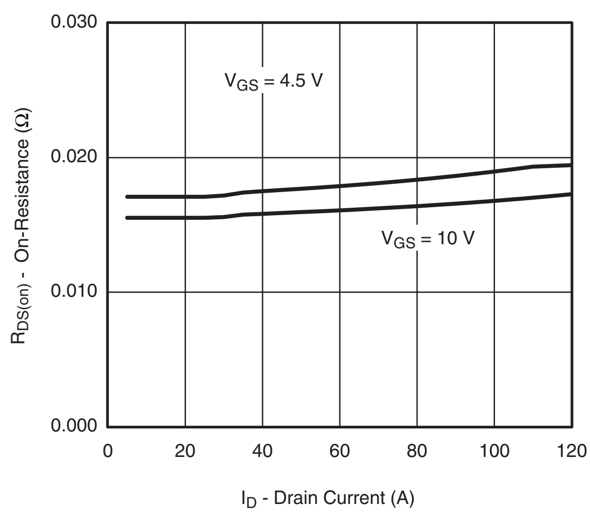
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



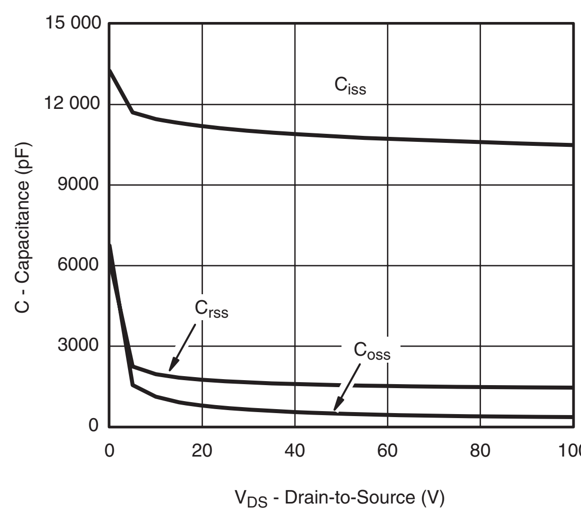
Output Characteristics



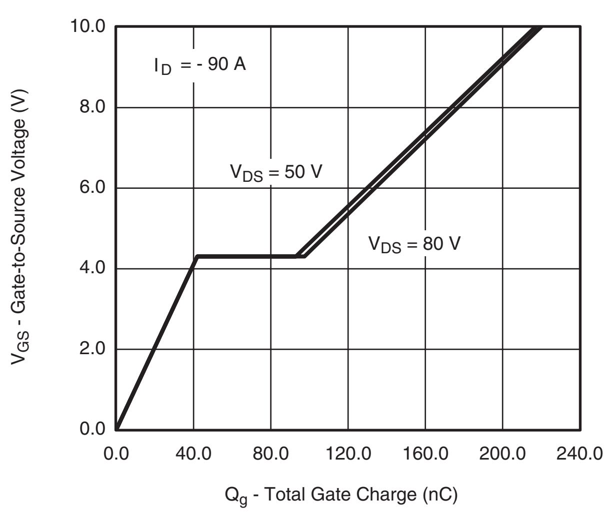
Transfer Characteristics



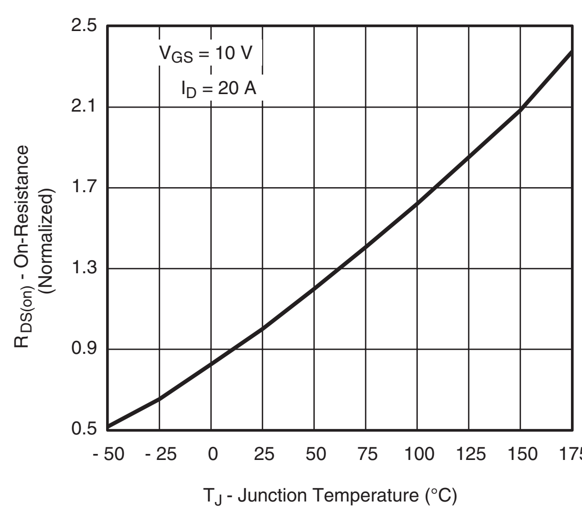
On-Resistance vs. Drain Current



Capacitance

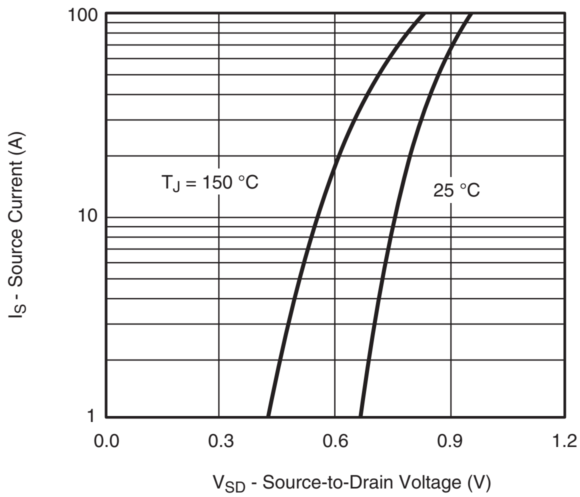


Gate Charge

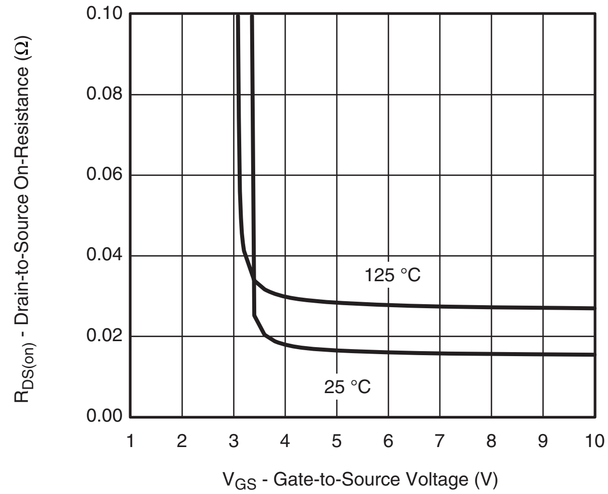


On-Resistance vs. Junction Temperature

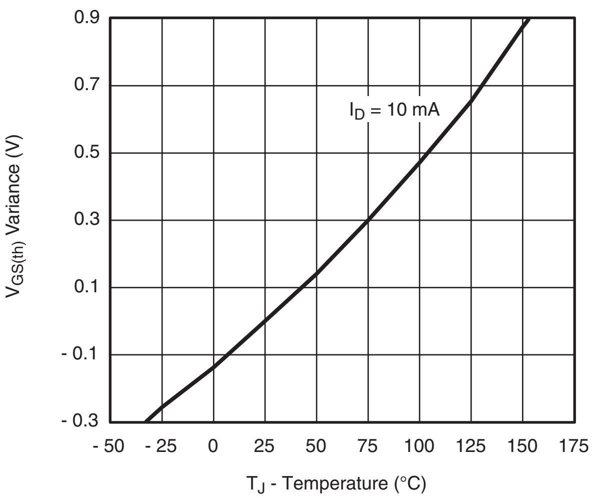
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



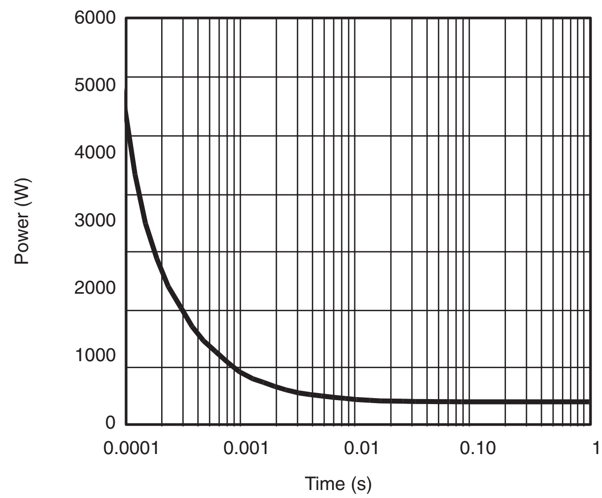
Source-Drain Diode Forward Voltage



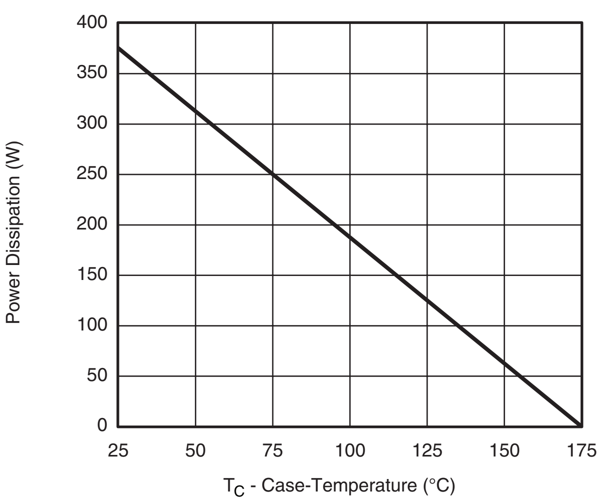
On-Resistance vs. Gate-to-Source Voltage



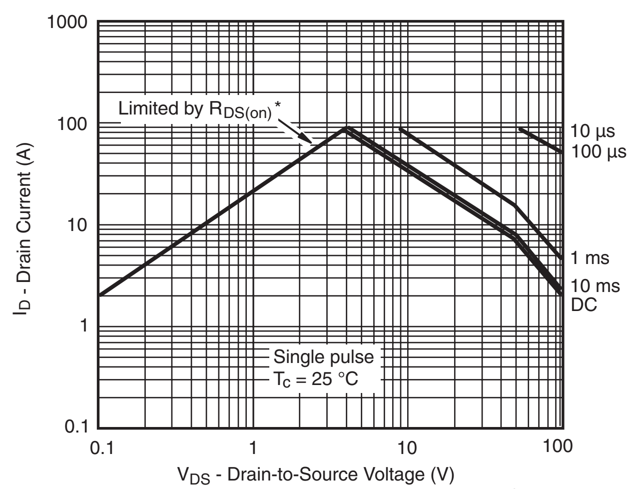
Threshold Voltage



Single Pulse, Junction-to-Case (T_C = 25 °C)

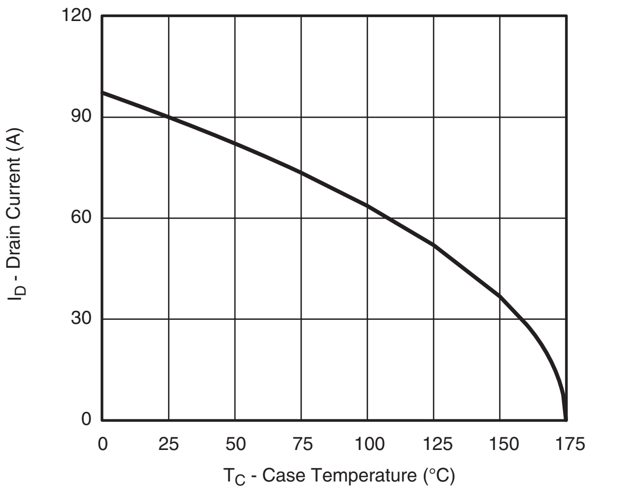


Power Derating (Junction-to-Case)

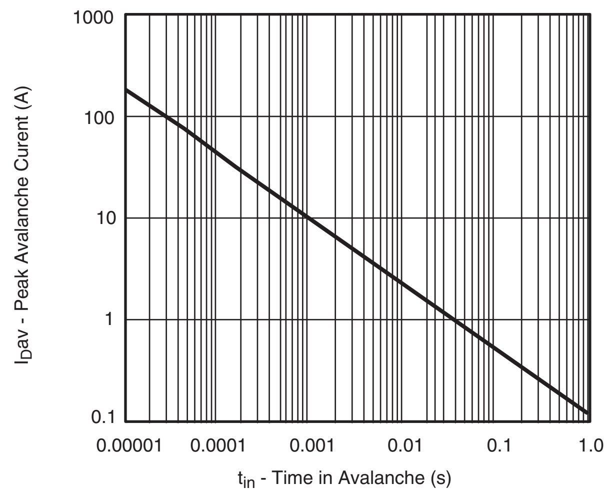


Safe Operating Area

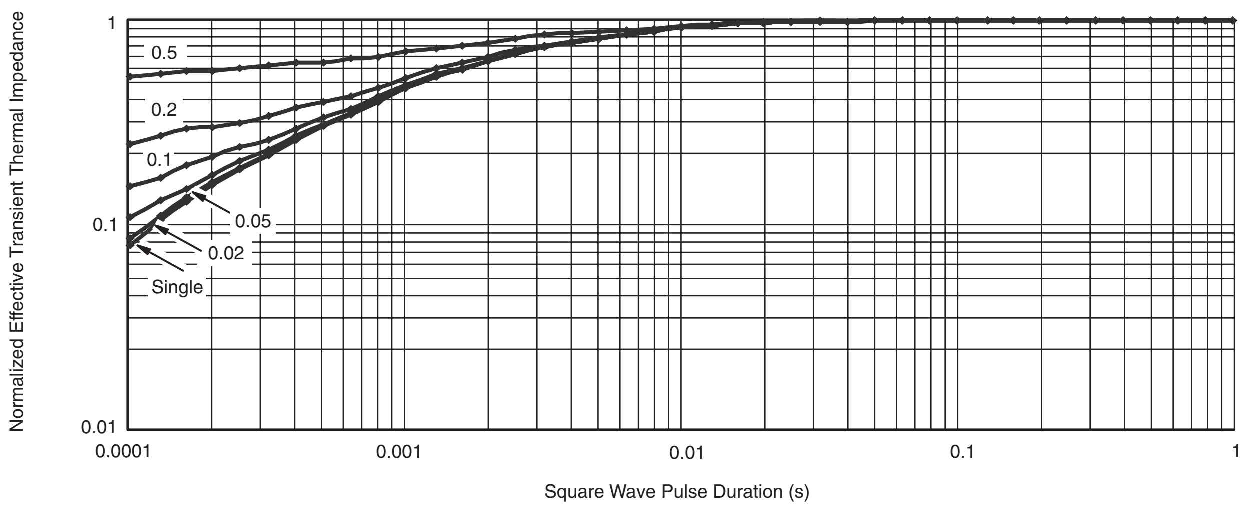
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Max Avalanche and Drain Current vs. Case Temperature



Avalanche Current vs. Time



Normalized Thermal Transient Impedance, Junction-to-Case

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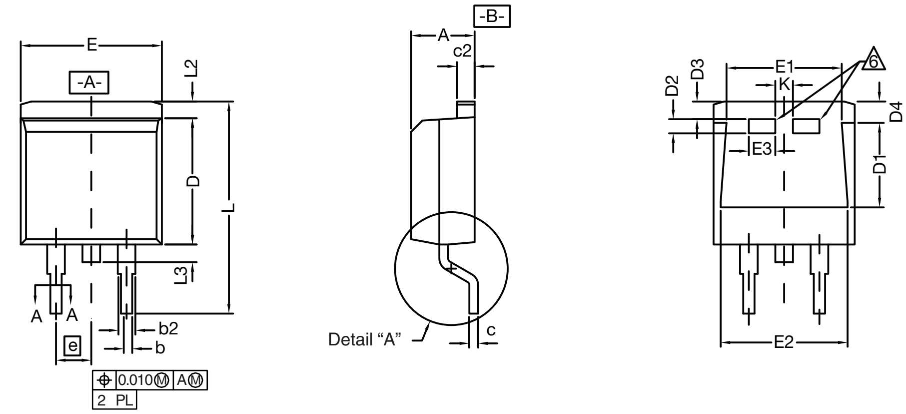
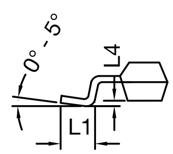
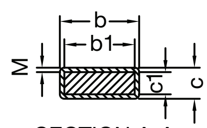
TO-263 (D^2PAK): 3-LEAD





DETAIL A (ROTATED 90°)



SECTION A-A

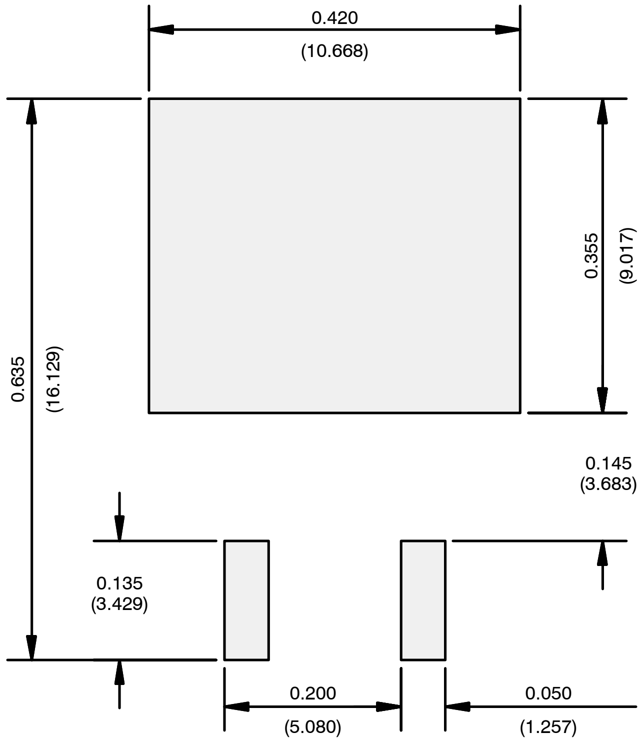
DIM.		INCHES MIN.	INCHES MAX.	MILLIMETERS MIN.	MILLIMETERS MAX.
A		0.160	0.190	4.064	4.826
b		0.020	0.039	0.508	0.990
b1		0.020	0.035	0.508	0.889
b2		0.045	0.055	1.143	1.397
c*	Thin lead	0.013	0.018	0.330	0.457
	Thick lead	0.023	0.028	0.584	0.711
c1	Thin lead	0.013	0.017	0.330	0.431
	Thick lead	0.023	0.027	0.584	0.685
c2		0.045	0.055	1.143	1.397
D		0.340	0.380	8.636	9.652
D1		0.220	0.240	5.588	6.096
D2		0.038	0.042	0.965	1.067
D3		0.045	0.055	1.143	1.397
D4		0.044	0.052	1.118	1.321
E		0.380	0.410	9.652	10.414
E1		0.245	-	6.223	-
E2		0.355	0.375	9.017	9.525
E3		0.072	0.078	1.829	1.981
e		0.100 BSC		2.54 BSC	
K		0.045	0.055	1.143	1.397
L		0.575	0.625	14.605	15.875
L1		0.090	0.110	2.286	2.794
L2		0.040	0.055	1.016	1.397
L3		0.050	0.070	1.270	1.778
L4		0.010 BSC		0.254 BSC	
M		-	0.002	-	0.050

ECN: T13-0707-Rev. K, 30-Sep-13
DWG: 5843

Notes

1. Plane B includes maximum features of heat sink tab and plastic.
2. No more than 25 % of L1 can fall above seating plane by max. 8 mils.
3. Pin-to-pin coplanarity max. 4 mils.
4. *: Thin lead is for SUB, SYB.
   Thick lead is for SUM, SYM, SQM.
5. Use inches as the primary measurement.
6. This feature is for thick lead.

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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