

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



**RoHS**  
COMPLIANT

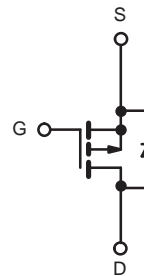
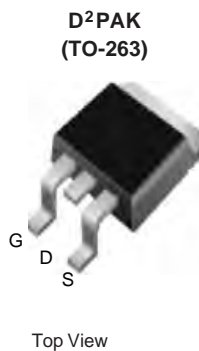
PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ.)
- 100	0.036 at V <sub>GS</sub> = - 10 V	- 50	32
	0.039 at V <sub>GS</sub> = - 4.5 V	- 40	

### FEATURES

- DT-Trench Power MOSFET
- 100 % R<sub>g</sub> and UIS Tested

### APPLICATIONS

- Power Switch
- DC/DC Converters
- Portable equipment and battery powered systems



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T <sub>C</sub> = 25 °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V <sub>DS</sub>	- 100	V	
Gate-Source Voltage	V <sub>GS</sub>	± 20		
Continuous Drain Current (T <sub>J</sub> = 150 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	- 50	A
		T <sub>C</sub> = 75 °C	- 45	
Pulsed Drain Current	I <sub>DM</sub>	- 200		
Avalanche Current	I <sub>AS</sub>	- 42		
Single Avalanche Energy <sup>a</sup>	E <sub>AS</sub>	49	mJ	
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>C</sub> = 25 °C	133 <sup>b</sup>	W
		T <sub>A</sub> = 25 °C <sup>c</sup>	4.1	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Limit	Unit
Junction-to-Ambient (PCB Mount) <sup>c</sup>	R <sub>thJA</sub>	48	°C/W
Junction-to-Case (Drain)	R <sub>thJC</sub>	2.1	

Notes:

- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When Mounted on 1" square PCB (FR-4 material).

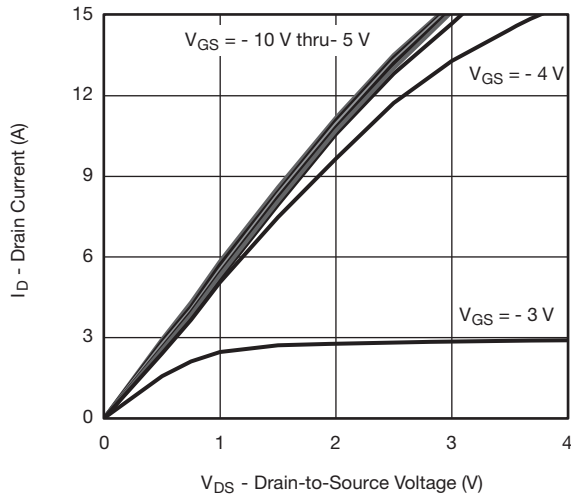
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
<b>Static</b>							
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{DS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-100			V	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1		-3.5		
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 250$	nA	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -80\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$	
		$V_{DS} = -80\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			-50		
		$V_{DS} = -80\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			-250		
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -10\text{ V}, V_{GS} = -10\text{ V}$	-160			A	
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -5\text{ A}$		0.036	0.045	$\Omega$	
		$V_{GS} = -4.5\text{ V}, I_D = -3\text{ A}$		0.039	0.050		
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -5\text{ A}$		17		S	
<b>Dynamic<sup>b</sup></b>							
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = -50\text{ V}, f = 1\text{ MHz}$		8450		$\mu\text{F}$	
Output Capacitance	$C_{oss}$			1405			
Reverse Transfer Capacitance	$C_{rss}$			504			
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = -50\text{ V}, V_{GS} = -10\text{ V}, I_D = -5\text{ A}$		35		$\text{nC}$	
			$V_{DS} = -50\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -3\text{ A}$		15		
					8		
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			6			
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$						
Gate Resistance	$R_g$	$f = 1\text{ MHz}$	1.2	5.8	11.5	$\Omega$	
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = -50\text{ V}, R_L = 17.2\text{ }\Omega$ $I_D \cong -2.9\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		18		ns	
Rise Time <sup>c</sup>	$t_r$			22			
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			49			
Fall Time <sup>c</sup>	$t_f$			13.5			
<b>Drain-Source Body Diode Ratings and Characteristics</b> $T_C = 25\text{ }^\circ\text{C}$ <sup>b</sup>							
Continuous Current	$I_S$				-50	A	
Pulsed Current	$I_{SM}$				-200		
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = -2.9\text{ A}, V_{GS} = 0\text{ V}$		-0.7	-1.5	V	
Reverse Recovery Time	$t_{rr}$	$I_F = -2.9\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		50		ns	
Peak Reverse Recovery Current	$I_{RM(REC)}$			-4	-6	A	
Reverse Recovery Charge	$Q_{rr}$			98	147	nC	

**Notes:**

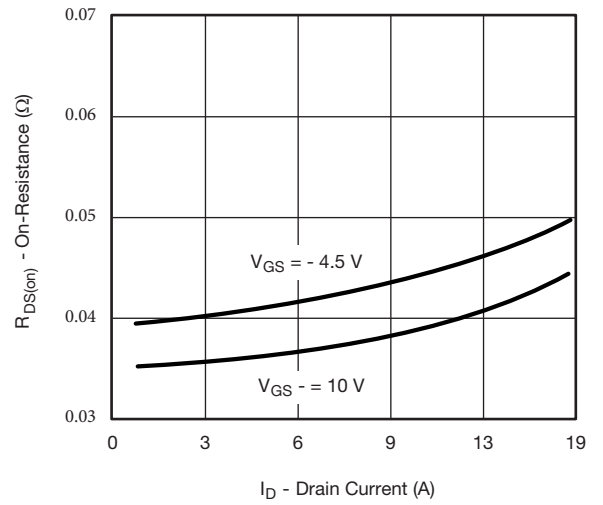
- Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

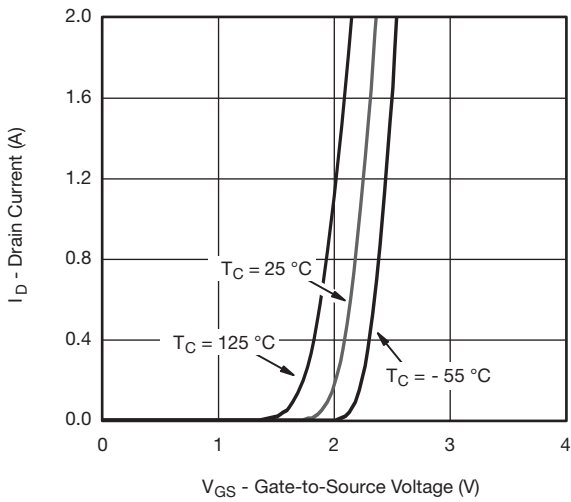
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



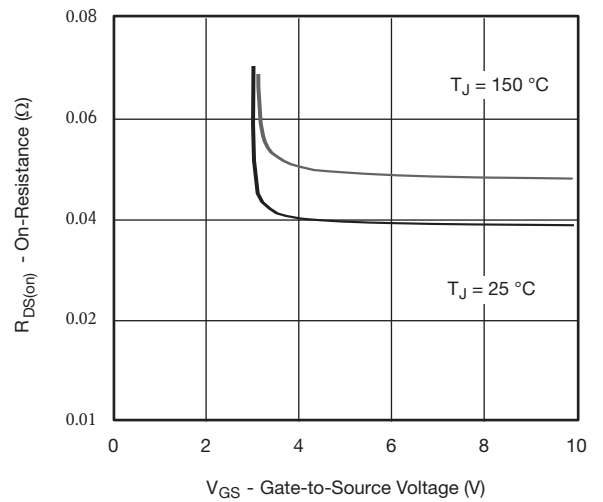
**Output Characteristics**



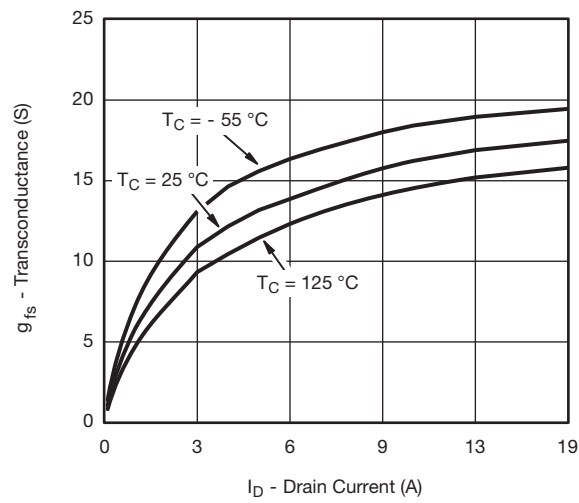
**On-Resistance vs. Drain Current**



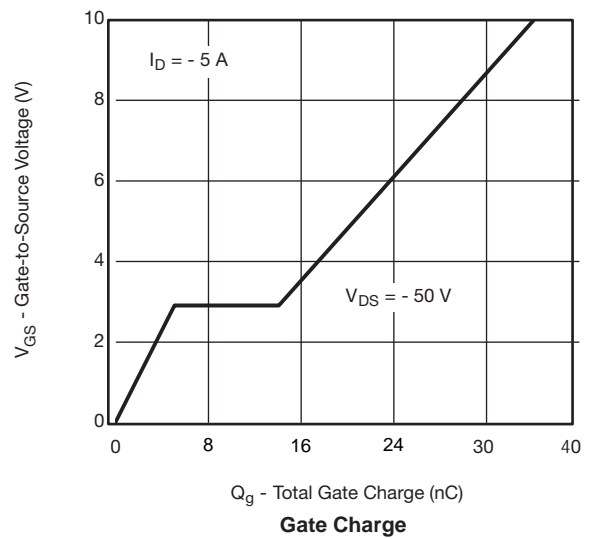
**Transfer Characteristics**



**On-Resistance vs. Gate-to-Source Voltage**

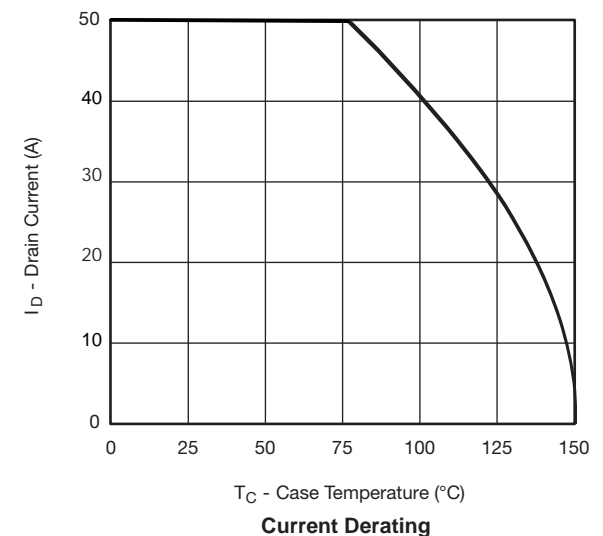
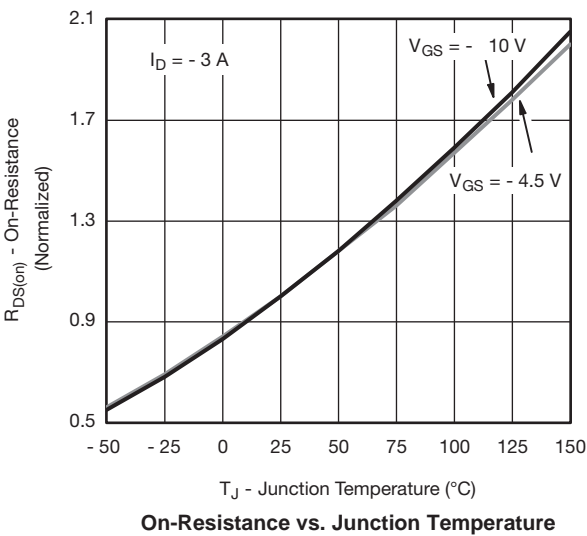
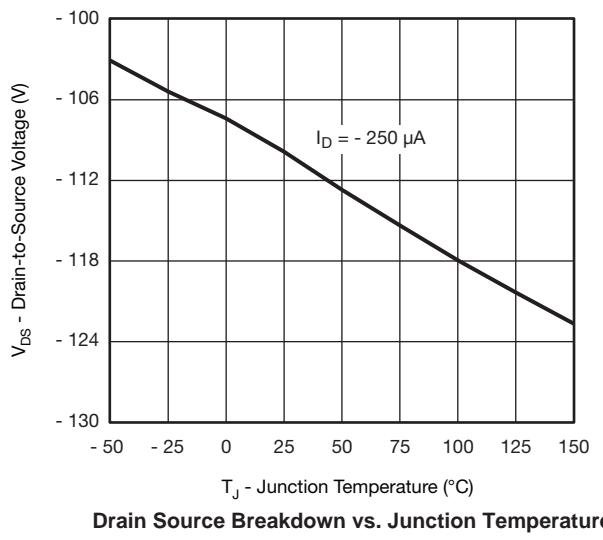
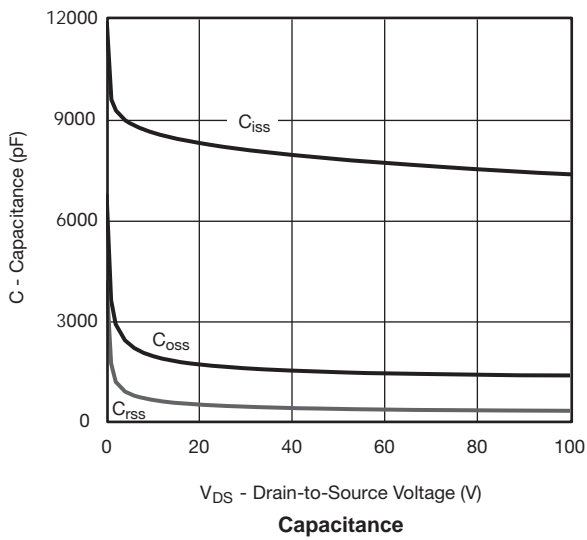
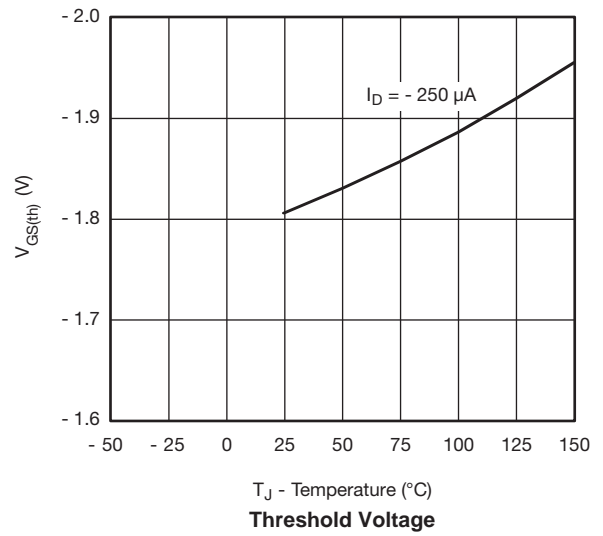
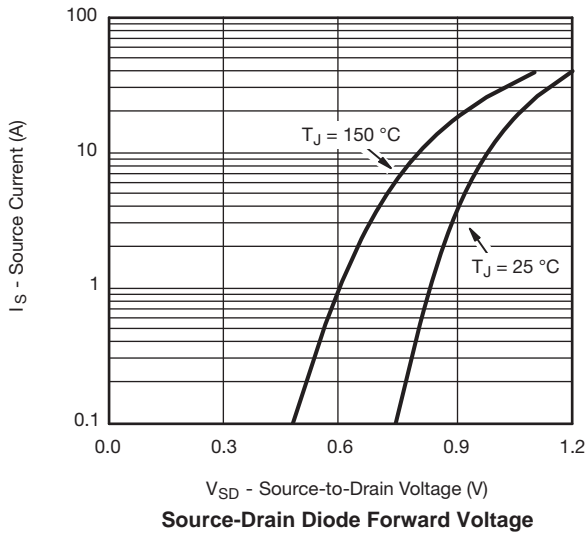


**Transconductance**

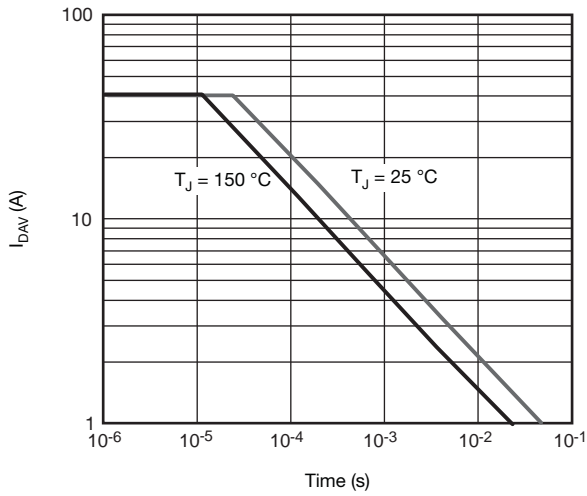


**Gate Charge**

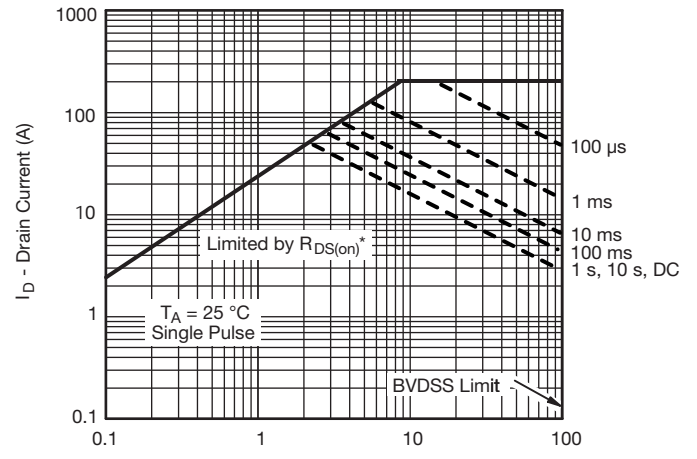
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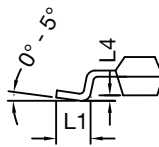
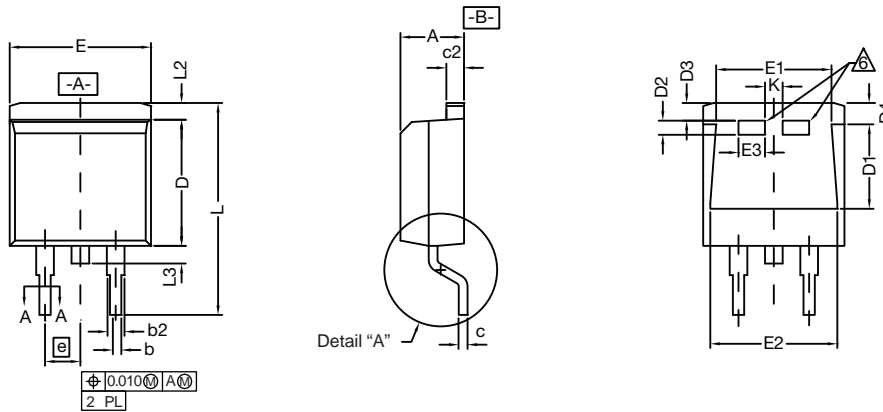
**Single Pulse Avalanche Current Capability vs. Time**



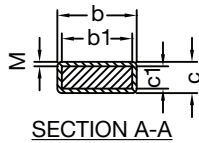
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

**Safe Operating Area**

## TO-263 (D<sup>2</sup>PAK): 3-LEAD



DETAIL A (ROTATED 90°)



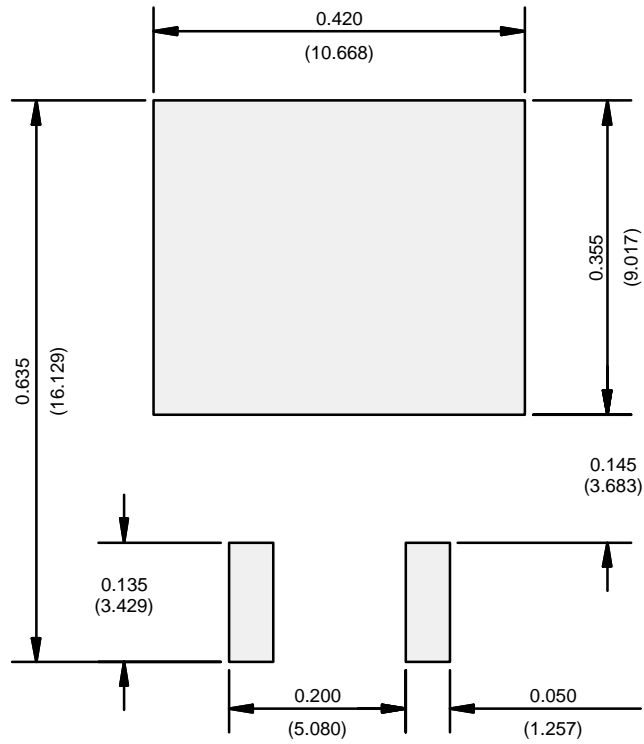
SECTION A-A

DIM.	INCHES		MILLIMETERS		
	MIN.	MAX.	MIN.	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	
<b>E3</b>	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 D<sup>2</sup>PAK: 3-Lead**



Recommended Minimum Pads  
Dimensions in Inches/(mm)

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