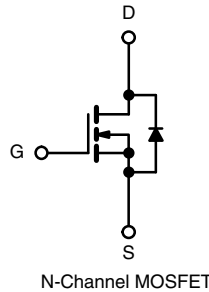


N-Channel 85 V (D-S) MOSFET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (mΩ) Typ.	I _D (A)	Q _g (Typ.)
85	4.9 at V _{GS} = 10 V	110 ^a	65 nC



FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested



RoHS
COMPLIANT

APPLICATIONS

- Primary Side Switching
- Synchronous Rectification
- DC/AC Inverters
- LED Backlighting

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	85	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	110 ^a
		T _C = 70 °C	102
		T _A = 25 °C	39 ^{b, c}
		T _A = 70 °C	33 ^{b, c}
Pulsed Drain Current (t = 100 μs)	I _{DM}	440	A
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	
		T _A = 25 °C	39 ^{b, c}
Single Pulse Avalanche Current	I _{AS}	107	mJ
Single Pulse Avalanche Energy	E _{AS}	690	
Maximum Power Dissipation	P _D	T _C = 25 °C	355
		T _C = 70 °C	167
		T _A = 25 °C	10 ^{b, c}
		T _A = 70 °C	7 ^{b, c}
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature) ^{d, e}		260	

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, f}	R _{thJA}	12	15	°C/W
Maximum Junction-to-Case (Drain)	R _{thJC}	0.3	0.5	

Notes

- Package limited.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- The TO-263 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
- Maximum under steady state conditions is 70 °C/W.

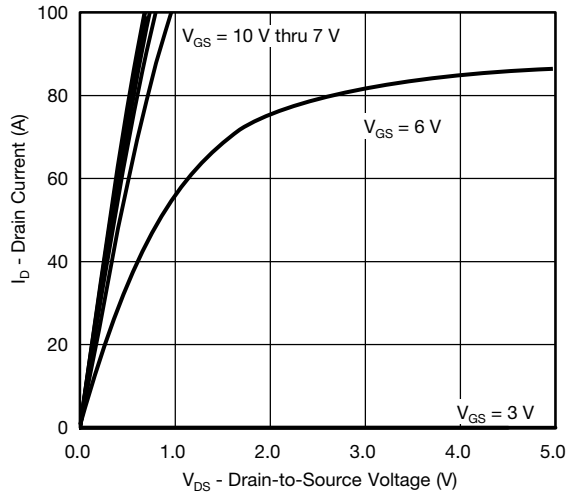
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	85			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		38		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			-6		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2		4	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 85\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 85\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	110			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		4.9	6.9	m Ω
Forward Transconductance ^a	g_{fs}	$V_{DS} = 10\text{ V}, I_D = 20\text{ A}$		63		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		6055		pF
Output Capacitance	C_{oss}			2250		
Reverse Transfer Capacitance	C_{rss}			68		
Total Gate Charge	Q_g	$V_{DS} = 40\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		65	120	nC
Gate-Source Charge	Q_{gs}			23		
Gate-Drain Charge	Q_{gd}			7		
Output Charge	Q_{oss}	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$		186		
Gate Resistance	R_g	$f = 1\text{ MHz}$	1	2	5	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 40\text{ V}, R_L = 4\text{ }\Omega$ $I_D \cong 20\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		25		ns
Rise Time	t_r			12		
Turn-Off Delay Time	$t_{d(off)}$			53		
Fall Time	t_f			18		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 40\text{ V}, R_L = 4\text{ }\Omega$ $I_D \cong 20\text{ A}, V_{GEN} = 6.0\text{ V}, R_g = 1\text{ }\Omega$		15		
Rise Time	t_r			13		
Turn-Off Delay Time	$t_{d(off)}$			34		
Fall Time	t_f			8		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			110	A
Pulse Diode Forward Current ($t = 100\text{ }\mu\text{s}$)	I_{SM}				440	
Body Diode Voltage	V_{SD}	$I_S = 1\text{ A}$		0.68	1	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 20\text{ A}, di/dt = 500\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		36		ns
Body Diode Reverse Recovery Charge	Q_{rr}			57		nC
Reverse Recovery Fall Time	t_a			28		ns
Reverse Recovery Rise Time	t_b			20		

Notes

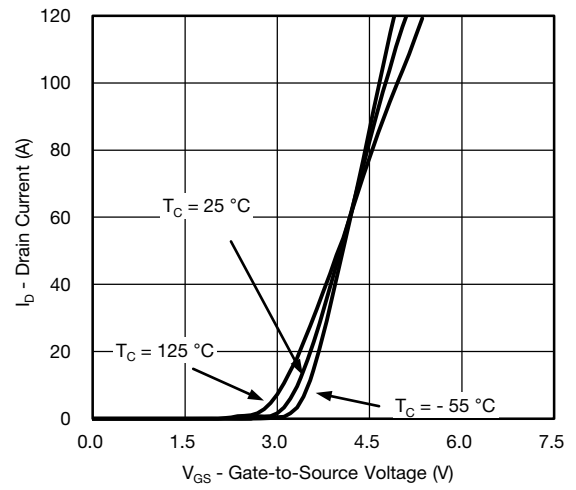
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

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.

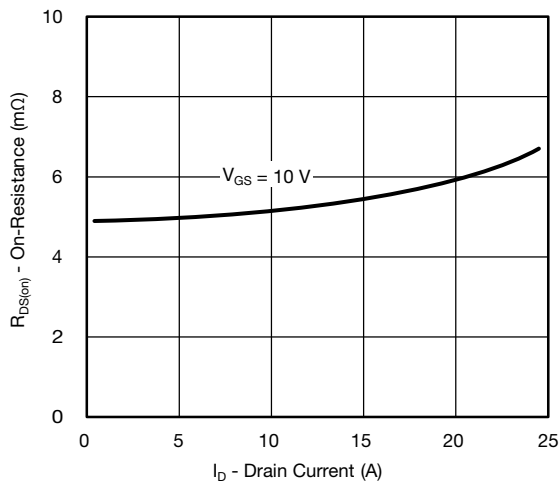
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



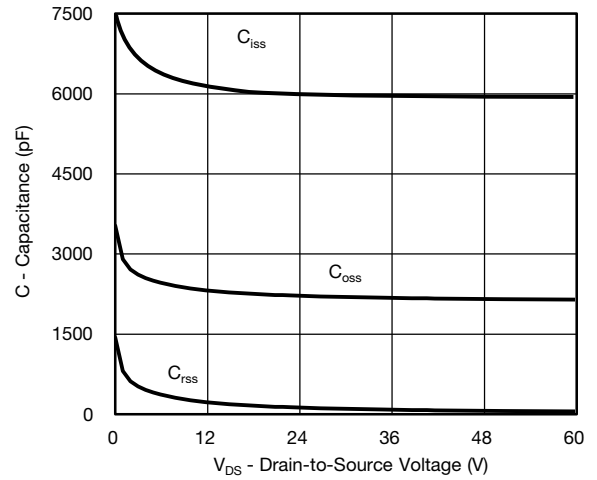
Output Characteristics



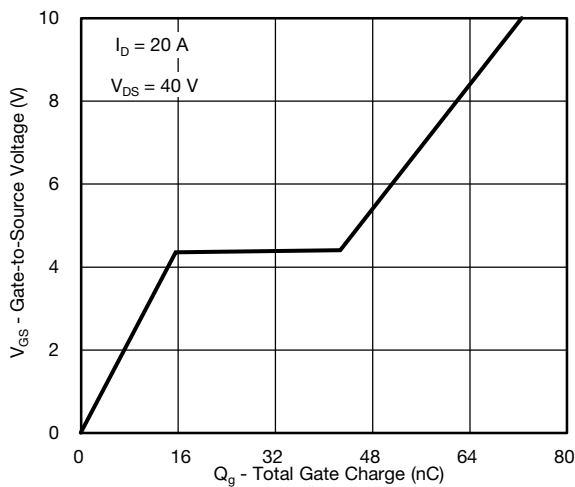
Transfer Characteristics



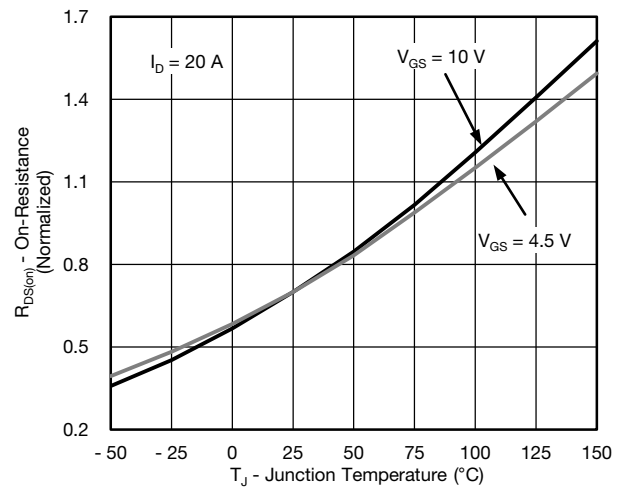
On-Resistance vs. Drain Current



Capacitance

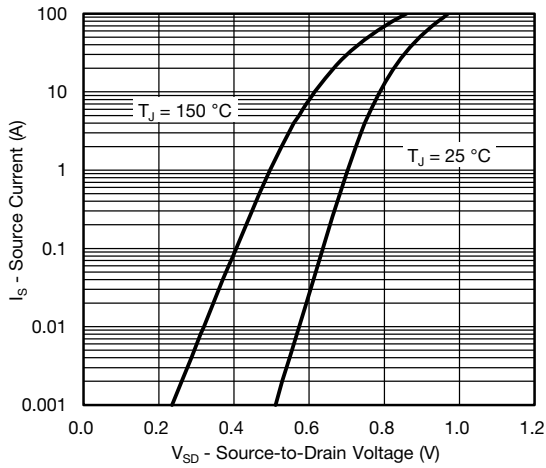


Gate Charge

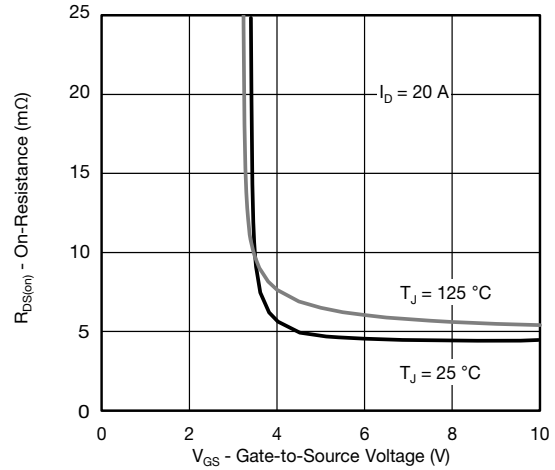


On-Resistance vs. Junction Temperature

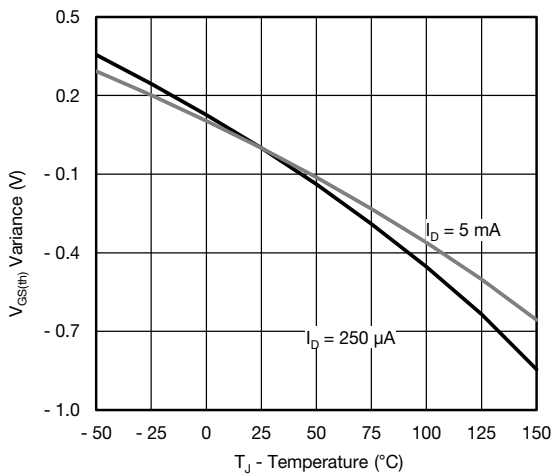
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



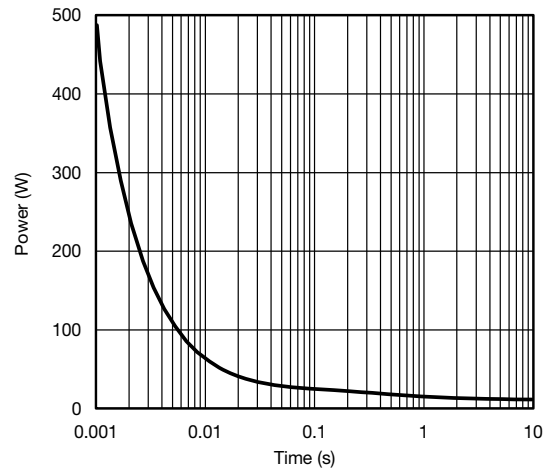
Source-Drain Diode Forward Voltage



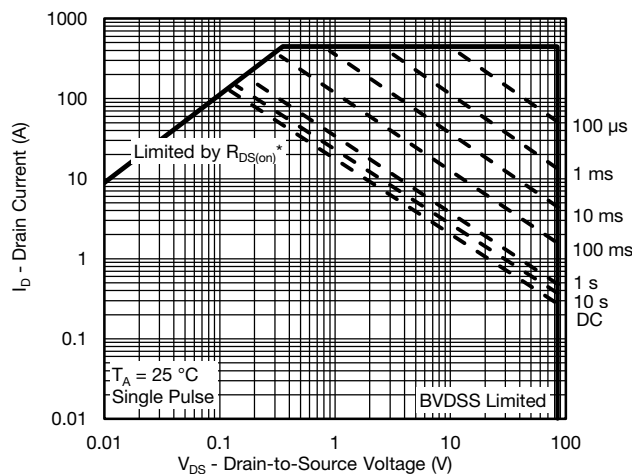
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



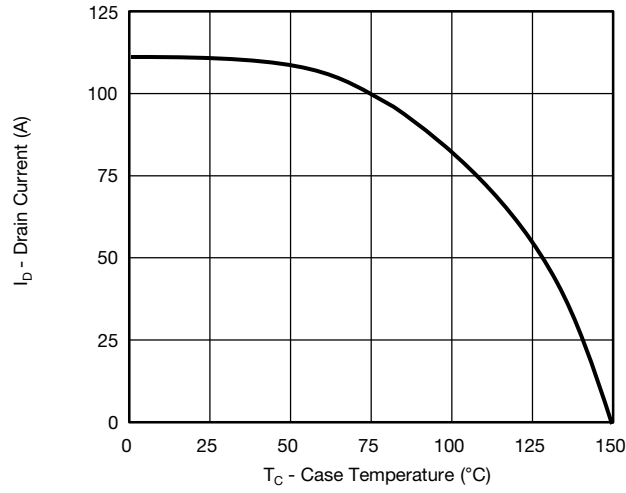
Single Pulse Power, Junction-to-Ambient



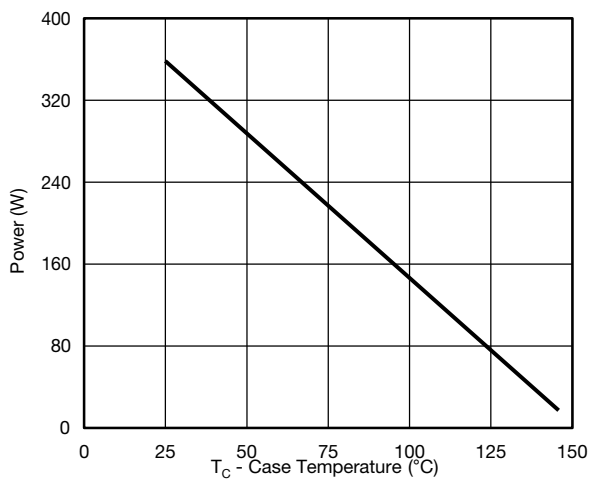
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

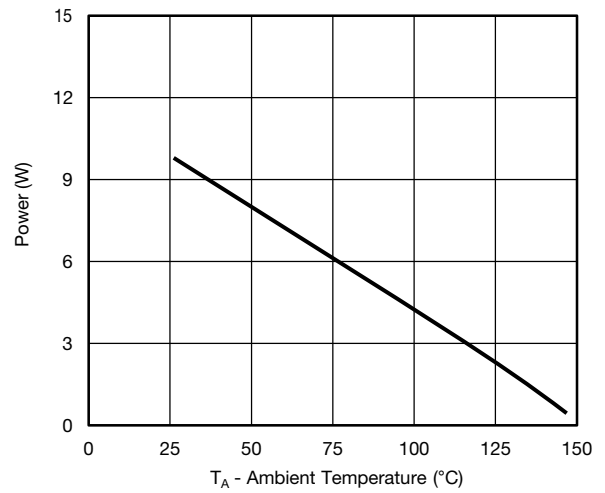
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*



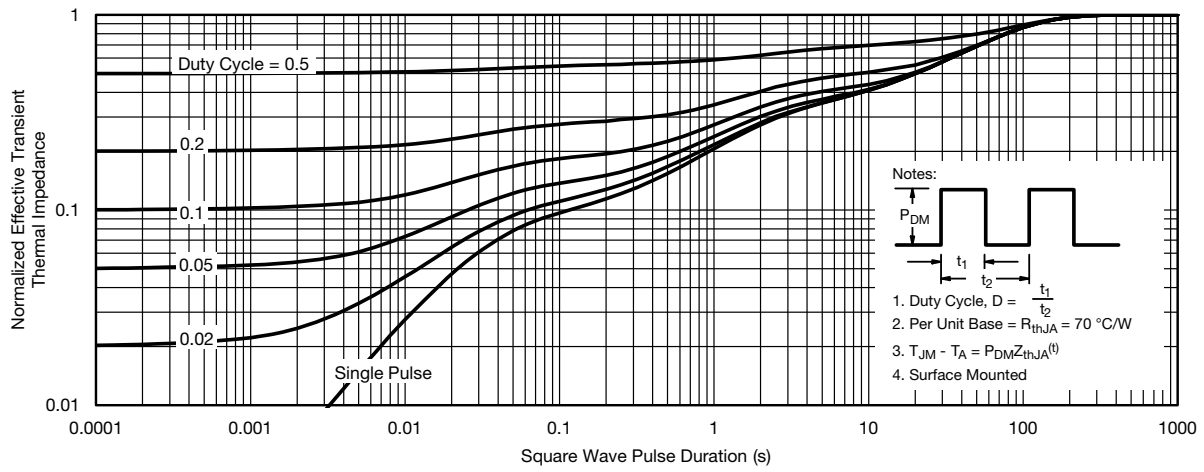
Power, Junction-to-Case



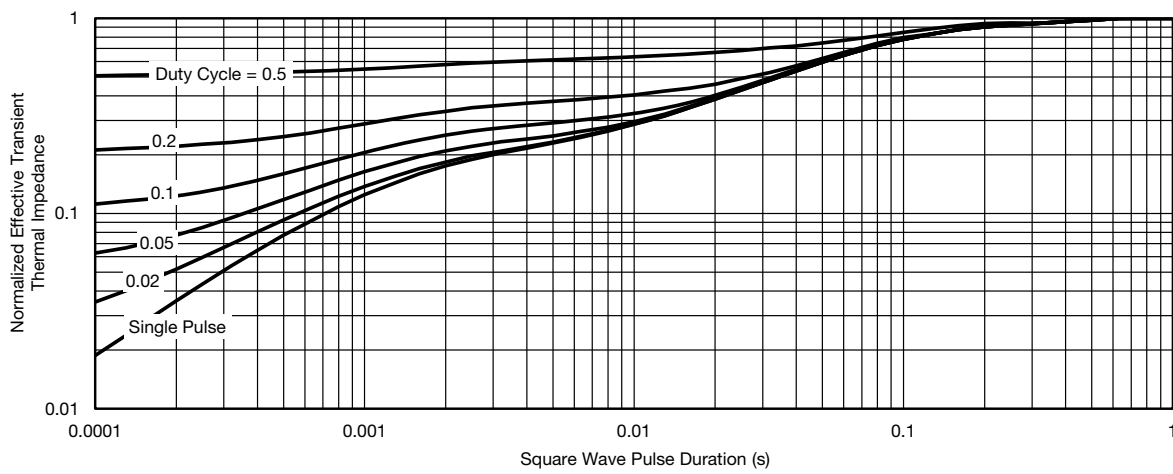
Power, Junction-to-Ambient

* 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)

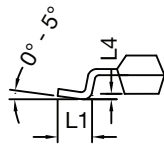
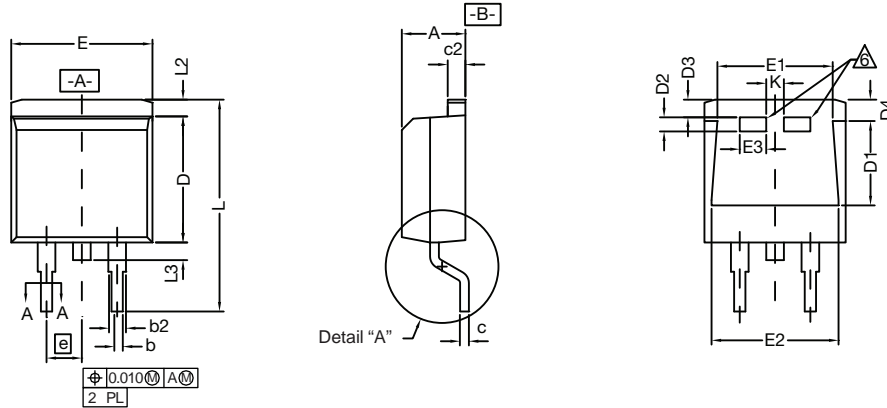


Normalized Thermal Transient Impedance, Junction-to-Ambient

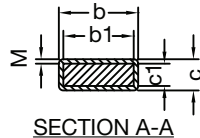


Normalized Thermal Transient Impedance, Junction-to-Case

TO-263 (D²PAK): 3-LEAD



DETAIL A (ROTATED 90°)

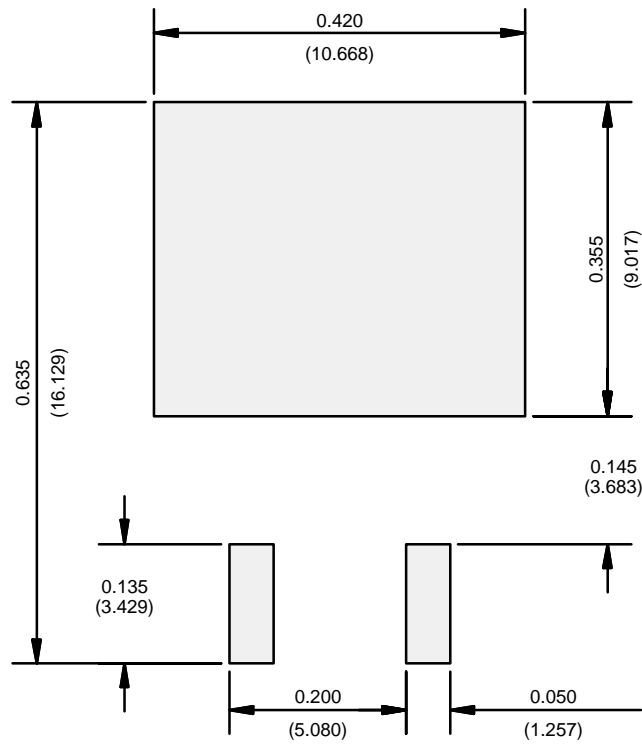


DIM.	INCHES		MILLIMETERS		
	MIN.	MAX.	MIN.	MAX.	
A	0.160	0.190	4.064	4.826	
b	0.020	0.039	0.508	0.990	
b1	0.020	0.035	0.508	0.889	
b2	0.045	0.055	1.143	1.397	
c*	Thin lead	0.013	0.018	0.330	0.457
	Thick lead	0.023	0.028	0.584	0.711
c1	Thin lead	0.013	0.017	0.330	0.431
	Thick lead	0.023	0.027	0.584	0.685
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	
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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