N-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
100	0.055 at V_{GS} = 10 V	25	21nC
	0.057 at V_{GS} = 4.5 V	25	
	0.070 at V_{GS} = 2.5 V	18	

FEATURES

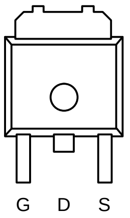
- TrenchFET® power MOSFET
- 100 % UIS tested

RoHS
COMPLIANT

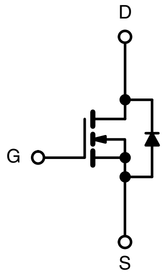
APPLICATIONS

- Primary side switch

TO-252



Top View



N-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 = 175 °C)	T_C = 25 °C	I_D	25	A
	T_C = 70 °C		20	
	T_A = 25 °C		12 [b, c]	
	T_A = 70 °C		10 [b, c]	
Pulsed Drain Current		I_{DM}	80	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	25 [e]	
	T_A = 25 °C		6.9 [b, c]	
Avalanche Current Pulse	L = 0.1 mH	I_{AS}	33	
Single Pulse Avalanche Energy		E_{AS}	55	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	83	W
	T_C = 70 °C		58	
	T_A = 25 °C		70[b, c]	
	T_A = 70 °C		50[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}	15	18	°C/W
Maximum Junction-to-Case	Steady State	R_{thJC}	1.5	1.8	

Notes

a. Based on T_C = 25 °C.
b. Surface mounted on 1" x 1" FR4 board.
c. t = 10 s.
d. Maximum under steady state conditions is 50 °C/W.
e. Calculated based on maximum junction temperature. Package limitation current is 50 A.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)

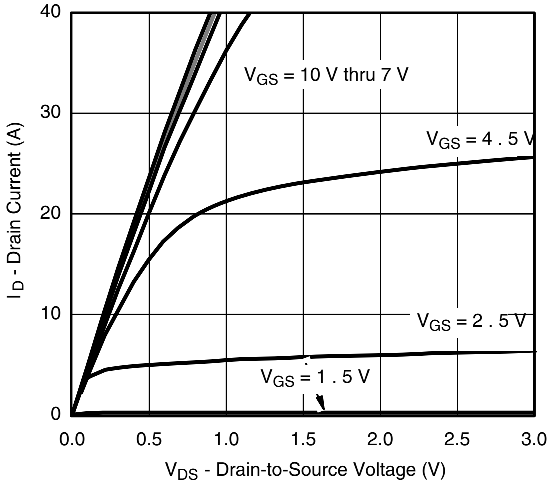
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	100	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA	-	165	-	mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		-	-11	-	
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	0.8	1.2	1.6	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 = 55 °C	-	-	10	
On-State Drain Current [a]	$I_{D(on)}$	$V_{DS} \geq 5$ V, V_{GS} = 10 V	25	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D =12A	-		0.055	Ω
		V_{GS}=4.5 V, I_D =8A			0.057	
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 12 A	-	25	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{DS} = 12 V, V_{GS} = 0 V, f = 1 MHz	-	-	2300	pF
Output Capacitance	C_{oss}		-	-	180	
Reverse Transfer Capacitance	C_{rss}		-	-	60	
Total Gate Charge	Q_g	V_{DS} = 50 V, V_{GS} = 10 V, I_D = 12 A	-	21	-	nC
Gate-Source Charge	Q_{gs}		-	10	-	
Gate-Drain Charge	Q_{gd}		-	9	-	
Gate Resistance	R_g	f = 1 MHz	-	1.5	-	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 50 V, R_L = 5 Ω $I_D \cong$ 10 A, V_{GEN} = 10 V, R_g = 1 Ω	-	10	15	ns
Rise Time	t_r		-	10	15	
Turn-Off Delay Time	$t_{d(off)}$		-	15	25	
Fall Time	t_f		-	10	15	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C	-	-	50	A
Pulse Diode Forward Current [a]	I_{SM}		-	-	40	
Body Diode Voltage	V_{SD}	I_S = 10 A	-	0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 10 A, di/dt = 100 A/µs, T_J = 25 °C	-	50	75	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	100	150	nC
Reverse Recovery Fall Time	t_a		-	38	-	ns
Reverse Recovery Rise Time	t_b		-	12	-	

Note

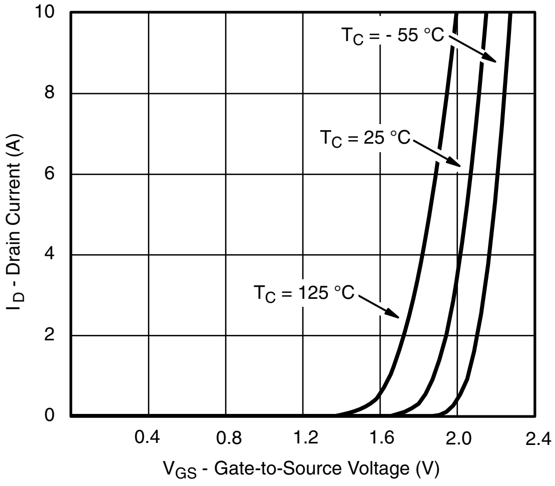
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

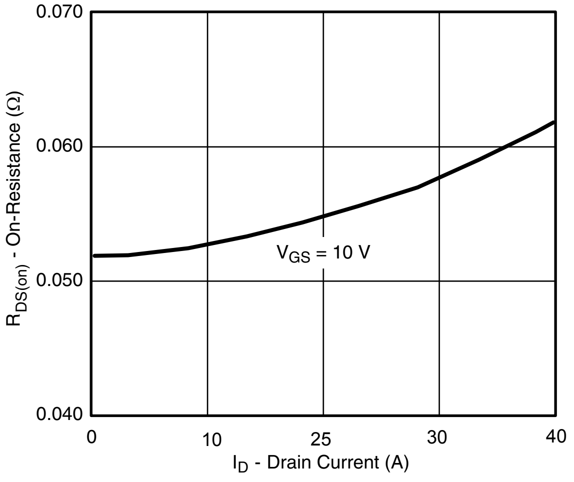
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



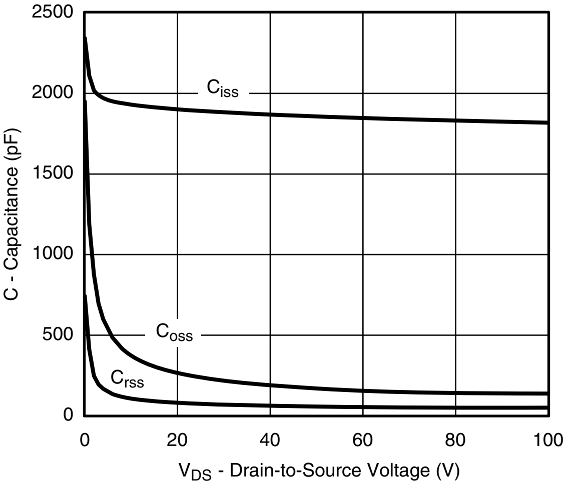
Output Characteristics



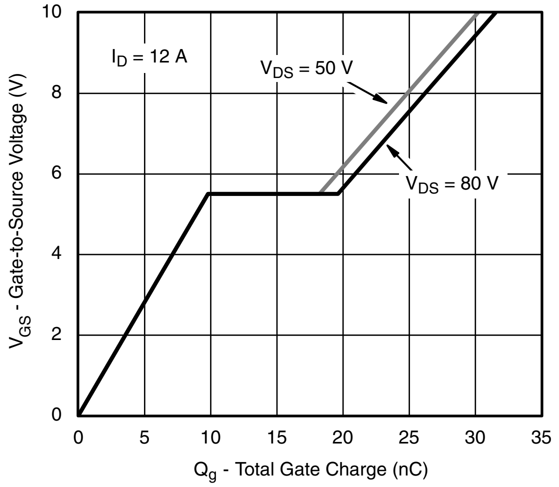
Transfer Characteristics



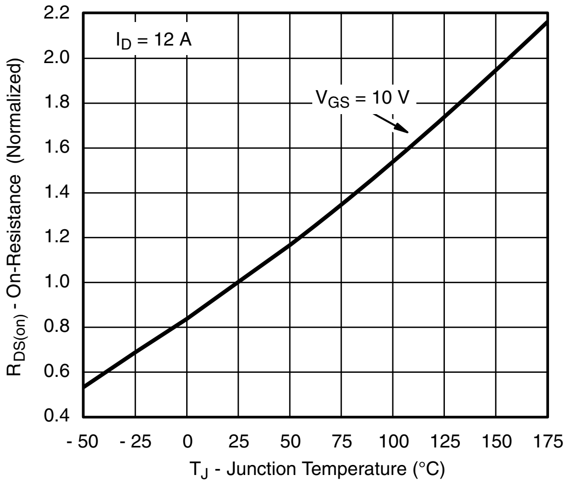
On-Resistance vs. Drain Current



Capacitance

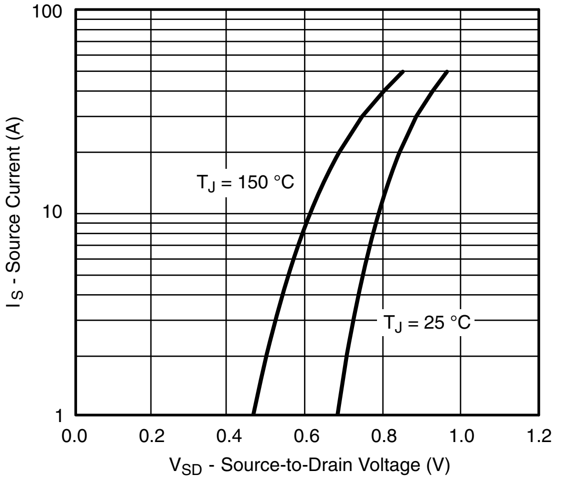


Gate Charge

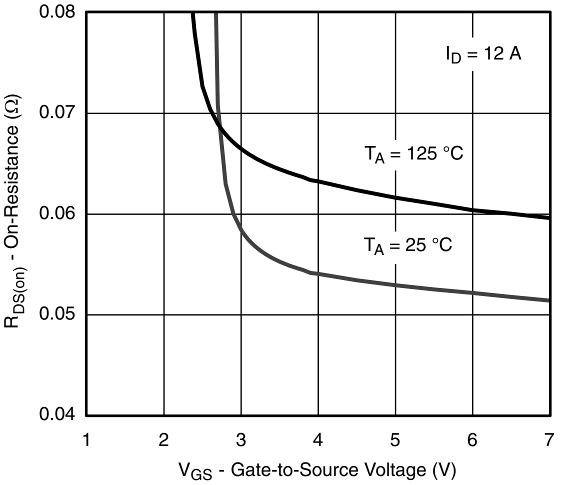


On-Resistance vs. Junction Temperature

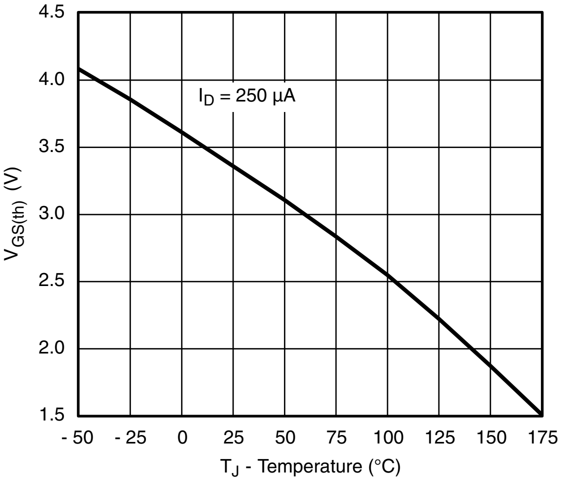
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



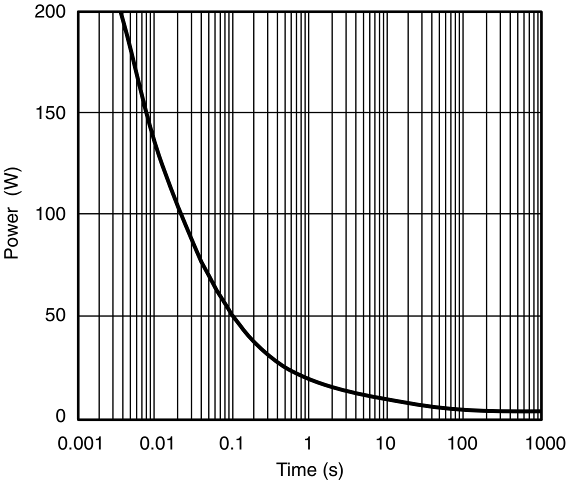
Source-Drain Diode Forward Voltage



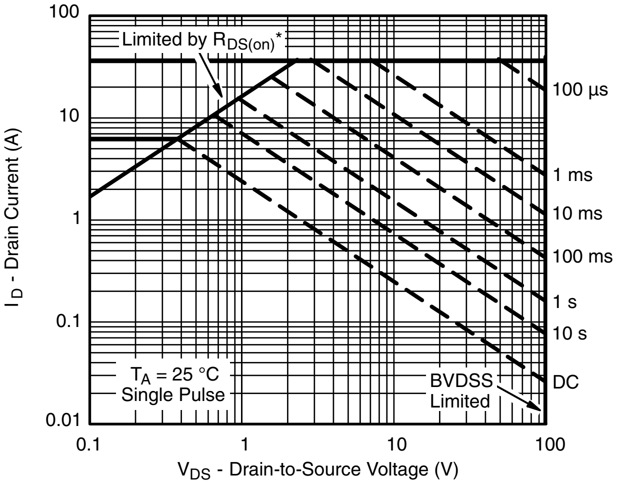
$R_{DS(on)}$ vs. V_{GS} vs. Temperature



Threshold Voltage



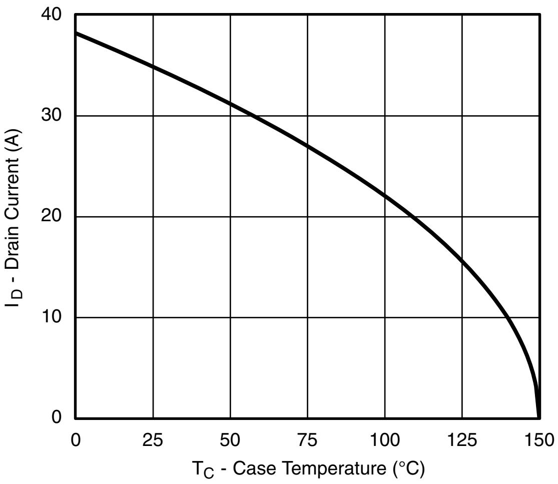
Single Pulse Power, Junction-to-Ambient



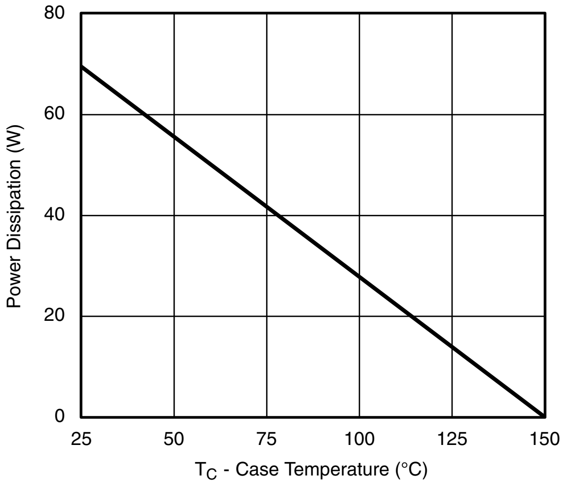
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating [a]

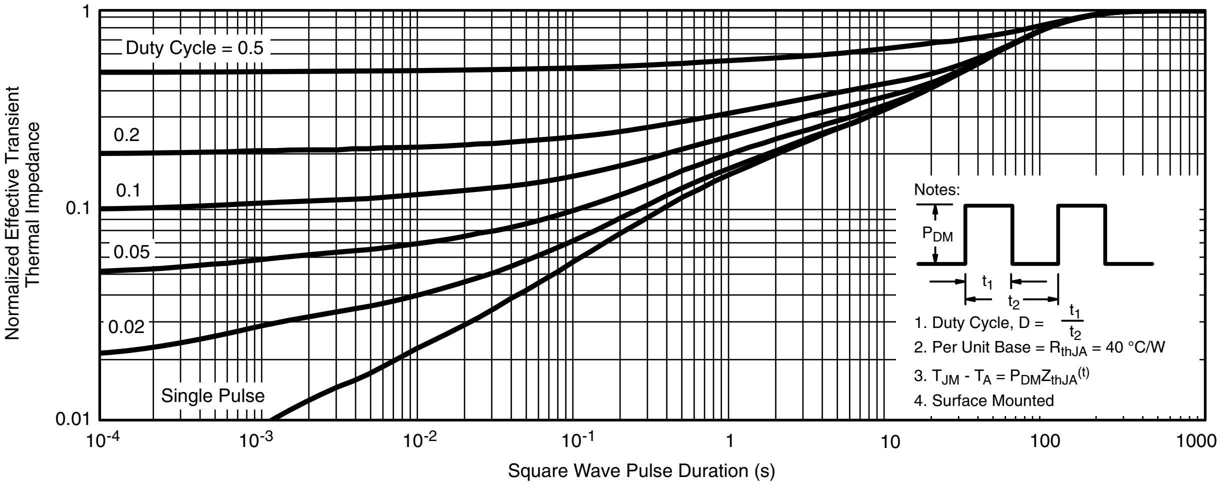


Power Derating

Note

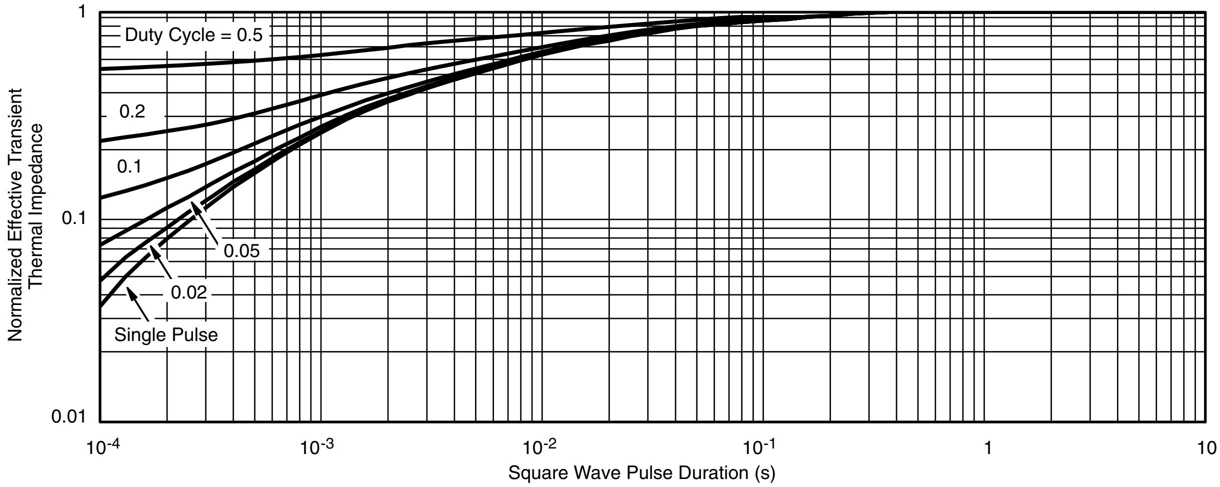
a. The power dissipation P_D is based on T_J (max.) = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



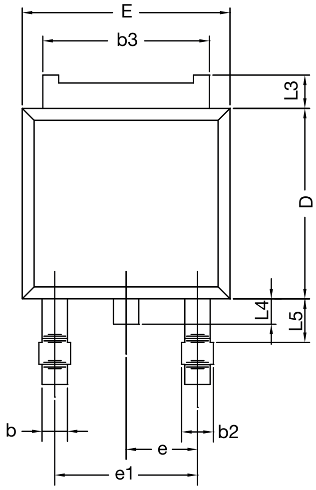
1. Duty Cycle, D = $\frac{t_1}{t_2}$
2. Per Unit Base = R_{thJA} = 40 °C/W
3. $T_{JM} - T_A = P_{DM}Z_{thJA}^{(t)}$
4. Surface Mounted

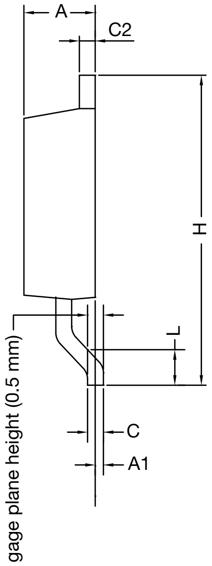
Normalized Thermal Transient Impedance, Junction-to-Ambient

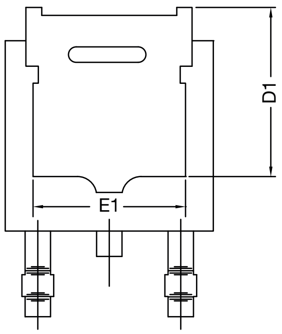


Normalized Thermal Transient Impedance, Junction-to-Case

TO-252AA Case Outline





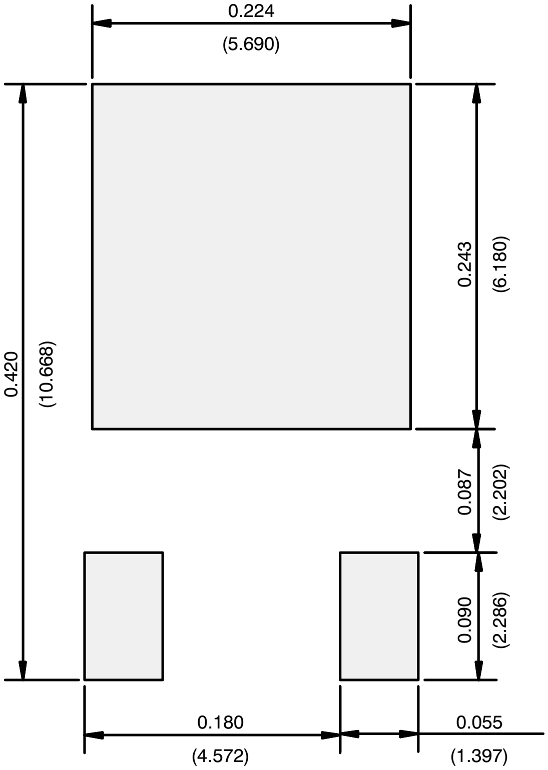


	MILLIMETERS		INCHES	
DIM.	**MIN.**	**MAX.**	**MIN.**	**MAX.**
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	4.10	-	0.161	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
H	9.40	10.41	0.370	0.410
e	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.01	1.52	0.040	0.060
ECN: T16-0236-Rev. P, 16-May-16 DWG: 5347				

Notes

- Dimension L3 is for reference only.

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads
Dimensions in Inches/(mm)

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