

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

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
30	0.0045 at V _{GS} = 10 V	72	33 nC
	0.0075 at V _{GS} = 4.5 V	56	

FEATURES

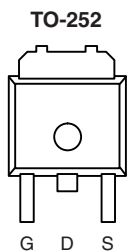
- DT-Trench Power MOSFET
- 100 % Rg and UIS Tested
- PWM Optimized

APPLICATIONS

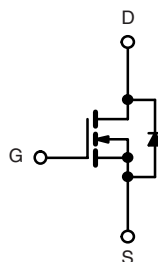
- LCD Display Backlight Inverters
- DC/DC Converters



RoHS
COMPLIANT



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _A = 25 °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 °C)	I _D	T _C = 25 °C	72 ^a	A
		T _C = 70 °C	56	
		T _A = 25 °C	29 ^b	
		T _A = 70 °C	19 ^b	
Pulsed Drain Current	I _{DM}	310		
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	72	
		T _A = 25 °C	4.3 ^b	
Single Pulse Avalanche Current	I _{AS}	70		
Avalanche Energy	E _{AS}	160	mJ	
Maximum Power Dissipation	P _D	T _C = 25 °C	179	W
		T _C = 70 °C	114	
		T _A = 25 °C	6.1 ^b	
		T _A = 70 °C	3.9 ^b	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^b	R _{thJA}	18	23	°C/W	
Maximum Junction-to-Case					

Notes:

a. Package limited.

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

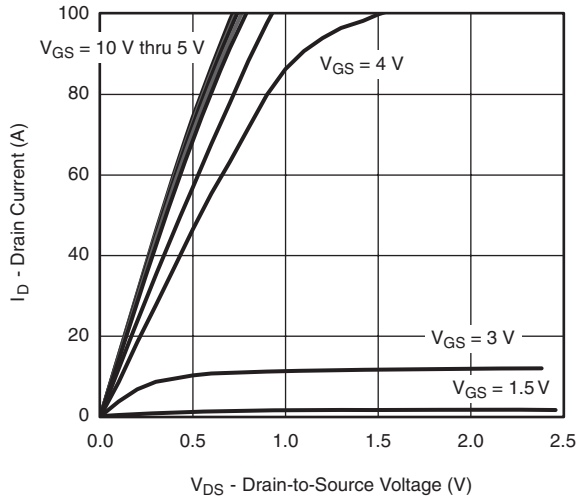
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 1.0\text{ mA}$		44		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 5.9		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0		3.0	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}	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, T_J = 70\text{ }^\circ\text{C}$			20	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	72			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		0.0045	0.0055	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 15\text{ A}$		0.0075	0.0090	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 15\text{ A}$		85		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		3170		pF
Output Capacitance	C_{oss}			305		
Reverse Transfer Capacitance	C_{rss}			73		
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		33		nC
			$V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 15\text{ A}$		18	
Gate-Source Charge	Q_{gs}			6.6		
Gate-Drain Charge	Q_{gd}		4.1			
Gate Resistance	R_g	$f = 1\text{ MHz}$		2.5		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 1\text{ }\Omega$ $I_D \cong 15\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\text{ }\Omega$		35		ns
Rise Time	t_r			16		
Turn-Off Delay Time	$t_{d(off)}$			43		
Fall Time	t_f			11		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 1\text{ }\Omega$ $I_D \cong 20\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		13		
Rise Time	t_r			6		
Turn-Off Delay Time	$t_{d(off)}$			32		
Fall Time	t_f			7		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			72	A
Pulse Diode Forward Current ^a	I_{SM}				310	
Body Diode Voltage	V_{SD}	$I_S = 10\text{ A}$		0.7	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		26	37	ns
Body Diode Reverse Recovery Charge	Q_{rr}			15	23	nC
Reverse Recovery Fall Time	t_a			11		ns
Reverse Recovery Rise Time	t_b			10		

Notes:

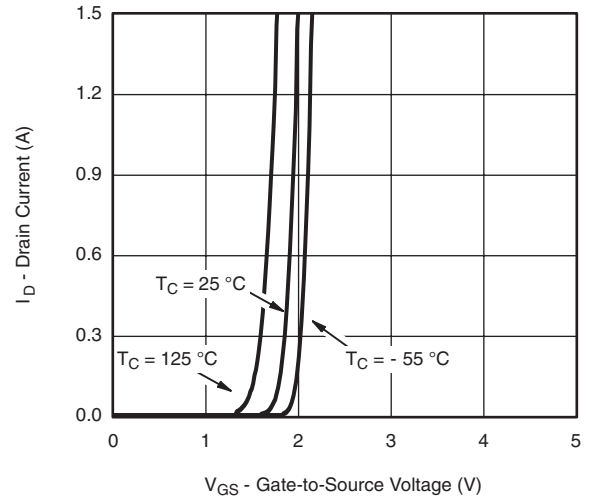
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

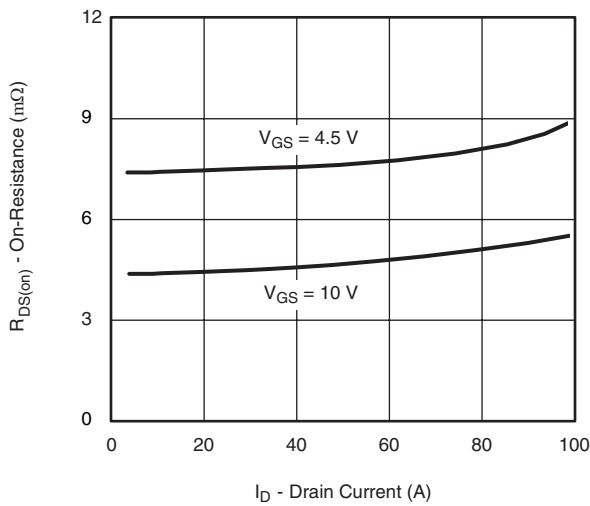
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



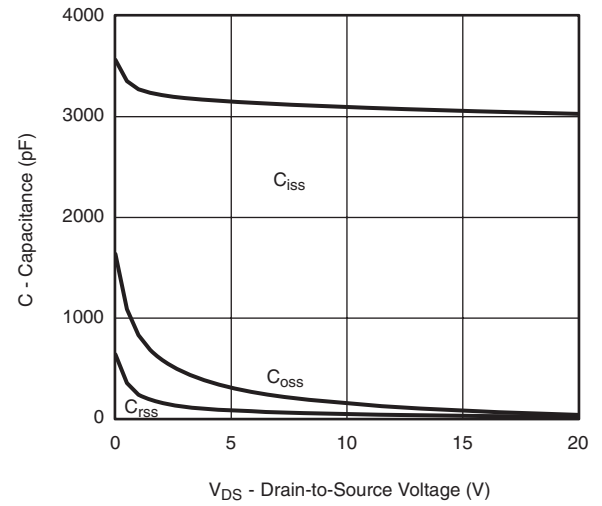
Output Characteristics



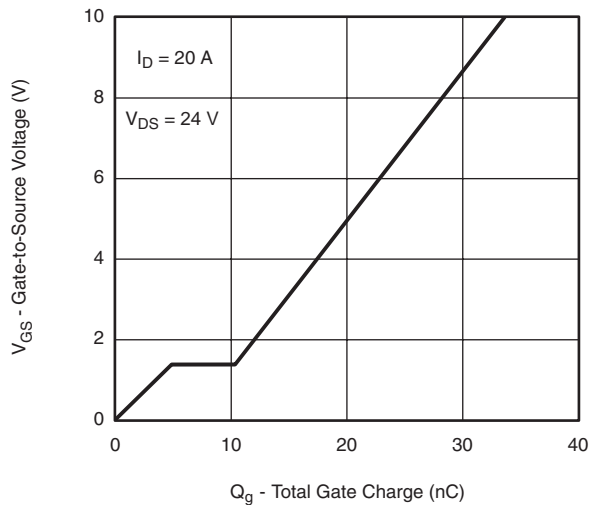
Transfer Characteristics



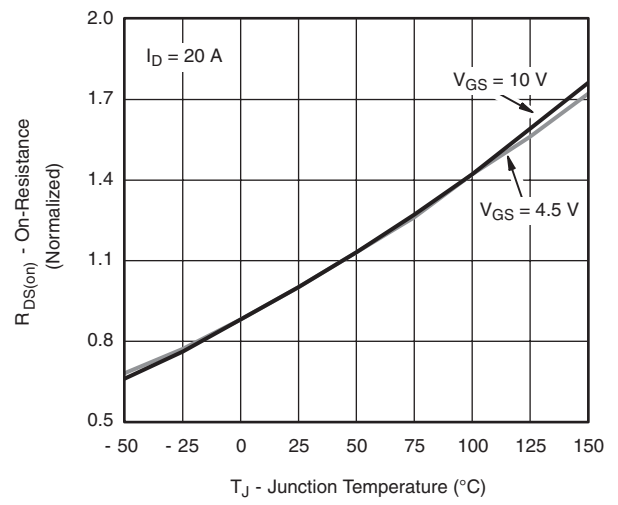
On-Resistance vs. Drain Current



Capacitance

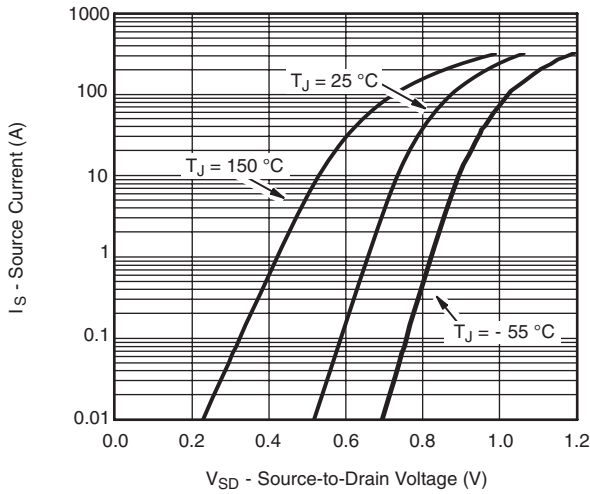


Gate Charge

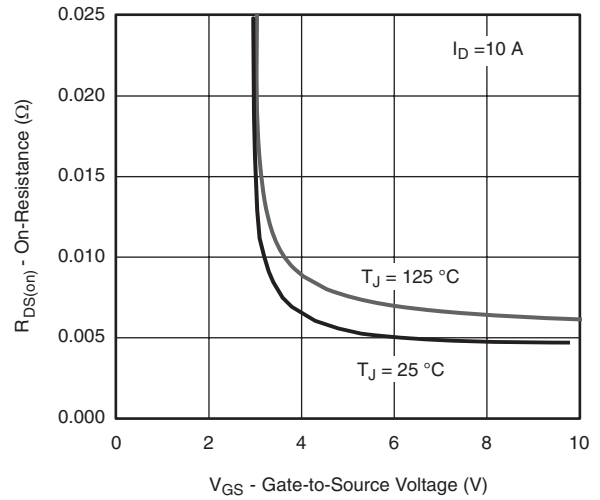


On-Resistance vs. Junction Temperature

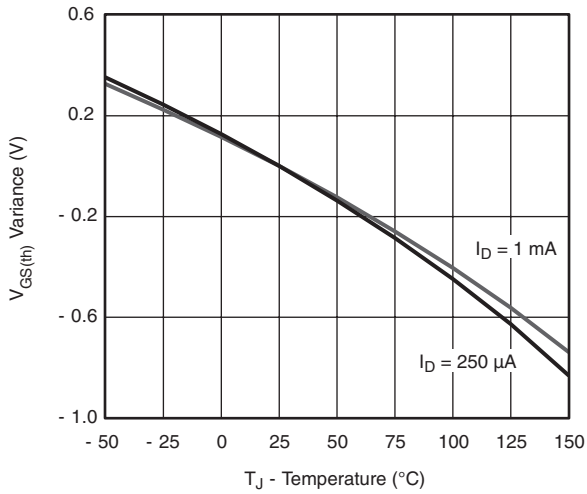
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



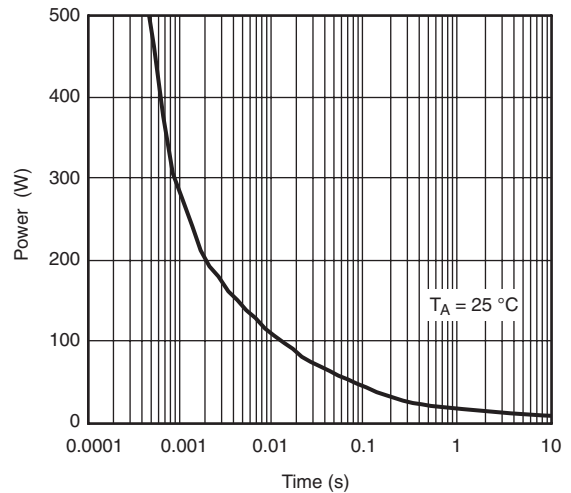
Source-Drain Diode Forward Voltage



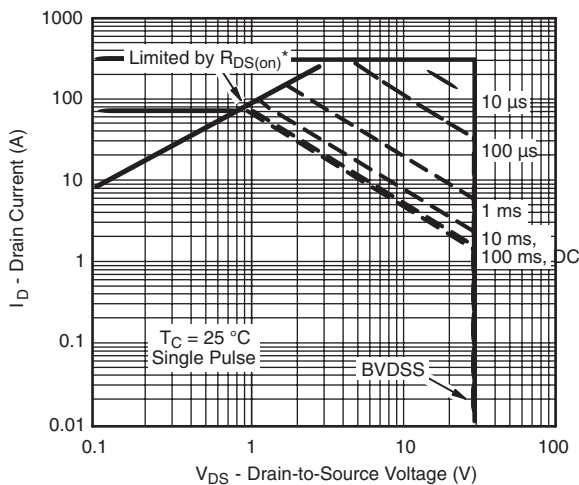
On-Resistance vs. Gate-to-Source Voltage



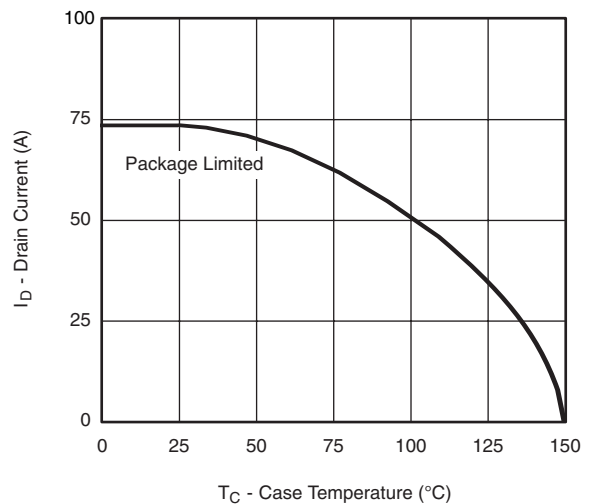
Threshold Voltage



Single Pulse, Junction-to-Ambient

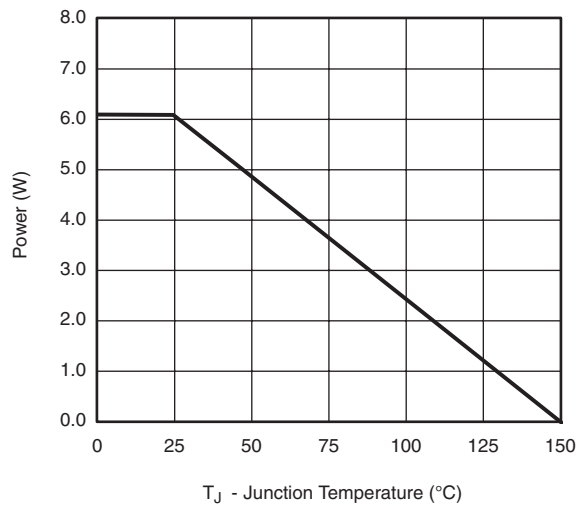


Safe Operating Area, Junction-to-Case
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

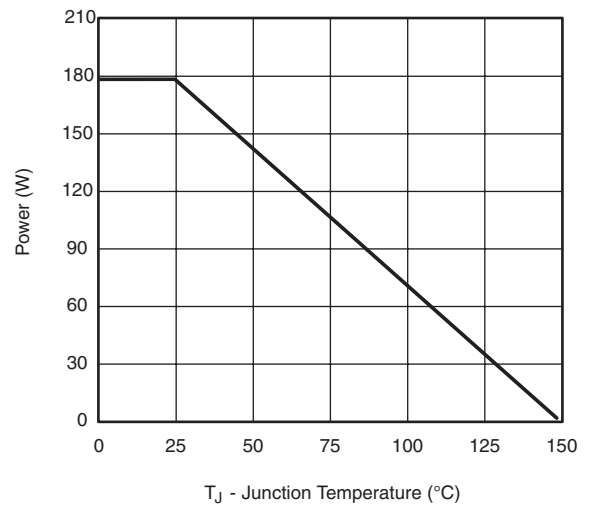


Current Derating*, Junction-to-Case

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



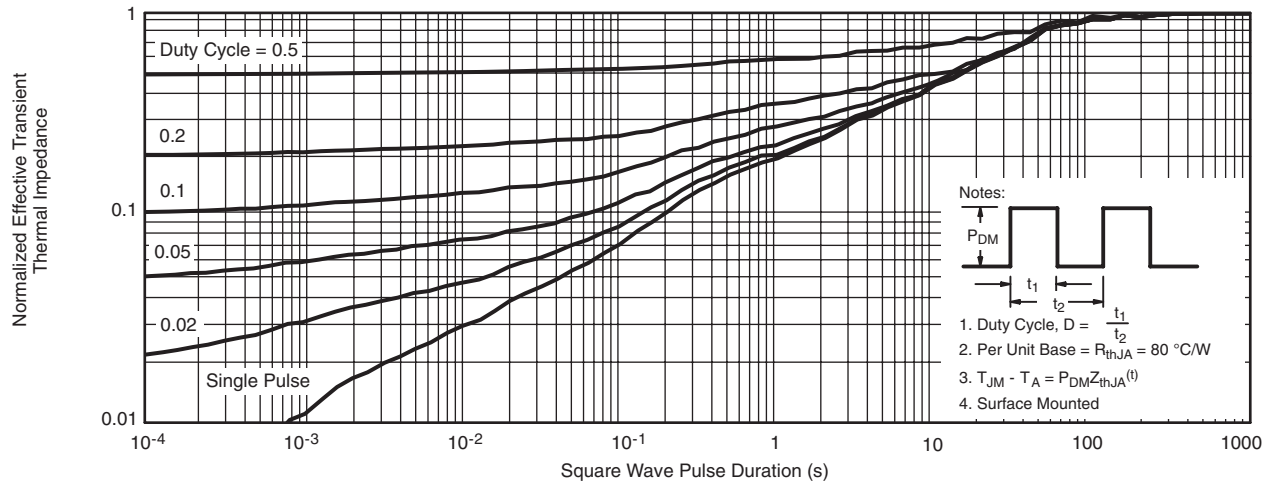
Power Derating, Junction-to-Ambient



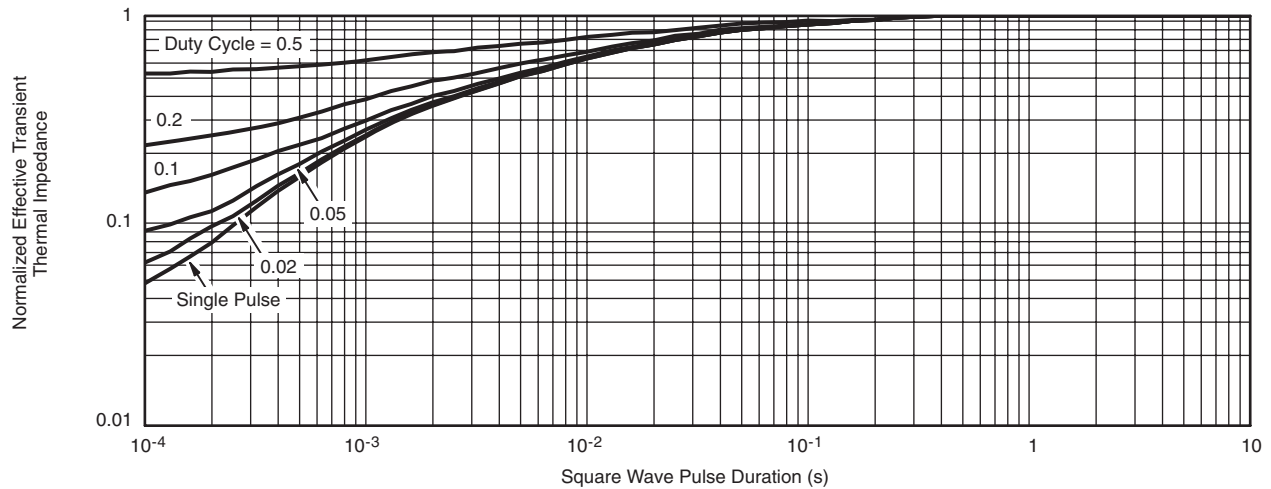
Power Derating, Junction-to-Case

* The power dissipation P_D is based on $T_{J(max)} = 150\text{ °C}$, 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-252AA Case Outline

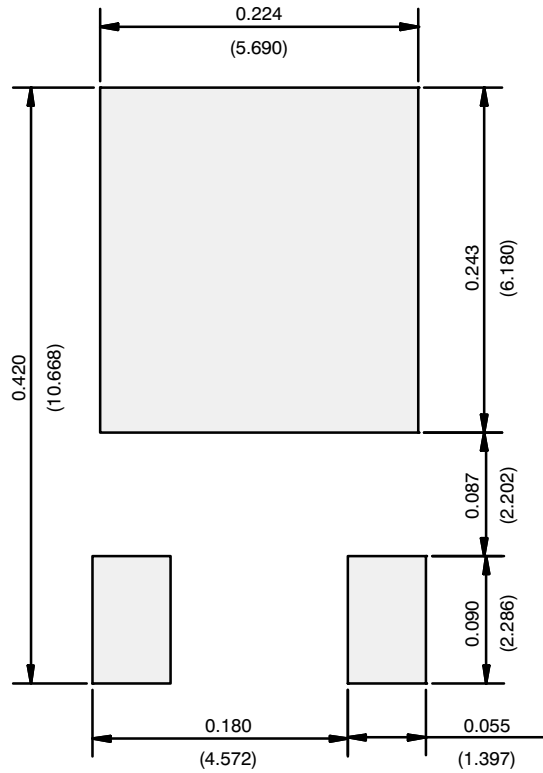


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	4.10	-	0.161	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
H	9.40	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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