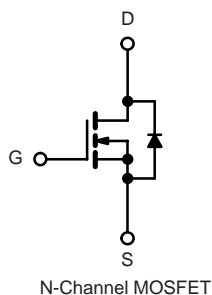
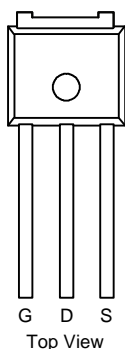


N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^{a, g}	Q_g (Typ.)
30	0.0058 at $V_{GS} = 10$ V	60 ^g	30 nC
	0.0097 at $V_{GS} = 4.5$ V	60 ^g	

TO-251



FEATURES

- Halogen-free
- TrenchFET® Gen III Power MOSFET
- 100 % R_g Tested
- 100 % Avalanche Tested



RoHS
COMPLIANT

APPLICATIONS

- Low-Side Switch for DC/DC Converters
 - Servers
 - POL
 - VRM
- OR-ing

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)	$T_C = 25$ °C	60 ^g	A
	$T_C = 70$ °C	60 ^g	
	$T_A = 25$ °C	33 ^{b, c}	
	$T_A = 70$ °C	26 ^{b, c}	
Pulsed Drain Current	I_{DM}	180	mJ
Continuous Source-Drain Diode Current	$T_C = 25$ °C	60 ^g	
	$T_A = 25$ °C	4.7 ^{b, c}	
Single Pulse Avalanche Current	$L = 0.1$ mH	47	
Single Pulse Avalanche Energy	E_{AS}	121	W
Maximum Power Dissipation	$T_C = 25$ °C	82	
	$T_C = 70$ °C	51	
	$T_A = 25$ °C	5.2 ^{b, c}	
	$T_A = 70$ °C	3.3 ^{b, c}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature)		260	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient	R_{thJA}	18	23	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	1.0	1.5	

Notes:

a. Based on $T_C = 25$ °C.

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

c. $t = 10$ s.

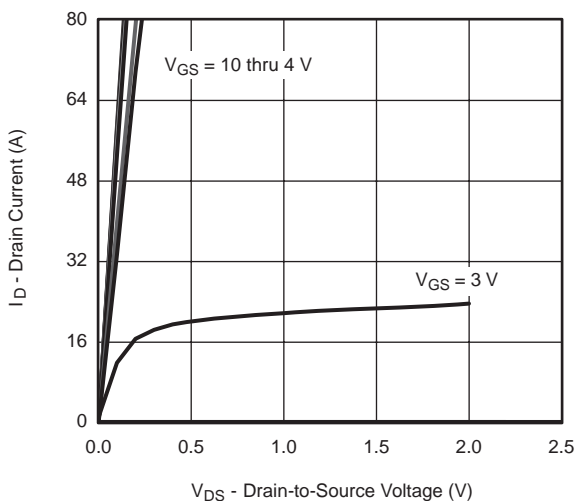
SPECIFICATIONS T _J = 25 °C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	30			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		26		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 6.5		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.2		2.7	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} = 30 V, V _{GS} = 0 V			1	μA
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	30			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.0031	0.0058	Ω
		V _{GS} = 4.5 V, I _D = 20 A		0.0073	0.0097	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 20 A		100		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz		4190		pF
Output Capacitance	C _{oss}			800		
Reverse Transfer Capacitance	C _{rss}			310		
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 20 A		71	100	nC
		V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 20 A		32	50	
Gate-Source Charge	Q _{gs}			11		
Gate-Drain Charge	Q _{gd}			10		
Gate Resistance	R _g	f = 1 MHz	0.2	0.8	1.5	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 1.5 Ω I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω		19	33	ns
Rise Time	t _r			5	10	
Turn-Off Delay Time	t _{d(off)}			45	81	
Fall Time	t _f			5	10	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 1 Ω I _D ≅ 10 A, V _{GEN} = 4.5 V, R _g = 1 Ω		45	81	
Rise Time	t _r			18	43	
Turn-Off Delay Time	t _{d(off)}			60	110	
Fall Time	t _f			30	60	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			60	A
Pulse Diode Forward Current ^a	I _{SM}				180	
Body Diode Voltage	V _{SD}	I _S = 4 A		0.71	1.1	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 10 A, dI/dt = 100 A/μs, T _J = 25 °C		33	50	ns
Body Diode Reverse Recovery Charge	Q _{rr}			25	40	nC
Reverse Recovery Fall Time	t _a			16		ns
Reverse Recovery Rise Time	t _b			17		

Notes:

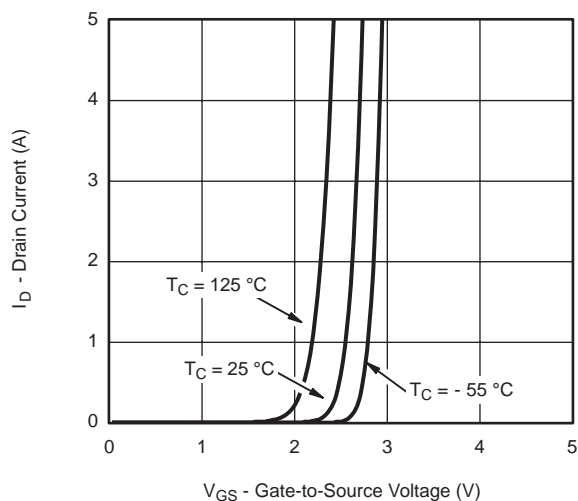
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

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.

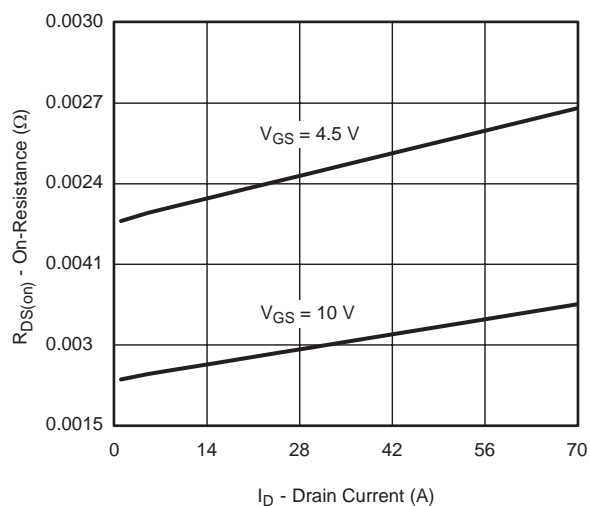
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



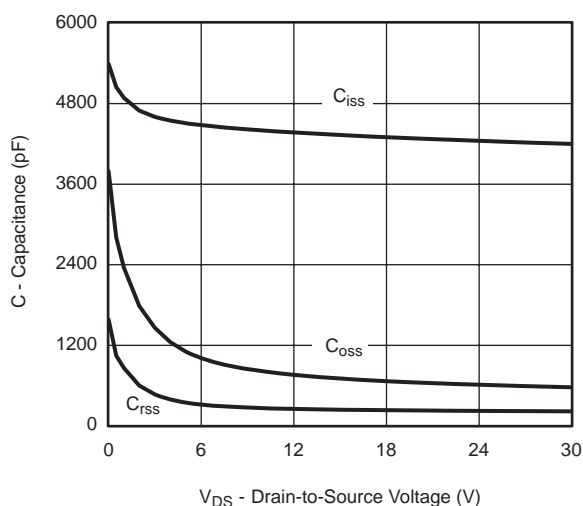
Output Characteristics



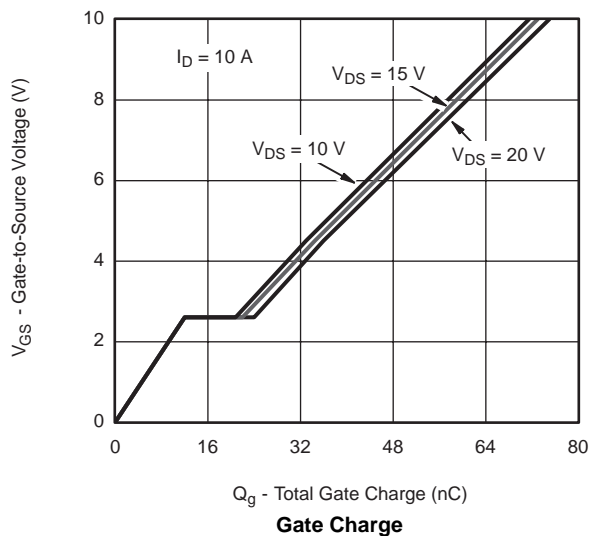
Transfer Characteristics



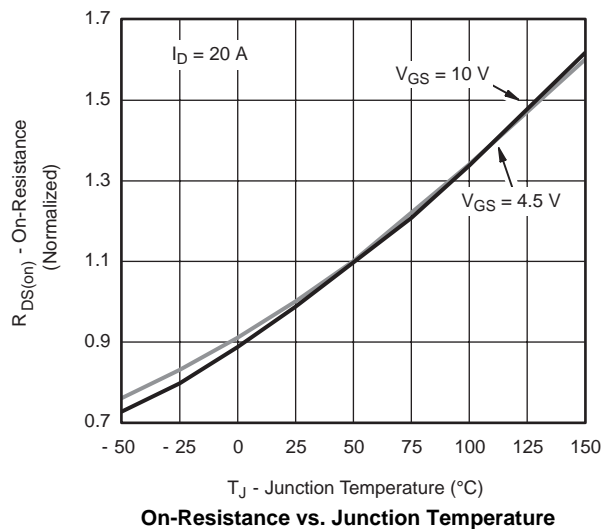
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

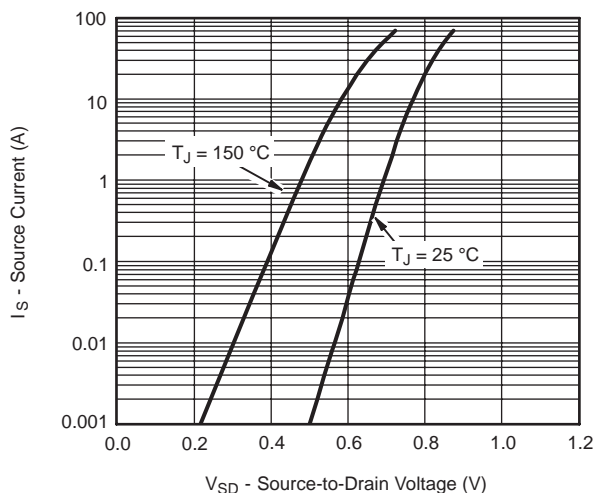


Gate Charge

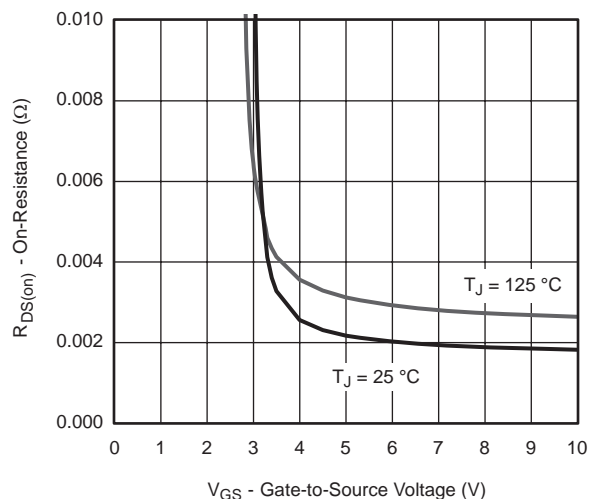


On-Resistance vs. Junction Temperature

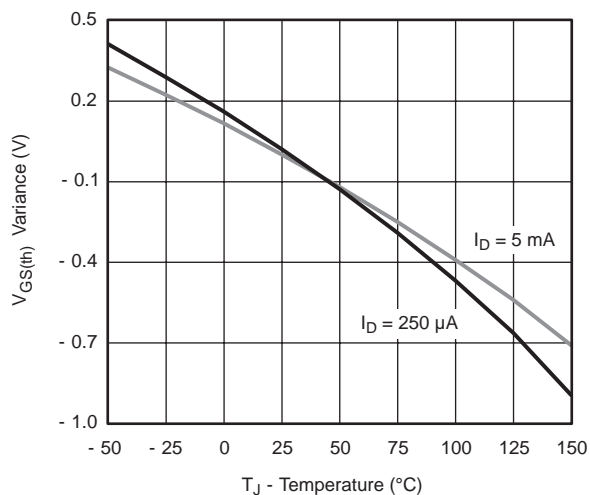
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



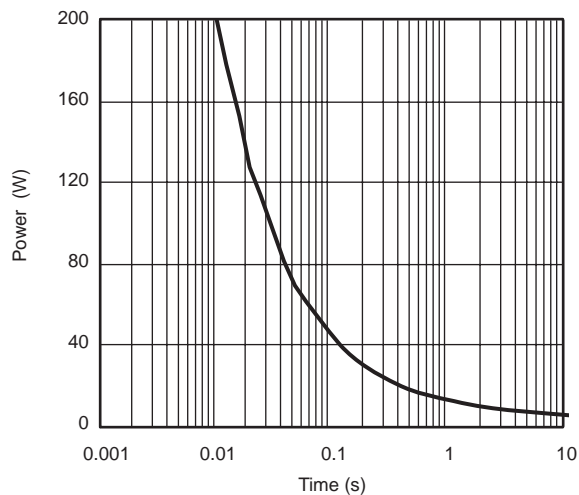
Source-Drain Diode Forward Voltage



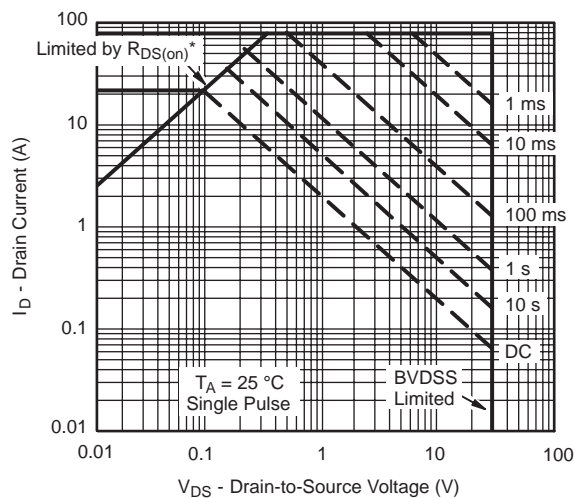
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



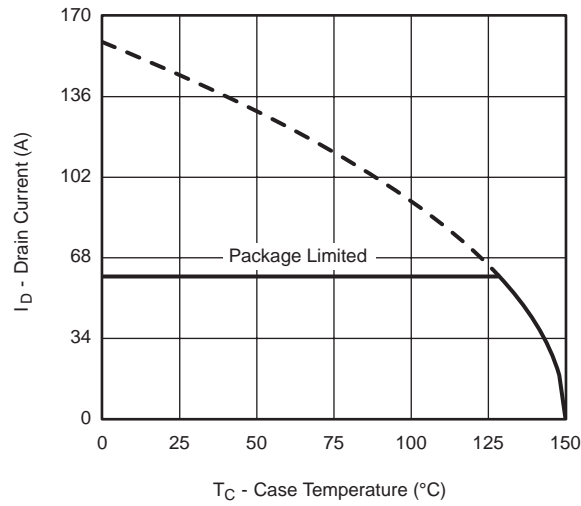
Single Pulse Power, Junction-to-Ambient



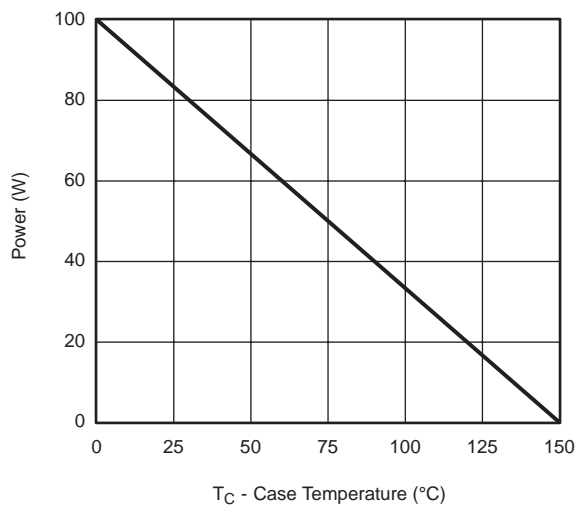
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

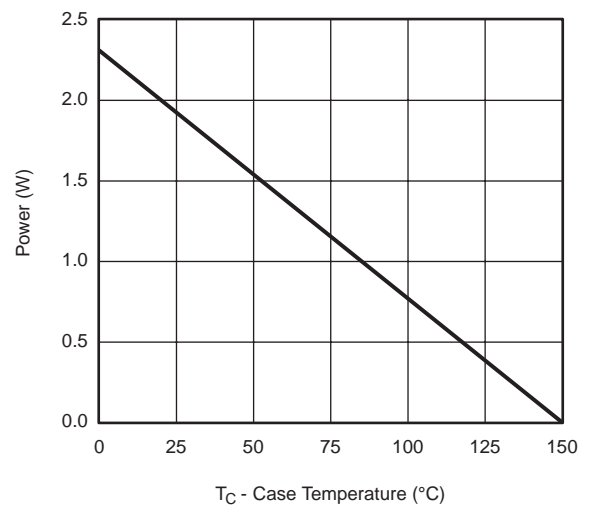
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Current Derating*



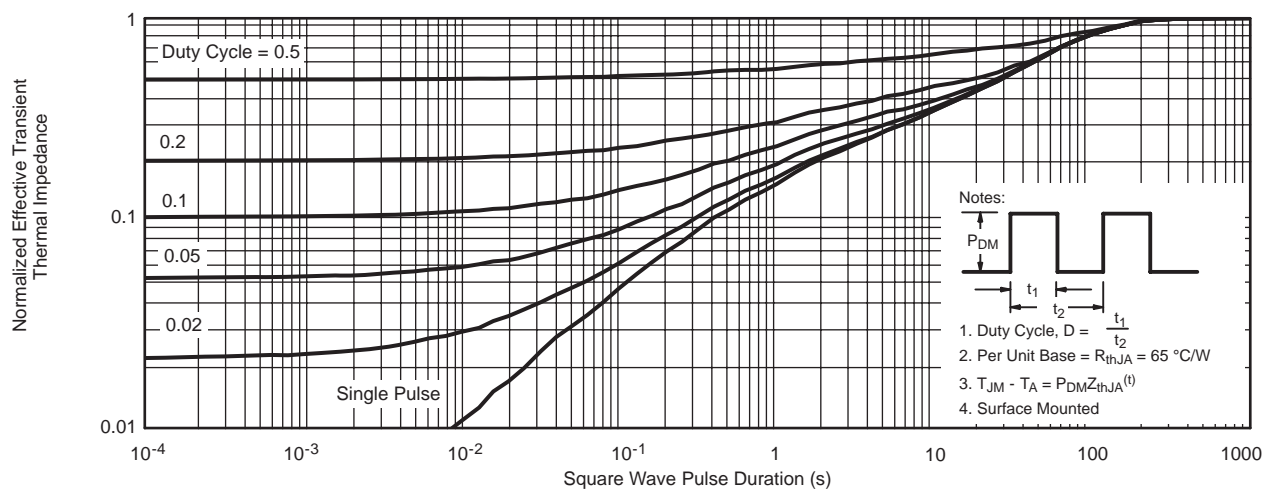
Power, Junction-to-Case



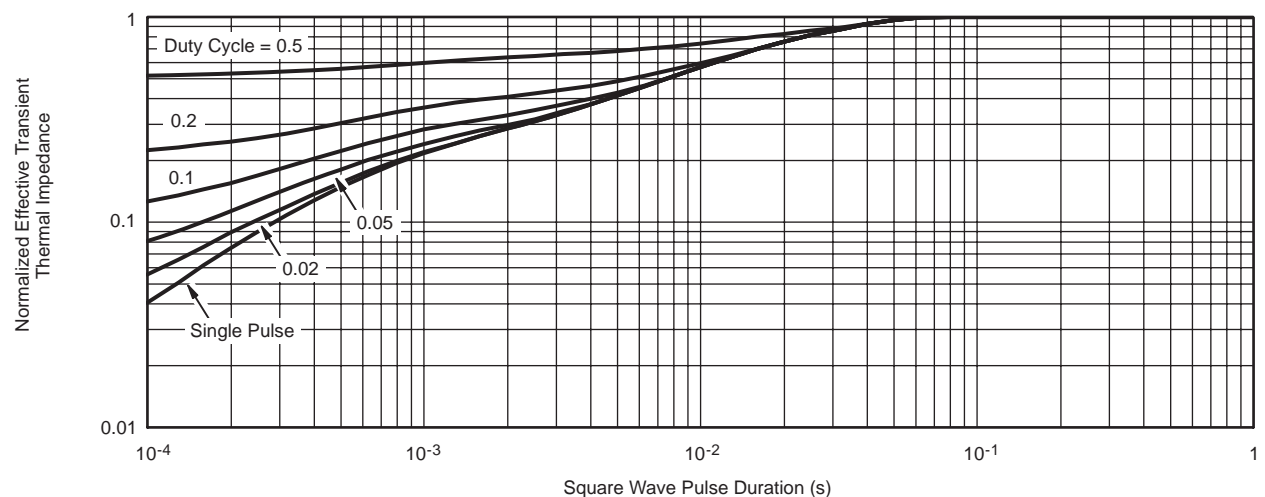
Power, Junction-to-Ambient

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

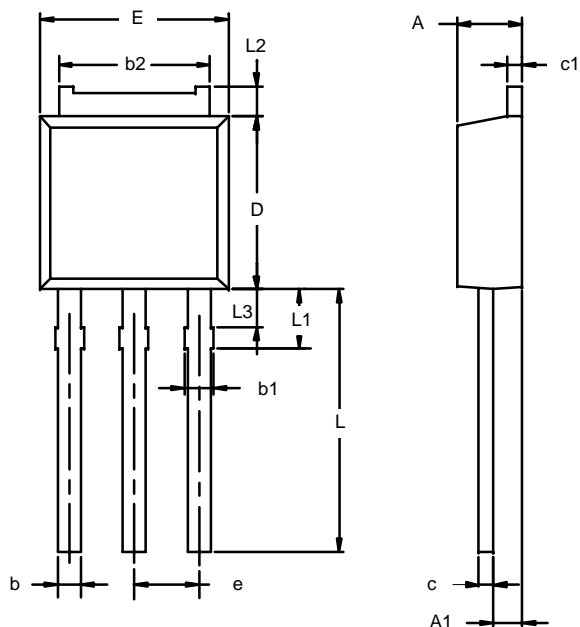


Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

TO-251AA (DPAK)



Note: Dimension L3 is for reference only.

Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	2.21	2.38	0.087	0.094
A1	0.89	1.14	0.035	0.045
b	0.71	0.89	0.028	0.035
b1	0.76	1.14	0.030	0.045
b2	5.23	5.43	0.206	0.214
c	0.46	0.58	0.018	0.023
c1	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
E	6.48	6.73	0.255	0.265
e	2.28 BSC		0.090 BSC	
L	8.89	9.53	0.350	0.375
L1	1.91	2.28	0.075	0.090
L2	0.89	1.27	0.035	0.050
L3	1.15	1.52	0.045	0.060
ECN: S-03946—Rev. E, 09-Jul-01 DWG: 5346				

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