

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

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
- 100	0.120 at $V_{GS} = - 10$ V	- 19	16.5 nC
	0.160 at $V_{GS} = - 4.5$ V	- 15.7	

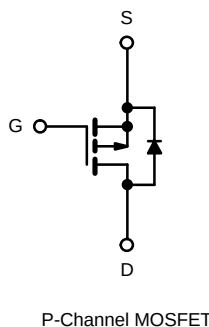
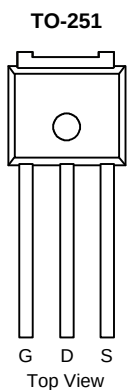
FEATURES

- Halogen-free Option Available
- TrenchFET® Power MOSFET
- UIS and R_g Tested


RoHS
 COMPLIANT

APPLICATIONS

- Active Clamp in Intermediate DC/DC Power Supplies



ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 100	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_C = 25^\circ\text{C}$	A
		$T_C = 70^\circ\text{C}$	
		$T_A = 25^\circ\text{C}$	
		$T_A = 70^\circ\text{C}$	
Pulsed Drain Current	I_{DM}	- 20	A
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$	
		$T_A = 25^\circ\text{C}$	- 3.0 ^{a, b}
Avalanche Current	I_{AS}	15	mJ
Single-Pulse Avalanche Energy	E_{AS}	11.25	
Maximum Power Dissipation	P_D	$T_C = 25^\circ\text{C}$	W
		$T_C = 70^\circ\text{C}$	
		$T_A = 25^\circ\text{C}$	
		$T_A = 70^\circ\text{C}$	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 50 to 150	$^\circ\text{C}$
Soldering Recommendations (Peak Temperature)		260	

Notes:

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

 b. $t = 10$ s.

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, b}	$t \leq 10$ s	R_{thJA}	26	33	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	1.9	2.4	

Notes:

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

b. Maximum under Steady State conditins is 81 °C/W.

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	ΔV _{DS} /T _J	I _D = - 250 μA		- 100		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 5.0		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA	- 1		- 3	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} ≥ - 5 V, V _{GS} = - 10 V	- 10			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 4 A		0.108	0.120	Ω
		V _{GS} = - 4.5 V, I _D = - 3 A		0.119	0.160	
Forward Transconductance ^a	g _{fs}	V _{DS} = - 15 V, I _D = 4 A		25		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = - 50 V, V _{GS} = 0 V, f = 1 MHz		1480		pF
Output Capacitance	C _{oss}			80		
Reverse Transfer Capacitance	C _{rss}			60		
Total Gate Charge	Q _g	V _{DS} = - 50 V, V _{GS} = - 10 V, I _D = - 4 A		35	55	nC
		V _{DS} = - 50 V, V _{GS} = - 4.5 V, I _D = - 4 A		16.5	25	
Q _{gs}			4.7			
Q _{gd}			8			
Gate Resistance	R _g	f = 1 MHz		5.3	8	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = - 50 V, R _L = 12.5 Ω I _D ≡ - 4 A, V _{GEN} = - 4.5 V, R _g = 1 Ω		30	45	ns
Rise Time	t _r			110	165	
Turn-Off DelayTime	t _{d(off)}			51	80	
Fall Time	t _f			40	60	
Turn-On Delay Time	t _{d(on)}	V _{DD} = - 50 V, R _L = 12.5 Ω I _D ≡ - 4 A, V _{GEN} = - 10 V, R _g = 1 Ω		11	18	
Rise Time	t _r			13	20	
Turn-Off DelayTime	t _{d(off)}			42	65	
Fall Time	t _f			10	15	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			- 19	A
Pulse Diode Forward Current ^a	I _{SM}				- 20	
Body Diode Voltage	V _{SD}	I _S = - 3 A		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = - 4 A, dI/dt = 100 A/μs, T _J = 25 °C		46	70	ns
Body Diode Reverse Recovery Charge	Q _{rr}			97	150	nC
Reverse Recovery Fall Time	t _a			36		ns
Reverse Recovery Rise Time	t _b			10		

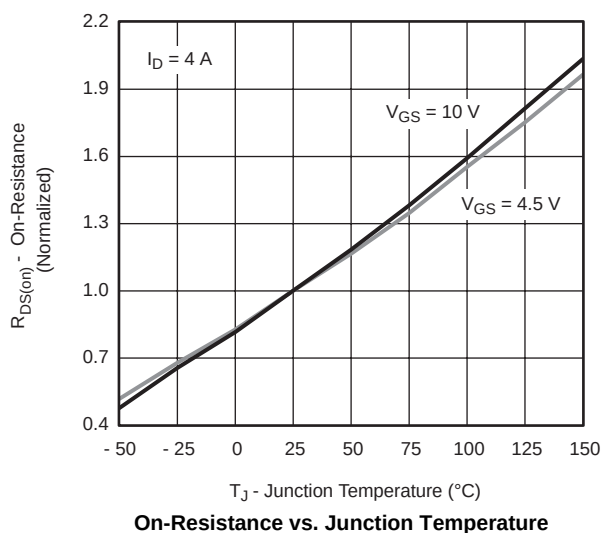
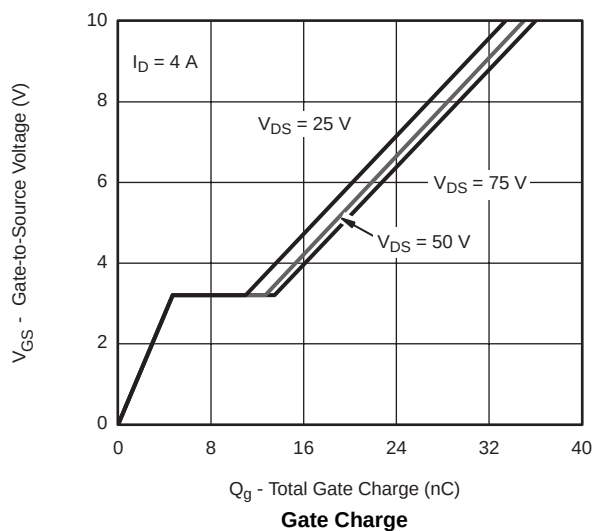
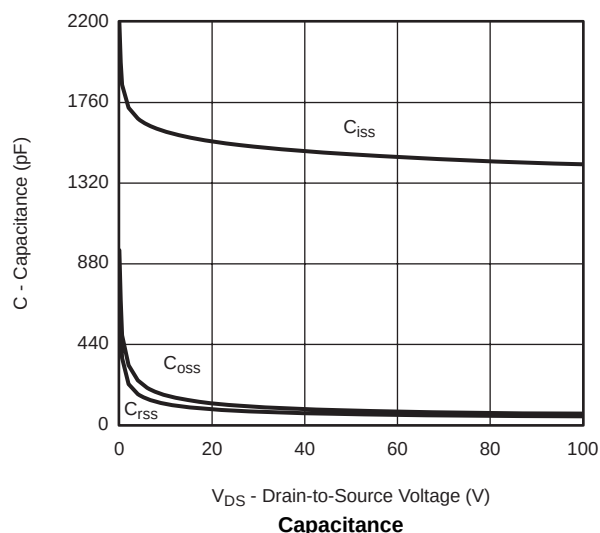
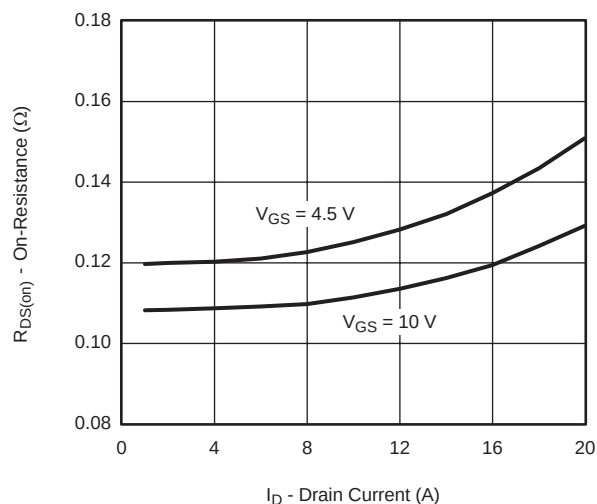
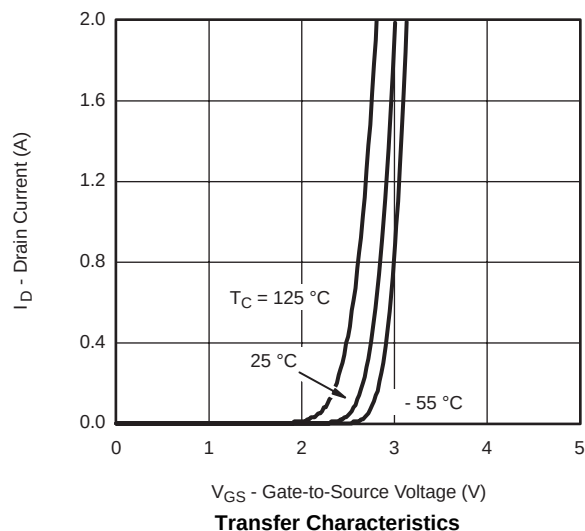
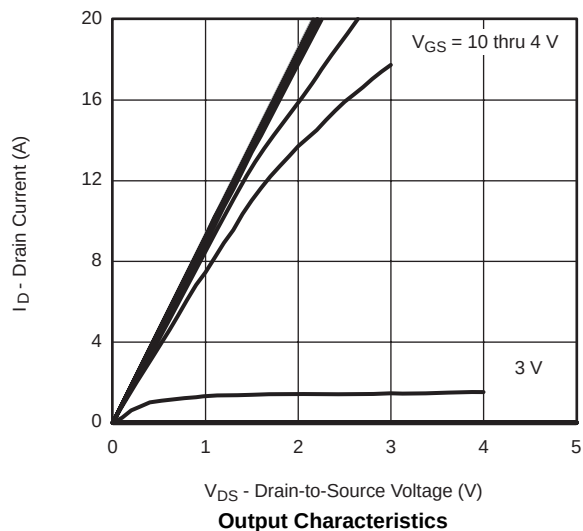
Notes:

 a. Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %.

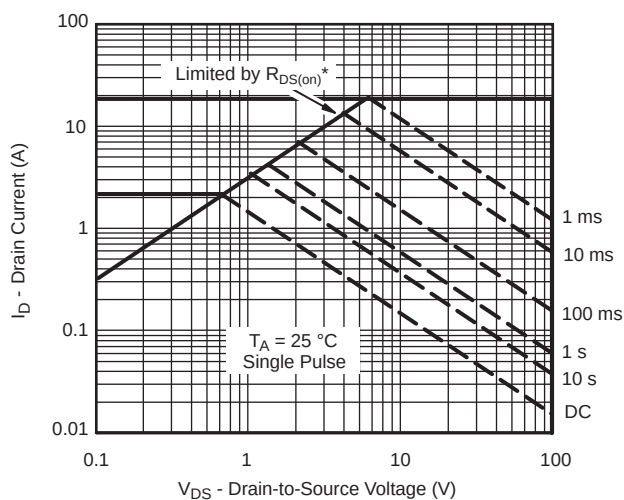
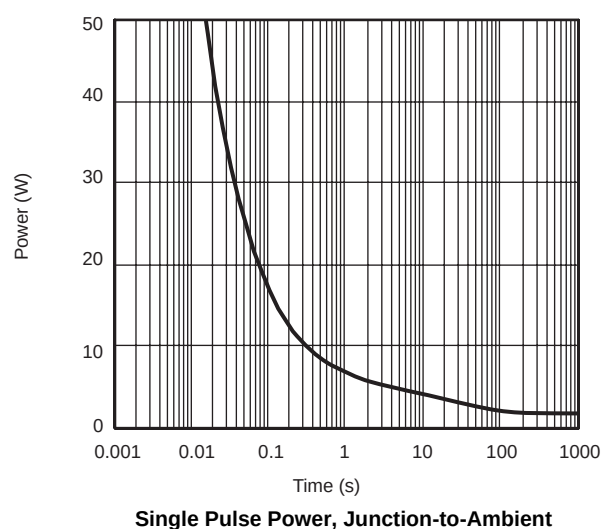
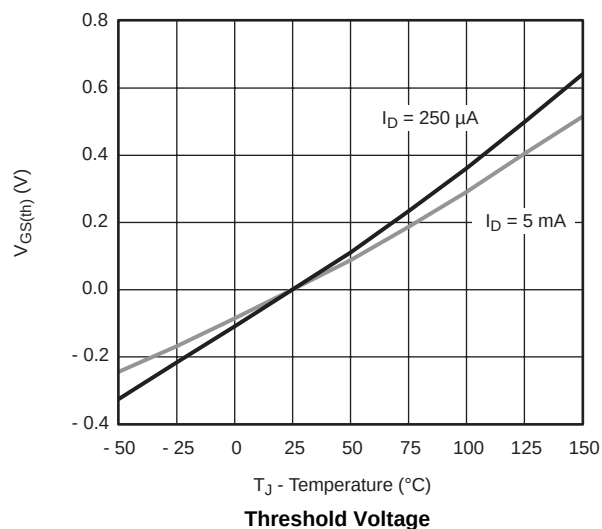
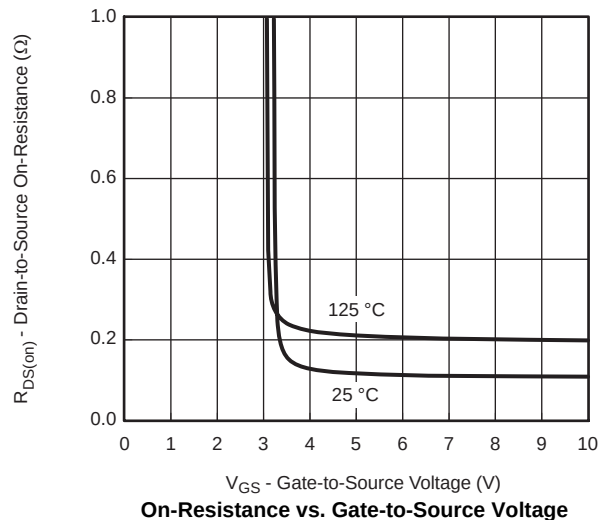
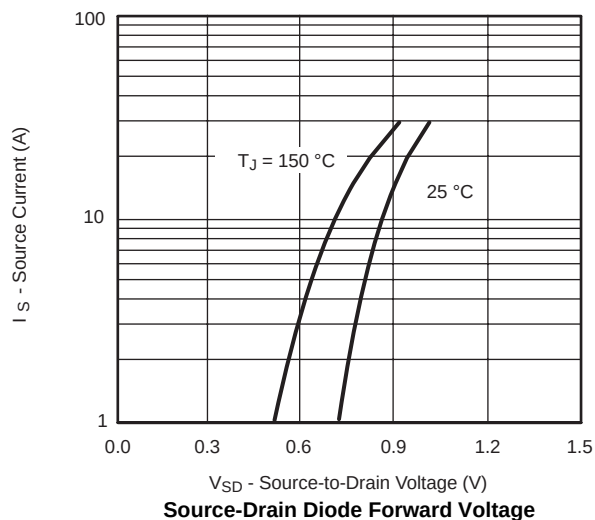
b. Guaranteed by design, not subject to production testing.

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



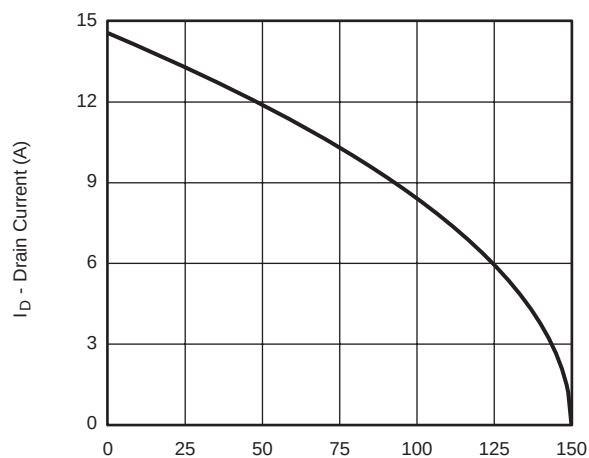
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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

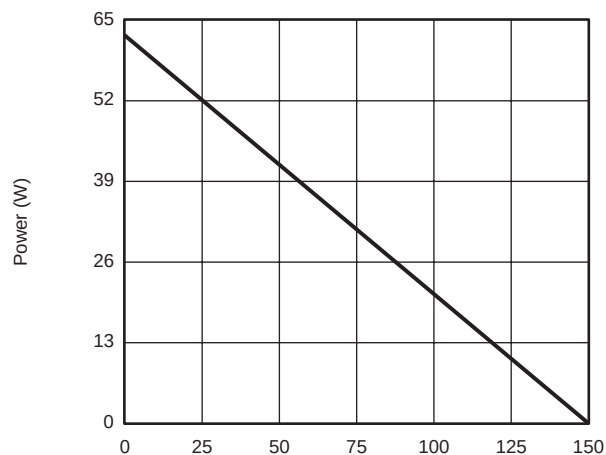
Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



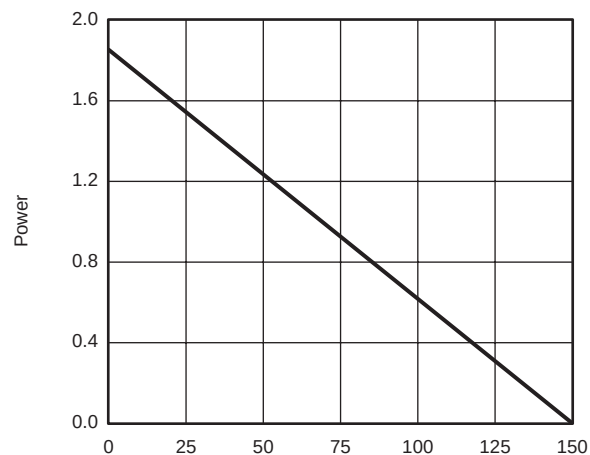
T_C - Case Temperature (°C)

Current Derating*



T_C - Case Temperature (°C)

Power, Junction-to-Case

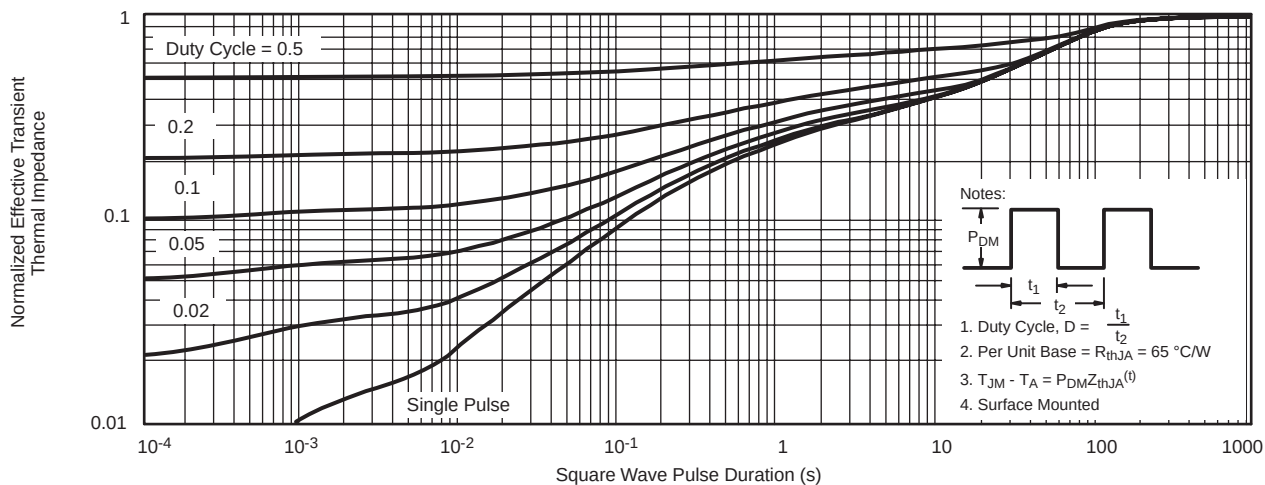


T_C - Case Temperature (°C)

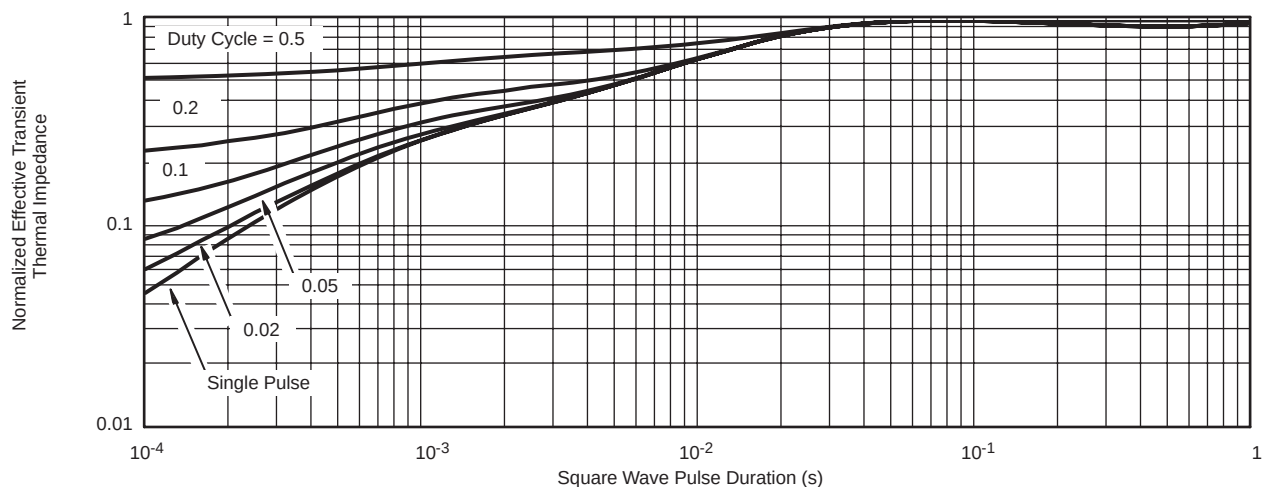
Power, Junction-to-Ambient

* The power dissipation PD 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

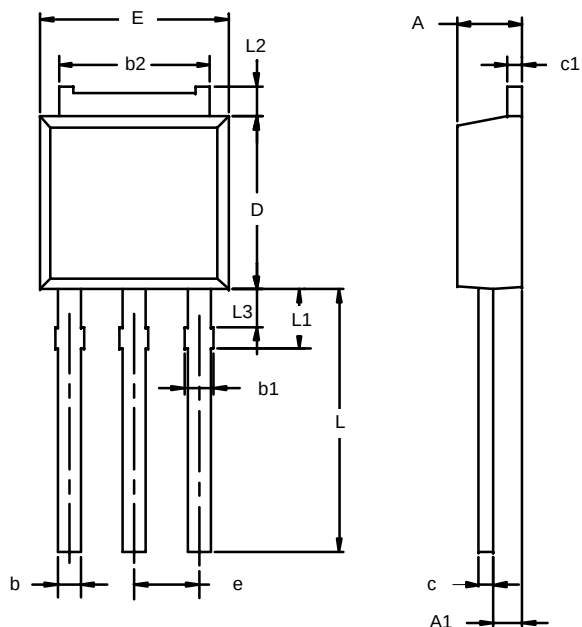


Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

TO-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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