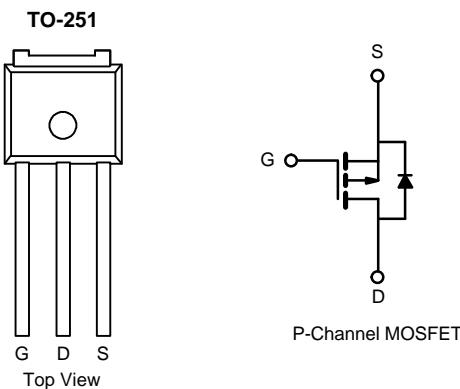


P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^d	Q _g (Typ.)
- 30	0.018 at V _{GS} = - 10 V	- 40	13 nC
	0.022 at V _{GS} = - 4.5 V	- 35	



FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 % R_g Tested



APPLICATIONS

- Load Switch
- Battery Switch

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	I _D	- 40	A
	T _C = 70 °C		- 35	
	T _A = 25 °C		- 30 ^{a, b}	
	T _A = 70 °C		- 28 a, b	
Pulsed Drain Current		I _{DM}	- 150	W
Continuous Source-Drain Diode Current	T _C = 25 °C	I _S	- 3.5	
	T _A = 25 °C		- 2.1a, b	
Maximum Power Dissipation	T _C = 25 °C	P _D	40	
	T _C = 70 °C		32	
	T _A = 25 °C		2.5 ^{a, b}	
	T _A = 70 °C		1.6 ^{a, 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 ^{a, c}	t ≤ 10 s	R _{thJA}	40	50	°C/W
Maximum Junction-to-Foot	Steady State	R _{thJF}	24	30	

Notes:

- a. Surface mounted on 1" x 1" FR4 board.
- b. t = 10 s.
- c. Maximum under Steady State conditions is 95 °C/W.
- d. Based on T_C = 25 °C.

SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

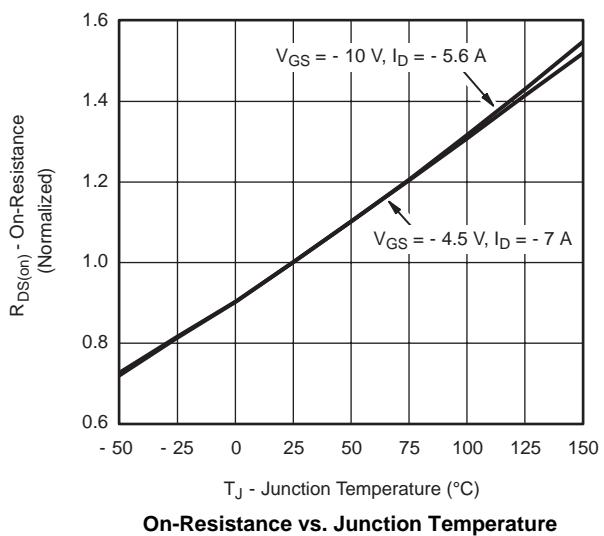
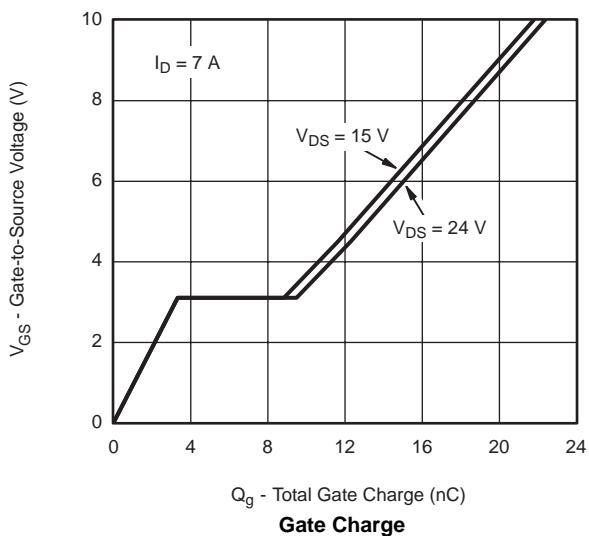
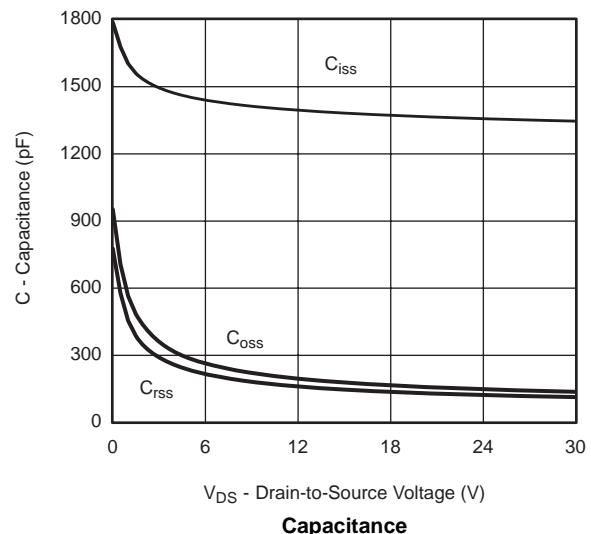
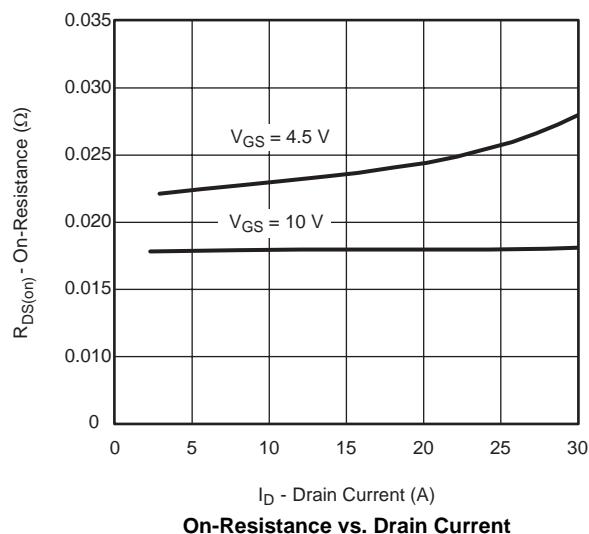
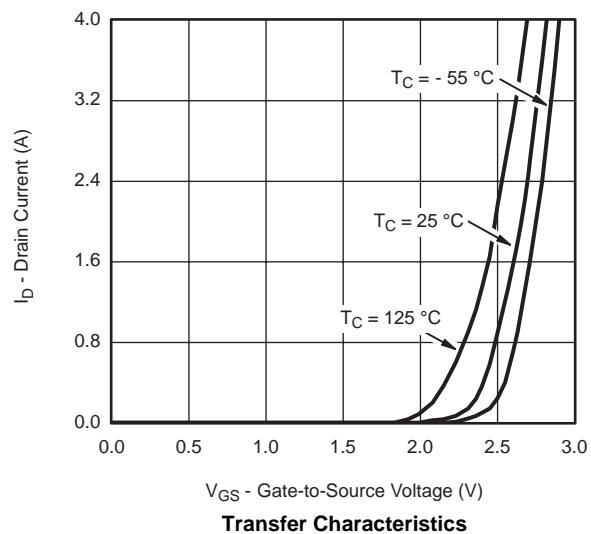
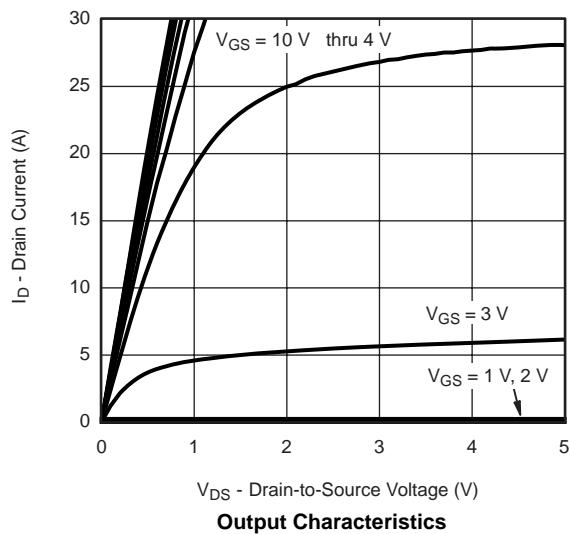
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = -250\text{ }\mu\text{A}$	- 30			V	
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		- 31			
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			4.5		mV/°C	
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$	- 1.0		- 2.5	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}	$V_{DS} = -30\text{ V}$, $V_{GS} = 0\text{ V}$			- 1		
		$V_{DS} = -30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55^\circ\text{C}$			- 5	μA	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}$, $V_{GS} = -10\text{ V}$	- 20			A	
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}$, $I_D = -7.0\text{ A}$		0.018			
		$V_{GS} = -4.5\text{ V}$, $I_D = -5.6\text{ A}$		0.022		Ω	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}$, $I_D = -7.0\text{ A}$		18		S	
Dynamic^b							
Input Capacitance	C_{iss}	$V_{DS} = -15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$		1455			
Output Capacitance	C_{oss}			180			
Reverse Transfer Capacitance	C_{rss}			145		pF	
Total Gate Charge	Q_g	$V_{DS} = -15\text{ V}$, $V_{GS} = -10\text{ V}$, $I_D = -7.0\text{ A}$		25	38		
Gate-Source Charge	Q_{gs}			13	20		
Gate-Drain Charge	Q_{gd}			3.5			
Gate Resistance	R_g			5.5		nC	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}$, $R_L = 2.7\text{ Ω}$ $I_D \geq -5.6\text{ A}$, $V_{GEN} = -10\text{ V}$, $R_g = 1\text{ Ω}$		0.4	2.0	4.0	Ω
Rise Time	t_r			10	20		
Turn-Off DelayTime	$t_{d(off)}$			13	20		
Fall Time	t_f			23	35		
Turn-On Delay Time	$t_{d(on)}$			9	18		
Rise Time	t_r			38	57		
Turn-Off DelayTime	$t_{d(off)}$			89	134		
Fall Time	t_f			22	33		
				11	17		
Drain-Source Body Diode Characteristics							
Continous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$			- 6.5		
Pulse Diode Forward Current	I_{SM}				- 30		A
Body Diode Voltage	V_{SD}	$I_S = -5.6\text{ A}$, $V_{GS} = 0\text{ V}$		- 0.71	- 1.2	V	
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -5.6\text{ A}$, $dl/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$		22	33		
Body Diode Reverse Recovery Charge	Q_{rr}			17	26	nC	
Reverse Recovery Fall Time	t_a			13			
Reverse Recovery Rise Time	t_b			9			
							ns

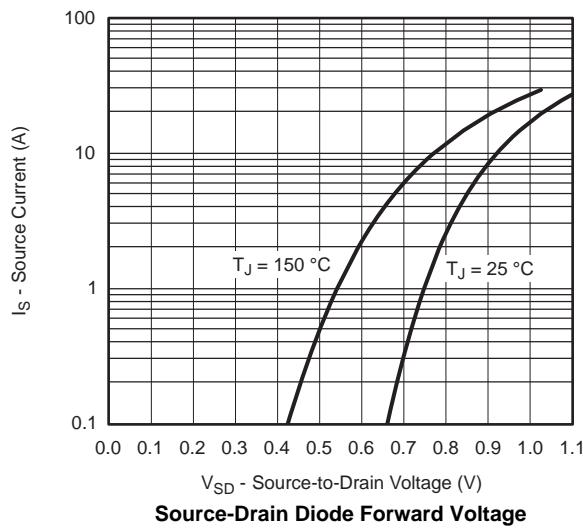
Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

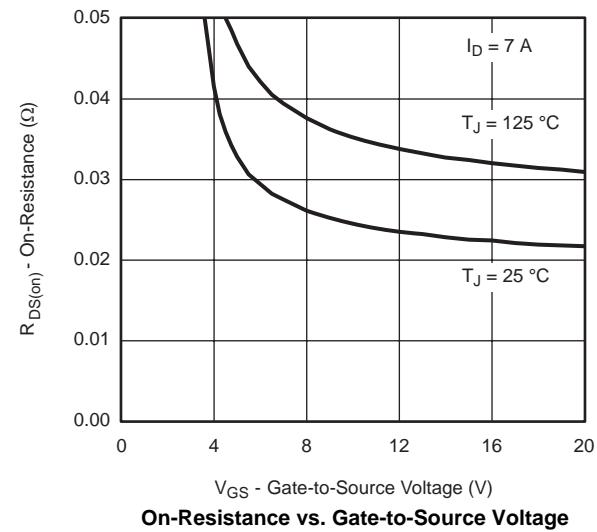
b. Guaranteed by design, not subject to production testing.

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.

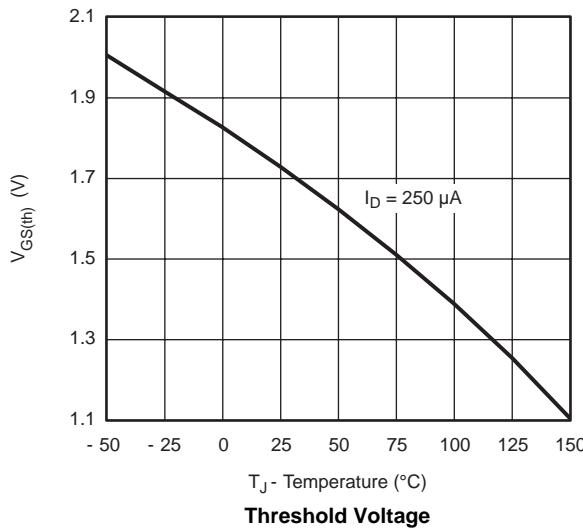
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


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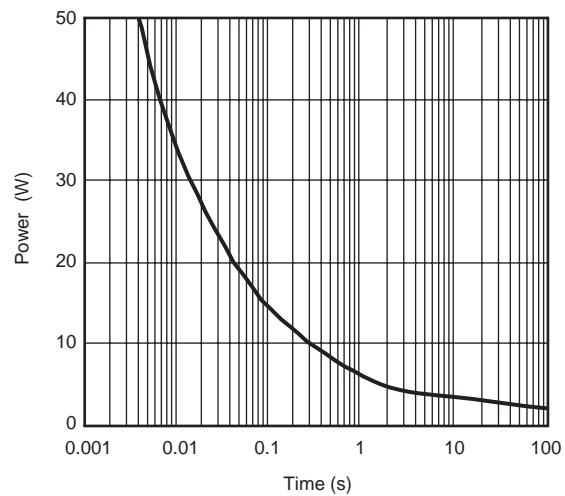
Source-Drain Diode Forward Voltage



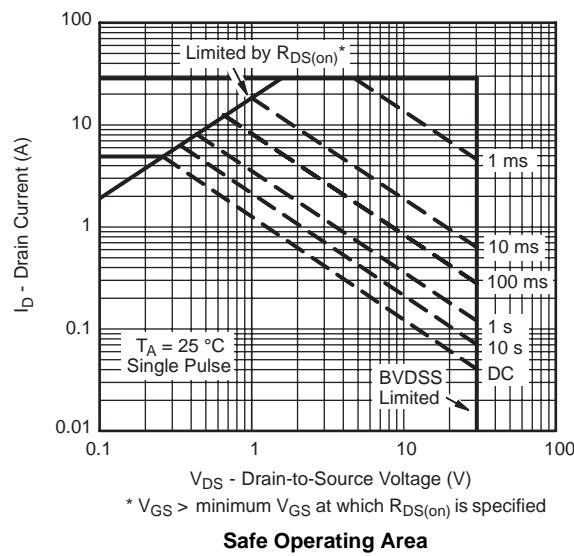
On-Resistance vs. Gate-to-Source Voltage



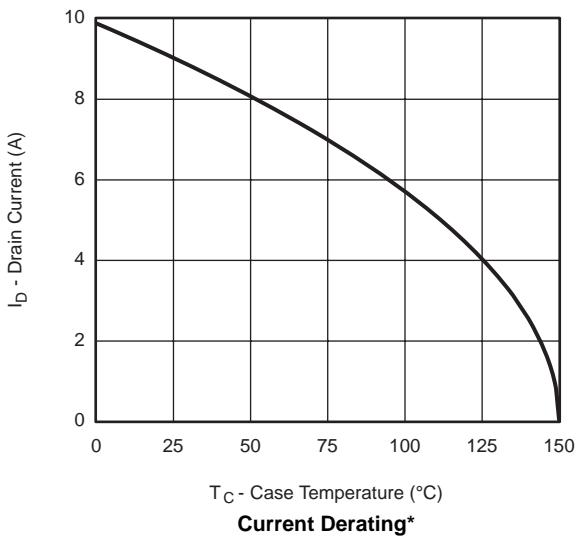
Threshold Voltage

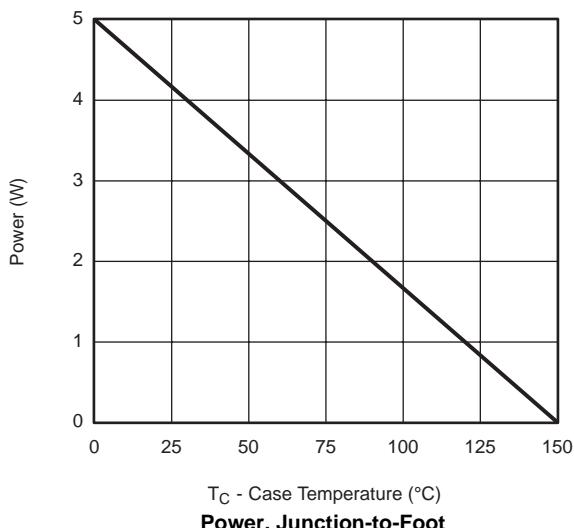


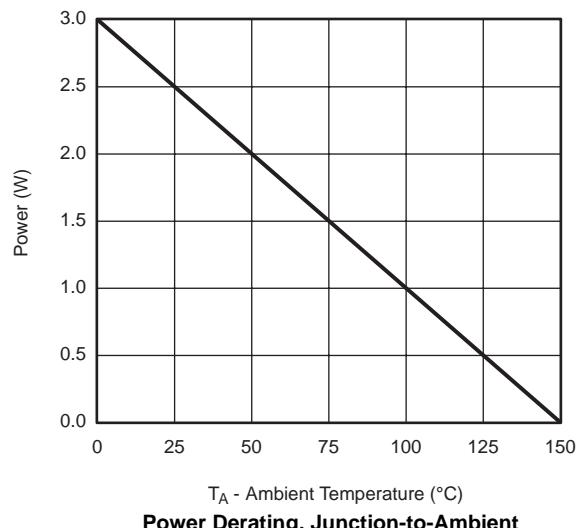
Single Pulse Power, Junction-to-Ambient



Safe Operating Area

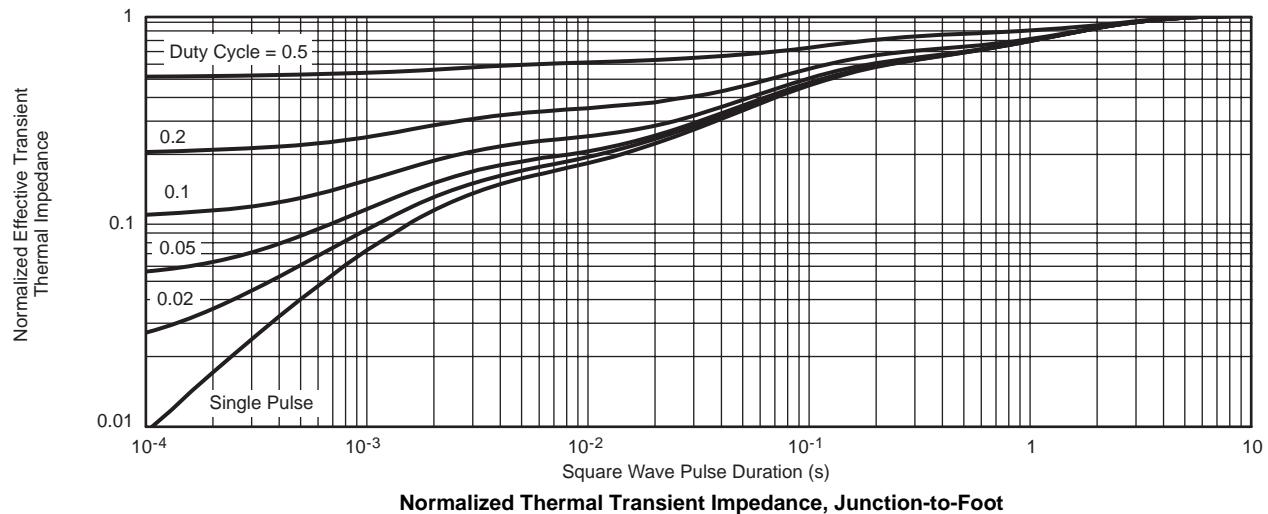
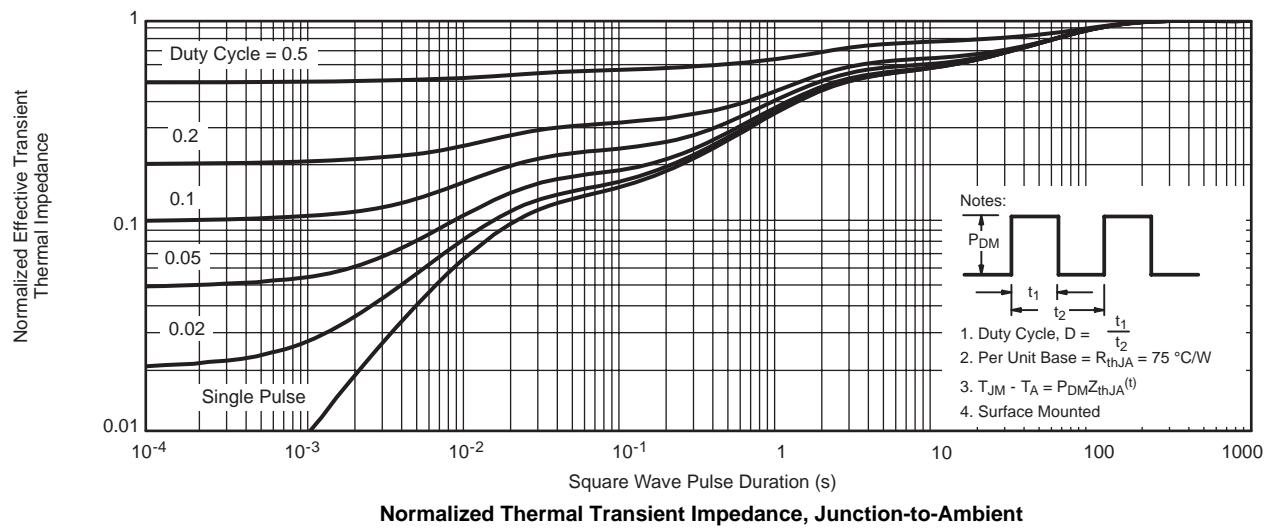
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

 T_C - Case Temperature (°C)

Current Derating*

 T_C - Case Temperature (°C)

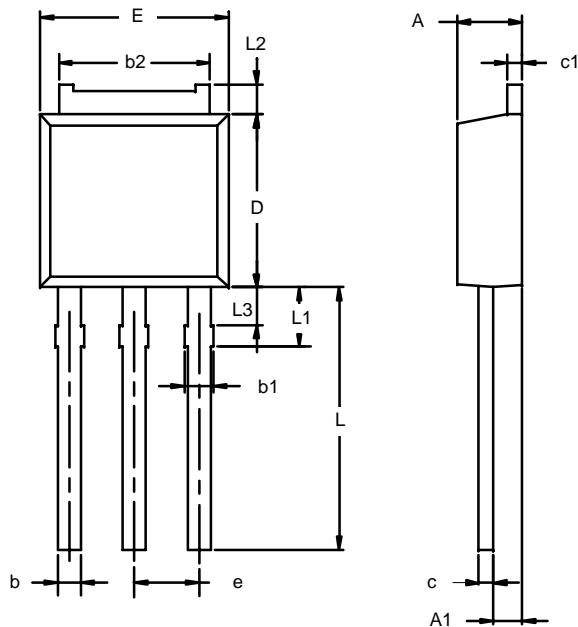
Power, Junction-to-Foot

 T_A - Ambient Temperature (°C)

Power Derating, 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


TO-251AA (DPAK)



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	3.89	9.53	0.153	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

Note: Dimension L3 is for reference only.

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