

## Dual P-channel Enhancement Mode Power MOSFET

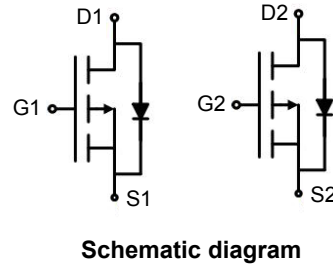
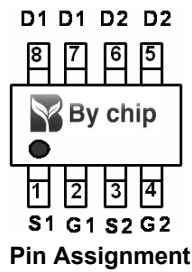
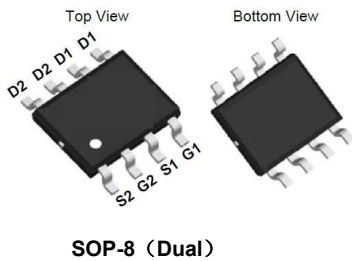
### Features

- $V_{DS} = -60V$ ,  $I_D = -5.3 A$   
 $R_{DS(ON)} < 54m\Omega$  @  $V_{GS} = -10V$   
 $R_{DS(ON)} < 60m\Omega$  @  $V_{GS} = -4.5V$

### General Features

- Advanced Trench Technology
- Provide Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead Free and Green Available

100% UIS TESTED!  
 100%  $\Delta V_{ds}$  TESTED!



<b>ABSOLUTE MAXIMUM RATINGS</b> $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	- 60	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current ( $T_J = 150\text{ }^\circ\text{C}$ )	$I_D$	$T_C = 25\text{ }^\circ\text{C}$	- 5.3 <sup>e</sup>	
		$T_C = 70\text{ }^\circ\text{C}$	- 5.0 <sup>e</sup>	
		$T_A = 25\text{ }^\circ\text{C}$	- 5.3 <sup>a, b</sup>	
		$T_A = 70\text{ }^\circ\text{C}$	- 5.0 <sup>a, b</sup>	
Pulsed Drain Current	$I_{DM}$	- 32 <sup>e</sup>	A	
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$		- 4.1
		$T_A = 25\text{ }^\circ\text{C}$		- 2.0 <sup>a, b</sup>
Avalanche Current	$I_{AS}$	- 20	mJ	
Single-Pulse Avalanche Energy	$E_{AS}$	20		
Maximum Power Dissipation	$P_D$	$T_C = 25\text{ }^\circ\text{C}$	4.0	
		$T_C = 70\text{ }^\circ\text{C}$	2.5	
		$T_A = 25\text{ }^\circ\text{C}$	2.0 <sup>a, b</sup>	
		$T_A = 70\text{ }^\circ\text{C}$	1.4 <sup>a, b</sup>	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150	$^\circ\text{C}$	

<b>THERMAL RESISTANCE RATINGS</b>					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient <sup>a, c</sup>	$R_{thJA}$	38	50	$^\circ\text{C/W}$	
Maximum Junction-to-Foot	$R_{thJF}$	20	25		

#### Notes:

- Surface mounted on 1" x 1" FR4 board.
- $t = 10\text{ s}$ .
- Maximum under Steady State conditions is 85  $^\circ\text{C/W}$ .
- Based on  $T_C = 25\text{ }^\circ\text{C}$ .
- Limited by package.

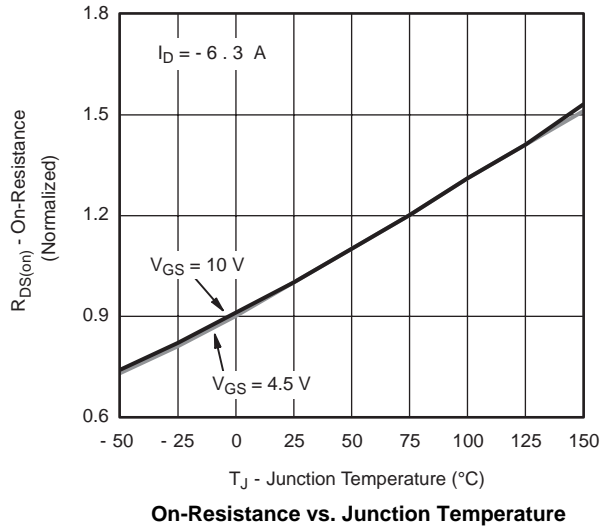
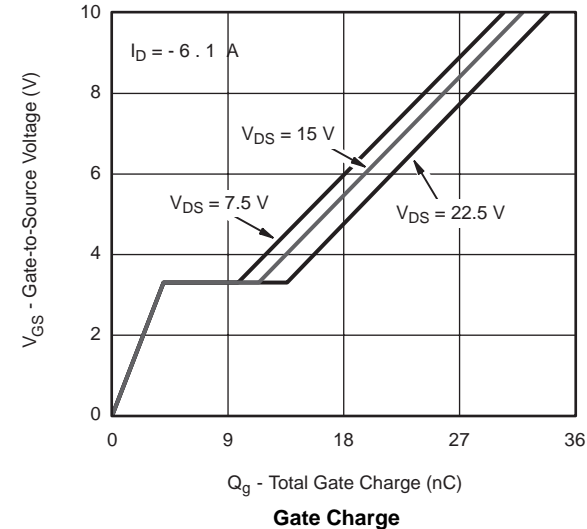
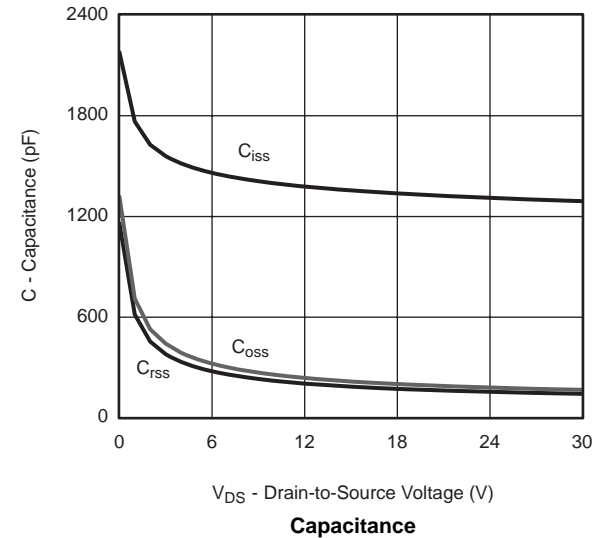
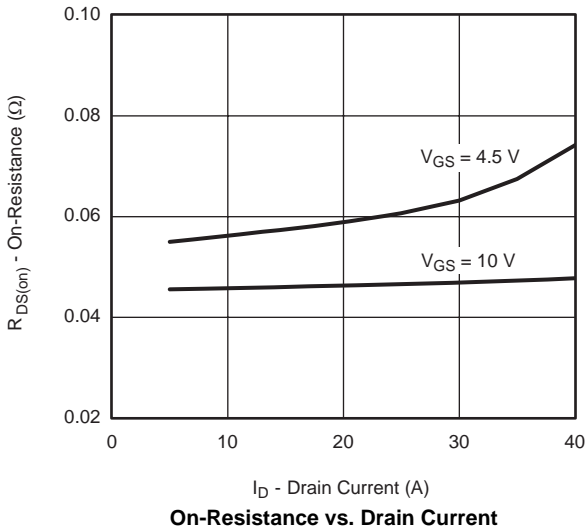
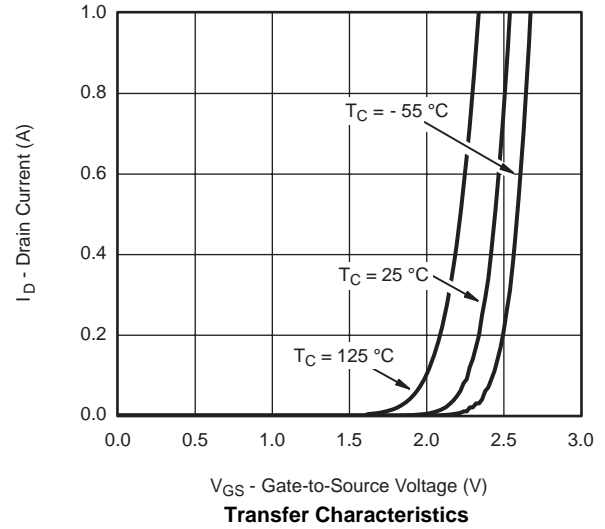
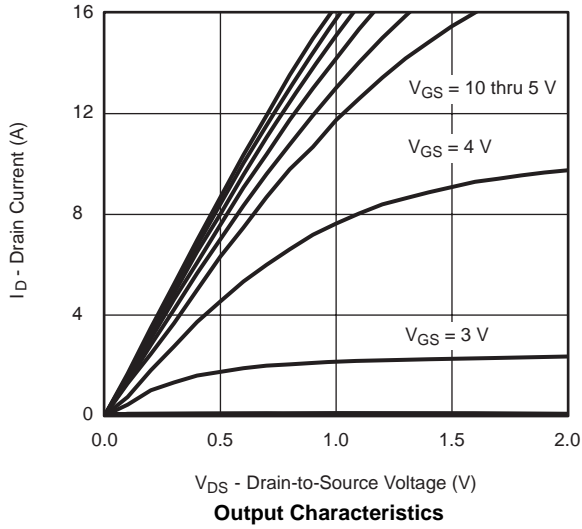
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 60			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		- 31		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		4.5			
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	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$			- 1	$\mu\text{A}$
		$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			- 5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq -10\text{ V}, V_{GS} = -10\text{ V}$	- 30			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -5\text{ A}$		0.054		$\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -4.5\text{ A}$		0.060		
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10\text{ V}, I_D = -5\text{ A}$		23		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1345		pF
Output Capacitance	$C_{oss}$		210			
Reverse Transfer Capacitance	$C_{rss}$		180			
Total Gate Charge	$Q_g$	$V_{DS} = -15\text{ V}, V_{GS} = -10\text{ V}, I_D = -5\text{ A}$		32	50	nC
		$V_{DS} = -15\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -5\text{ A}$		15	25	
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -15\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -5\text{ A}$		4		nC
Gate-Drain Charge	$Q_{gd}$		7.5			
Gate Resistance	$R_g$		$f = 1\text{ MHz}$		5.8	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		10	15	ns
Rise Time	$t_r$		8	15		
Turn-Off Delay Time	$t_{d(off)}$		45	70		
Fall Time	$t_f$		12	25		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		42	70	
Rise Time	$t_r$		35	60		
Turn-Off Delay Time	$t_{d(off)}$		40	70		
Fall Time	$t_f$		16	30		
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			- 4.1	A
Pulse Diode Forward Current	$I_{SM}$				- 32	
Body Diode Voltage	$V_{SD}$	$I_S = -2\text{ A}, V_{GS} = 0\text{ V}$		- 0.75	- 1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -2\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		34	60	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$		22	40	nC	
Reverse Recovery Fall Time	$t_a$		11		ns	
Reverse Recovery Rise Time	$t_b$		23			

Notes:

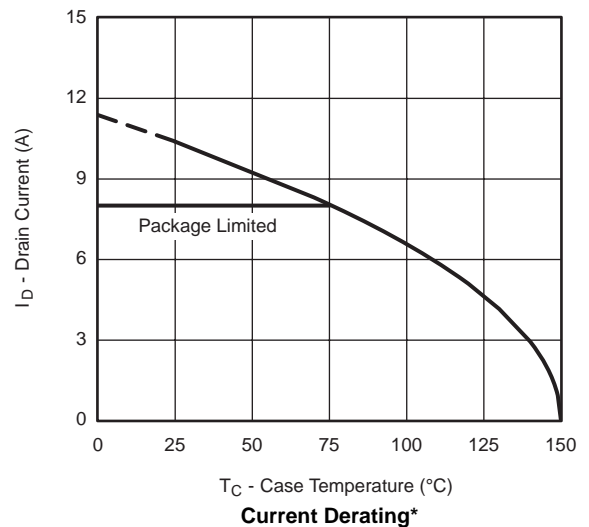
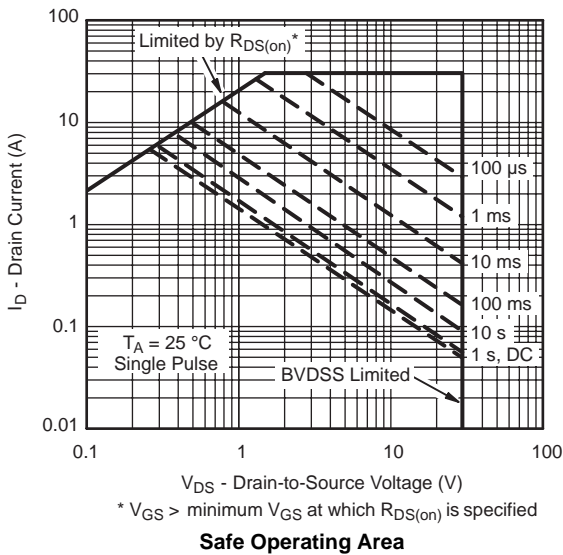
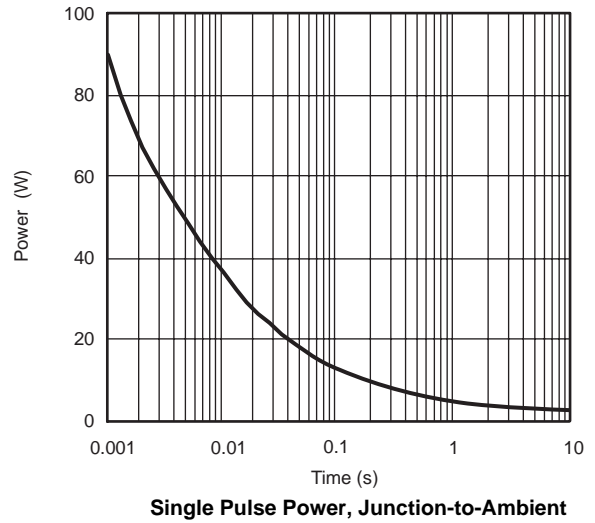
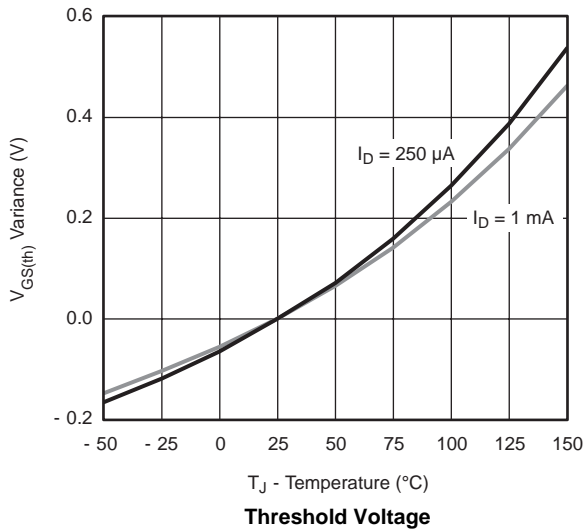
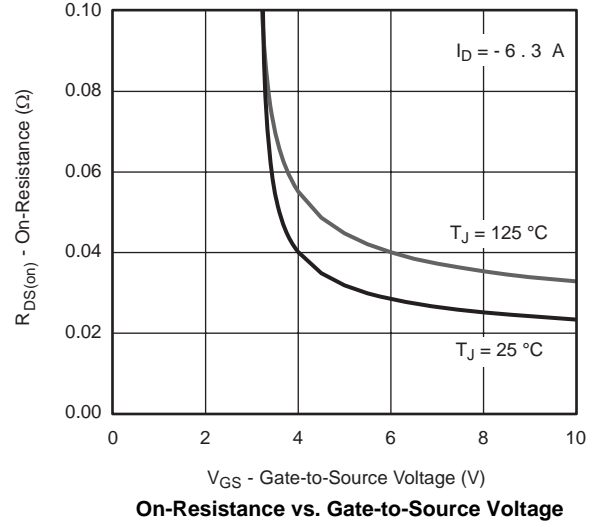
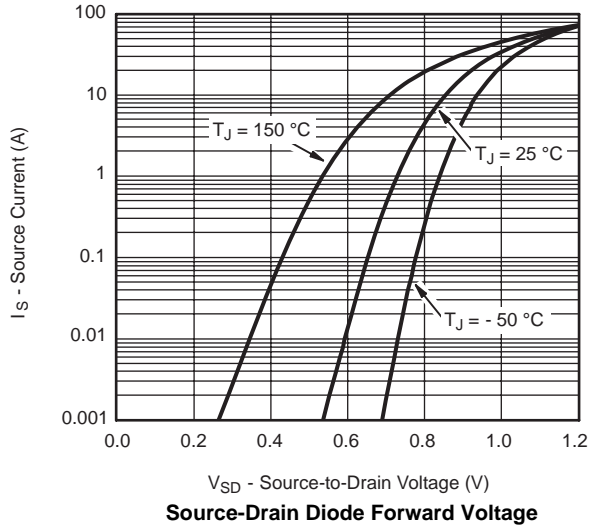
- Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

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.

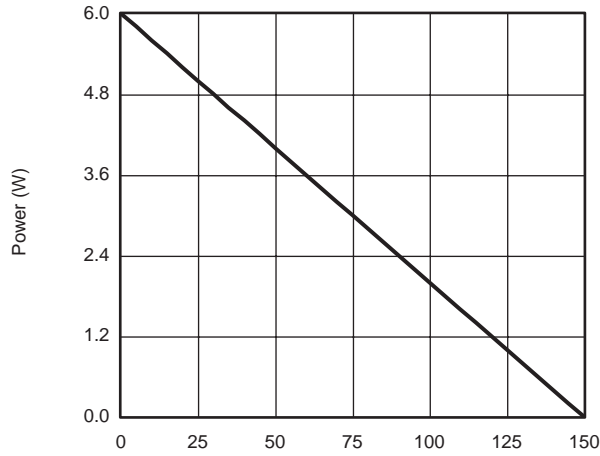
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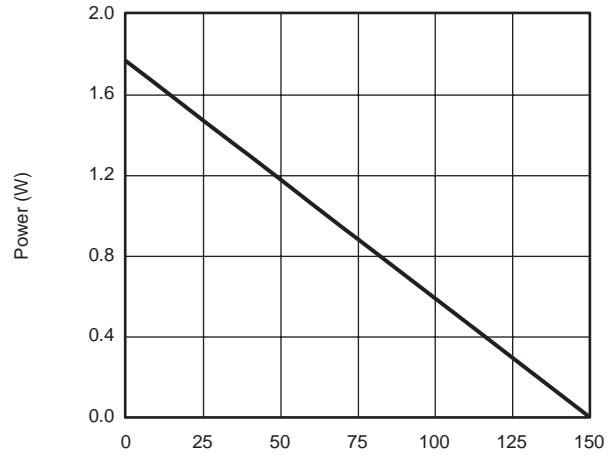


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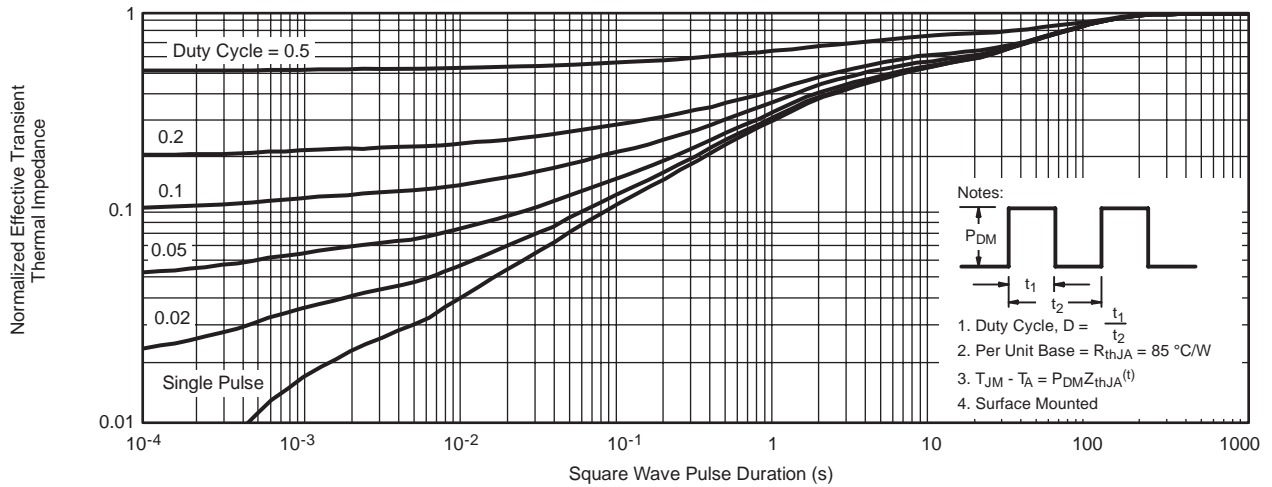
$T_C$  - Case Temperature (°C)

**Power, Junction-to-Foot**

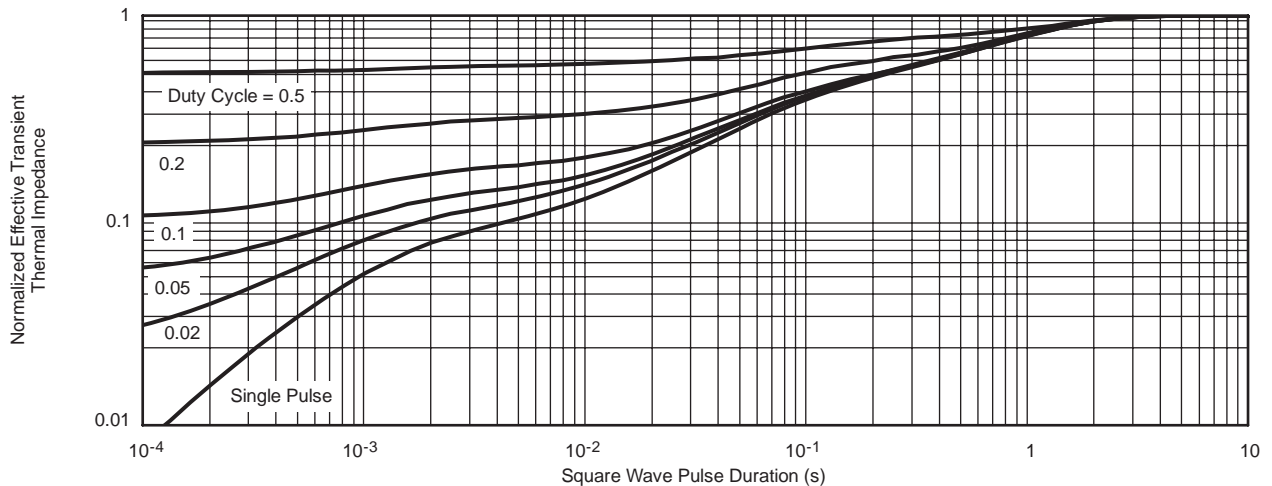


$T_A$  - Ambient Temperature (°C)

**Power Derating, Junction-to-Ambient**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**



**Normalized Thermal Transient Impedance, Junction-to-Foot**