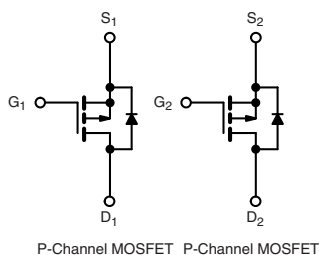
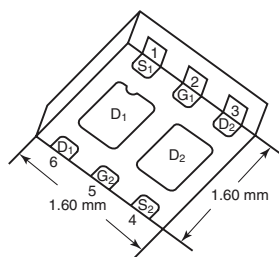




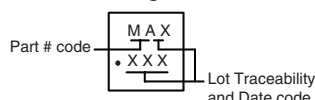
## Dual P-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY	
$V_{DS}$ (V)	- 20
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = - 4.5$ V	0.295
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = - 2.5$ V	0.420
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = - 1.8$ V	0.560
$I_D$ (A) <sup>f</sup>	- 2.6
Configuration	Dual

PowerPAK SC75-6L-Dual



Marking Code



### FEATURES

- High Quality Manufacturing Process Using SMM Process Flow
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- New Thermally Enhanced PowerPAK® SC-75 Package
  - Small Footprint Area
- Compliant to RoHS Directive 2002/95/EC
- Find out more about Vishay's Medical Products at: [www.vishay.com/medical-mosfets](http://www.vishay.com/medical-mosfets)



### APPLICATION EXAMPLES

- Medical Implantable Applications Including
  - Drug Delivery Systems
  - Defibrillators
  - Pacemakers
  - Hearing Aids
  - Other Implantable Devices
- Load Switch, PA Switch and Battery Switch for Portable Devices

ORDERING INFORMATION	
Package	PowerPAK SC-75
Lead (Pb)-free and Halogen-free	SMMB911DK-T1-GE3

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted				
PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-Source Voltage	$V_{DS}$	- 20	V	
Gate-Source Voltage	$V_{GS}$	$\pm 8$		
Continuous Drain Current ( $T_J = 150$ °C)	$I_D$	$T_C = 25$ °C	- 2.6	A
		$T_C = 70$ °C	- 2.1	
		$T_A = 25$ °C <sup>a, b</sup>	- 1.5	
		$T_A = 70$ °C <sup>a, b</sup>	- 1.2	
Pulsed Drain Current	$I_{DM}$	- 5		
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25$ °C	- 2.6	
		$T_A = 25$ °C <sup>a, b</sup>	- 0.9	
Maximum Power Dissipation	$P_D$	$T_C = 25$ °C	3.1	W
		$T_C = 70$ °C	2	
		$T_A = 25$ °C <sup>a, b</sup>	1.1	
		$T_A = 70$ °C <sup>a, b</sup>	0.7	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to + 150	°C	
Soldering Recommendations (Peak Temperature) <sup>c, d</sup>		260	°C	



### THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Ambient <sup>a, e</sup>	$t \leq 5$ s	$R_{thJA}$	90	115	°C/W
Junction-to-Case (Drain)	Steady State	$R_{thJC}$	32	40	

#### Notes

- Surface mounted on 1" x 1" FR4 board.
- $t = 5$  s.
- See Solder Profile ([www.vishay.com/ppg?73257](http://www.vishay.com/ppg?73257)). The PowerPAK SC-75 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
- Maximum under steady state conditions is 125 °C/W.
- Based on  $T_C = 25$  °C.

### SPECIFICATIONS $T_J = 25$ °C, unless otherwise noted

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
<b>Static</b>							
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0$ V, $I_D = -250$ $\mu$ A	-20	-	-	V	
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250$ $\mu$ A	-	-19	-	mV/°C	
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		-	1.9	-		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -250$ $\mu$ A	-0.4	-	-1	V	
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0$ V, $V_{GS} = \pm 8$ V	-	-	$\pm 100$	nA	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0$ V	-	-	-1	$\mu$ A	
		$V_{GS} = 0$ V	$V_{DS} = -20$ V, $T_J = 55$ °C	-	-		-10
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{GS} = -4.5$ V	5	-	-	A	
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -4.5$ V	-	0.242	0.295	$\Omega$	
		$V_{GS} = -2.5$ V	-	0.345	0.420		
		$V_{GS} = -1.8$ V	-	0.455	0.560		
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10$ V, $I_D = -1.5$ A	-	3	-	S	
<b>Dynamic<sup>b</sup></b>							
Input Capacitance	$C_{iss}$	$V_{GS} = 0$ V	$V_{DS} = -10$ V, $f = 1$ MHz	-	115	-	pF
Output Capacitance	$C_{oss}$			-	30	-	
Reverse Transfer Capacitance	$C_{rss}$			-	20	-	
Total Gate Charge	$Q_g$	$V_{GS} = -8$ V	$V_{DS} = -10$ V, $I_D = -1.7$ A	-	2.6	4.0	nC
		$V_{GS} = -4.5$ V	$V_{DS} = -10$ V, $I_D = -1.7$ A	-	1.6	2.5	
Gate-Source Charge	$Q_{gs}$	$V_{GS} = -4.5$ V	$V_{DS} = -10$ V, $I_D = -1.7$ A	-	0.3	-	
Gate-Drain Charge	$Q_{gd}$			-	0.5	-	
Gate Resistance	$R_g$	$f = 1$ MHz		-	7	-	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10$ V, $R_L = 7.1$ $\Omega$ $I_D \cong -1.4$ A, $V_{GEN} = -4.5$ V, $R_g = 1$ $\Omega$		-	12	20	ns
Rise Time	$t_r$			-	45	70	
Turn-Off Delay Time	$t_{d(off)}$			-	10	15	
Fall Time	$t_f$			-	31	50	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10$ V, $R_L = 7.1$ $\Omega$ $I_D \cong -1.4$ A, $V_{GEN} = -8$ V, $R_g = 1$ $\Omega$		-	3	10	
Rise Time	$t_r$			-	25	40	
Turn-Off Delay Time	$t_{d(off)}$			-	10	15	
Fall Time	$t_f$			-	10	15	
<b>Source-Drain Body Diode Characteristics</b>							
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25$ °C		-	-	-2.6	A
Pulse Diode Forward Current	$I_{SM}$			-	-	5	



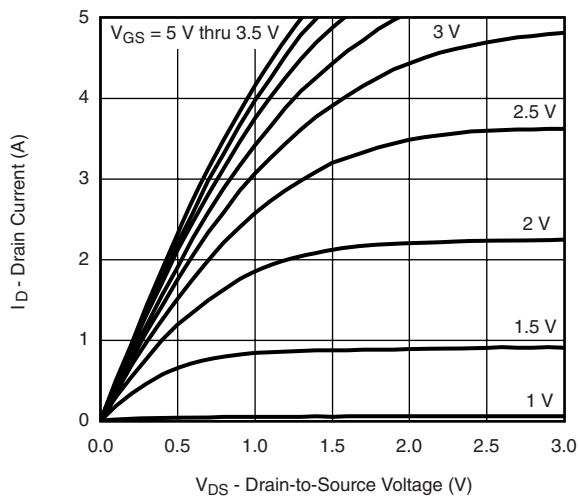
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Source-Drain Body Diode Characteristics</b>						
Body Diode Voltage	$V_{SD}$	$I_S = -1.4\text{ A}$ , $V_{GS} = 0\text{ V}$	-	-0.8	-1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -1.4\text{ A}$ , $dI/dt = 100\text{ A}/\mu\text{s}$ , $T_J = 25\text{ }^\circ\text{C}$	-	25	50	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	26	50	nC
Reverse Recovery Fall Time	$t_a$		-	19	-	ns
Reverse Recovery Rise Time	$t_b$		-	6	-	

**Notes**

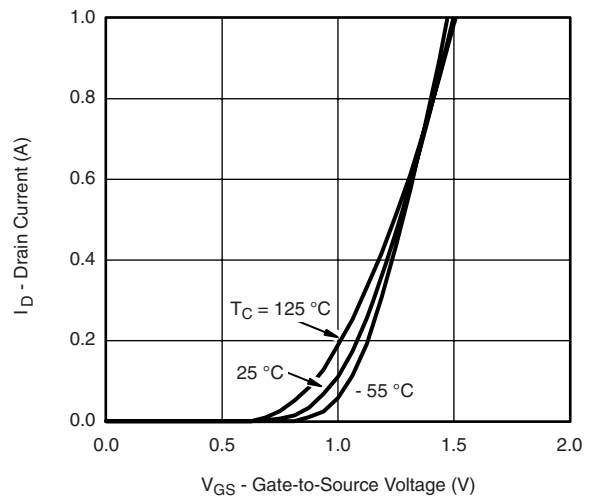
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

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.

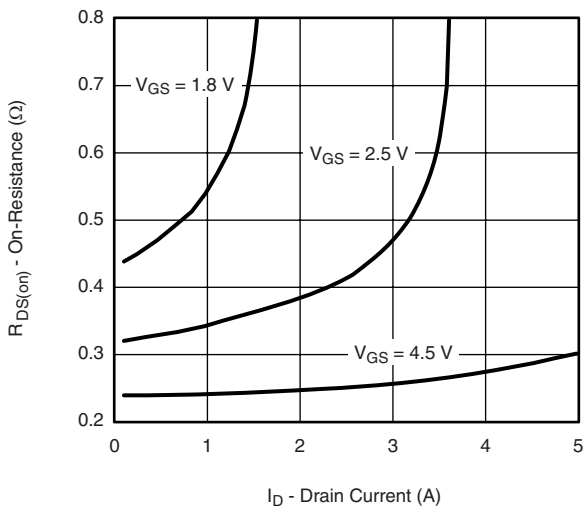
**TYPICAL CHARACTERISTICS**  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted



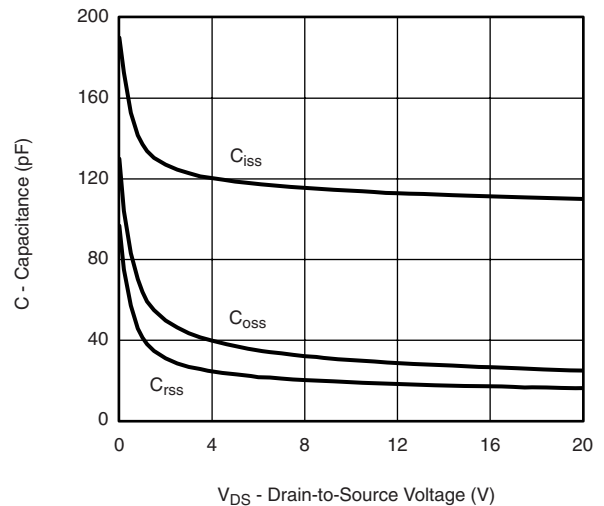
**Output Characteristics**



**Transfer Characteristics**



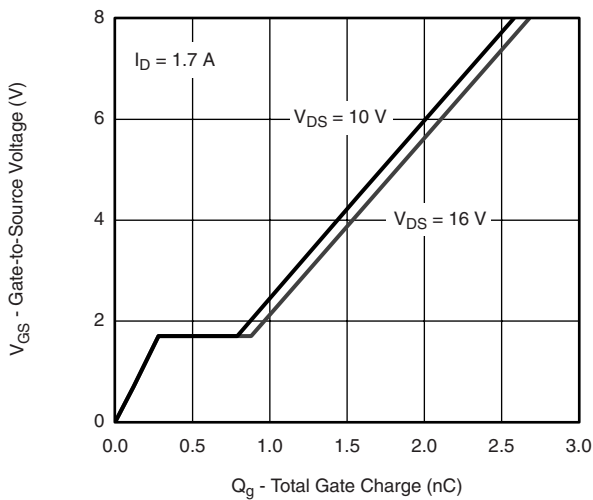
**On-Resistance vs. Drain Current and Gate Voltage**



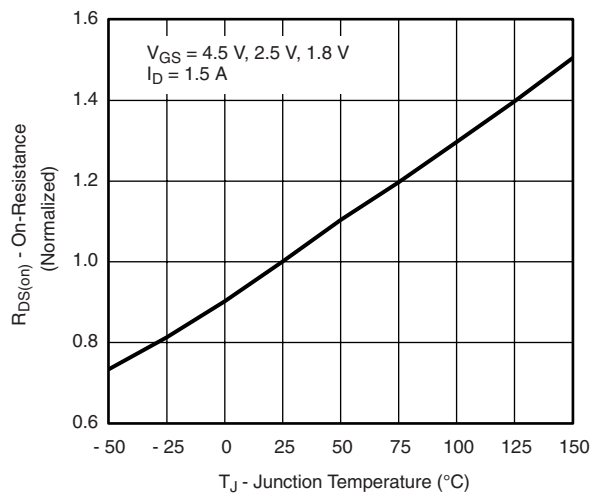
**Capacitance**



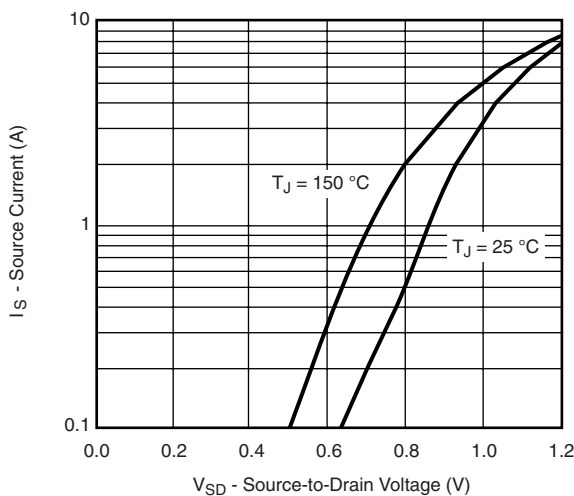
**TYPICAL CHARACTERISTICS**  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted



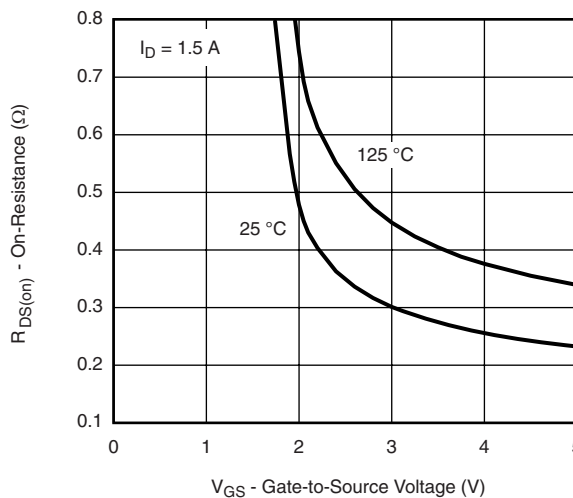
**Gate Charge**



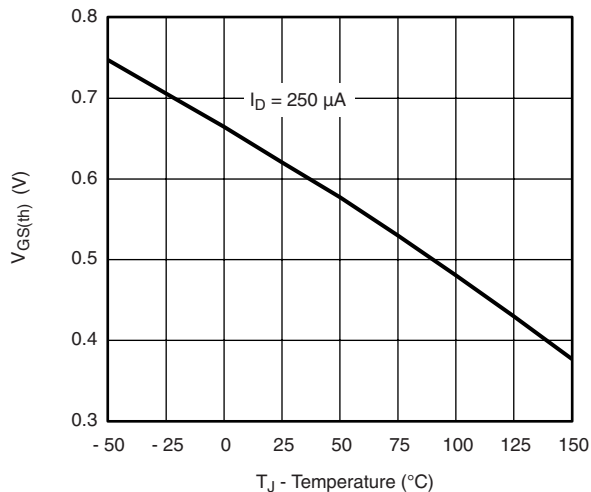
**On-Resistance vs. Junction Temperature**



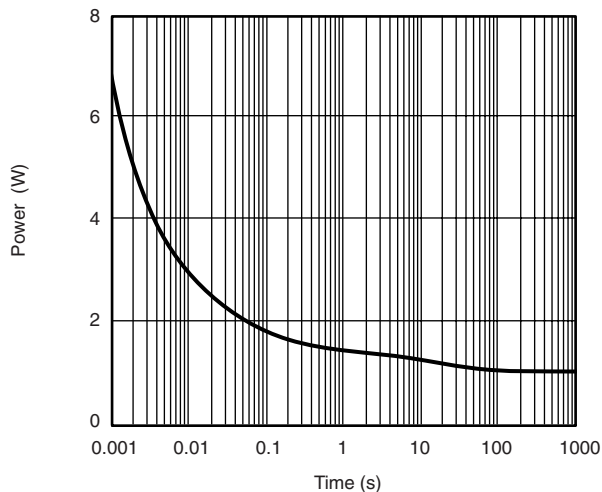
**Source-Drain Diode Forward Voltage**



**On-Resistance vs. Gate-to-Source Voltage**



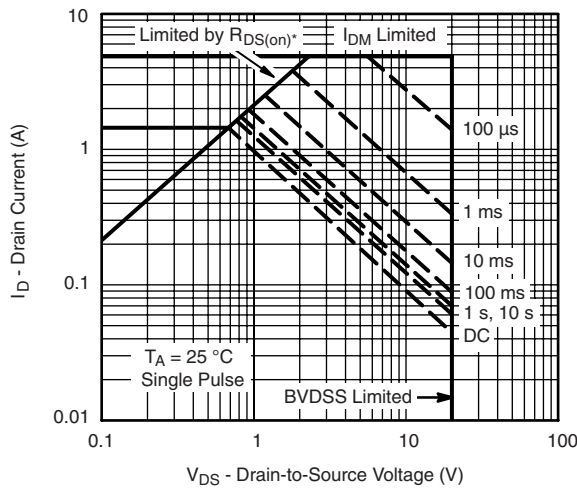
**Threshold Voltage**



**Single Pulse Power, Junction-to-Ambient**

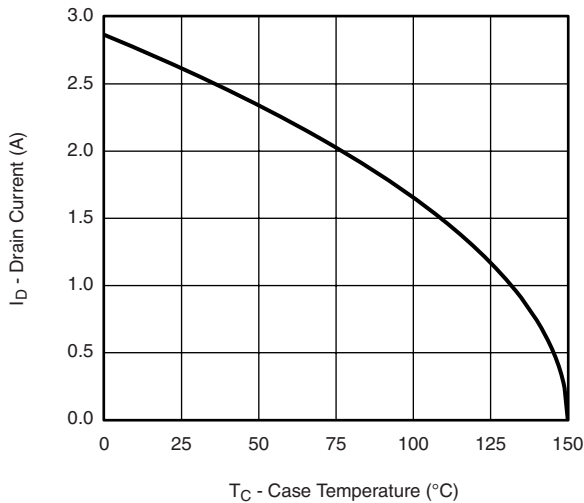


**TYPICAL CHARACTERISTICS**  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted

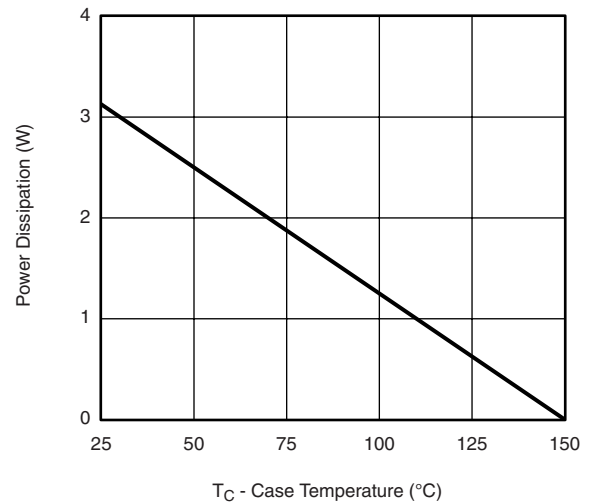


\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

**Safe Operating Area, Junction-to-Ambient**



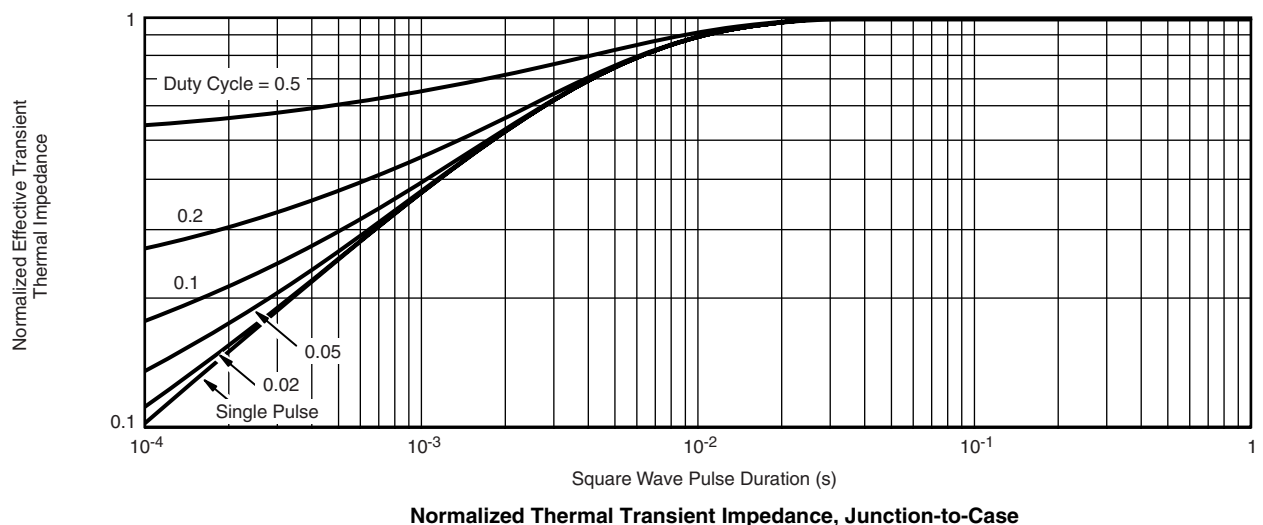
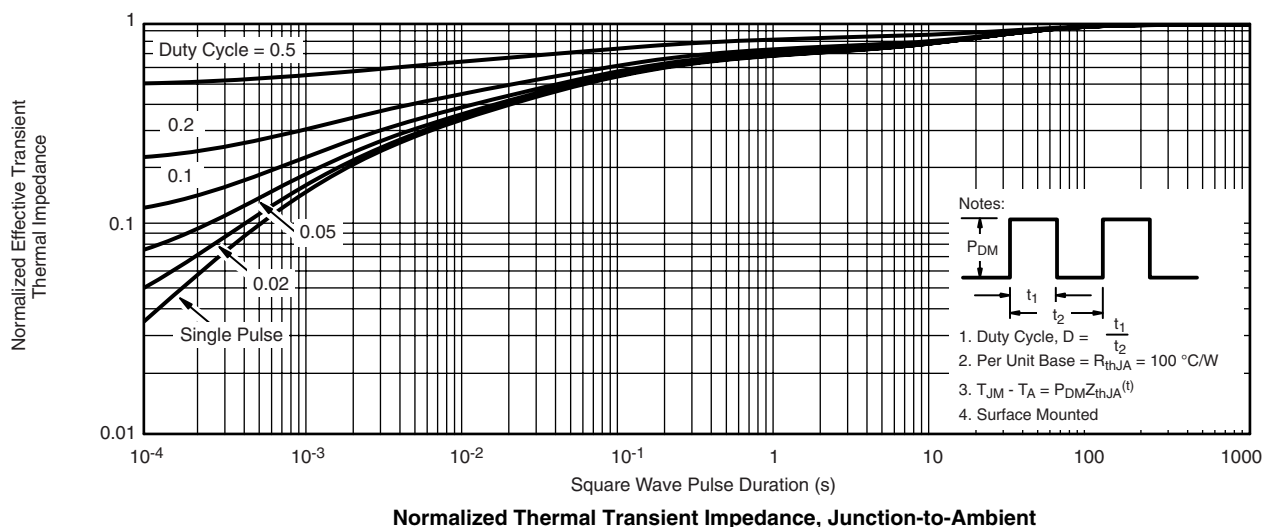
**Current Derating\***



**Power Derating**

\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 150\text{ }^\circ\text{C}$ , 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**  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted



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