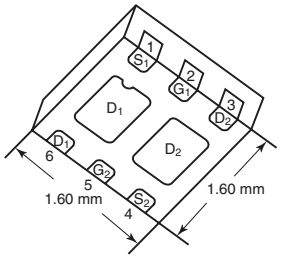
SMMB911DK

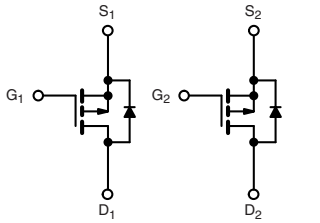
Vishay Siliconix

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

PRODUCT SUMMARY	
V_{DS} (V)	- 20
$R_{DS(on)}$ (Ω) at V_{GS} = - 4.5 V	0.295
$R_{DS(on)}$ (Ω) at V_{GS} = - 2.5 V	0.420
$R_{DS(on)}$ (Ω) at V_{GS} = - 1.8 V	0.560
I_D (A)[f]	- 2.6
Configuration	Dual

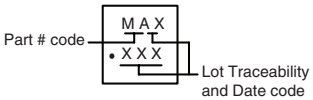
PowerPAK SC75-6L-Dual





P-Channel MOSFET P-Channel MOSFET

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

Pb-free RoHS COMPLIANT HALOGEN FREE

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}	± 8	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	- 2.6	A
	T_C = 70 °C		- 2.1	
	T_A = 25 °C[a, b]		- 1.5	
	T_A = 70 °C[a, b]		- 1.2	
Pulsed Drain Current		I_{DM}	- 5	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	- 2.6	
	T_A = 25 °C[a, b]		- 0.9	
Maximum Power Dissipation	T_C = 25 °C	P_D	3.1	W
	T_C = 70 °C		2	
	T_A = 25 °C[a, b]		1.1	
	T_A = 70 °C[a, b]		0.7	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to + 150	°C
Soldering Recommendations (Peak Temperature)[c, d]			260	°C

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THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Ambient[a, e]	t ≤ 5 s	R_{thJA}	90	115	°C/W
Junction-to-Case (Drain)	Steady State	R_{thJC}	32	40	

Notes

a. Surface mounted on 1" x 1" FR4 board.
b. t = 5 s.
c. See Solder Profile (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.
d. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
e. Maximum under steady state conditions is 125 °C/W.
f. Based on T_C = 25 °C.

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		- 20	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		-	- 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 µA		- 0.4	-	- 1	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 8 V		-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V	V_{DS} = - 20 V	-	-	- 1	µA
		V_{GS} = 0 V	V_{DS} = - 20 V, T_J = 55 °C	-	-	- 10	
On-State Drain Current[a]	$I_{D(on)}$	V_{GS} = - 4.5 V	V_{DS} ≤ 5 V	5	-	-	A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 4.5 V	I_D = - 1.5 A	-	0.242	0.295	Ω
		V_{GS} = - 2.5 V	I_D = - 1.2 A	-	0.345	0.420	
		V_{GS} = - 1.8 V	I_D = - 0.18 A	-	0.455	0.560	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 10 V, I_D = - 1.5 A		-	3	-	S
Dynamic[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}			-	0.3	-	
Gate-Drain Charge	Q_{gd}			-	0.5	-	
Gate Resistance	R_g	f = 1 MHz		-	7	-	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 10 V, R_L = 7.1 Ω $I_D \cong$ - 1.4 A, V_{GEN} = - 4.5 V, R_g = 1 Ω		-	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 Ω $I_D \cong$ - 1.4 A, V_{GEN} = - 8 V, R_g = 1 Ω		-	3	10	
Rise Time	t_r			-	25	40	
Turn-Off Delay Time	$t_{d(off)}$			-	10	15	
Fall Time	t_f			-	10	15	
Source-Drain Body Diode Characteristics							
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 °C, unless otherwise noted						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Source-Drain Body Diode Characteristics						
Body Diode Voltage	V_{SD}	I_S = - 1.4 A, V_{GS} = 0 V	-	- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = - 1.4 A, dI/dt = 100 A/µs, T_J = 25 °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	-	

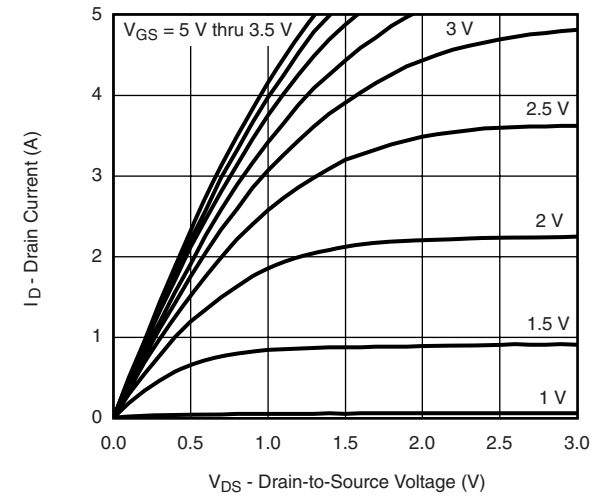
Notes

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

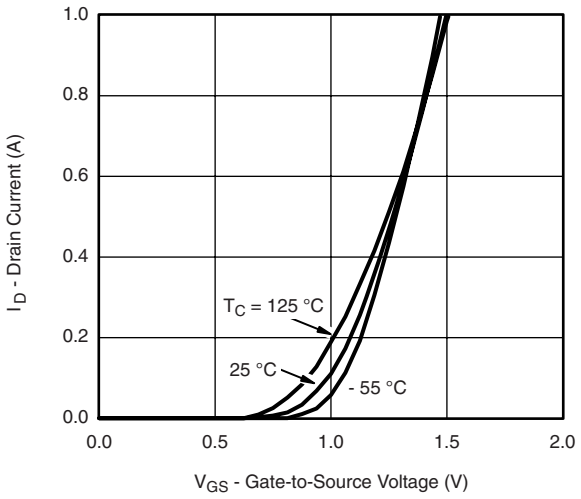
b. Guaranteed by design, not subject to production testing.

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.

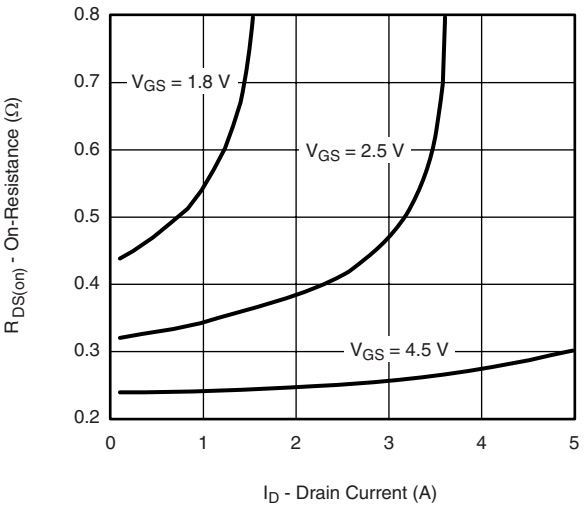
TYPICAL CHARACTERISTICS T_A = 25 °C, unless otherwise noted



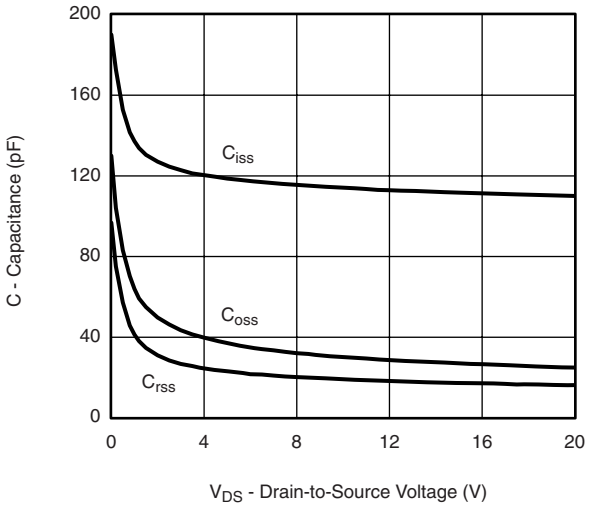
Output Characteristics



Transfer Characteristics

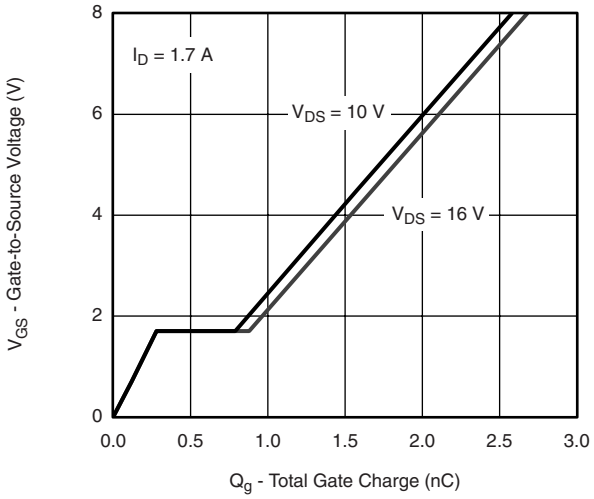


On-Resistance vs. Drain Current and Gate Voltage

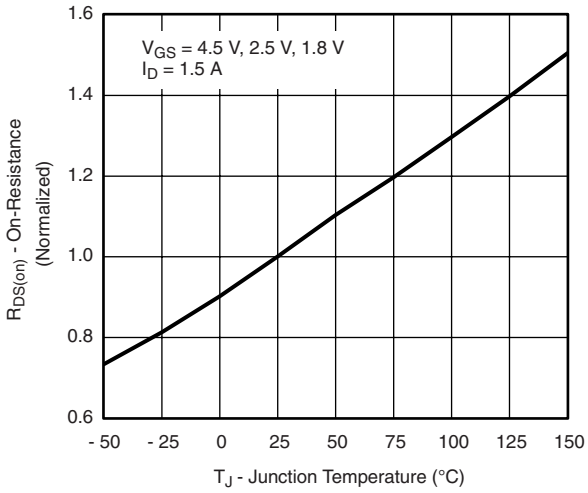


Capacitance

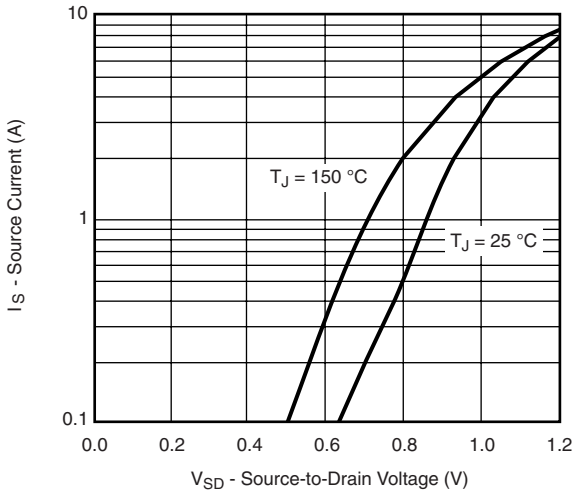
TYPICAL CHARACTERISTICS T_A = 25 °C, unless otherwise noted



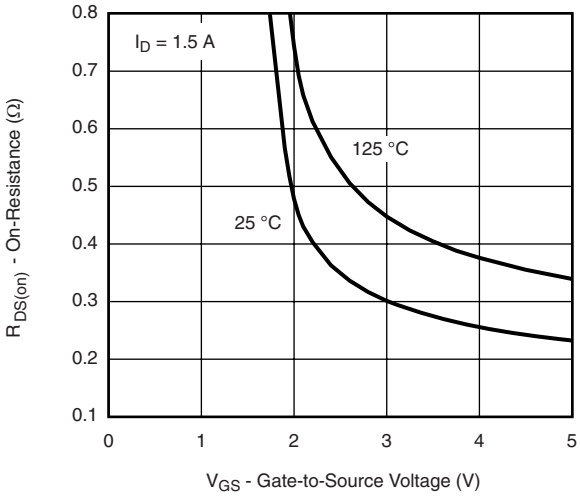
Gate Charge



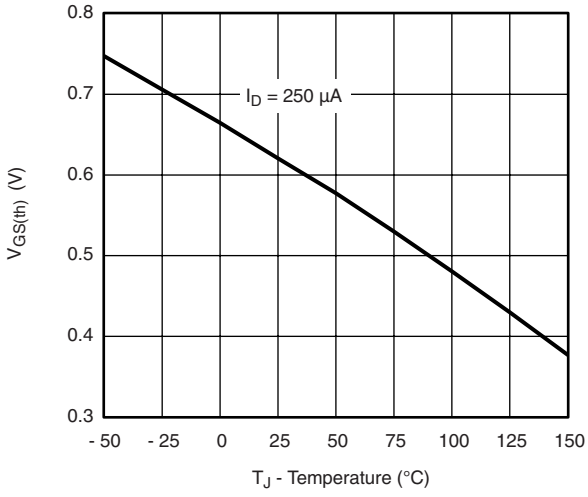
On-Resistance vs. Junction Temperature



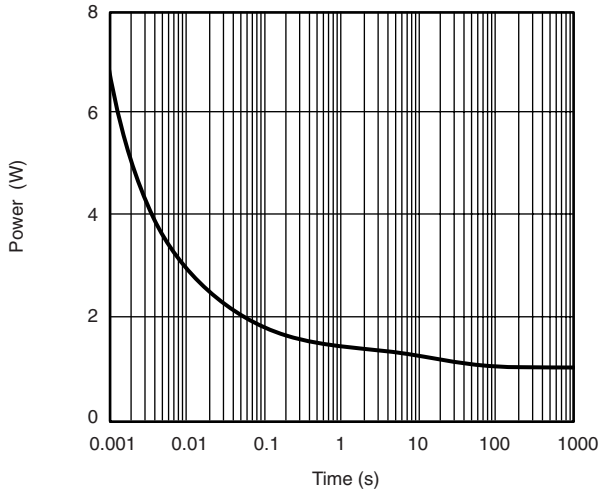
Soure-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

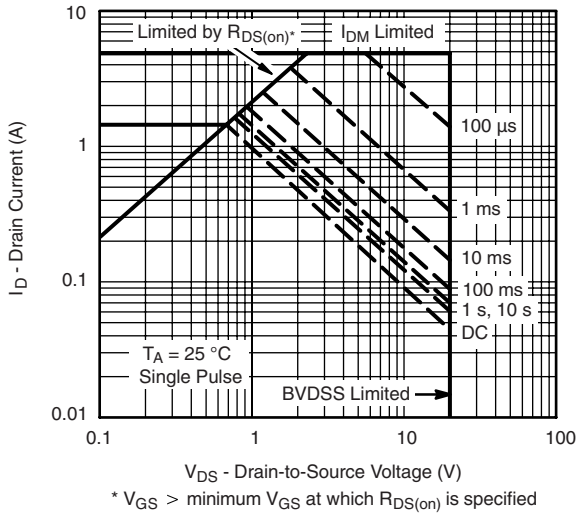


Threshold Voltage

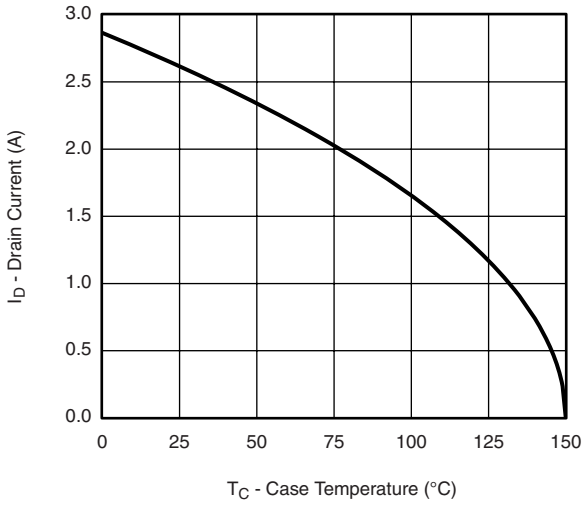


Single Pulse Power, Junction-to-Ambient

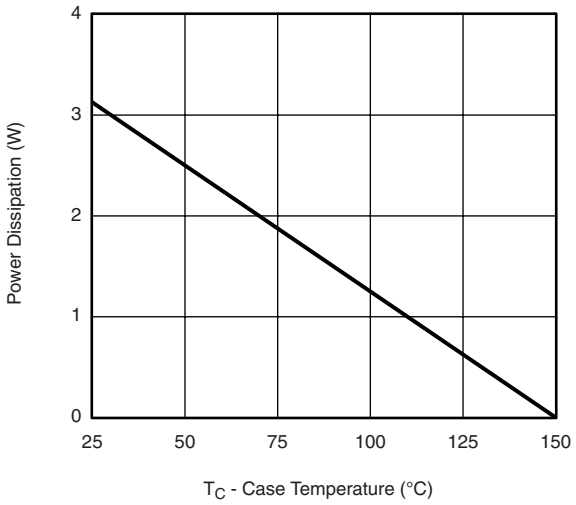
TYPICAL CHARACTERISTICS T_A = 25 °C, unless otherwise noted



Safe Operating Area, Junction-to-Ambient



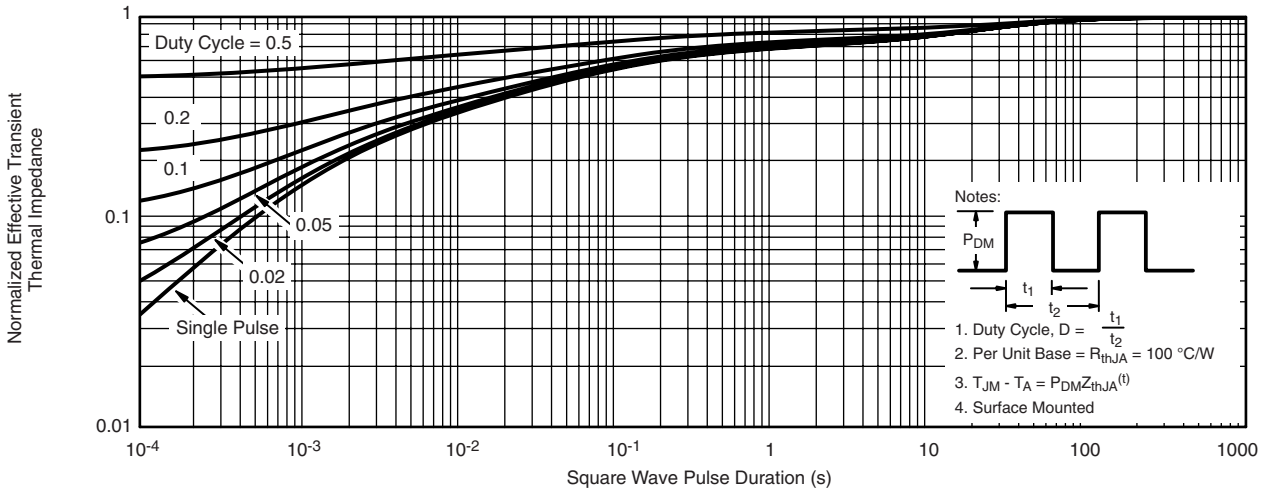
Current Derating*



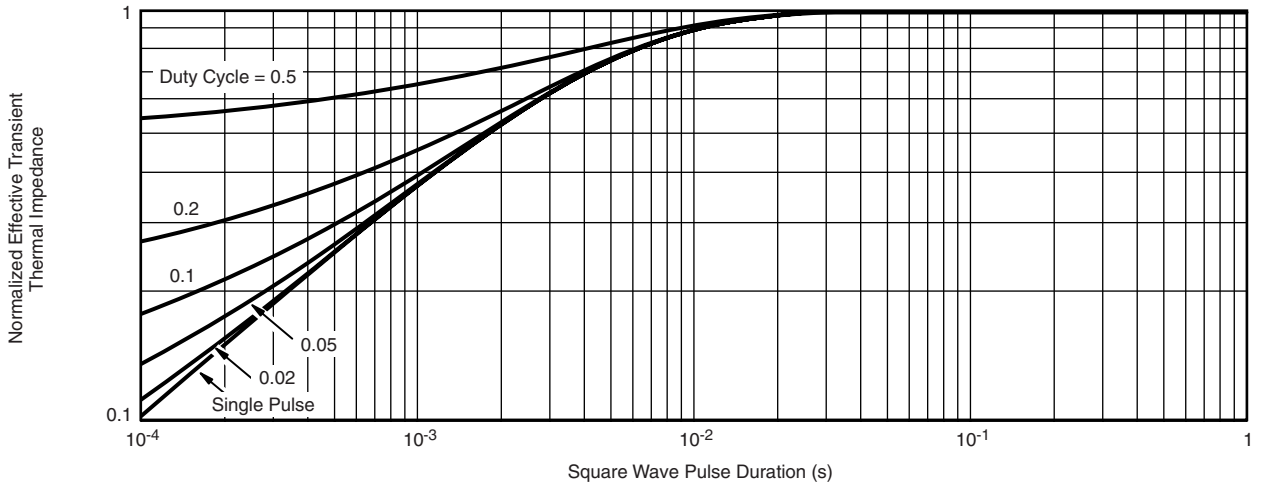
Power Derating

* 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 T_A = 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?65174.

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