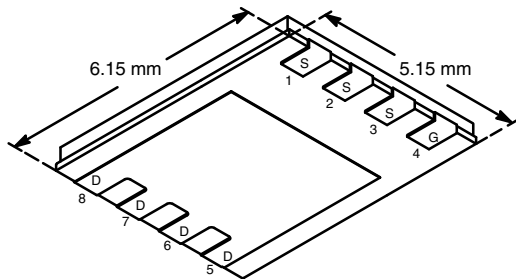




N-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
100	0.006 at V _{GS} = 10 V	60	26.7 nC
	0.0064 at V _{GS} = 7.5 V	60	
	0.0078 at V _{GS} = 4.5 V	60	

PowerPAK[®] SO-8



Bottom View

Ordering Information: SiR870DP-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

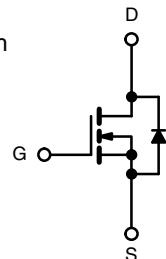
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Fixed Telecom
- DC/DC Converter
- Primary and Secondary Side Switch



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °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 °C)	I _D	T _C = 25 °C	60 ^a
		T _C = 70 °C	60 ^a
		T _A = 25 °C	22.8 ^{b, c}
		T _A = 70 °C	18.2 ^{b, c}
Pulsed Drain Current	I _{DM}	100	A
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	
		T _A = 25 °C	5.6 ^{b, c}
Single Pulse Avalanche Current	I _{AS}	35	mJ
Single Pulse Avalanche Energy	E _{AS}	61	
Maximum Power Dissipation	P _D	T _C = 25 °C	104
		T _C = 70 °C	66.6
		T _A = 25 °C	6.25 ^{b, c}
		T _A = 70 °C	4.0 ^{b, c}
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature) ^{d, e}		260	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, f}	t ≤ 10 s	R _{thJA}	15	20	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R _{thJC}	0.9	1.2	

Notes:

- Package limited.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- See solder profile (www.vishay.com/ppg?73257). The PowerPAK SO-8 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 54 °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		60		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 6.0		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.2		3.0	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	30			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.005	0.006	Ω
		V _{GS} = 7.5 V, I _D = 20 A		0.0053	0.0064	
		V _{GS} = 4.5 V, I _D = 15 A		0.0065	0.0078	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 20 A		80		S
Dynamic^b						
Input Capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz		2840		pF
Output Capacitance	C _{oss}			1475		
Reverse Transfer Capacitance	C _{rss}			99		
Total Gate Charge	Q _g	V _{DS} = 50 V, V _{GS} = 10 V, I _D = 20 A		55.7	84	nC
		V _{DS} = 50 V, V _{GS} = 7.5 V, I _D = 20 A		42.5	64	
Gate-Source Charge	Q _{gs}	V _{DS} = 50 V, V _{GS} = 4.5 V, I _D = 20 A		26.7	40	
Gate-Drain Charge	Q _{gd}			8.4		
Gate Resistance	R _g			11.7		
Turn-On Delay Time	t _{d(on)}	f = 1 MHz	0.3	0.95	1.9	Ω
Rise Time	t _r	V _{DD} = 50 V, R _L = 2.5 Ω I _D ≅ 20 A, V _{GEN} = 10 V, R _g = 1 Ω		12	24	ns
Turn-Off Delay Time	t _{d(off)}			10	20	
Fall Time	t _f			38	70	
Turn-On Delay Time	t _{d(on)}			8	16	
Rise Time	t _r	V _{DD} = 50 V, R _L = 2.5 Ω I _D ≅ 20 A, V _{GEN} = 7.5 V, R _g = 1 Ω		15	30	
Turn-Off Delay Time	t _{d(off)}			15	30	
Fall Time	t _f			35	70	
Fall Time	t _f			8	16	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			60	A
Pulse Diode Forward Current ^a	I _{SM}				100	
Body Diode Voltage	V _{SD}	I _S = 5 A		0.74	1.1	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs, T _J = 25 °C		63	120	ns
Body Diode Reverse Recovery Charge	Q _{rr}			82	160	nC
Reverse Recovery Fall Time	t _a			27		ns
Reverse Recovery Rise Time	t _b			36		

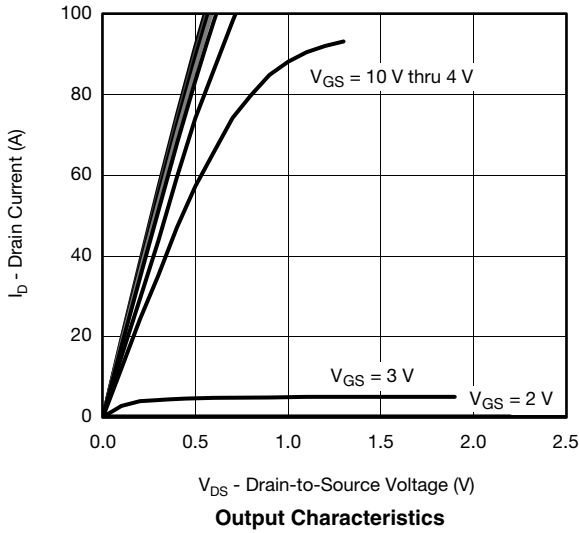
Notes:

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

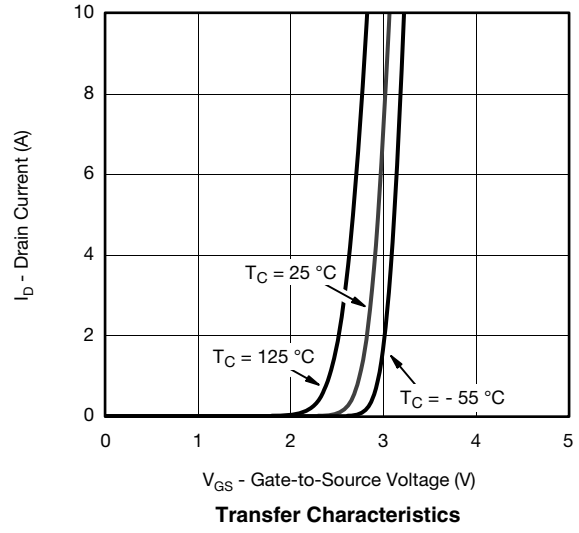
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



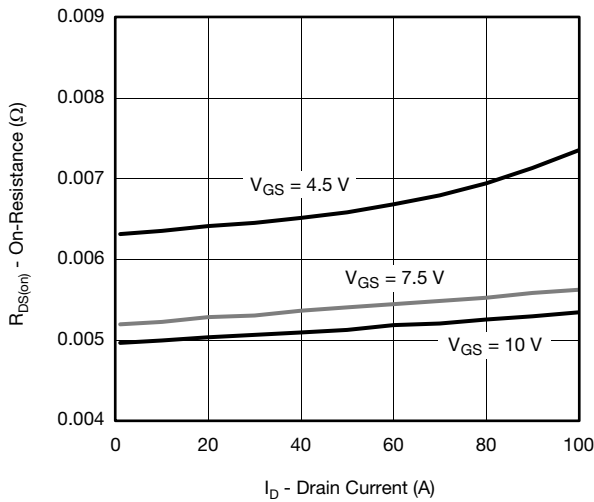
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



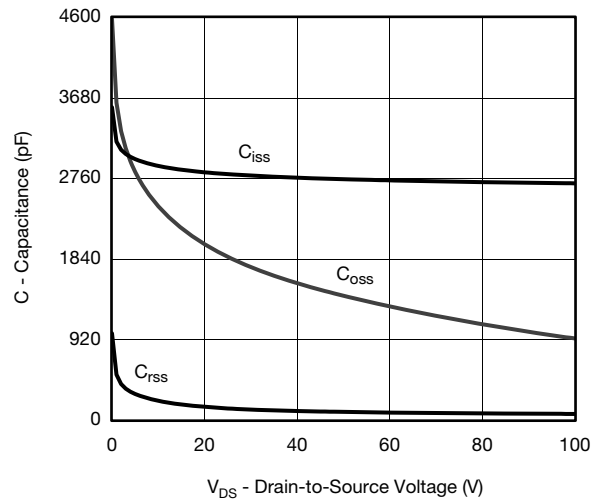
Output Characteristics



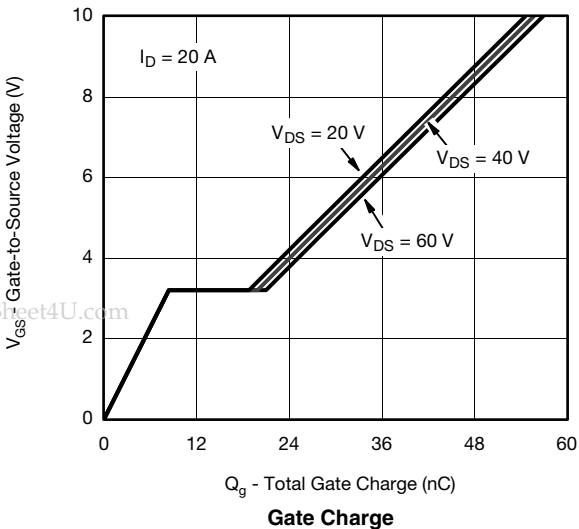
Transfer Characteristics



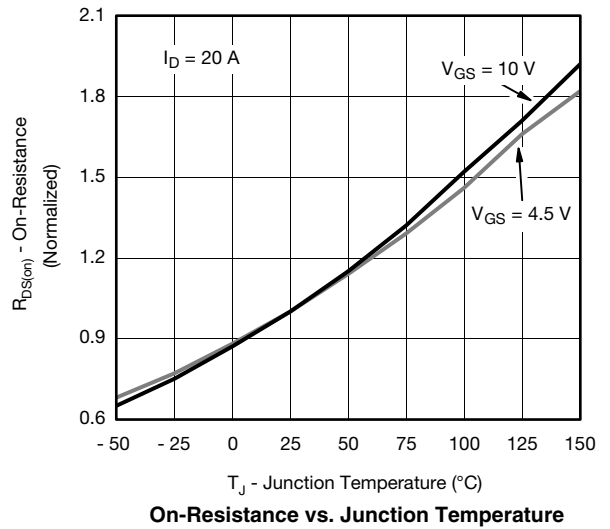
On-Resistance vs. Drain Current



Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

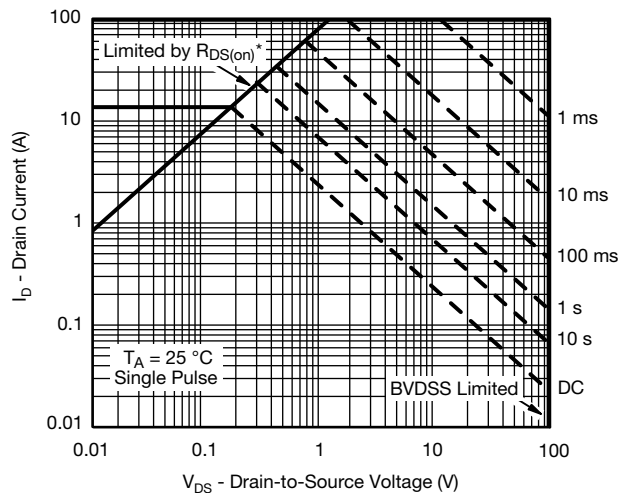
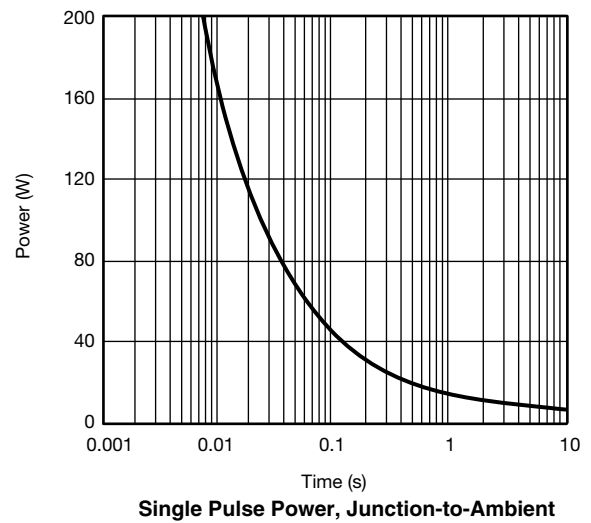
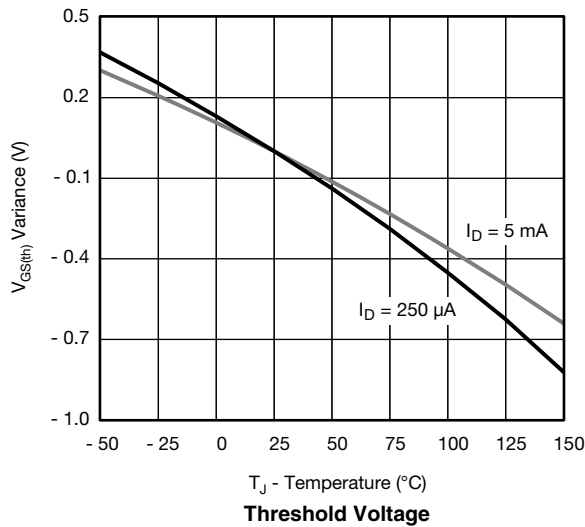
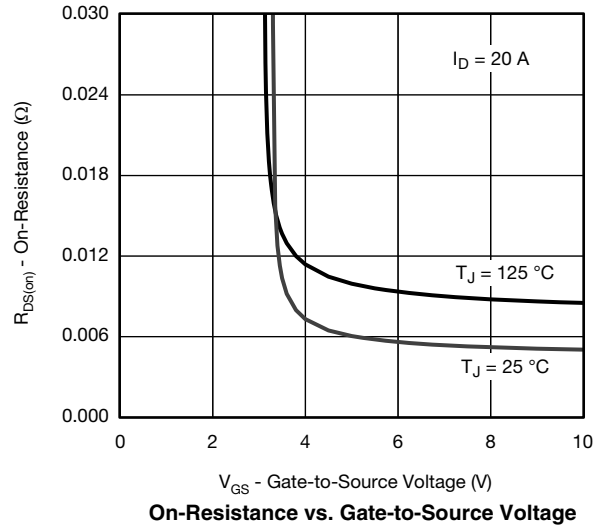
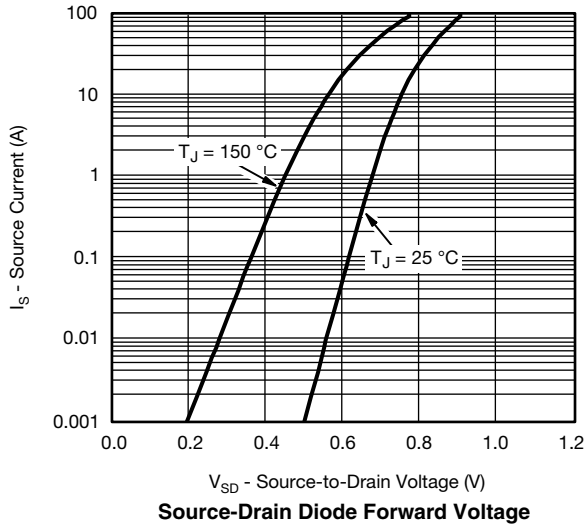
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SiR870DP

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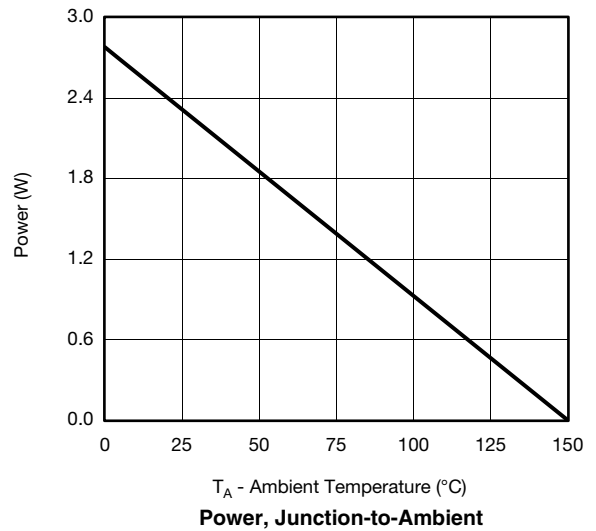
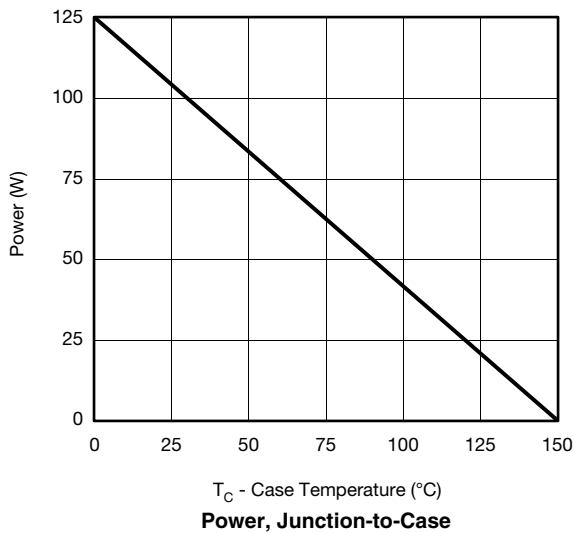
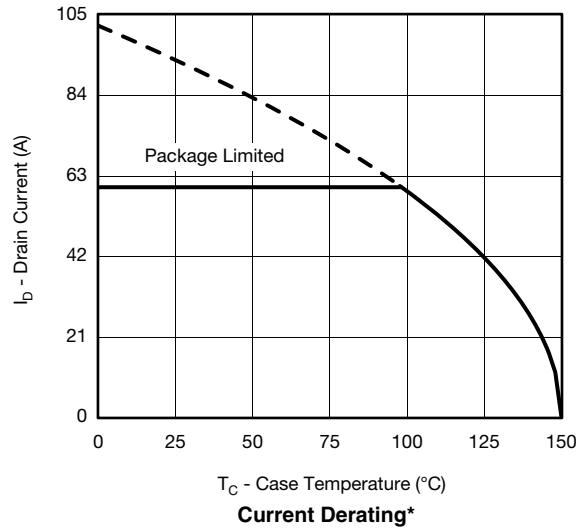
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



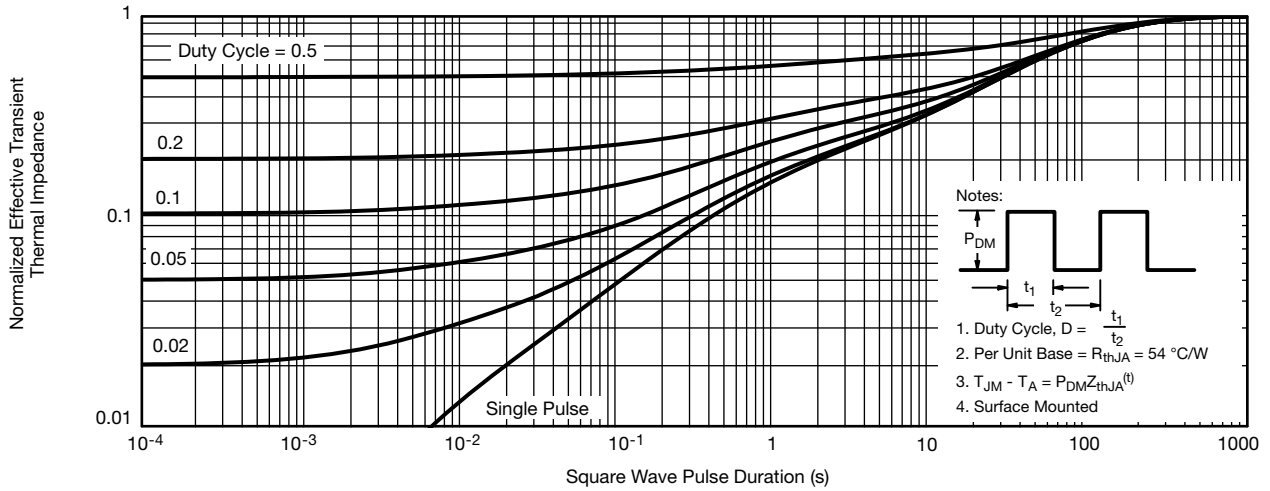
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

SiR870DP

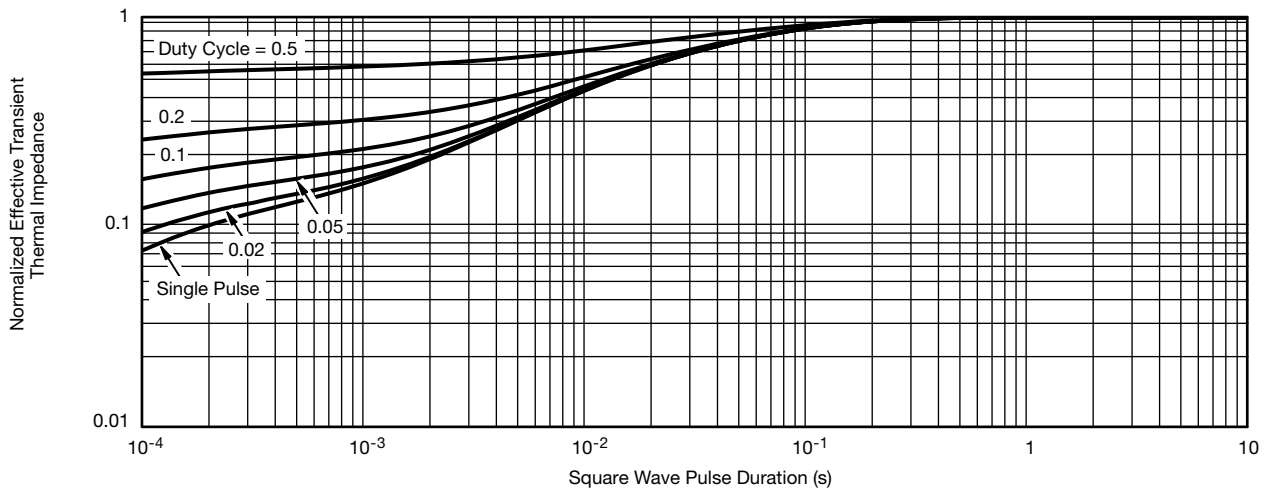
Vishay Siliconix



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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