

Automotive Dual N-Channel 60 V (D-S) 175 °C MOSFET

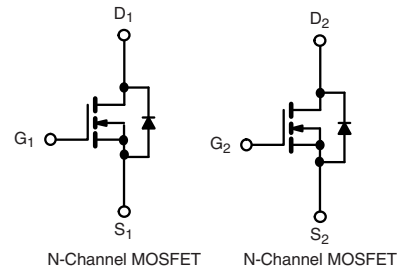
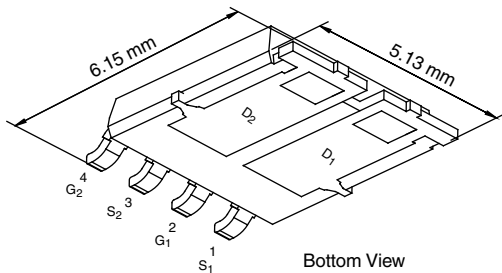
 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE

PRODUCT SUMMARY	
V_{DS} (V)	60
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.060
$R_{DS(on)}$ (Ω) at $V_{GS} = 4.5$ V	0.080
I_D (A) per leg	8
Configuration	Dual

FEATURES

- TrenchFET® Power MOSFET
- AEC-Q101 Qualified
- 100 % R_g and UIS Tested
- Material categorization:
For definitions of compliance please see www.vishay.com/doc?99912

PowerPAK® SO-8L Dual


ORDERING INFORMATION	
Package	PowerPAK SO-8L
Lead (Pb)-free and Halogen-free	SQJ962EP-T1-GE3

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)					
PARAMETER	SYMBOL	LIMIT	UNIT		
Drain-Source Voltage	V_{DS}	60	V		
Gate-Source Voltage	V_{GS}	± 20			
Continuous Drain Current ^a	I_D	$T_C = 25$ °C	8	A	
		$T_C = 125$ °C	8		
Continuous Source Current (Diode Conduction) ^a	I_S	8			
Pulsed Drain Current ^b	I_{DM}	32			
Single Pulse Avalanche Current	$L = 0.1$ mH	I_{AS}	10		
Single Pulse Avalanche Energy			E_{AS}		5
Maximum Power Dissipation ^b		P_D	$T_C = 25$ °C	25	W
			$T_C = 125$ °C	8	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 175	°C		
Soldering Recommendations (Peak Temperature) ^{d, e}		260			

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	LIMIT	UNIT	
Junction-to-Ambient	R_{thJA}	85	°C/W	
Junction-to-Case (Drain)				

Notes

- Package limited.
- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR4 material).
- See solder profile (www.vishay.com/doc?73257). The PowerPAK SO-8L. 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.



SPECIFICATIONS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	60	-	-	V	
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	1.5	2.0	2.5		
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}	$V_{GS} = 0\text{ V}$	$V_{DS} = 60\text{ V}$	-	-	1	μA
		$V_{GS} = 0\text{ V}$	$V_{DS} = 60\text{ V}$, $T_J = 125\text{ }^\circ\text{C}$	-	-	50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 60\text{ V}$, $T_J = 175\text{ }^\circ\text{C}$	-	-	150	
On-State Drain Current ^a	$I_{D(on)}$	$V_{GS} = 10\text{ V}$	$V_{DS} \geq 5\text{ V}$	15	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 4.3\text{ A}$	-	0.046	0.060	Ω
		$V_{GS} = 10\text{ V}$	$I_D = 4.3\text{ A}$, $T_J = 125\text{ }^\circ\text{C}$	-	-	0.102	
		$V_{GS} = 10\text{ V}$	$I_D = 4.3\text{ A}$, $T_J = 175\text{ }^\circ\text{C}$	-	-	0.127	
		$V_{GS} = 4.5\text{ V}$	$I_D = 3.5\text{ A}$	-	0.060	0.080	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 4.3\text{ A}$		-	10	-	S
Dynamic^b							
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	-	379	475	pF
Output Capacitance	C_{oss}			-	72	90	
Reverse Transfer Capacitance	C_{rss}			-	32	40	
Total Gate Charge ^c	Q_g	$V_{GS} = 10\text{ V}$	$V_{DS} = 30\text{ V}$, $I_D = 4.5\text{ A}$	-	8.5	14	nC
Gate-Source Charge ^c	Q_{gs}			-	1.4	-	
Gate-Drain Charge ^c	Q_{gd}			-	3.3	-	
Gate Resistance	R_g	$f = 1\text{ MHz}$		2.25	4.50	6.75	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 30\text{ V}$, $R_L = 30\text{ }\Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 1\text{ }\Omega$	-	5	8	ns	
Rise Time ^c	t_r		-	11	17		
Turn-Off Delay Time ^c	$t_{d(off)}$		-	16	24		
Fall Time ^c	t_f		-	6	9		
Source-Drain Diode Ratings and Characteristics^b							
Pulsed Current ^a	I_{SM}			-	-	32	A
Forward Voltage	V_{SD}	$I_F = 3.5\text{ A}$, $V_{GS} = 0\text{ V}$		-	0.8	1.1	V

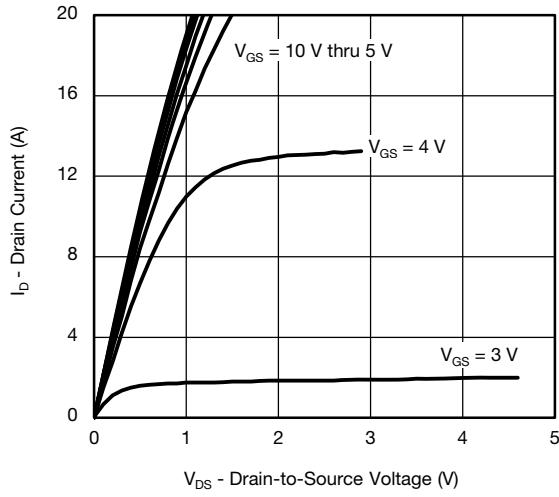
Notes

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

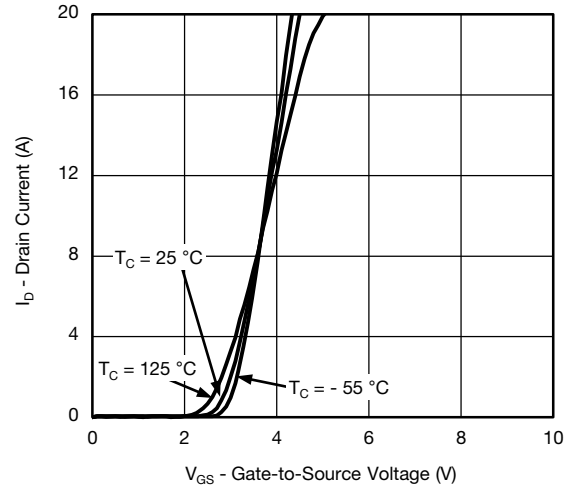
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



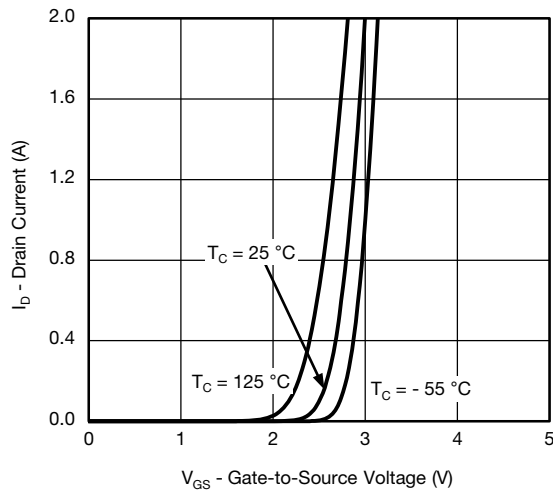
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



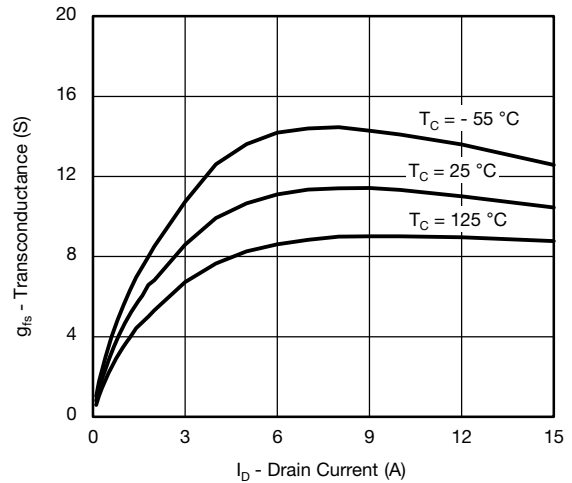
Output Characteristics



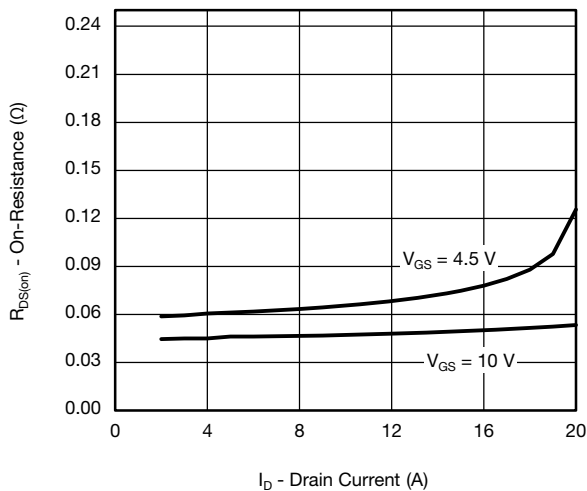
Transfer Characteristics



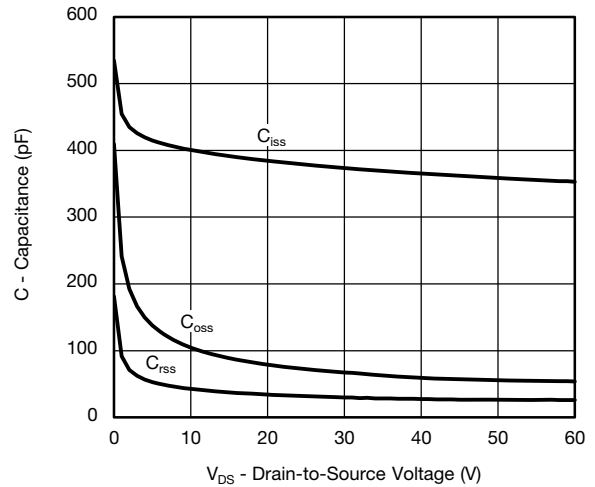
Transfer Characteristics



Transconductance

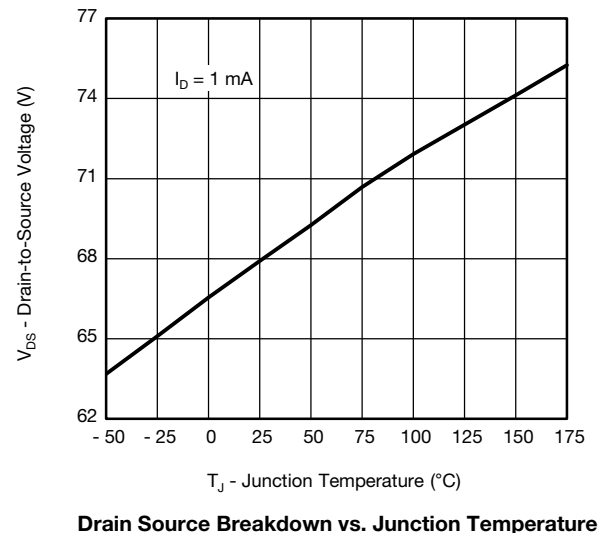
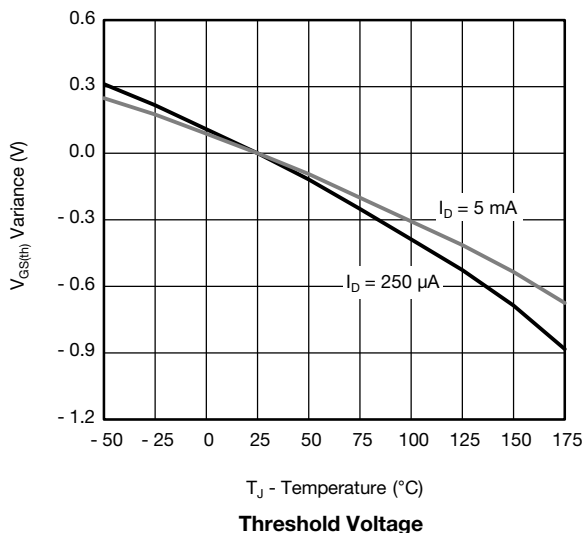
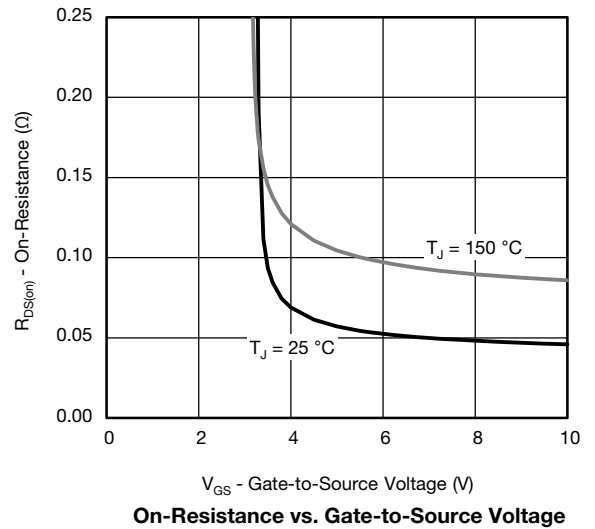
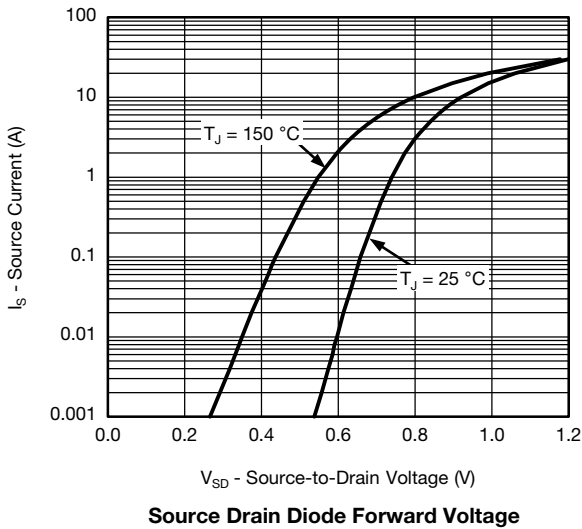
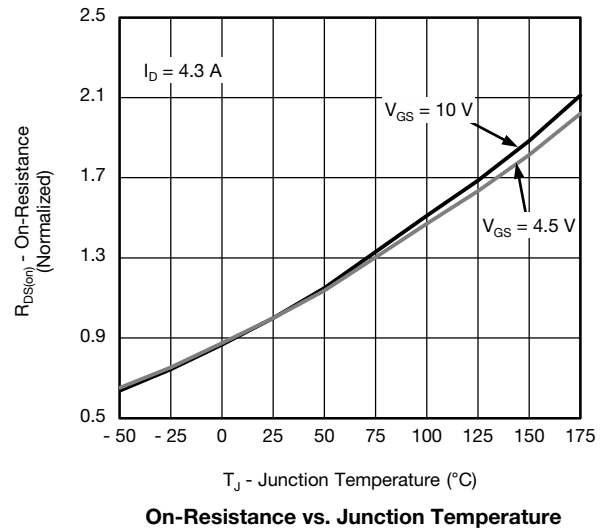
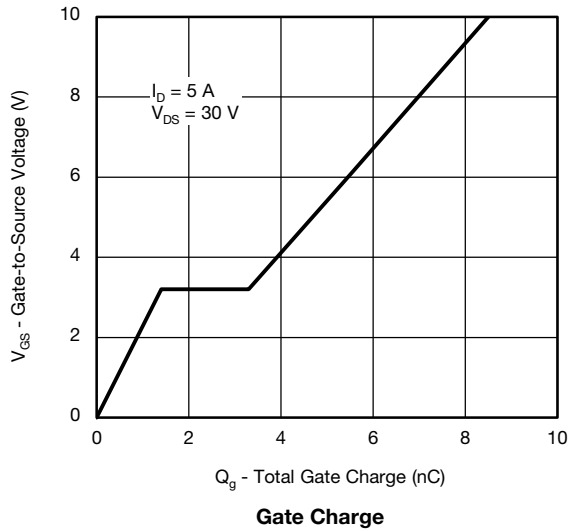


On-Resistance vs. Drain Current



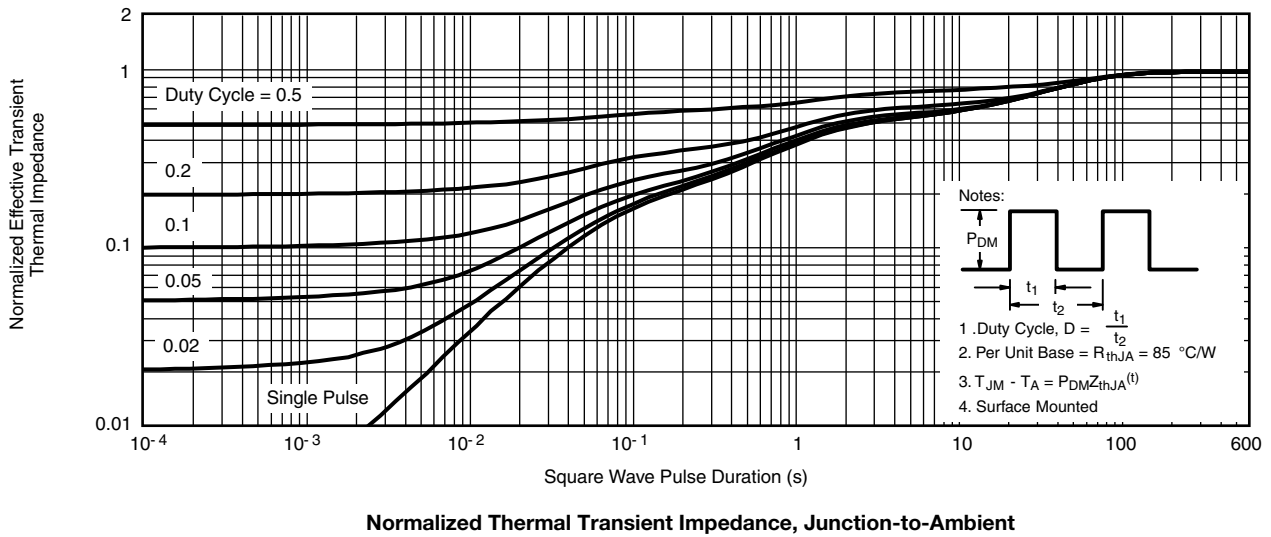
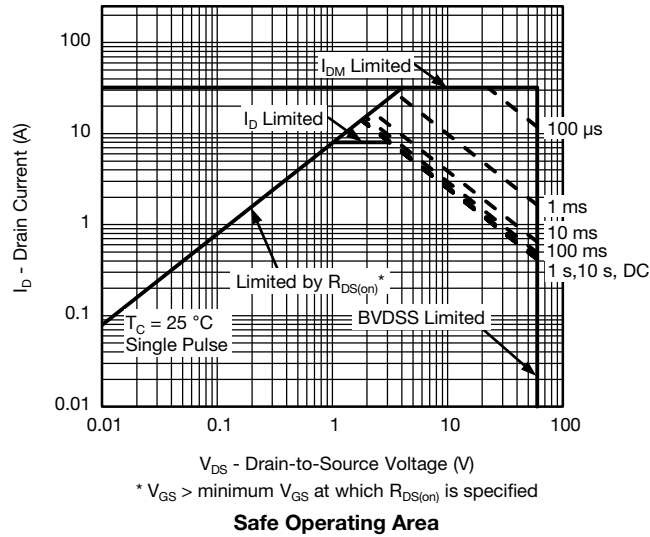
Capacitance

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



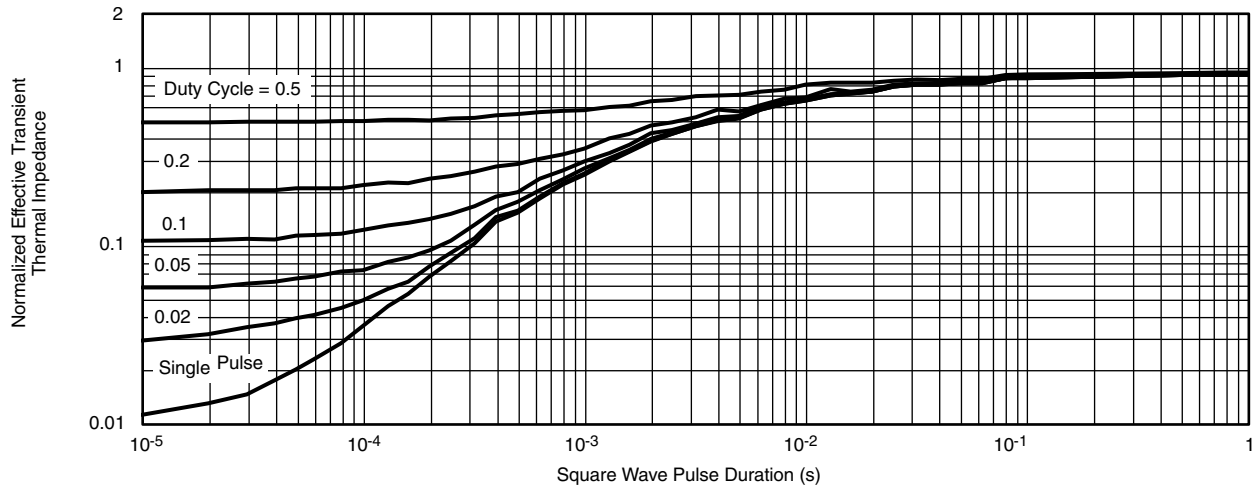


THERMAL RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)





THERMAL RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
 - Normalized Transient Thermal Impedance Junction-to-Case (25 °C)
- are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

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