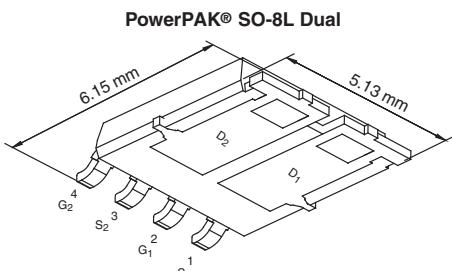


# Automotive Dual N-Channel 40 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY	
$V_{DS}$ (V)	40
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 10$ V	0.014
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 4.5$ V	0.015
$I_D$ (A) per leg	8
Configuration	Dual

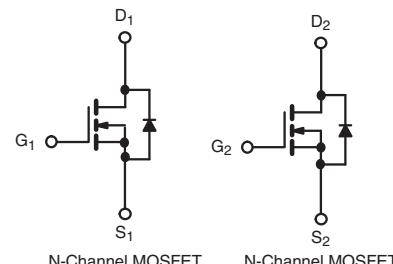


Bottom View

## FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 %  $R_g$  and UIS Tested
- Compliant to RoHS Directive 2002/95/EC
- AEC-Q101 Qualified<sup>d</sup>

AUTOMOTIVE GRADE


**RoHS**  
COMPLIANT  
HALOGEN  
FREE


N-Channel MOSFET

N-Channel MOSFET

## ORDERING INFORMATION

Package	PowerPAK SO-8L
Lead (Pb)-free and Halogen-free	SQJ912EP-T1-GE3

## ABSOLUTE MAXIMUM RATINGS ( $T_C = 25$ °C, unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		$V_{DS}$	40	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>a</sup>	$T_C = 25$ °C	$I_D$	8	
	$T_C = 125$ °C		8	
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	8	A
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	32	
Single Pulse Avalanche Current	$L = 0.1$ mH	$I_{AS}$	33	mJ
Single Pulse Avalanche Energy		$E_{AS}$	56	
Maximum Power Dissipation <sup>b</sup>	$T_C = 25$ °C	$P_D$	48	W
	$T_C = 125$ °C		16	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	- 55 to + 175	°C
Soldering Recommendations (Peak Temperature) <sup>e, f</sup>			260	

## THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount <sup>c</sup>	$R_{thJA}$	85	°C/W
Junction-to-Case (Drain)		$R_{thJC}$	3.1	

### Notes

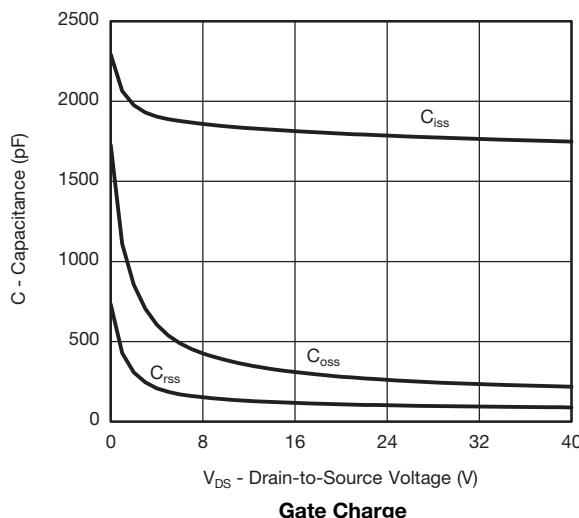
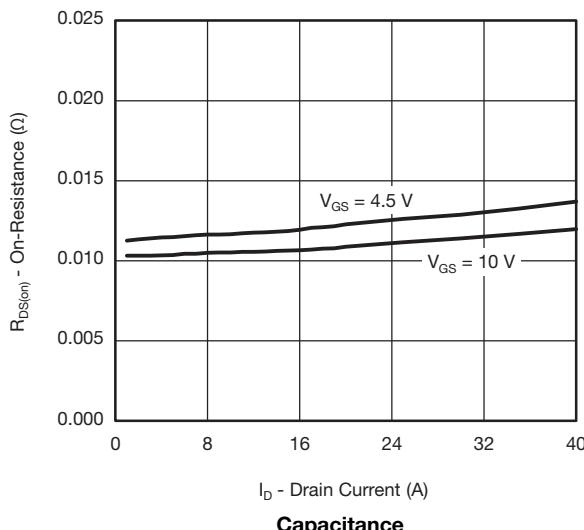
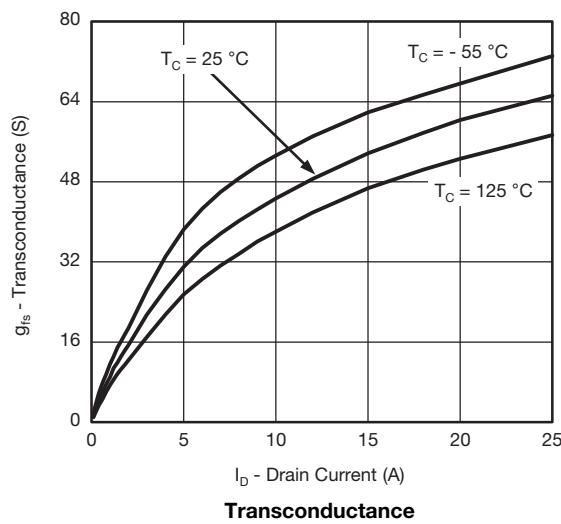
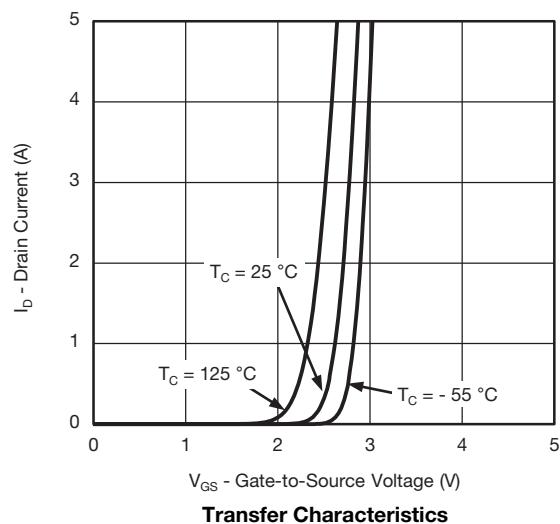
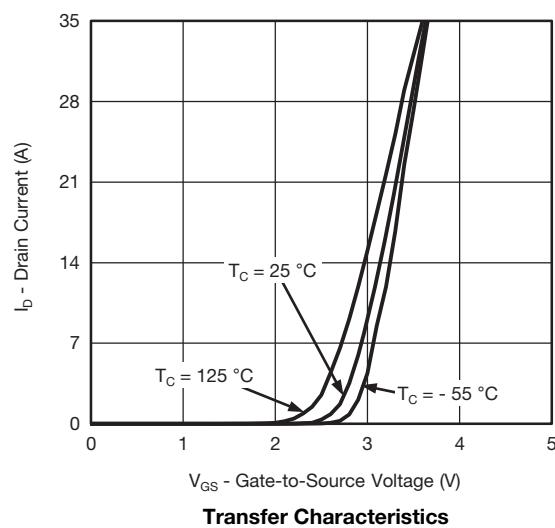
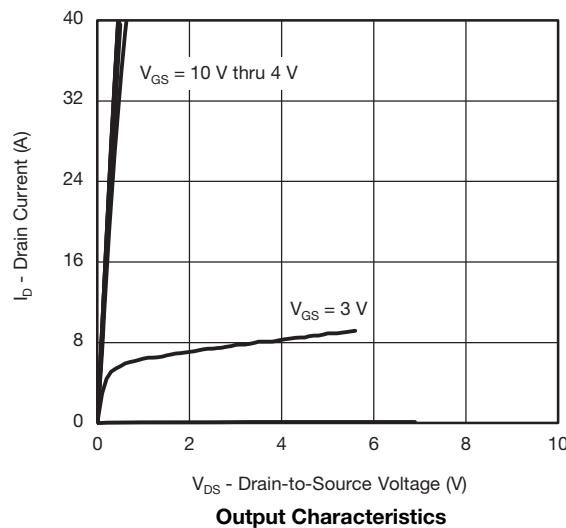
- Package limited.
- Pulse test; pulse width  $\leq 300$   $\mu$ s, duty cycle  $\leq 2$  %.
- When mounted on 1" square PCB (FR4 material).
- Parametric verification ongoing.
- See solder profile ([www.vishay.com/doc?273257](http://www.vishay.com/doc?273257)). The PowerPAK SO-8L. The end of the lead 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.

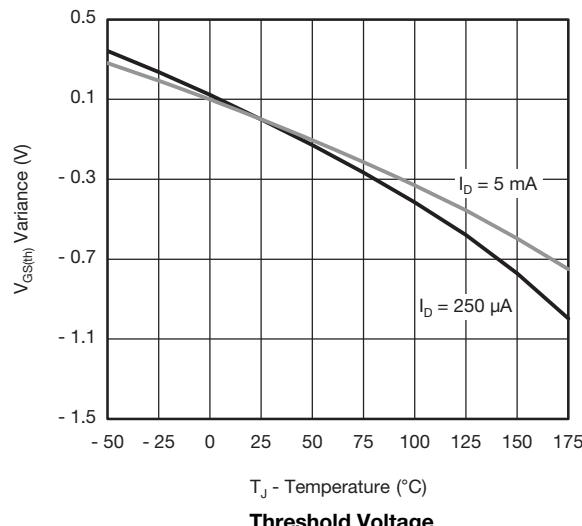
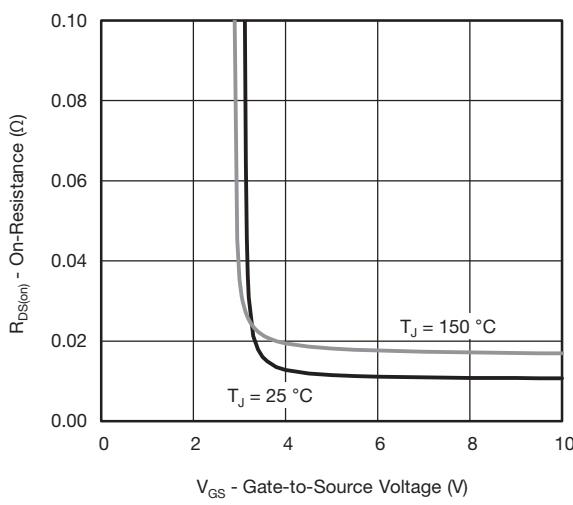
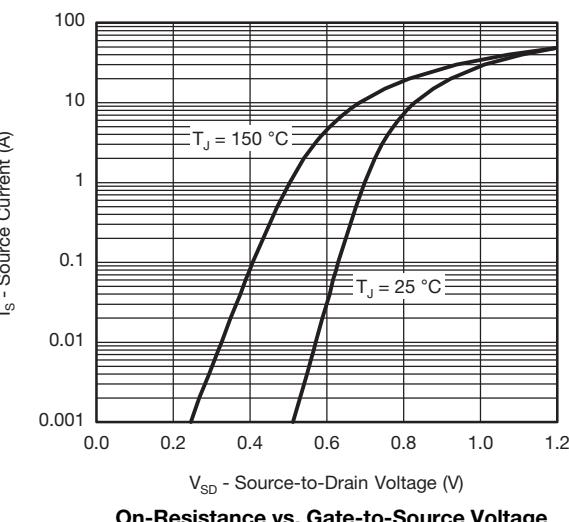
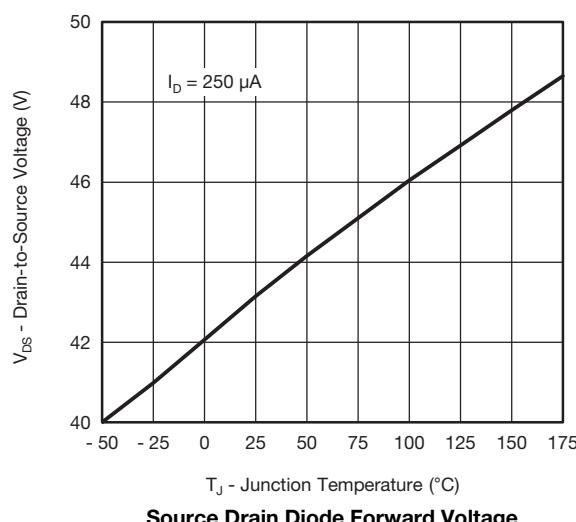
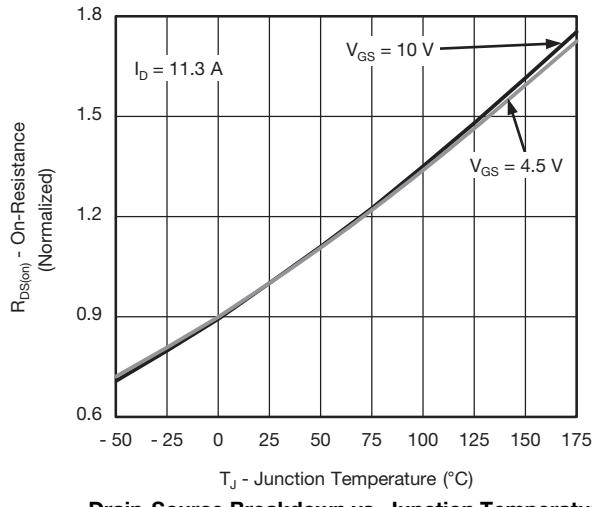
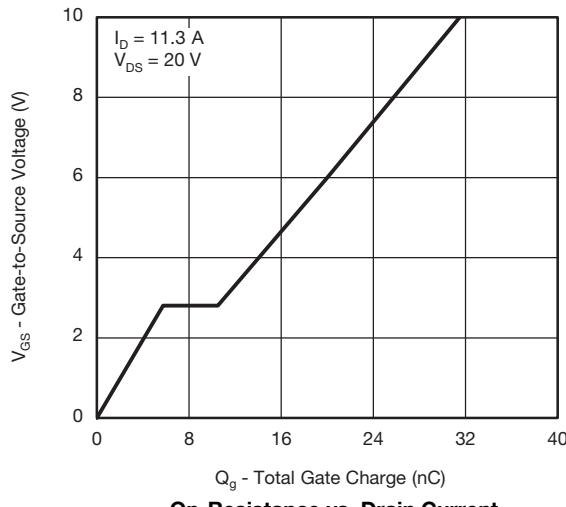
<b>SPECIFICATIONS</b> ( $T_C = 25^\circ\text{C}$ , unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
<b>Static</b>								
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$		40	-	-	V	
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$		1.3	1.8	2.3		
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}$ , $V_{GS} = \pm 20 \text{ V}$		-	-	$\pm 100$	nA	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0 \text{ V}$	$V_{DS} = 40 \text{ V}$	-	-	1	$\mu\text{A}$	
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 40 \text{ V}$ , $T_J = 125^\circ\text{C}$	-	-	50		
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 40 \text{ V}$ , $T_J = 175^\circ\text{C}$	-	-	150		
On-State Drain Current <sup>a</sup>	$I_{D(\text{on})}$	$V_{GS} = 10 \text{ V}$	$V_{DS} \geq 5 \text{ V}$	30	-	-	A	
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$	$I_D = 11 \text{ A}$	-	0.011	0.014	$\Omega$	
		$V_{GS} = 4.5 \text{ V}$	$I_D = 8 \text{ A}$	-	0.012	0.015		
		$V_{GS} = 10 \text{ V}$	$I_D = 11 \text{ A}$ , $T_J = 125^\circ\text{C}$	-	-	0.021		
		$V_{GS} = 10 \text{ V}$	$I_D = 11 \text{ A}$ , $T_J = 175^\circ\text{C}$	-	-	0.025		
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}$ , $I_D = 10 \text{ A}$		-	44	-	S	
<b>Dynamic<sup>b</sup></b>								
Input Capacitance	$C_{iss}$	$V_{GS} = 0 \text{ V}$	$V_{DS} = 20 \text{ V}$ , $f = 1 \text{ MHz}$	-	1799	2248	pF	
Output Capacitance	$C_{oss}$			-	282	352		
Reverse Transfer Capacitance	$C_{rss}$			-	109	136		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{GS} = 10 \text{ V}$	$V_{DS} = 20 \text{ V}$ , $I_D = 11.3 \text{ A}$	-	31.5	48	nC	
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			-	5.7	-		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			-	4.8	-		
Gate Resistance	$R_g$	$f = 1 \text{ MHz}$		2.1	4.3	7	$\Omega$	
Turn-On Delay Time <sup>c</sup>	$t_{d(\text{on})}$	$V_{DD} = 20 \text{ V}$ , $R_L = 1.77 \Omega$ $I_D \approx 11.3 \text{ A}$ , $V_{GEN} = 10 \text{ V}$ , $R_g = 1 \Omega$		-	7	11	ns	
Rise Time <sup>c</sup>	$t_r$			-	21	32		
Turn-Off Delay Time <sup>c</sup>	$t_{d(\text{off})}$			-	33	50		
Fall Time <sup>c</sup>	$t_f$			-	19	29		
<b>Source-Drain Diode Ratings and Characteristics<sup>b</sup></b>								
Pulsed Current <sup>a</sup>	$I_{SM}$			-	-	32	A	
Forward Voltage	$V_{SD}$	$I_F = 8 \text{ A}$ , $V_{GS} = 0 \text{ V}$		-	0.8	1.1	V	

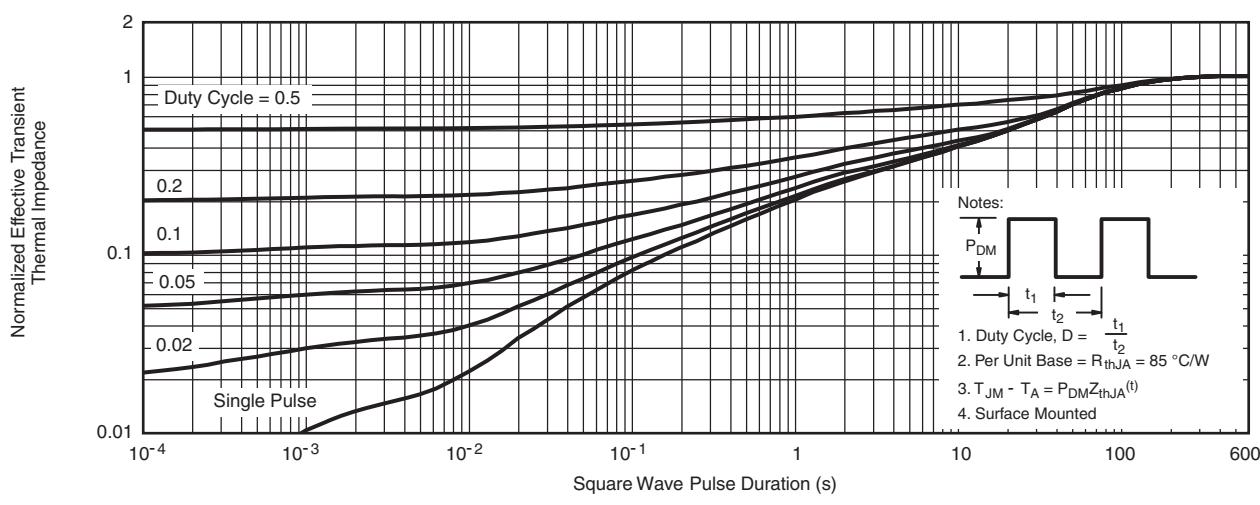
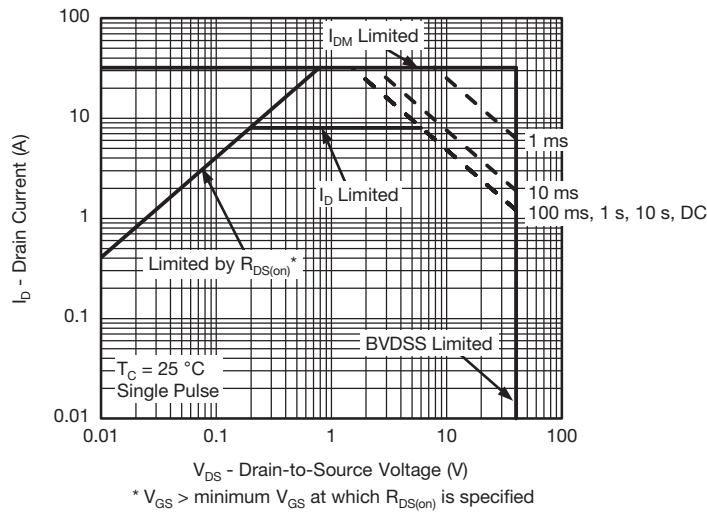
**Notes**

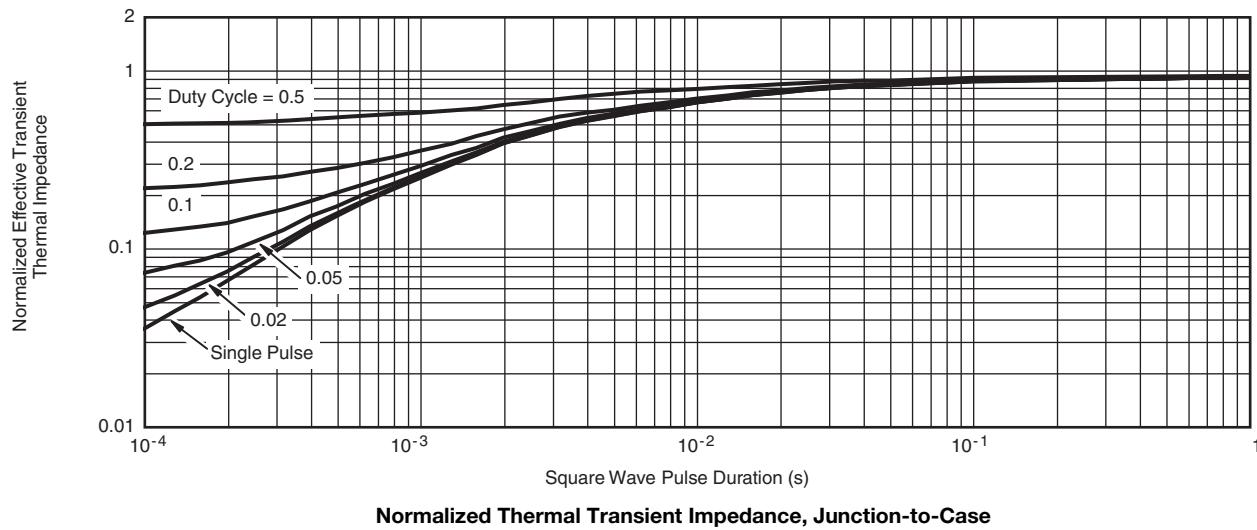
- a. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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


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


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**Note**

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction-to-Ambient ( $25^\circ\text{C}$ )
  - Normalized Transient Thermal Impedance Junction-to-Case ( $25^\circ\text{C}$ )

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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