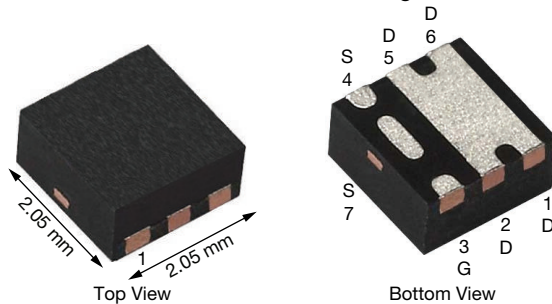


## P-Channel 30 V (D-S) MOSFET

**PowerPAK® SC-70-6L Single**

**Marking code: KA**

PRODUCT SUMMARY	
$V_{DS}$ (V)	-30
$R_{DS(on)}$ max. ( $\Omega$ ) at $V_{GS} = -10$ V	0.020
$R_{DS(on)}$ max. ( $\Omega$ ) at $V_{GS} = -4.5$ V	0.033
$Q_g$ typ. (nC)	8.3
$I_D$ (A) <sup>f</sup>	-12
Configuration	Single

ORDERING INFORMATION	
Package	PowerPAK SC-70
Lead (Pb)-free and halogen-free	SiA483ADJ-T1-GE3

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	$V_{DS}$	-30	V
Gate-source voltage	$V_{GS}$	-20 / +16	V
Continuous drain current ( $T_J = 150$ °C)	$I_D$	$T_C = 25$ °C	-12 <sup>f</sup>
		$T_C = 70$ °C	-12 <sup>f</sup>
		$T_A = 25$ °C	-10.6 <sup>a, b</sup>
		$T_A = 70$ °C	-8.5 <sup>a, b</sup>
Pulsed drain current ( $t = 100$ $\mu$ s)	$I_{DM}$	-60	A
Continuous source-drain diode current	$I_S$	$T_C = 25$ °C	-12 <sup>f</sup>
		$T_A = 25$ °C	-2.9 <sup>a, b</sup>
Maximum power dissipation	$P_D$	$T_C = 25$ °C	17.9
		$T_C = 70$ °C	11.4
		$T_A = 25$ °C	3.4 <sup>a, b</sup>
		$T_A = 70$ °C	2.2 <sup>a, b</sup>
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
Maximum junction-to-ambient <sup>a, e</sup>	$t \leq 5$ s	$R_{thJA}$	29	37	°C/W
Maximum junction-to-case (drain)	Steady state	$R_{thJC}$	5.5	7	

**Notes**

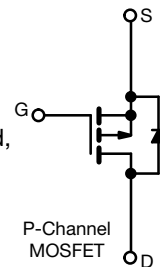
- Surface mounted on 1" x 1" FR4 board
- $t = 5$  s
- See solder profile ([www.vishay.com/ppg?73257](http://www.vishay.com/ppg?73257)). The PowerPAK SC-70 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder 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 80 °C/W
- Package limited

**FEATURES**

- TrenchFET® Gen IV p-channel power MOSFET
- Thermally enhanced PowerPAK® SC-70 package
- Provides excellent  $R_{DS-Q_g}$  Figure-of-Merit (FOM) for switching applications
- 100 %  $R_g$  tested
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS COMPLIANT**  
**HALOGEN FREE**
**APPLICATIONS**

- Battery charging and management
- Load switch
- DC/DC converters
- Power management in battery-operated, mobile and wearable devices





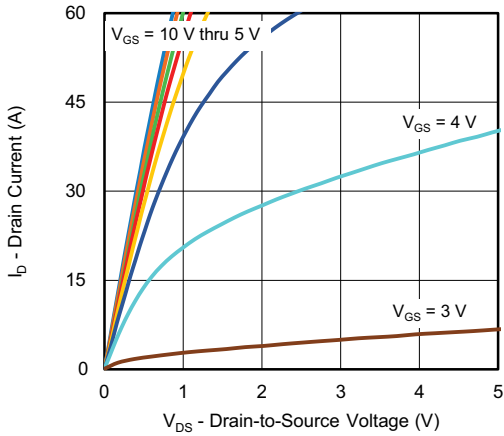
SPECIFICATIONS ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-source breakdown voltage	$V_{DS}$	$V_{GS} = 0\text{ V}$ , $I_D = -250\text{ }\mu\text{A}$	-30	-	-	V
$V_{DS}$ temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$	-	-26	-	mV/ $^\circ\text{C}$
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$		-	5	-	
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -250\text{ }\mu\text{A}$	-1	-	-2.5	V
Gate-source leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = -20\text{ V} / +16\text{ V}$	-	-	$\pm 100$	nA
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = -30\text{ V}$ , $V_{GS} = 0\text{ V}$	-	-	-1	$\mu\text{A}$
		$V_{DS} = -30\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 55\text{ }^\circ\text{C}$	-	-	-10	
On-state drain current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}$ , $V_{GS} = 0\text{ V}$	-10	-	-	A
Drain-source on-state resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}$ , $I_D = -5\text{ A}$	-	0.016	0.020	$\Omega$
		$V_{GS} = -4.5\text{ V}$ , $I_D = -3\text{ A}$	-	0.025	0.033	
Forward transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10\text{ V}$ , $I_D = -5\text{ A}$	-	25	-	S
<b>Dynamic <sup>b</sup></b>						
Input capacitance	$C_{ISS}$	$V_{DS} = -15\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ MHz}$	-	950	-	pF
Output capacitance	$C_{OSS}$		-	460	-	
Reverse transfer capacitance	$C_{rss}$		-	50	-	
Total gate charge	$Q_g$	$V_{DS} = -15\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D = -10.6\text{ A}$	-	17	26	nC
		$V_{DS} = -15\text{ V}$ , $V_{GS} = -4.5\text{ V}$ , $I_D = -10.6\text{ A}$	-	8.3	12.5	
Gate-source charge	$Q_{gs}$	$V_{DS} = -15\text{ V}$ , $V_{GS} = -4.5\text{ V}$ , $I_D = -10.6\text{ A}$	-	3.7	-	nC
Gate-drain charge	$Q_{gd}$		-	3	-	
Gate resistance	$R_g$	$f = 1\text{ MHz}$	1.5	8.8	15	$\Omega$
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -15\text{ V}$ , $R_L = 1.8\text{ }\Omega$ , $I_D \cong -8.5\text{ A}$ , $V_{GEN} = -4.5\text{ V}$ , $R_g = 1\text{ }\Omega$	-	26	52	ns
Rise time	$t_r$		-	95	190	
Turn-off delay time	$t_{d(off)}$		-	24	80	
Fall time	$t_f$		-	16	32	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -15\text{ V}$ , $R_L = 1.8\text{ }\Omega$ , $I_D \cong -8.5\text{ A}$ , $V_{GEN} = -10\text{ V}$ , $R_g = 1\text{ }\Omega$	-	12	24	ns
Rise time	$t_r$		-	6	12	
Turn-off delay time	$t_{d(off)}$		-	30	60	
Fall time	$t_f$		-	8	16	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous source-drain diode current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$	-	-	-12	A
Pulse diode forward current	$I_{SM}$		-	-	-60	
Body diode voltage	$V_{SD}$	$I_S = -10\text{ A}$ , $V_{GS} = 0\text{ V}$	-	-0.85	-1.2	V
Body diode reverse recovery time	$t_{rr}$	$I_F = -8.5\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , $T_J = 25\text{ }^\circ\text{C}$	-	19	38	ns
Body diode reverse recovery charge	$Q_{rr}$		-	7	14	nC
Reverse recovery fall time	$t_a$		-	9	-	ns
Reverse recovery rise time	$t_b$		-	10	-	

**Notes**

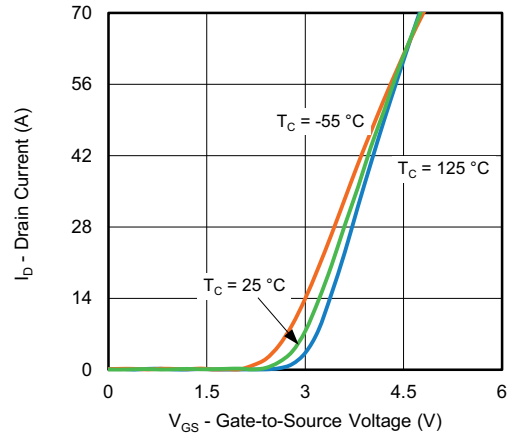
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$   
b. Guaranteed by design, not subject to production testing

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.

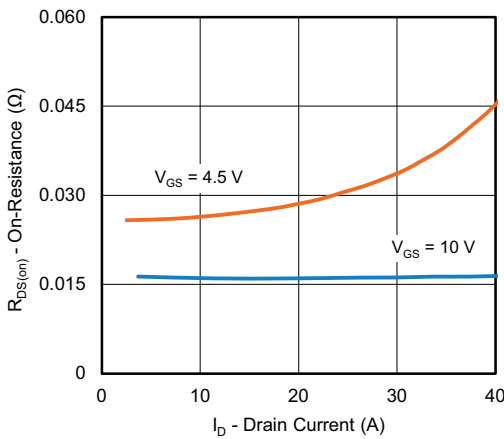
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



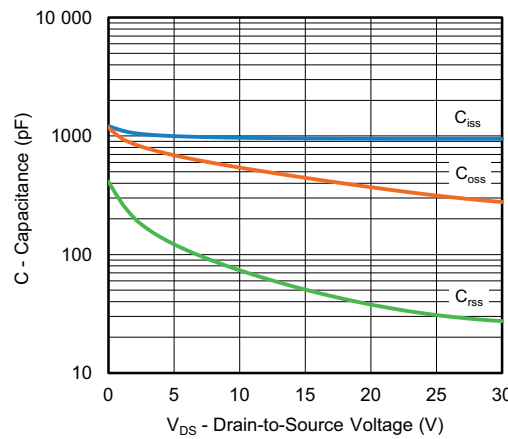
**Output Characteristics**



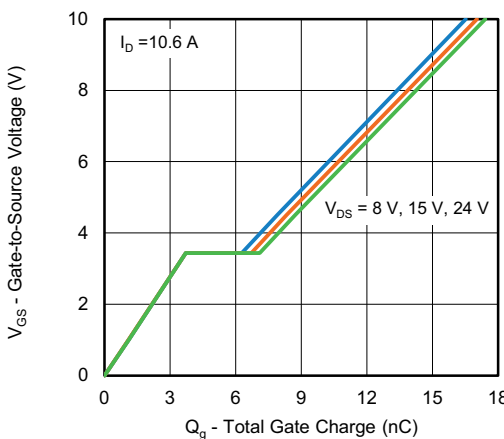
**Transfer Characteristics**



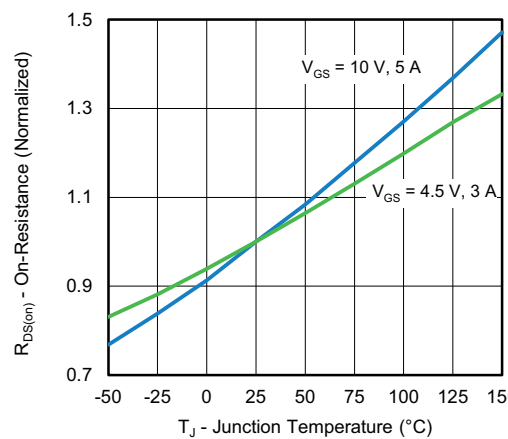
**On-Resistance vs. Drain Current and Gate Voltage**



**Capacitance**



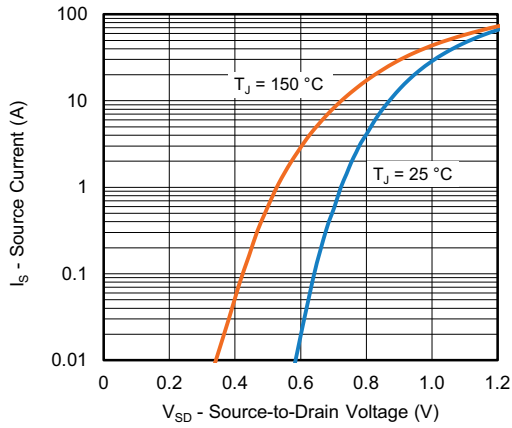
**Gate Charge**



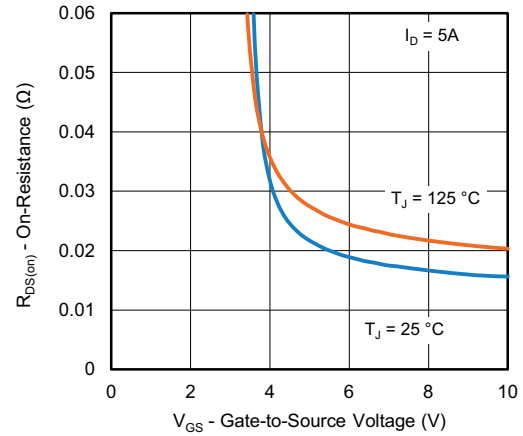
**On-Resistance vs. Junction Temperature**



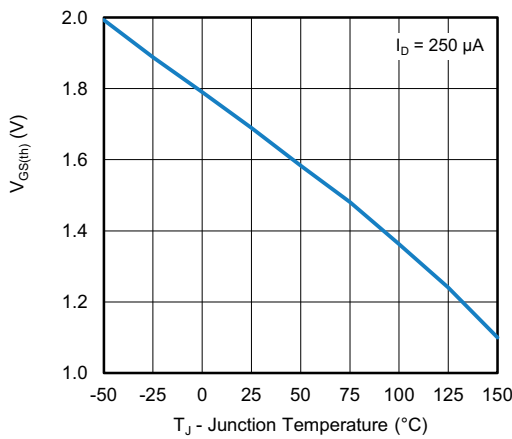
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



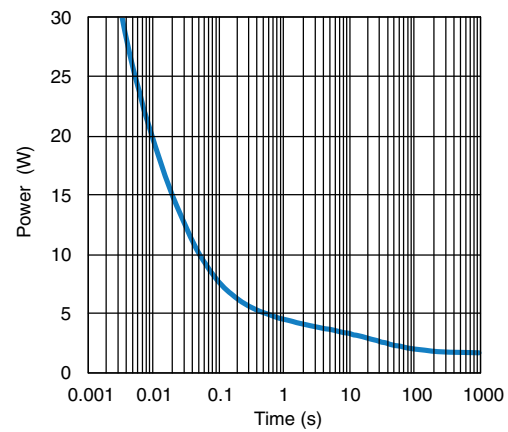
Source-Drain Diode Forward Voltage



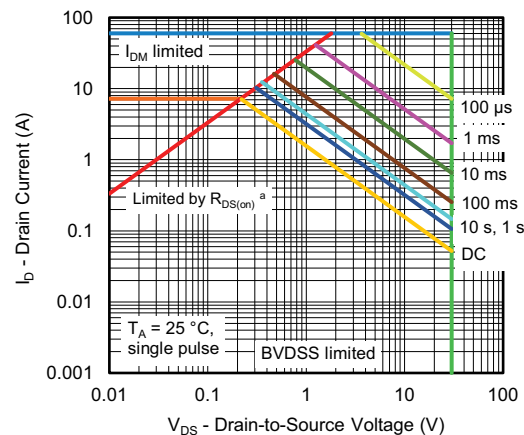
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



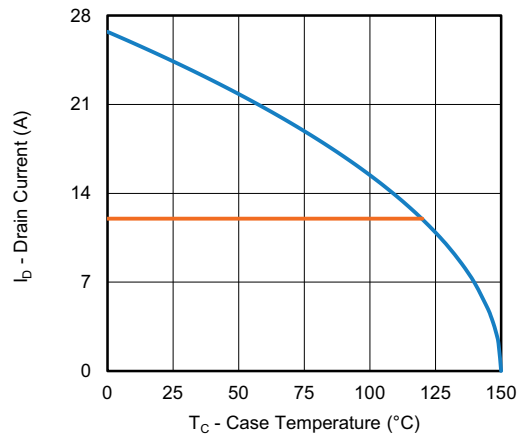
Safe Operating Area, Junction-to-Ambient

Note

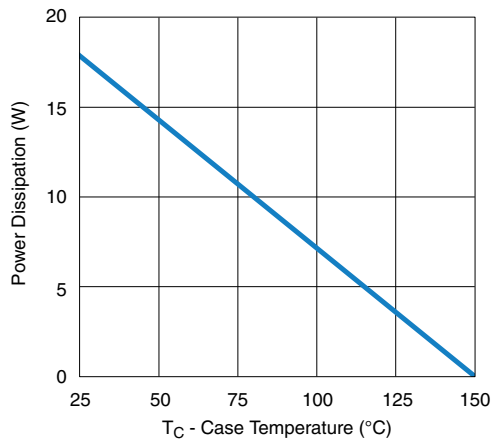
a.  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified



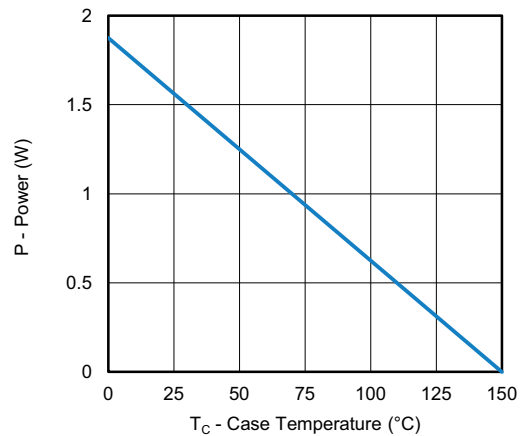
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



**Current Derating <sup>a</sup>**



**Power, Junction-to-Case**



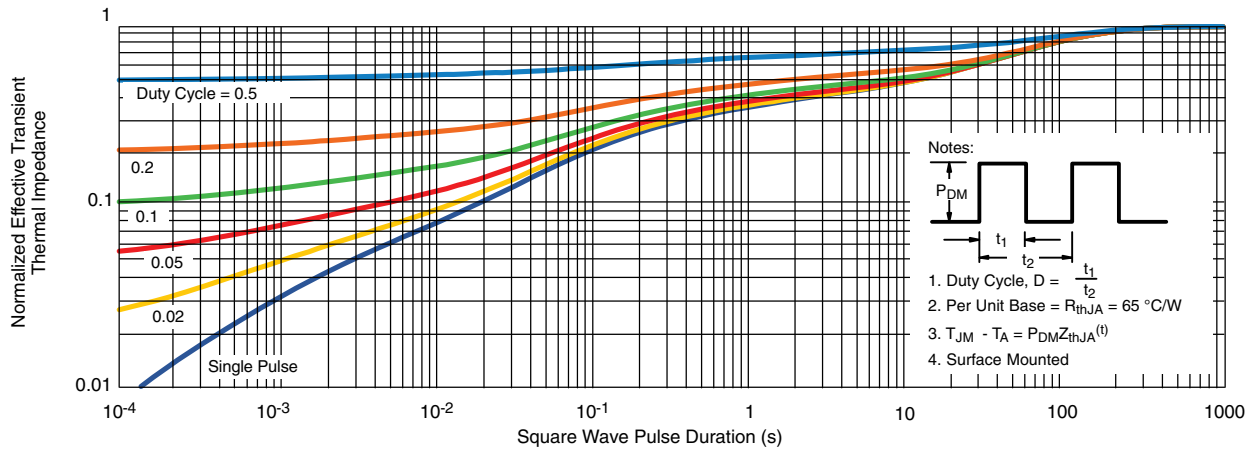
**Power, Junction-to-Ambient**

**Note**

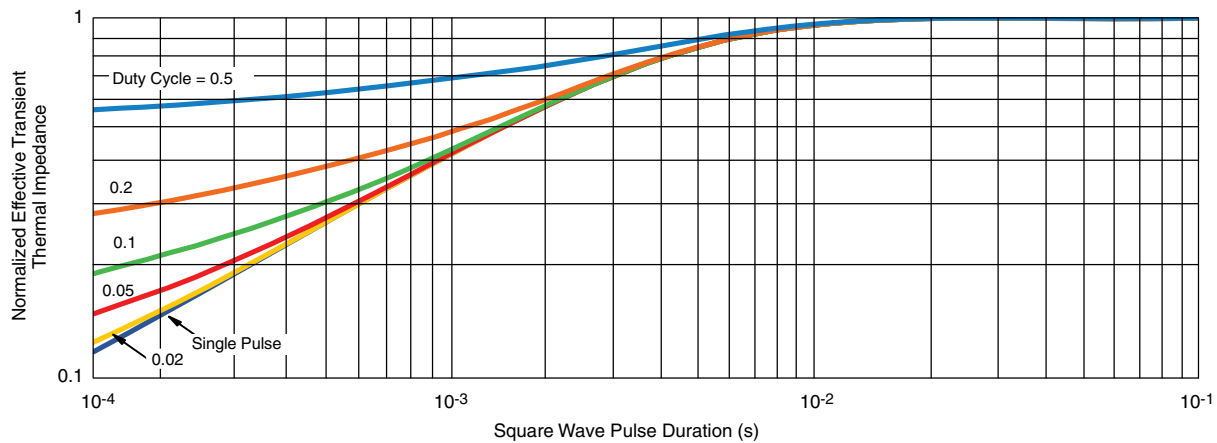
- a. The power dissipation P<sub>D</sub> is based on T<sub>J</sub> max. = 150 °C, using junction-to-ambient thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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