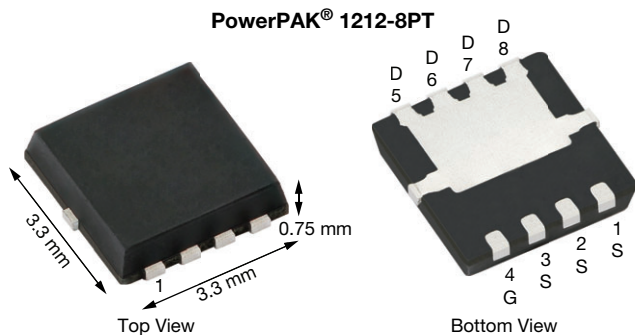


N-Channel 30 V (D-S) MOSFET



FEATURES

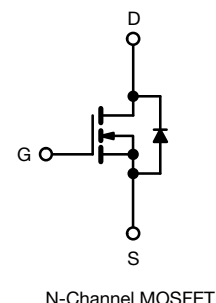
- TrenchFET® Gen IV power MOSFET
- 100 % $R_{DS(on)}$ and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- High power density DC/DC
- Synchronous rectification
- VRMs and embedded DC/DC
- Battery protection



N-Channel MOSFET

PRODUCT SUMMARY

V_{DS} (V)	30
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 10$ V	0.0036
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 4.5$ V	0.0050
Q_g typ. (nC)	11.7
I_D (A)	104 ^a
Configuration	Single

ORDERING INFORMATION

Package	PowerPAK 1212-8PT
Lead (Pb)-free and halogen-free	SiSA10BDN-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)	$T_C = 25$ °C	104	A
	$T_C = 70$ °C	83	
	$T_A = 25$ °C	26 ^{b, c}	
	$T_A = 70$ °C	21 ^{b, c}	
Pulsed drain current ($t = 100$ μ s)	I_{DM}	150	A
Continuous source-drain diode current	$T_C = 25$ °C	57	A
	$T_A = 25$ °C	3.4 ^{b, c}	
Single pulse avalanche current	I_{AS}	20	mJ
Single pulse avalanche energy	E_{AS}	20	
Maximum power dissipation	$T_C = 25$ °C	63	W
	$T_C = 70$ °C	40	
	$T_A = 25$ °C	3.8 ^{b, c}	
	$T_A = 70$ °C	2.4 ^{b, c}	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +150	°C
Soldering recommendations (peak temperature) ^{d, e}		260	°C

Notes

- Based on $T_C = 25$ °C
- Surface mounted on 1" x 1" FR4 board
- $t = 10$ s
- See solder profile (www.vishay.com/doc?73257). The PowerPAK 1212-8PT 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

**THERMAL RESISTANCE RATINGS**

PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient ^{a, b}	$t \leq 10$ s	R_{thJA}	26	33	°C/W
Maximum junction-to-case (drain)	Steady state	R_{thJC}	1.6	2	

Notes

- a. Surface mounted on 1" x 1" FR4 board
b. Maximum under steady state conditions is 67 °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, $I_D = 250$ μ A	30	-	-	V
Drain-source breakdown voltage ^(c) (transient)	$V_{DS(t)}$	$V_{GS} = 0$ V, $I_{D(aval)} = 70$ A, $t_{transient} \leq 50$ ns	36	-	-	
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = 250$ μ A	-	18	-	mV/°C
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$		-	-3.8	-	
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250$ μ A	1.2	-	2.4	V
Gate-source leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = +20, -16$ V	-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 30$ V, $V_{GS} = 0$ V	-	-	1	μ A
		$V_{DS} = 30$ V, $V_{GS} = 0$ V, $T_J = 55$ °C	-	-	10	
On-state drain current ^a	$I_{D(on)}$	$V_{DS} \geq 5$ V, $V_{GS} = 10$ V	25	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 10$ A	-	0.0023	0.0036	Ω
		$V_{GS} = 4.5$ V, $I_D = 7$ A	-	0.0035	0.0050	
Forward transconductance ^a	g_{fs}	$V_{DS} = 10$ V, $I_D = 20$ A	-	68	-	S
Dynamic ^b						
Input capacitance	C_{iss}	$V_{DS} = 15$ V, $V_{GS} = 0$ V, $f = 1$ MHz	-	1710	-	pF
Output capacitance	C_{oss}		-	655	-	
Reverse transfer capacitance	C_{rss}		-	68	-	
C_{rss}/C_{iss} ratio			-	0.040	0.080	
Total gate charge	Q_g	$V_{DS} = 15$ V, $V_{GS} = 10$ V, $I_D = 10$ A	-	24.1	36.2	nC
		$V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = 10$ A	-	11.7	17.6	
Gate-source charge	Q_{gs}		-	4.2	-	
Gate-drain charge	Q_{gd}		-	2.8	-	
Output charge	Q_{oss}	$V_{DS} = 15$ V, $V_{GS} = 0$ V	-	18	-	
Gate resistance	R_g	$f = 1$ MHz	0.3	1.3	2.6	Ω
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15$ V, $R_L = 1.5$ Ω $I_D \cong 10$ A, $V_{GEN} = 10$ V, $R_g = 1$ Ω	-	7	15	ns
Rise time	t_r		-	20	40	
Turn-off delay time	$t_{d(off)}$		-	25	50	
Fall time	t_f		-	10	20	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15$ V, $R_L = 1.5$ Ω $I_D \cong 10$ A, $V_{GEN} = 4.5$ V, $R_g = 1$ Ω	-	17	35	
Rise time	t_r		-	35	70	
Turn-off delay time	$t_{d(off)}$		-	30	60	
Fall time	t_f		-	15	30	

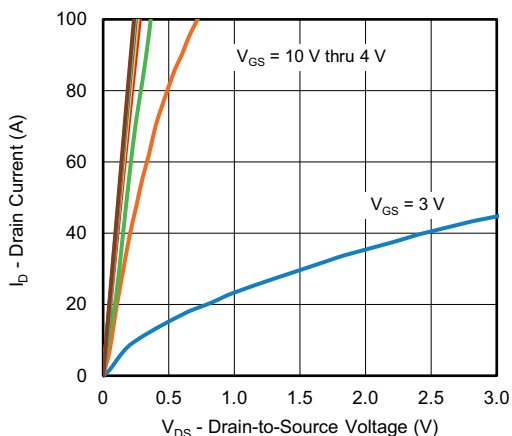
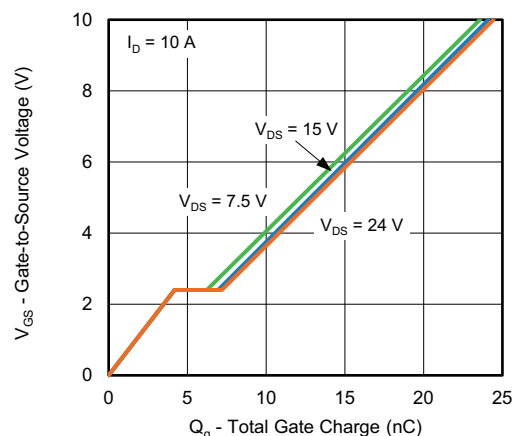
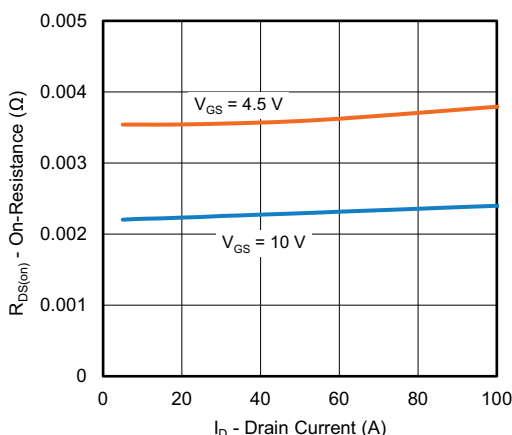
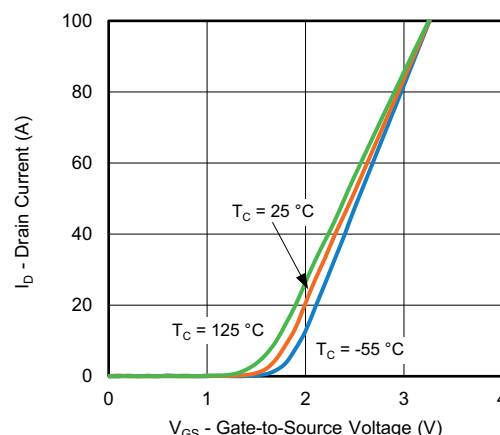
**SPECIFICATIONS** ($T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	$T_C = 25\text{ }^{\circ}\text{C}$	-	-	57	A
Pulse diode forward current ^a	I_{SM}		-	-	150	
Body diode voltage	V_{SD}	$I_S = 10\text{ A}$	-	0.75	1.1	V
Body diode reverse recovery time	t_{rr}	$I_F = 10\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^{\circ}\text{C}$	-	38	70	ns
Body diode reverse recovery charge	Q_{rr}		-	36	70	nC
Reverse recovery fall time	t_a		-	20	-	ns
Reverse recovery rise time	t_b		-	18	-	

Notes

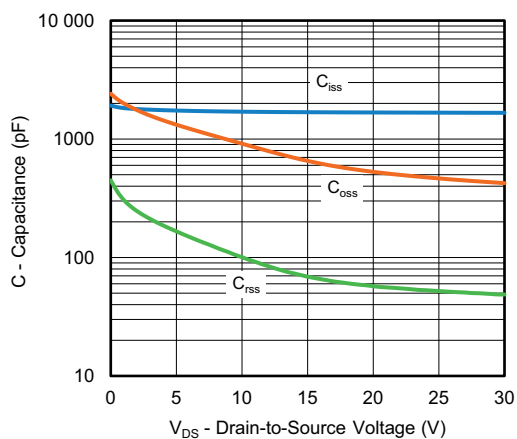
- a. Pulse test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
b. Guaranteed by design, not subject to production testing
c. Based on characterization, not subject to production testing

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.

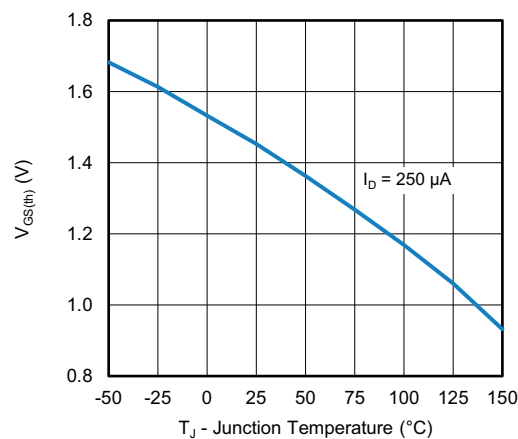
TYPICAL CHARACTERISTICS ($25\text{ }^{\circ}\text{C}$, unless otherwise noted)**Output Characteristics****Gate Charge****On-Resistance vs. Drain Current****Transfer Characteristics**



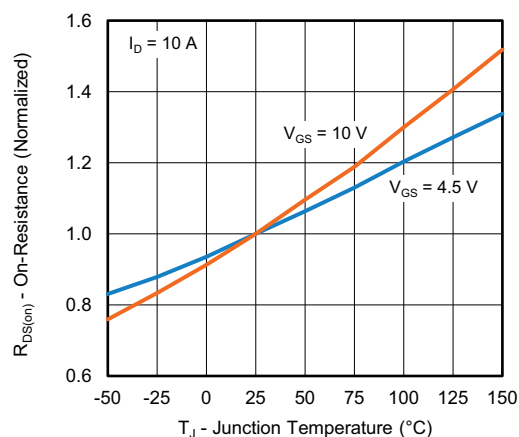
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



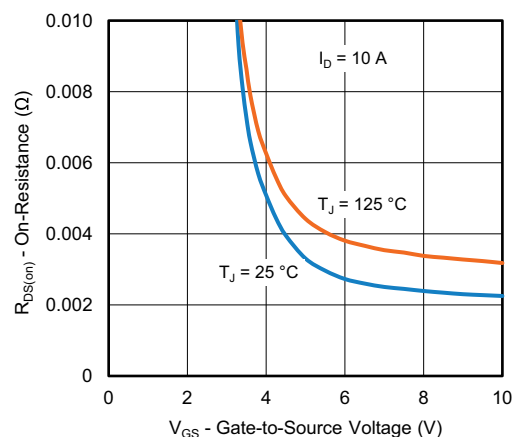
Capacitance



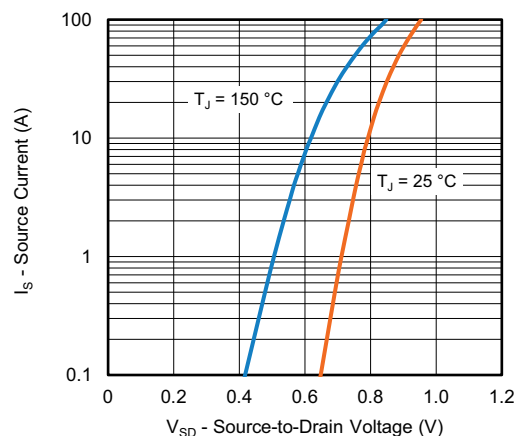
Threshold Voltage



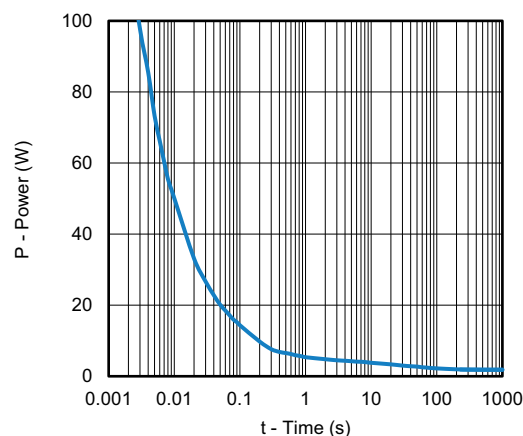
On-Resistance vs. Junction Temperature



On-Resistance vs. Gate-to-Source Voltage



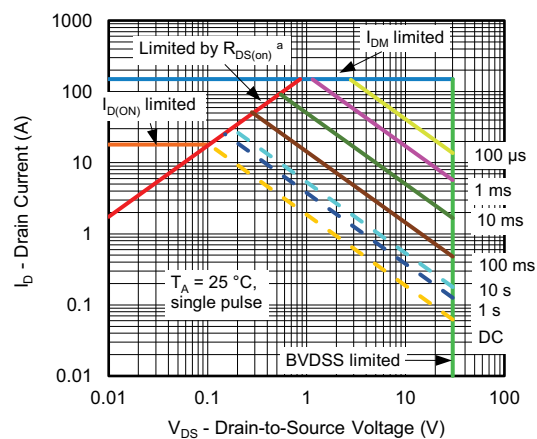
Source-Drain Diode Forward Voltage



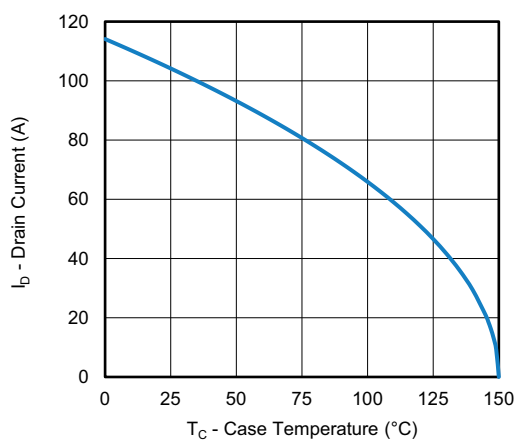
Single Pulse Power, Junction-to-Ambient



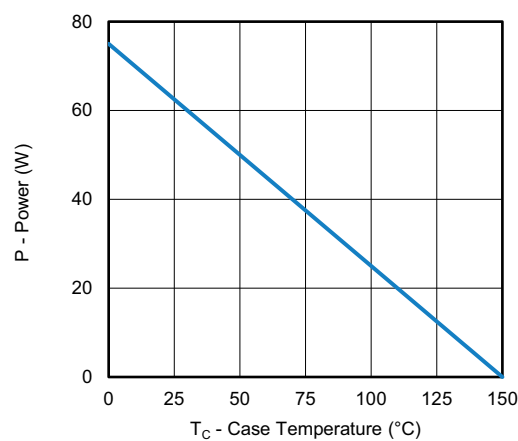
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Safe Operating Area



Current Derating ^a



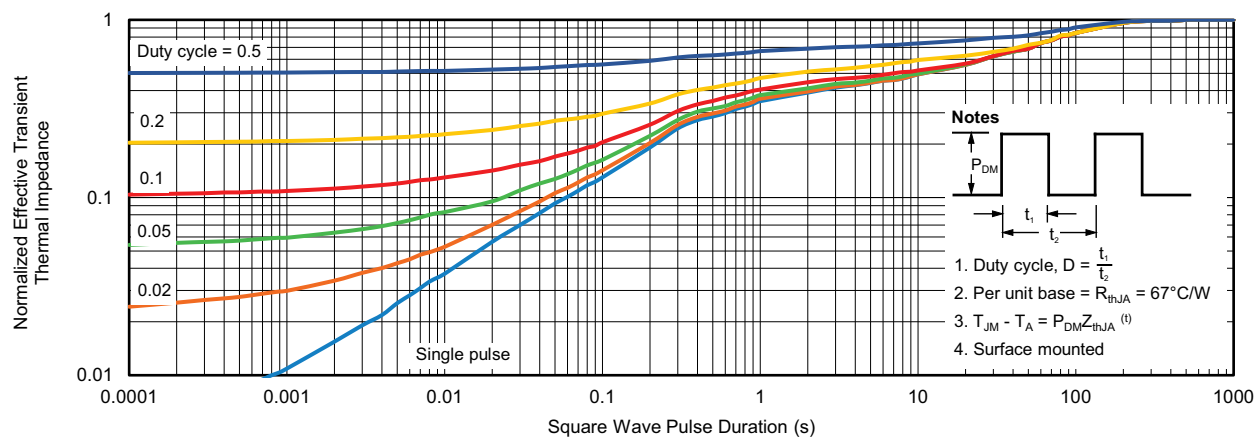
Power, Junction-to-Case

Note

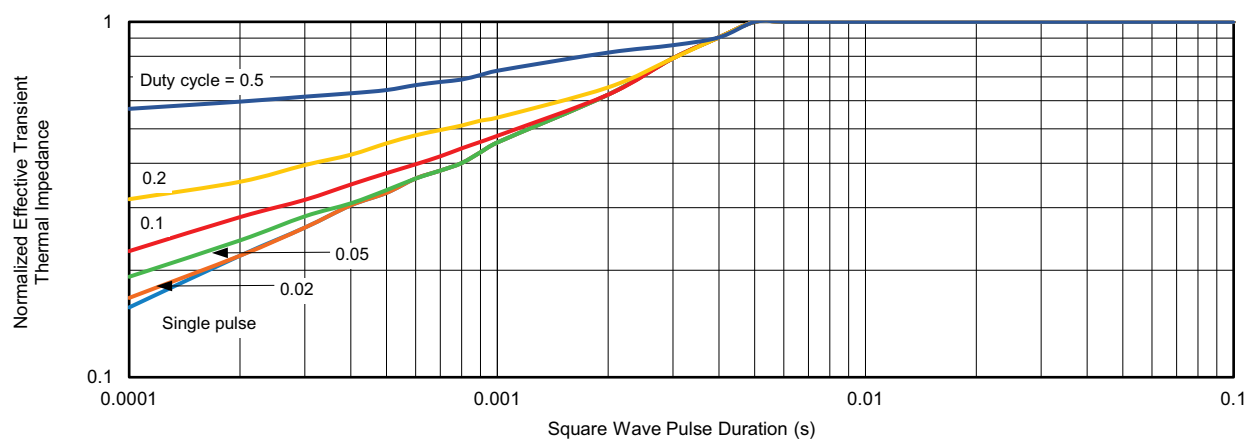
- a. The power dissipation P_D is based on T_J max. = 150 $^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



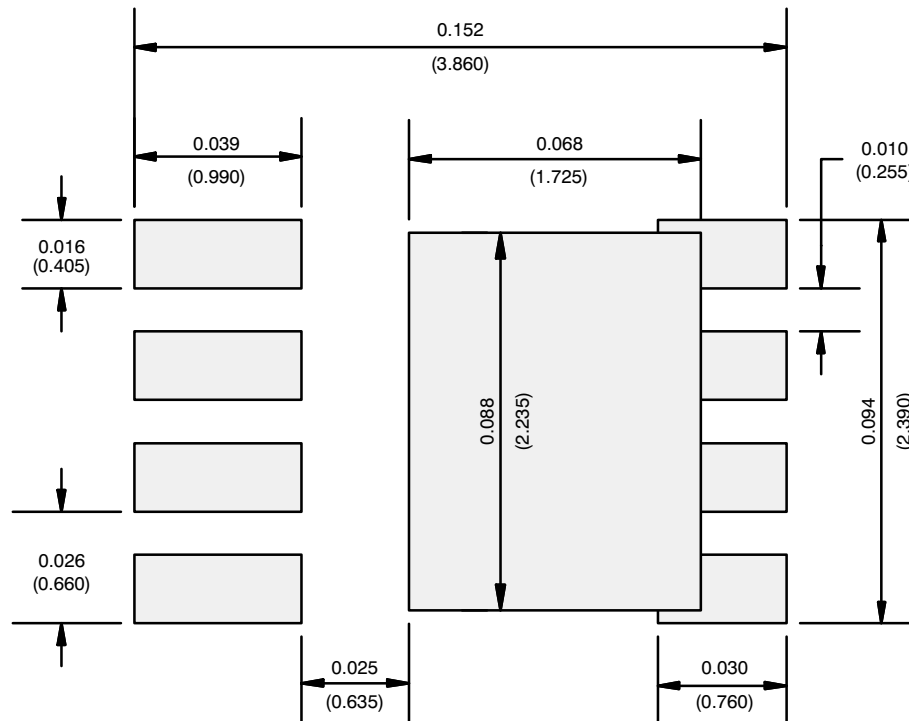
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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RECOMMENDED MINIMUM PADS FOR PowerPAK® 1212-8 Single



Recommended Minimum Pads
Dimensions in Inches/(mm)

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