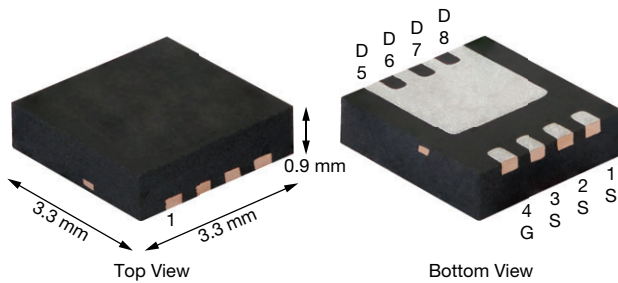


N-Channel 30-V (D-S) MOSFET

PowerPAK® 1212-8SH


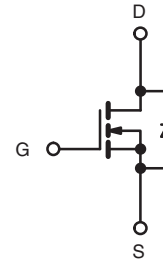
FEATURES

- TrenchFET® power MOSFET
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
 COMPLIANT
 HALOGEN
FREE

APPLICATIONS

- Synchronous rectification



N-Channel MOSFET

PRODUCT SUMMARY

V _{DS} (V)	30
R _{DS(on)} max. (Ω) at V _{GS} = 10 V	0.0075
R _{DS(on)} max. (Ω) at V _{GS} = 4.5 V	0.0098
Q _g typ. (nC)	10.2
I _D (A)	35 ^{a, g}
Configuration	Single

ORDERING INFORMATION

Package	PowerPAK 1212-8
Lead (Pb)-free and halogen-free	SiSH114ADN-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	V
Continuous drain current (T _J = 150 °C)	I _D	T _C = 25 °C	35 ^g
		T _C = 70 °C	35 ^g
		T _A = 25 °C	18 ^{b, c}
		T _A = 70 °C	14.5 ^{b, c}
Pulsed drain current	I _{DM}	60	A
Avalanche current	I _{AS}	30	A
Avalanche energy	E _{AS}	45	mJ
Continuous source-drain diode current	I _S	T _C = 25 °C	32
		T _A = 25 °C	3.2 ^{b, c}
Maximum power dissipation	P _D	T _C = 25 °C	39
		T _C = 70 °C	25
		T _A = 25 °C	3.7 ^{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

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient ^{b, f}	R _{thJA}	26	34	°C/W
Maximum junction-to-case (drain)	R _{thJC}	2.4	3.2	

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 1212-8 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 81 °C/W
- Package limited



SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	30	-	-	V
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$	-	33	-	mV/ $^\circ\text{C}$
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$		-	-6	-	
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	1.2	-	2.5	V
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}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^\circ\text{C}$	-	-	5	
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 18\text{ A}$	-	0.0062	0.0075	Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 16\text{ A}$	-	0.0081	0.0098	
Forward transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 18\text{ A}$	-	50	-	S
Dynamic ^b						
Input capacitance	C_{iss}	$V_{DS} = 15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	-	1230	-	pF
Output capacitance	C_{oss}		-	275	-	
Reverse transfer capacitance	C_{rss}		-	105	-	
Total gate charge	Q_g	$V_{DS} = 15\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 19\text{ A}$	-	21	32	nC
		$V_{DS} = 15\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 19\text{ A}$	-	10.2	20	
Gate-source charge	Q_{gs}		-	3.9	-	
Gate-drain charge	Q_{gd}	-	3.2	-		
Gate resistance	R_g	$f = 1\text{ MHz}$	0.3	1.6	3.2	Ω
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15\text{ V}$, $R_L = 1.5\text{ }\Omega$ $I_D \cong 10\text{ A}$, $V_{GEN} = 4.5\text{ V}$, $R_g = 1\text{ }\Omega$	-	20	30	ns
Rise time	t_r		-	14	21	
Turn-off delay time	$t_{d(off)}$		-	20	30	
Fall time	t_f		-	10	20	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15\text{ V}$, $R_L = 1.5\text{ }\Omega$ $I_D \cong 10\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 1\text{ }\Omega$	-	11	20	
Rise time	t_r		-	8	16	
Turn-off delay time	$t_{d(off)}$		-	20	30	
Fall time	t_f		-	7	14	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	$T_C = 25\text{ }^\circ\text{C}$	-	-	32	A
Pulse diode forward current	I_{SM}		-	-	60	
Body diode voltage	V_{SD}	$I_S = 10\text{ A}$, $V_{GS} = 0\text{ V}$	-	0.8	1.2	V
Body diode reverse recovery time	t_{rr}	$I_F = 10\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^\circ\text{C}$	-	24	36	ns
Body diode reverse recovery charge	Q_{rr}		-	20	30	nC
Reverse recovery fall time	t_a		-	16	-	ns
Reverse recovery rise time	t_b		-	8	-	

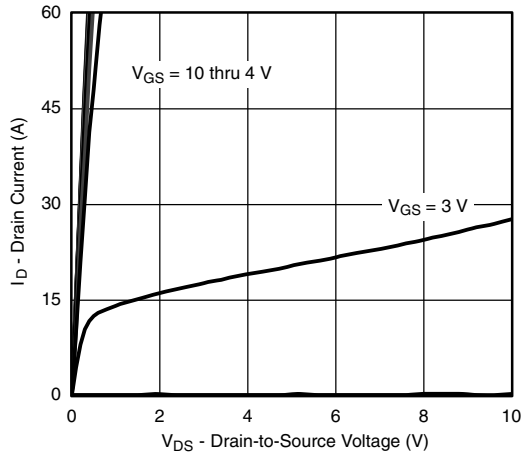
Notes

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

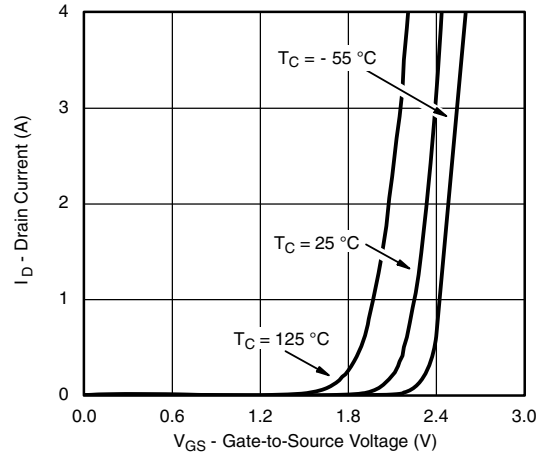
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



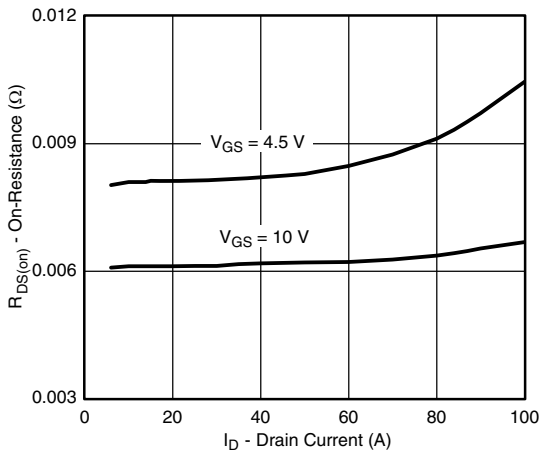
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



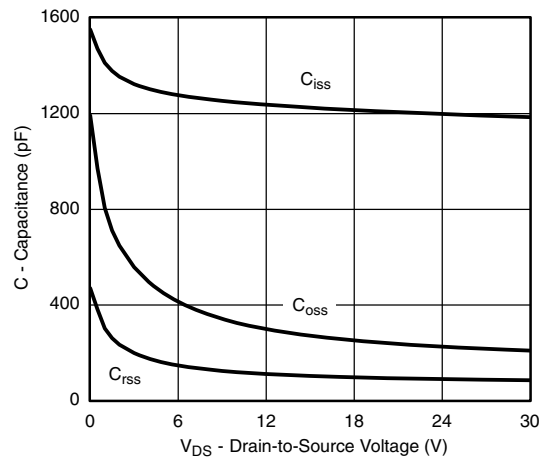
Output Characteristics



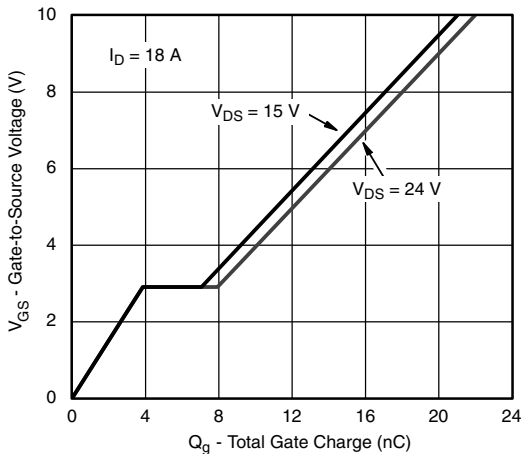
Transfer Characteristics



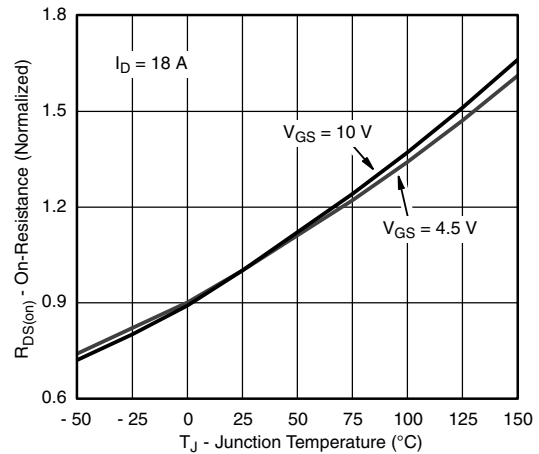
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



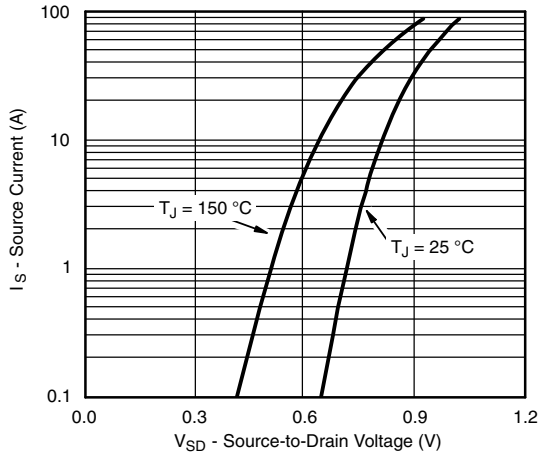
Gate Charge



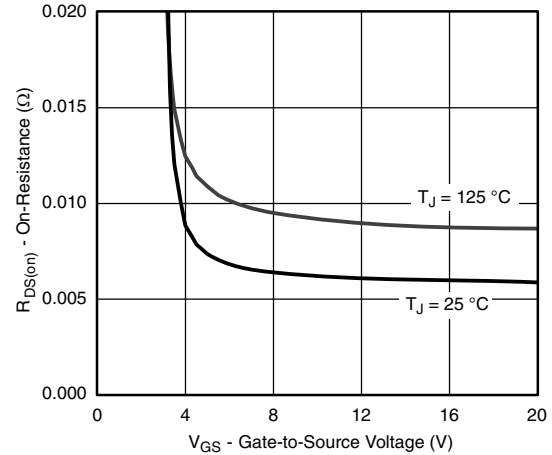
On-Resistance vs. Junction Temperature



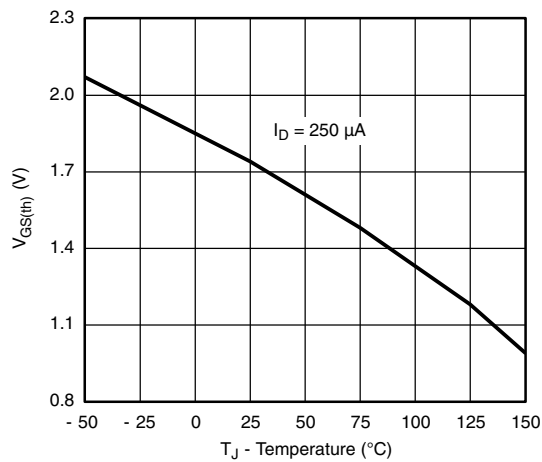
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



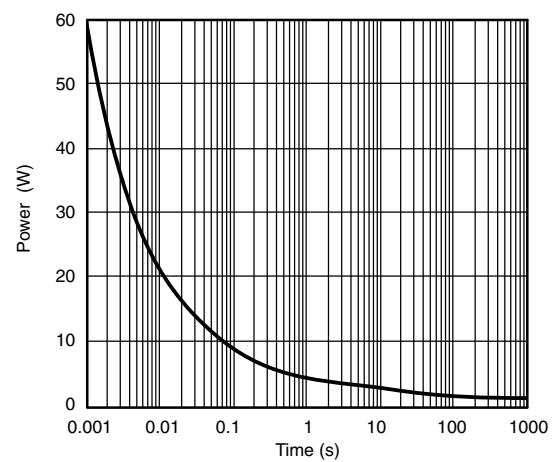
Source-Drain Diode Forward Voltage



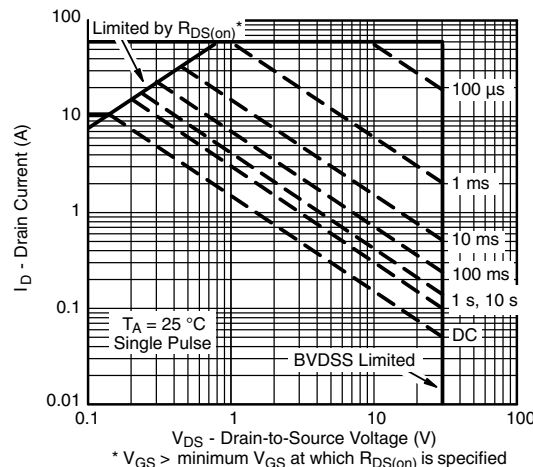
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



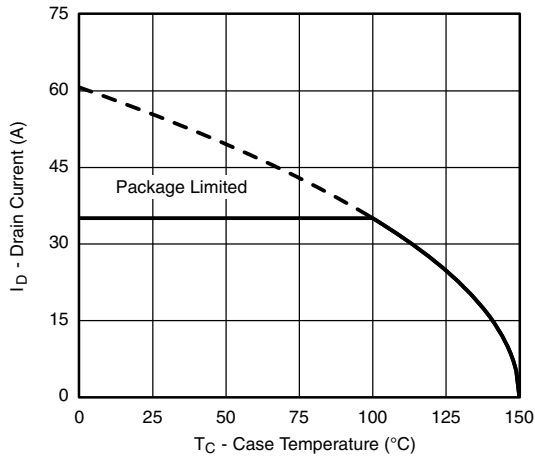
Single Pulse Power (Junction-to-Ambient)



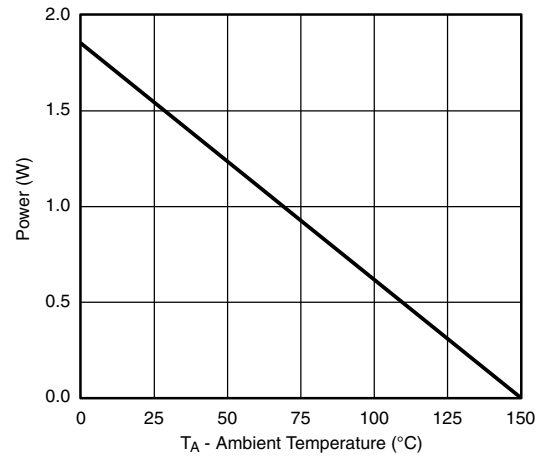
Safe Operating Area, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating ^a



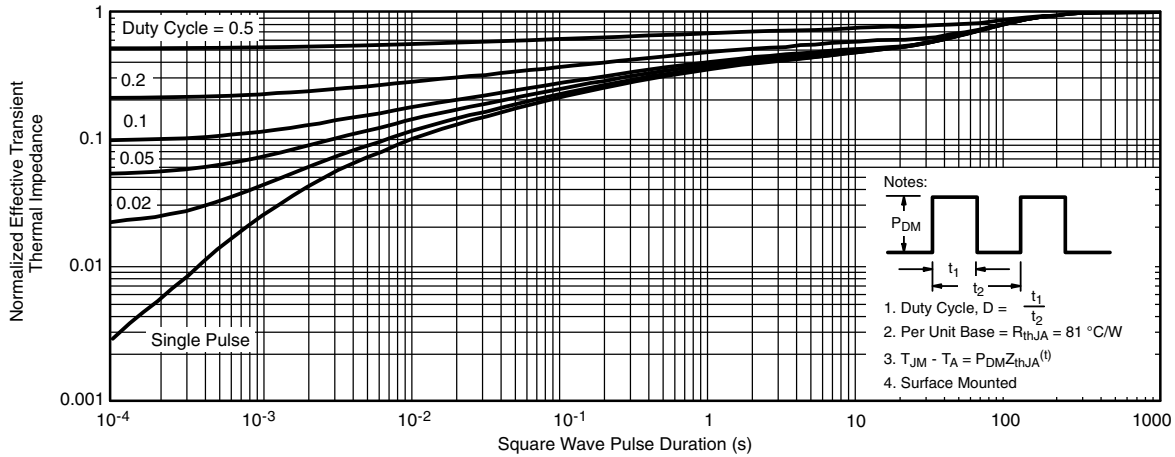
Power Derating, Junction-to-Ambient

Note

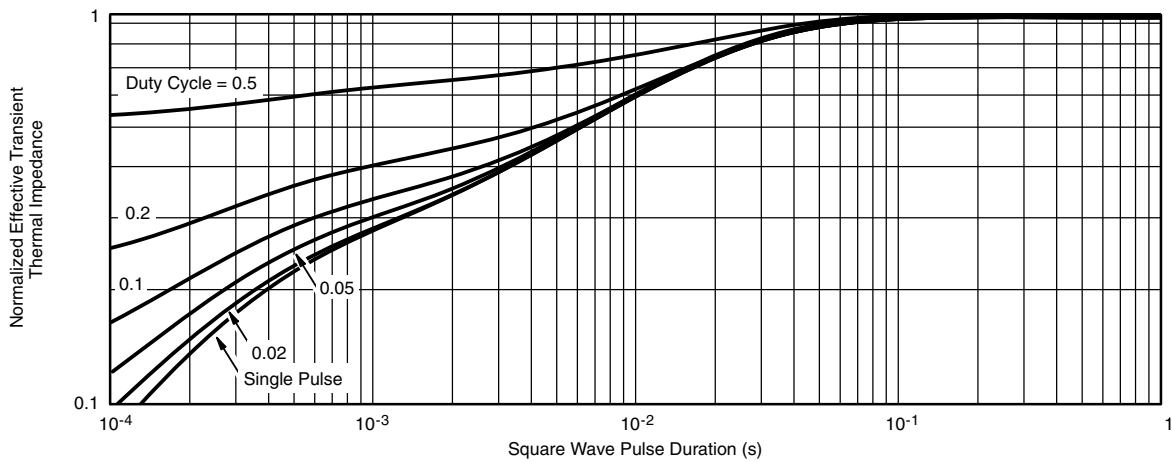
- a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

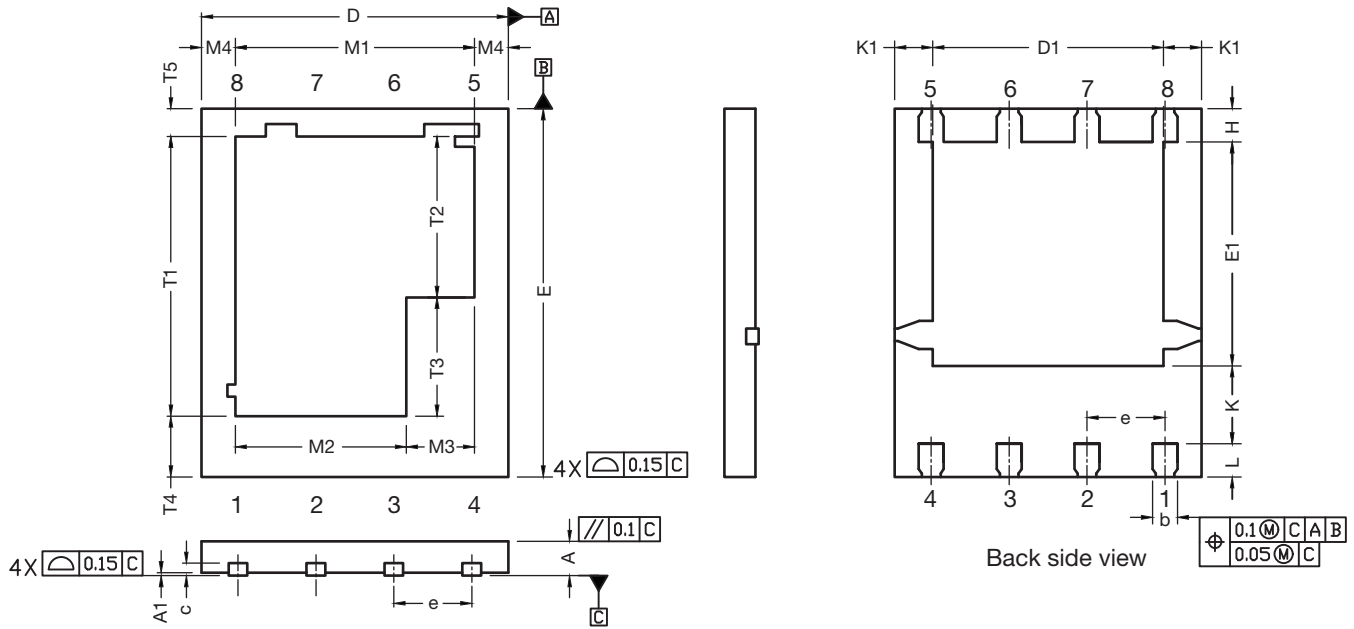


Normalized Thermal Transient Impedance, Junction-to-Case

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package / tape drawings, part marking, and reliability data, see www.vishay.com/ppg?75172.



PowerPAK[®] SO-8 Double Cooling Case Outline



DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.51	0.56	0.61	0.012	0.014	0.016
A1	0.00	0.02	0.05	0.000	0.0008	0.002
b	0.36	0.41	0.46	0.014	0.016	0.018
c	0.15	0.20	0.25	0.006	0.008	0.010
D	4.90	5.00	5.10	0.193	0.197	0.201
D1	3.71	3.76	3.81	0.146	0.148	0.150
e	1.27 BSC			0.050 BSC		
E	5.90	6.00	6.10	0.232	0.236	0.240
E1	3.60	3.65	3.70	0.142	0.144	0.146
H	0.49	0.54	0.59	0.019	0.021	0.023
K	1.22	1.27	1.32	0.048	0.050	0.052
K1	0.64 typ.			0.025 typ.		
L	0.49	0.54	0.59	0.019	0.021	0.023
M1	3.85	3.90	3.95	0.152	0.154	0.156
M2	2.74	2.79	2.84	0.108	0.110	0.112
M3	1.06	1.11	1.16	0.042	0.044	0.046
M4	0.56 typ.			0.022 typ.		
N	8			8		
T1	4.51	4.56	4.61	0.178	0.180	0.182
T2	2.58	2.63	2.68	0.102	0.104	0.106
T3	1.88	1.93	1.98	0.074	0.076	0.078
T4	0.97 typ.			0.038 typ.		
T5	0.48 typ.			0.019 typ.		

ECN: T16-0445-Rev. A, 11-Jul-16
DWG: 6048

RECOMMENDED MINIMUM PADS FOR PowerPAK® SO-8 Single



Recommended Minimum Pads
Dimensions in Inches/(mm)

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