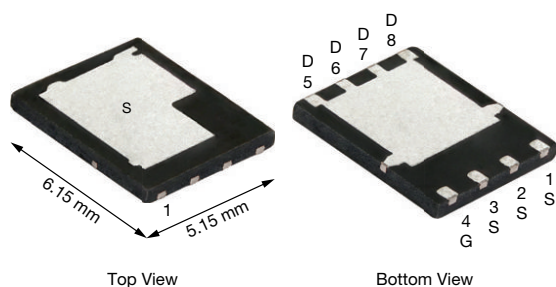


N-Channel 150 V (D-S) MOSFET

PowerPAK® SO-8DC



Top View

Bottom View

PRODUCT SUMMARY

V_{DS} (V)	150
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 10$ V	0.0177
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 7.5$ V	0.0204
Q_g typ. (nC)	20.7
I_D (A) ^a	56.7
Configuration	Single

FEATURES

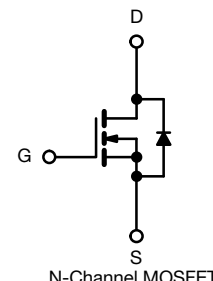
- TrenchFET® power MOSFET
- 100 % R_g and UIS tested
- Top side cooling feature provides additional venue for thermal transfer
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Synchronous rectification
- Primary side switching
- High power density DC/DC
- H-bridge
- Motor drive control



N-Channel MOSFET

ORDERING INFORMATION

Package	PowerPAK SO-8DC
Lead (Pb)-free and halogen-free	SiDR622DP-T1-GE3
Lead (Pb)-free and halogen-free	SiDR622DP-T1-RE3

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DS}	150	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	56.7
		$T_C = 70$ °C	45.3
		$T_A = 25$ °C	64.6 ^{b, c}
		$T_A = 70$ °C	51.7 ^{b, c}
Pulsed drain current ($t = 100$ μ s)	I_{DM}	100	A
Continuous source-drain diode current	I_S	$T_C = 25$ °C	60 ^g
		$T_A = 25$ °C	5.6 ^{b, c}
Single pulse avalanche current	I_{AS}	40	A
Single pulse avalanche Energy	E_{AS}	80	mJ
Maximum power dissipation	P_D	$T_C = 25$ °C	125
		$T_C = 70$ °C	80
		$T_A = 25$ °C	6.25 ^{b, c}
		$T_A = 70$ °C	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}	15	20	°C/W
Maximum junction-to-case (drain)	R_{thJC}	0.8	1	°C/W
Maximum junction-to-case (source)	R_{thJC}	1.1	1.4	°C/W

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 SO-8DC 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 54 °C/W
- Package limited

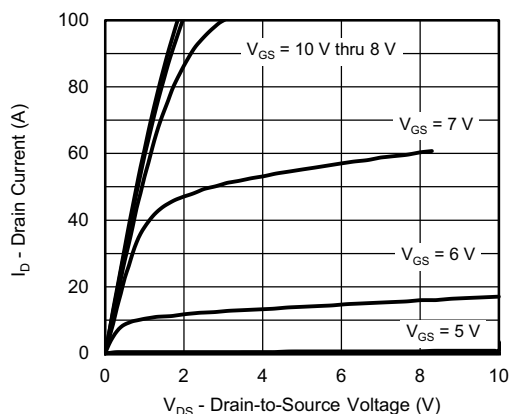
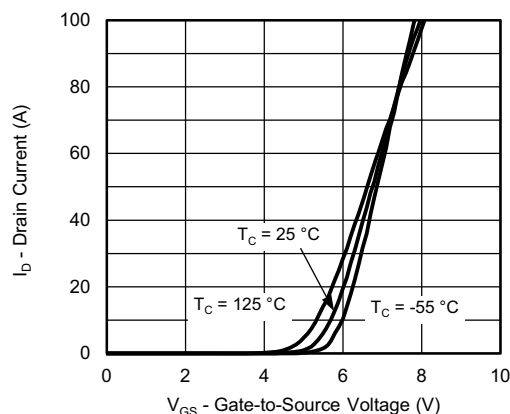
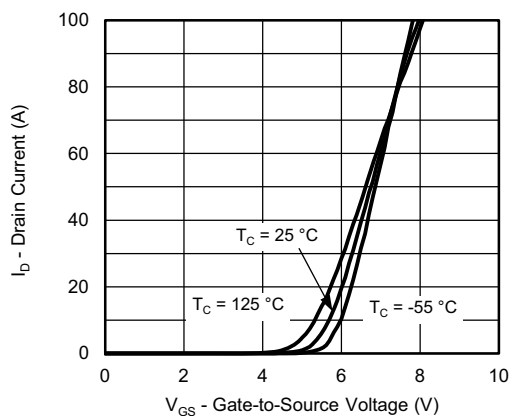
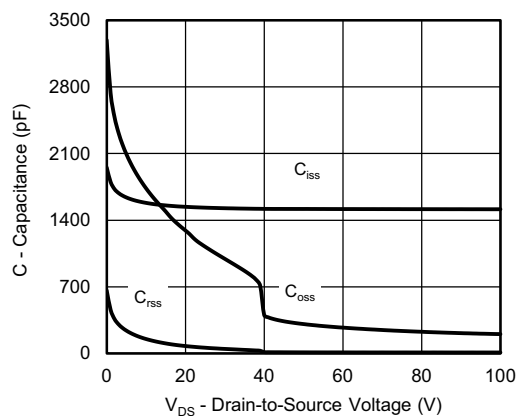
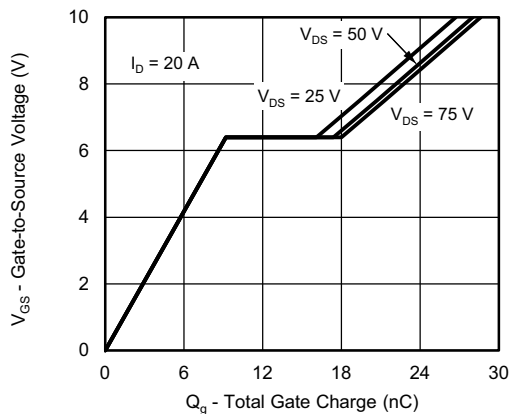
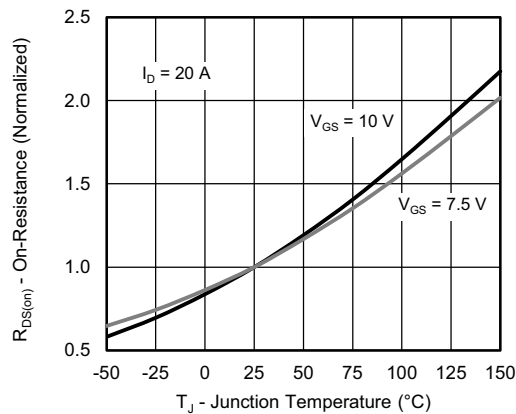


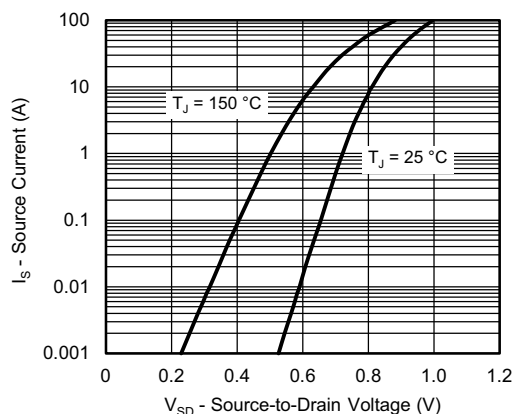
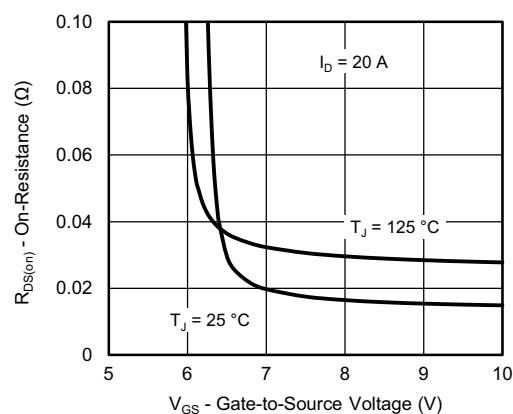
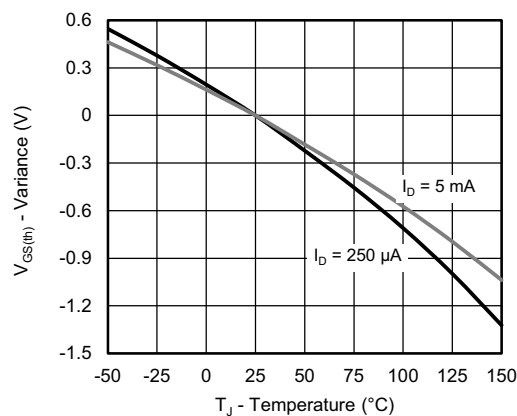
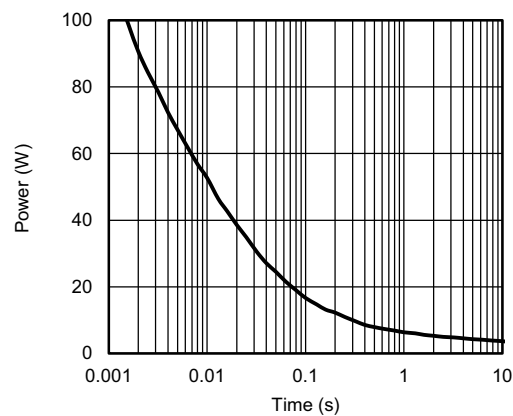
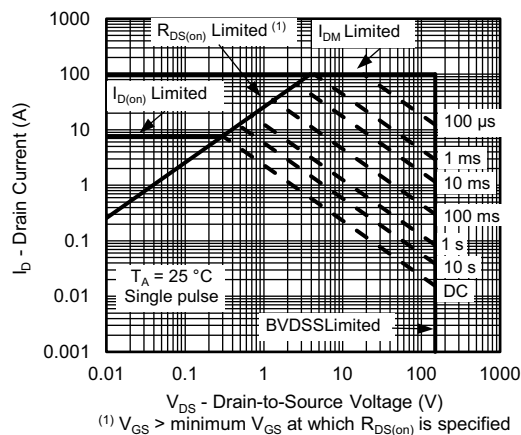
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	150	-	-	V
V _{DS} temperature coefficient	ΔV _{DS} /T _J	I _D = 250 μA	-	120	-	mV/°C
V _{GS(th)} temperature coefficient	ΔV _{GS(th)} /T _J		-	-9.7	-	
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.5	-	4.5	V
Gate-source leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = 150 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 150 V, V _{GS} = 0 V, T _J = 70 °C	-	-	10	
On-state drain current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	50	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A	-	0.0147	0.0177	Ω
		V _{GS} = 7.5 V, I _D = 15 A	-	0.0170	0.0204	
Forward transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 20 A	-	33	-	S
Dynamic ^b						
Input capacitance	C _{iss}	V _{DS} = 75 V, V _{GS} = 0 V, f = 1 MHz	-	1516	-	pF
Output capacitance	C _{oss}		-	236	-	
Reverse transfer capacitance	C _{rss}		-	10.5	-	
Total gate charge	Q _g	V _{DS} = 50 V, V _{GS} = 10 V, I _D = 20 A	-	27	41	nC
		V _{DS} = 50 V, V _{GS} = 7.5 V, I _D = 20 A	-	20.7	31	
Q _{gs}	-		9.2	-		
Q _{gd}	-		8.2	-		
Output charge	Q _{oss}	V _{DS} = 50 V, V _{GS} = 0 V	-	60	90	
Gate resistance	R _g	f = 1 MHz	0.8	1.8	3.5	Ω
Turn-on delay time	t _{d(on)}	V _{DD} = 50 V, R _L = 2.5 Ω I _D ≅ 20 A, V _{GEN} = 10 V, R _g = 1 Ω	-	13	25	ns
Rise time	t _r		-	6	12	
Turn-off delay time	t _{d(off)}		-	18	36	
Fall time	t _f		-	6	12	
Turn-on delay time	t _{d(on)}	V _{DD} = 50 V, R _L = 2.5 Ω I _D ≅ 20 A, V _{GEN} = 7.5 V, R _g = 1 Ω	-	16	32	
Rise time	t _r		-	7	14	
Turn-off delay time	t _{d(off)}		-	16	32	
Fall time	t _f		-	6	12	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I _S	T _C = 25 °C	-	-	60	A
Pulse diode forward current (t = 100 μs)	I _{SM}		-	-	100	
Body diode voltage	V _{SD}	I _S = 5 A	-	0.77	1.1	V
Body diode reverse recovery time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs, T _J = 25 °C	-	114	225	ns
Body diode reverse recovery charge	Q _{rr}		-	350	680	nC
Reverse recovery fall time	t _a		-	55	-	ns
Reverse recovery rise time	t _b		-	59	-	

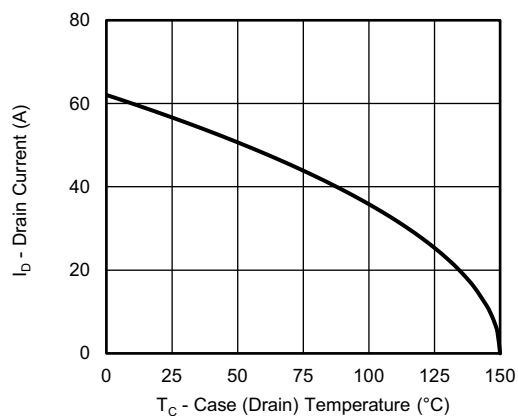
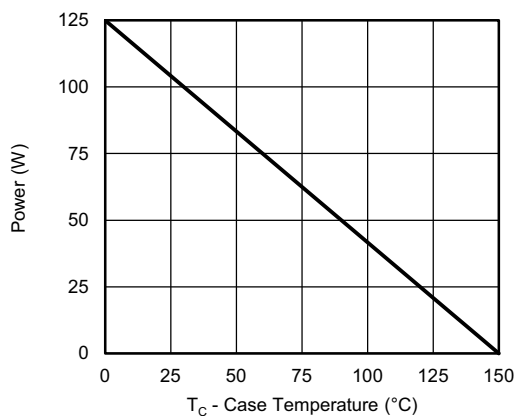
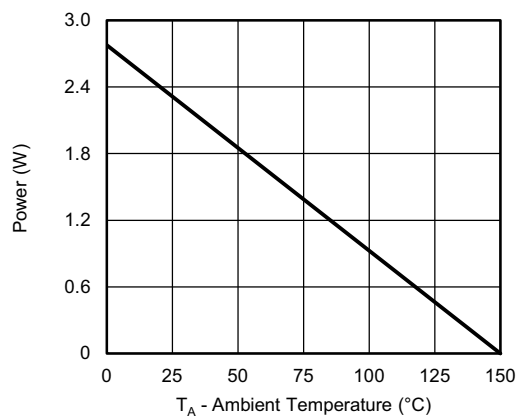
Notes

- 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

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature

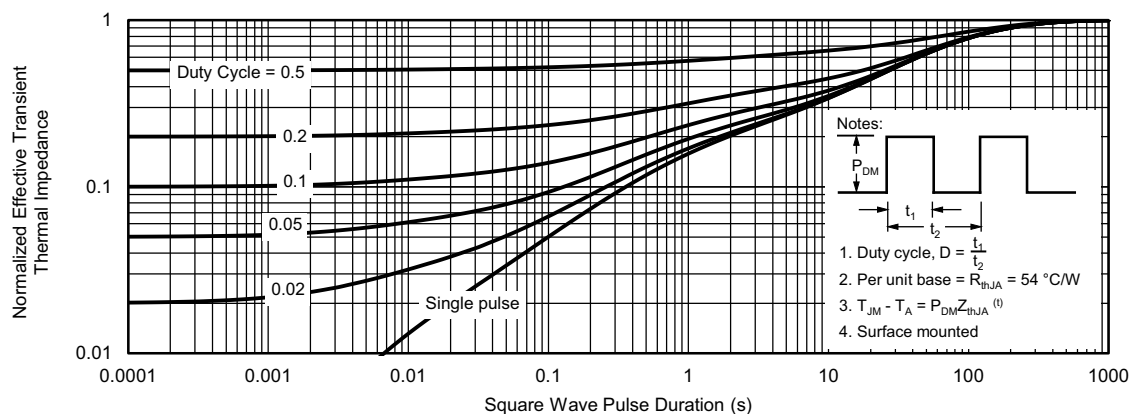
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Source-Drain Diode Forward Voltage

On-Resistance vs. Gate-to-Source Voltage

Threshold Voltage

Single Pulse Power, Junction-to-Ambient

Safe Operating Area

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Current Derating ^a

Power, Junction-to-Case

Power, Junction-to-Ambient
Note

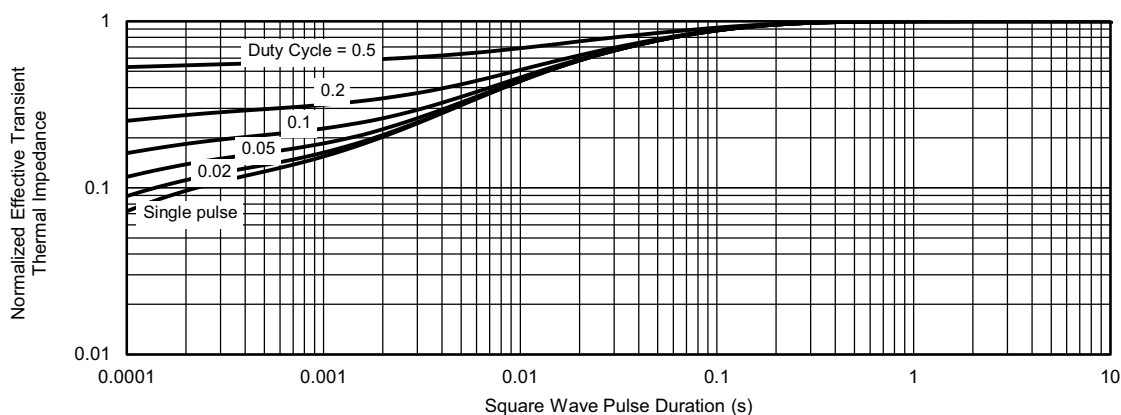
- a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

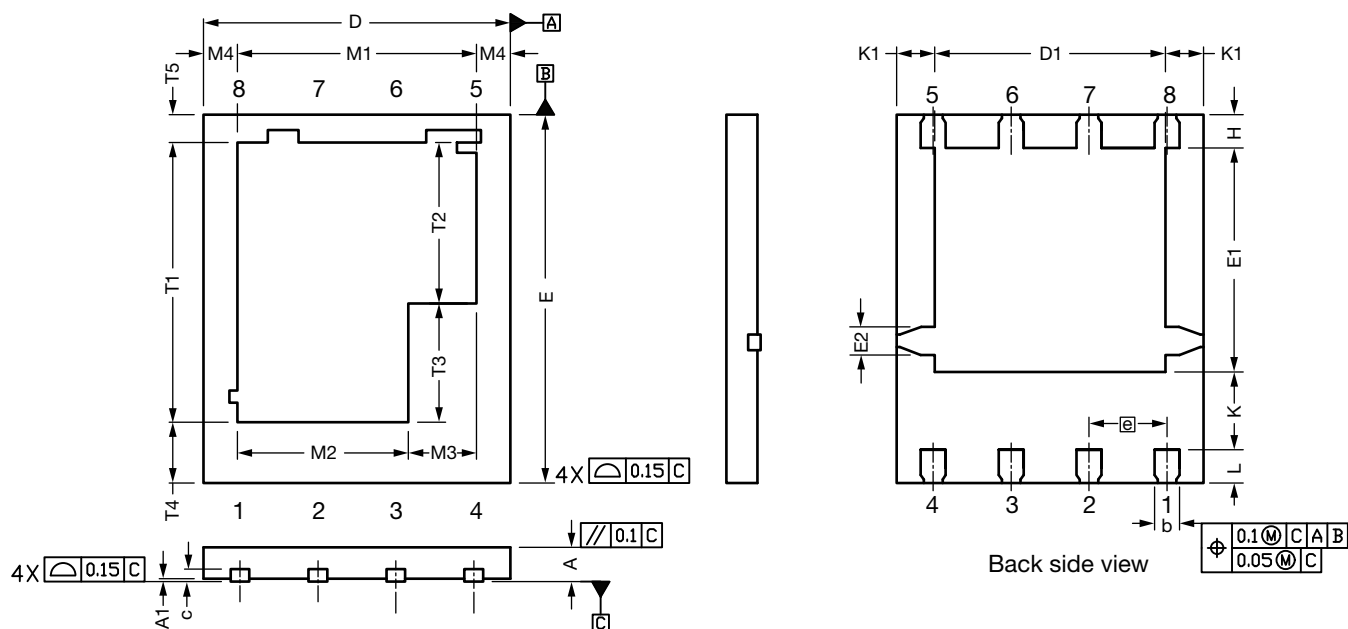


Normalized Thermal Transient Impedance, Junction-to-Case

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?75951.



PowerPAK® SO-8 Double Cooling Case Outline



DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.51	0.56	0.61	0.020	0.022	0.024
A1	0.00	0.02	0.05	0.000	0.001	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
E2	0.46 typ.			0.018 typ.		
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: T21-0014-Rev. B, 08-Feb-2021						
DWG: 6048						

RECOMMENDED MINIMUM PADS FOR PowerPAK® SO-8 Single



Recommended Minimum Pads
Dimensions in Inches/(mm)

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