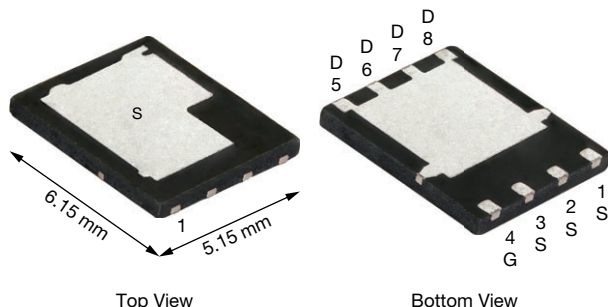


N-Channel 60 V (D-S) 175 °C MOSFET

PowerPAK® SO-8DC


FEATURES

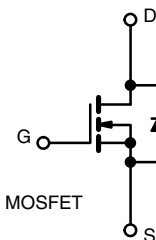
- TrenchFET® Gen IV power MOSFET
- Very low $R_{DS(on)}$ - Q_g figure of merit (FOM)
- Tuned for the lowest $R_{DS(on)}$ - Q_{oss} FOM
- 100 % R_g and UIS tested
- Top side cooling feature provides additional venue for thermal transfer
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Synchronous rectification
- Primary side switch
- DC/DC converter
- Solar micro inverter
- Motor drive switch
- Battery and load switch
- Industrial



N-Channel MOSFET

PRODUCT SUMMARY

V_{DS} (V)	60
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 10$ V	0.00174
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 7.5$ V	0.0021
Q_g typ. (nC)	51
I_D (A) ^a	227
Configuration	Single

ORDERING INFORMATION

Package	PowerPAK® SO-8DC
Lead (Pb)-free and halogen-free	SiDR626EP-T1-RE3

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DS}	60	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	227
		$T_C = 70$ °C	190
		$T_A = 25$ °C	50.8 ^{b, c}
		$T_A = 70$ °C	42.5 ^{b, c}
Pulsed drain current ($t = 100$ μ s)	I_{DM}	400	A
Continuous source-drain diode current	I_S	$T_C = 25$ °C	136
		$T_A = 25$ °C	6.8 ^{b, c}
Single pulse avalanche current	I_{AS}	50	
Single pulse avalanche energy	E_{AS}	125	mJ
Maximum power dissipation	P_D	$T_C = 25$ °C	150
		$T_C = 70$ °C	105
		$T_A = 25$ °C	7.5 ^{b, c}
		$T_A = 70$ °C	5.25 ^{b, c}
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +175	°C
Soldering recommendations (peak temperature) ^{d, e}		260	

Notes

- $T_C = 25$ °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

**THERMAL RESISTANCE RATINGS**

PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction to ambient ^a	$t \leq 10$ s	R_{thJA}	15	20	°C/W
Maximum junction to case (drain)	Steady state	R_{thJC}	0.8	1	
Maximum junction to case (source)	Steady state	R_{thJC}	1.1	1.4	

Notes

a. Surface mounted on 1" x 1" FR4 board

SPECIFICATIONS ($T_J = 25$ °C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	60	-	-	V
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = 10\text{ mA}$	-	33	-	mV/°C
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 250\text{ }\mu\text{A}$	-	-8.8	-	
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	2	-	4	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}	$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 70\text{ }^\circ\text{C}$	-	-	15	
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$	-	0.00145	0.00174	Ω
		$V_{GS} = 7.5\text{ V}$, $I_D = 20\text{ A}$	-	0.00175	0.0021	
Forward transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 20\text{ A}$	-	78	-	S
Dynamic ^b						
Input capacitance	C_{iss}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	-	5130	-	pF
Output capacitance	C_{oss}		-	1190	-	
Reverse transfer capacitance	C_{rss}		-	39	-	
Total gate charge	Q_g	$V_{DS} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$	-	68	102	nC
		$V_{DS} = 30\text{ V}$, $V_{GS} = 7.5\text{ V}$, $I_D = 20\text{ A}$	-	51	77	
Gate-source charge	Q_{gs}		-	25	-	
Gate-drain charge	Q_{gd}		-	7.4	-	
Output charge	Q_{oss}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$	-	71	-	
Gate resistance	R_g	$f = 1\text{ MHz}$	0.2	0.62	1.1	Ω
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30\text{ V}$, $R_L = 1.5\text{ }\Omega$, $I_D \cong 20\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 1\text{ }\Omega$	-	20	40	ns
Rise time	t_r		-	10	20	
Turn-off delay time	$t_{d(off)}$		-	35	70	
Fall time	t_f		-	7	14	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30\text{ V}$, $R_L = 1.5\text{ }\Omega$, $I_D \cong 20\text{ A}$, $V_{GEN} = 7.5\text{ V}$, $R_g = 1\text{ }\Omega$	-	24	48	
Rise time	t_r		-	25	50	
Turn-off delay time	$t_{d(off)}$		-	30	60	
Fall time	t_f		-	10	20	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	$T_C = 25\text{ }^\circ\text{C}$	-	-	136	A
Pulse diode forward current	I_{SM}		-	-	400	
Body diode voltage	V_{SD}	$I_S = 5\text{ A}$, $V_{GS} = 0\text{ V}$	-	0.74	1.1	V
Body diode reverse recovery time	t_{rr}	$I_F = 20\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^\circ\text{C}$	-	45	90	ns
Body diode reverse recovery charge	Q_{rr}		-	45	90	nC
Reverse recovery fall time	t_a		-	21	-	ns
Reverse recovery rise time	t_b		-	24	-	

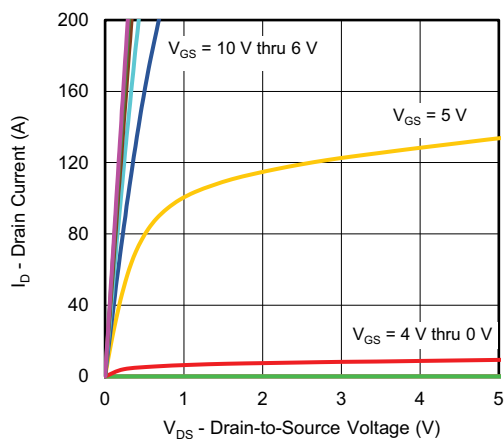
Notesa. Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %

b. Guaranteed by design, not subject to production testing

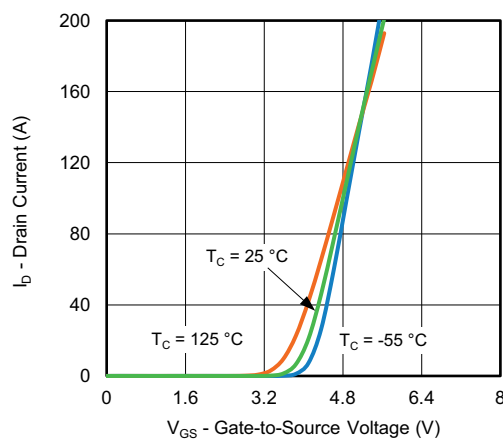
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



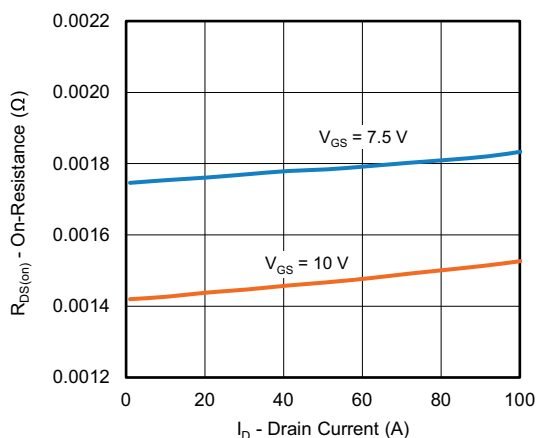
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



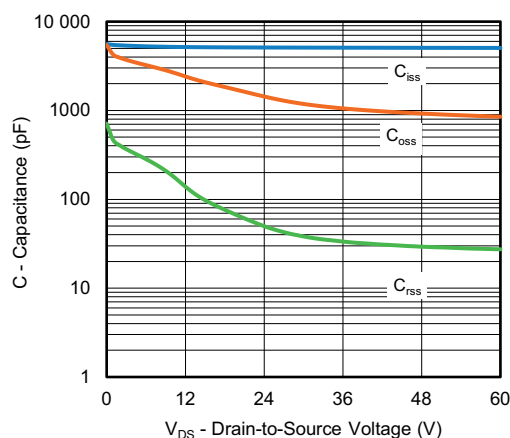
Output Characteristics



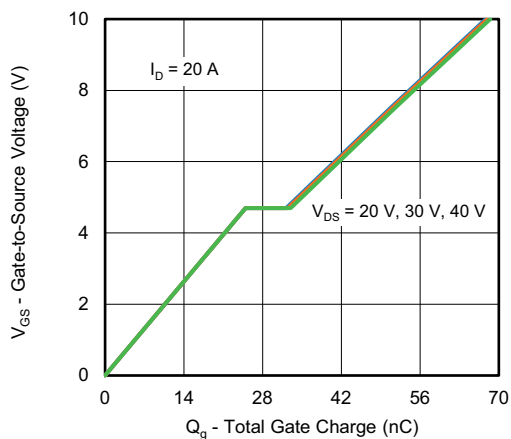
Transfer Characteristics



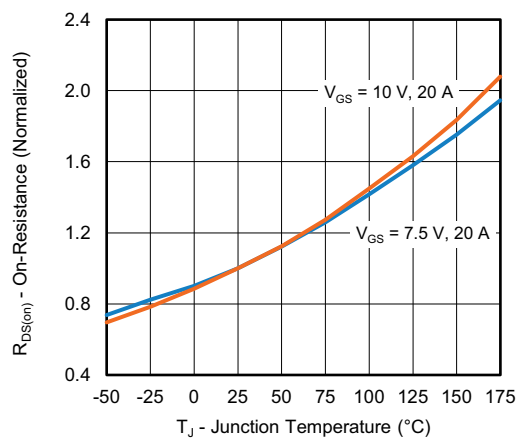
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



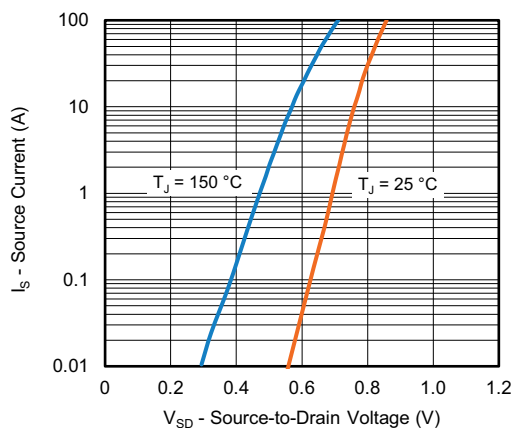
Gate Charge



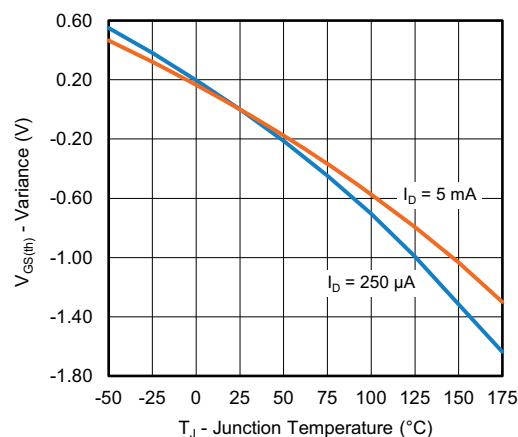
On-Resistance vs. Junction Temperature



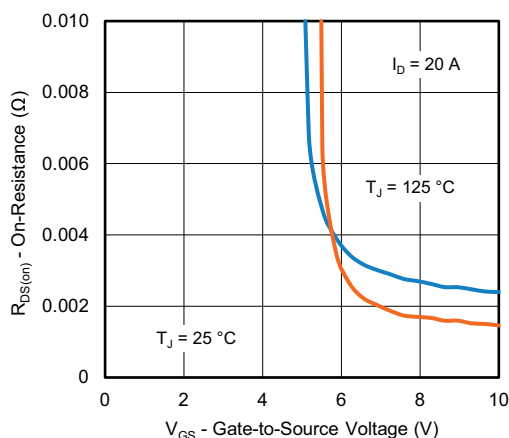
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



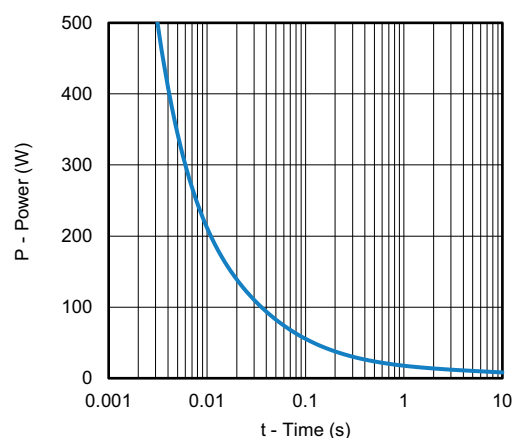
Source-Drain Diode Forward Voltage



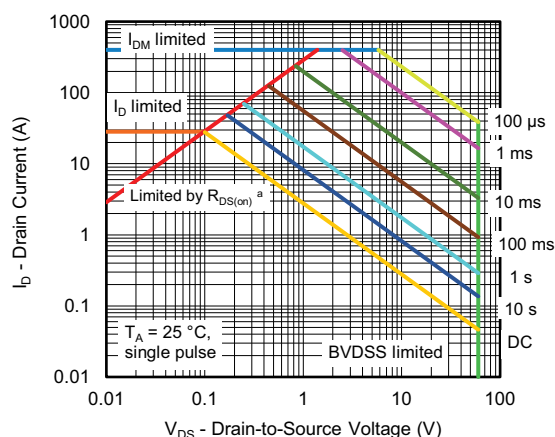
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



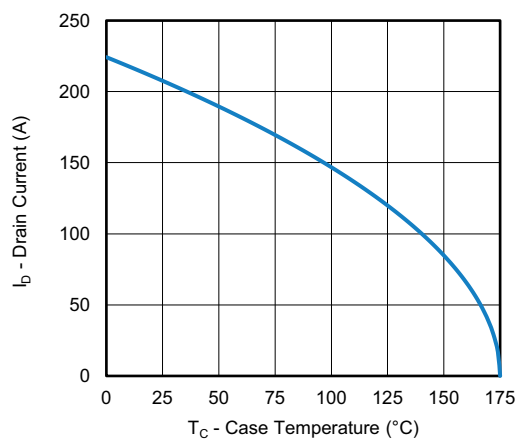
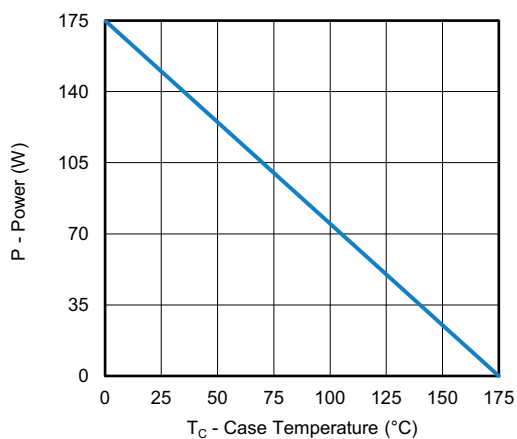
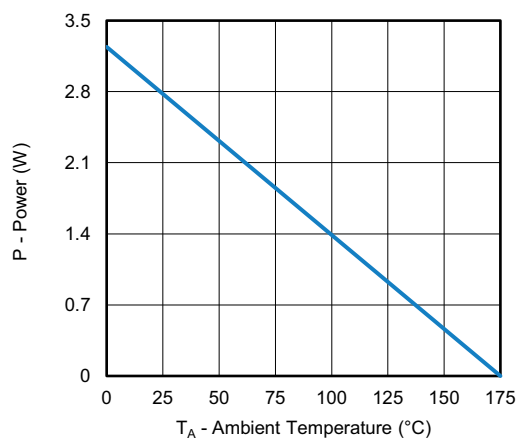
Single Pulse Power, Junction-to-Ambient



Safe Operating Area, Junction-to-Ambient

Note

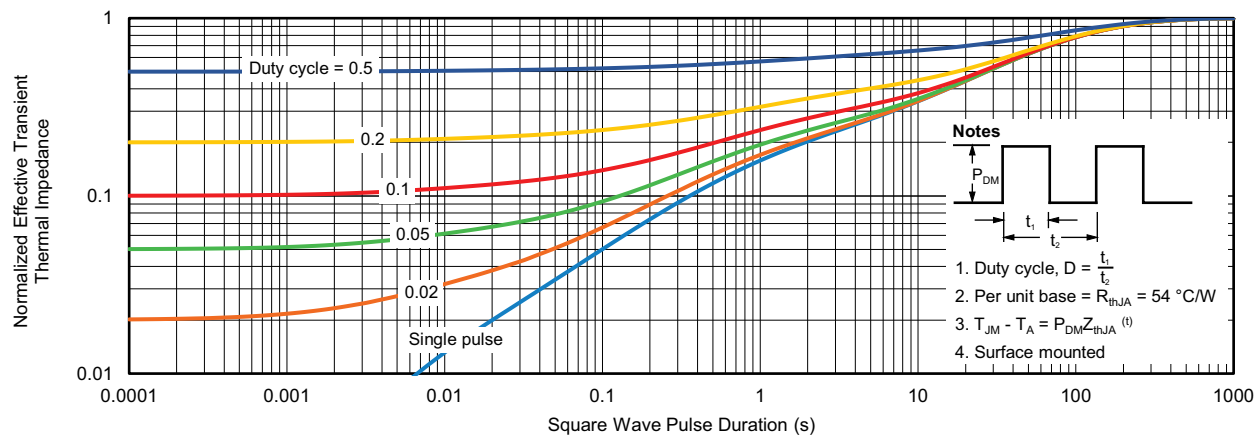
a. $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Current Derating ^a

Power, Junction-to-Case

Power, Junction-to-Ambient
Note

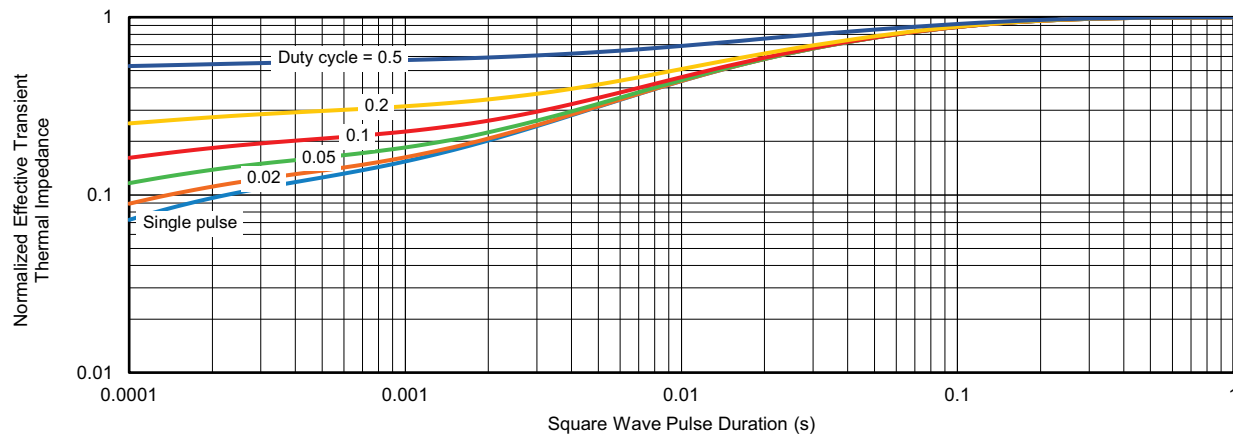
- a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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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	3.8	3.90	4.00	0.150	0.154	0.158
M2	2.69	2.79	2.89	0.106	0.110	0.114
M3	1.01	1.11	1.21	0.040	0.044	0.048
M4	0.56 typ.			0.022 typ.		
N	8			8		
T1	4.46	4.56	4.66	0.176	0.180	0.184
T2	2.53	2.63	2.73	0.100	0.104	0.108
T3	1.83	1.93	2.03	0.072	0.076	0.080
T4	0.97 typ.			0.038 typ.		
T5	0.48 typ.			0.019 typ.		
ECN: T24-0304-Rev. C, 29-Jul-2024						
DWG: 6048						

RECOMMENDED MINIMUM PADS FOR PowerPAK® SO-8 Single



Recommended Minimum Pads
Dimensions in Inches/(mm)

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