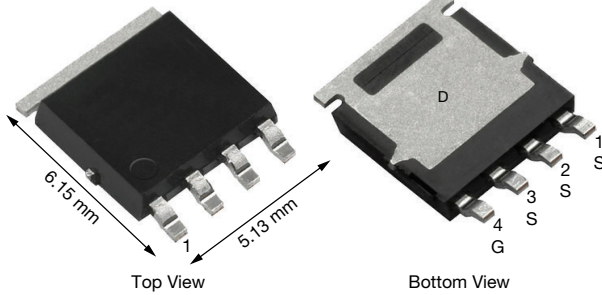


N-Channel 60 V (D-S) MOSFET

PowerPAK® SO-8L Single



FEATURES

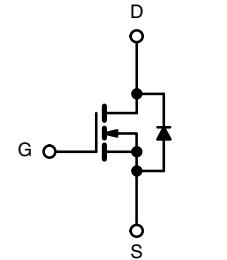
- TrenchFET® power MOSFET
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Primary side switching
- Synchronous rectification
- DC/DC converters
- Boost converters
- DC/AC inverters



N-Channel MOSFET

PRODUCT SUMMARY	
V _{DS} (V)	60
R _{DS(on)} max. (Ω) at V _{GS} = 10 V	0.0080
R _{DS(on)} max. (Ω) at V _{GS} = 6 V	0.0100
R _{DS(on)} max. (Ω) at V _{GS} = 4.5 V	0.0125
Q _g typ. (nC)	9.3
I _D (A)	46.5
Configuration	Single

ORDERING INFORMATION	
Package	SO-8L
Lead (Pb)-free and halogen-free	SiJ462DP-T1-GE3

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		
Continuous drain current (T _J = 150 °C)	I _D	T _C = 25 °C	46.5	A
		T _C = 70 °C	37.2	
		T _A = 25 °C	18.6 ^{b, c}	
		T _A = 70 °C	14.9 ^{b, c}	
Pulsed drain current (t = 100 μs)	I _{DM}	100		
Continuous source-drain diode current	I _S	T _C = 25 °C	28.3	
		T _A = 25 °C	4.5 ^{b, c}	
Single pulse avalanche current	I _{AS}	20		
Single pulse avalanche energy	E _{AS}	20	mJ	
Maximum power dissipation	P _D	T _C = 25 °C	31.2	W
		T _C = 70 °C	20	
		T _A = 25 °C	5 ^{b, c}	
		T _A = 70 °C	3.2 ^{b, c}	
Operating junction and storage temperature range	T _J , T _{stg}	-55 to +150	°C	
Soldering recommendations (peak temperature) ^{d, e}		260		

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient ^{a, b}	R _{thJA}	20	25	°C/W
Maximum junction-to-case (drain)	R _{thJC}	3	4	

Notes

- Maximum under steady state conditions is 70 °C/W
- Surface mounted on 1" x 1" FR4 board
- t = 10 s
- See solder profile (www.vishay.com/doc?73257). The PowerPAK SO-8L 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



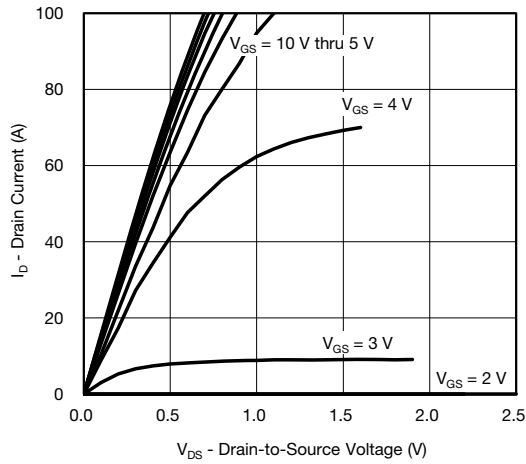
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
Static							
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	60	-	-	V	
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$	-	97	-	mV/ $^\circ\text{C}$	
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$		-	-5.1	-		
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	1.4	-	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}	$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$	-	-	1	μA	
		$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^\circ\text{C}$	-	-	10		
On-state drain current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}$, $V_{GS} = 10\text{ V}$	30	-	-	A	
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$	-	0.0065	0.0080	Ω	
		$V_{GS} = 6\text{ V}$, $I_D = 15\text{ A}$	-	0.0080	0.0100		
		$V_{GS} = 4.5\text{ V}$, $I_D = 10\text{ A}$	-	0.0100	0.0125		
Forward transconductance ^a	g_{fs}	$V_{DS} = 10\text{ V}$, $I_D = 20\text{ A}$	-	80	-	S	
Dynamic ^b							
Input capacitance	C_{iss}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	-	1400	-	pF	
Output capacitance	C_{oss}		-	525	-		
Reverse transfer capacitance	C_{rss}		-	45	-		
Total gate charge	Q_g	$V_{DS} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 10\text{ A}$	-	20.8	32	nC	
		$V_{DS} = 30\text{ V}$, $V_{GS} = 6\text{ V}$, $I_D = 10\text{ A}$	-	12.1	18.5		
Gate-source charge	Q_{gs}	$V_{DS} = 30\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 10\text{ A}$	-	9.3	14		
Gate-drain charge	Q_{gd}		-	4.1	-		
Output charge	Q_{oss}		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$	-	23.5		36
Gate resistance	R_g		$f = 1\text{ MHz}$	0.8	2.3		3.7
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30\text{ V}$, $R_L = 3\text{ }\Omega$ $I_D \cong 10\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 1\text{ }\Omega$	-	10	20	ns	
Rise time	t_r		-	10	20		
Turn-off delay time	$t_{d(off)}$		-	24	48		
Fall time	t_f		-	8	16		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30\text{ V}$, $R_L = 3\text{ }\Omega$ $I_D \cong 10\text{ A}$, $V_{GEN} = 4.5\text{ V}$, $R_g = 1\text{ }\Omega$	-	25	50		
Rise time	t_r		-	50	100		
Turn-off delay time	$t_{d(off)}$		-	17	34		
Fall time	t_f		-	9	18		
Drain-Source Body Diode Characteristics							
Continuous source-drain diode current	I_S	$T_C = 25\text{ }^\circ\text{C}$	-	-	28.3	A	
Pulse diode forward current ($t_p = 100\text{ }\mu\text{s}$)	I_{SM}		-	-	100		
Body diode voltage	V_{SD}	$I_S = 5\text{ A}$	-	0.77	1.1	V	
Body diode reverse recovery time	t_{rr}	$I_F = 10\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^\circ\text{C}$	-	25	50	ns	
Body diode reverse recovery charge	Q_{rr}		-	16	32	nC	
Reverse recovery fall time	t_a		-	14	-	ns	
Reverse recovery rise time	t_b		-	11	-		

Note

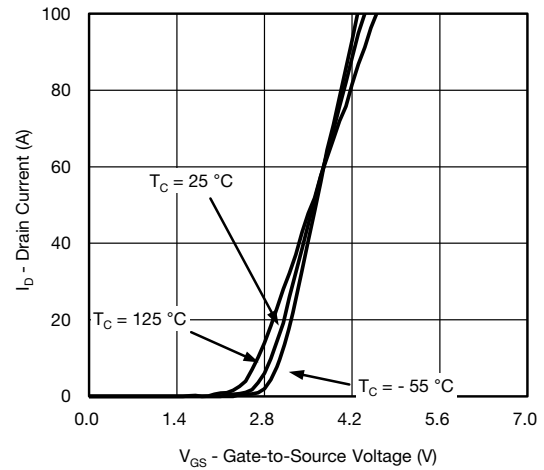
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
b. Guaranteed by design, not subject to production testing

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.

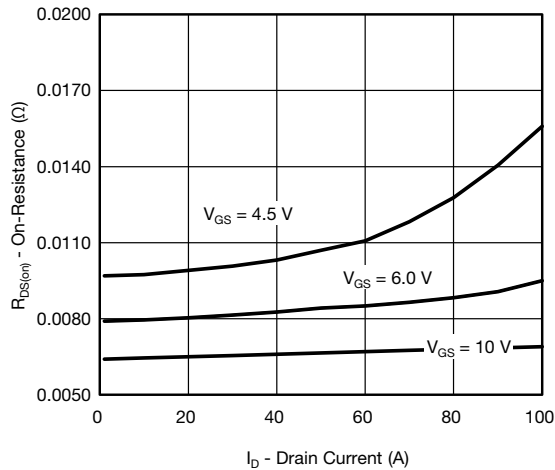
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



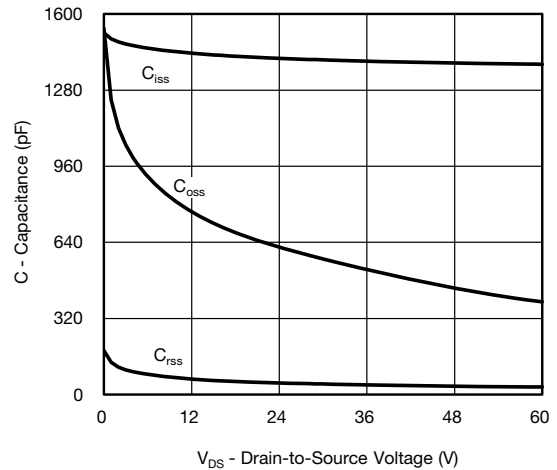
Output Characteristics



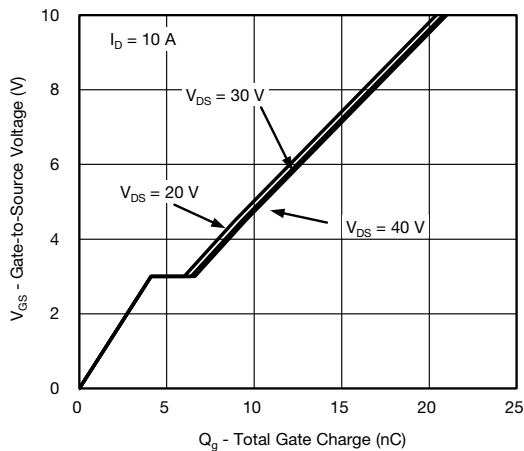
Transfer Characteristics



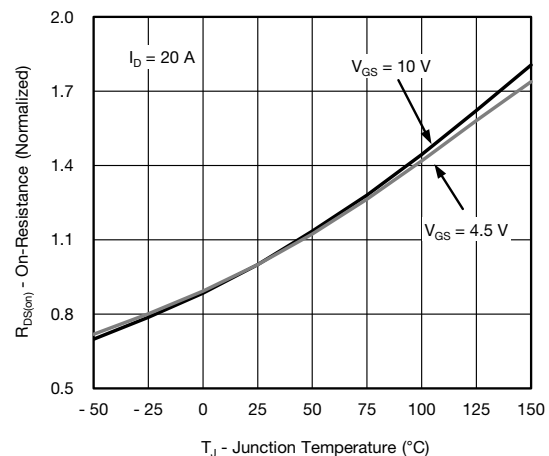
On-Resistance vs. Drain Current



Capacitance

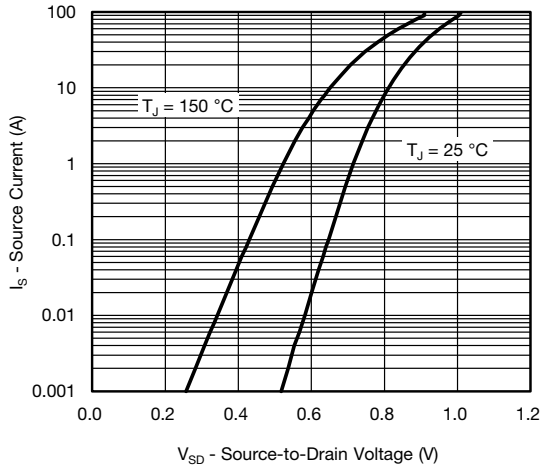


Gate Charge

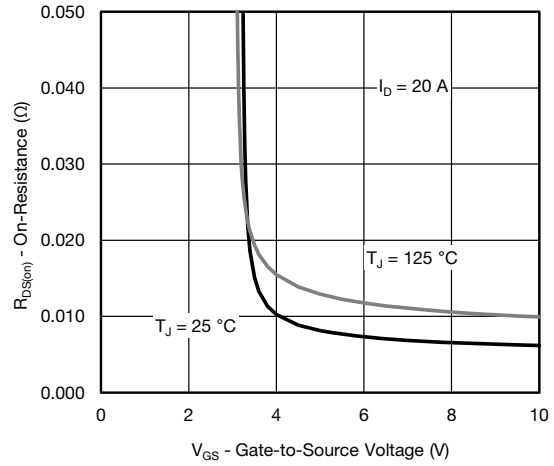


On-Resistance vs. Junction Temperature

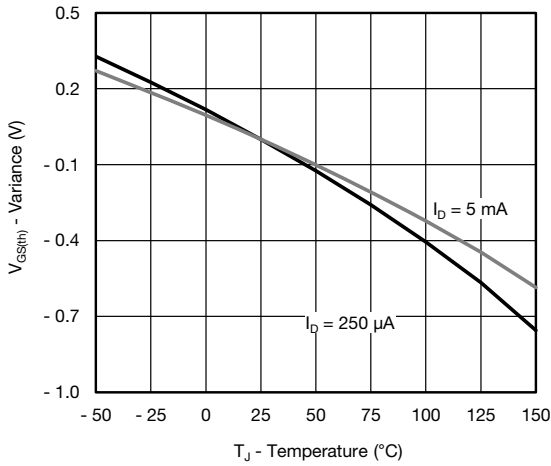
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



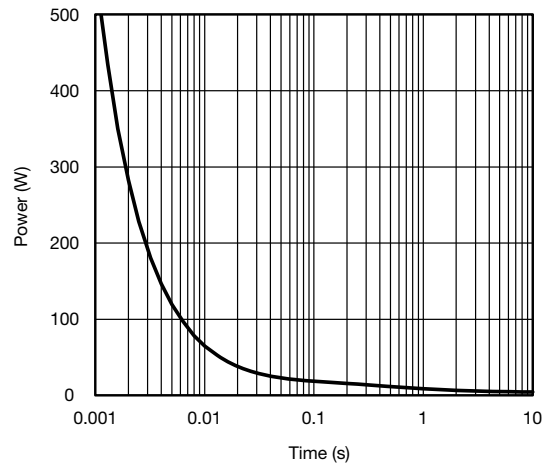
Source-Drain Diode Forward Voltage



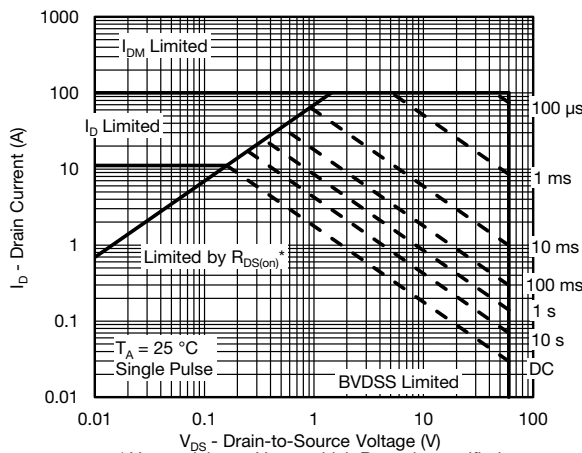
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

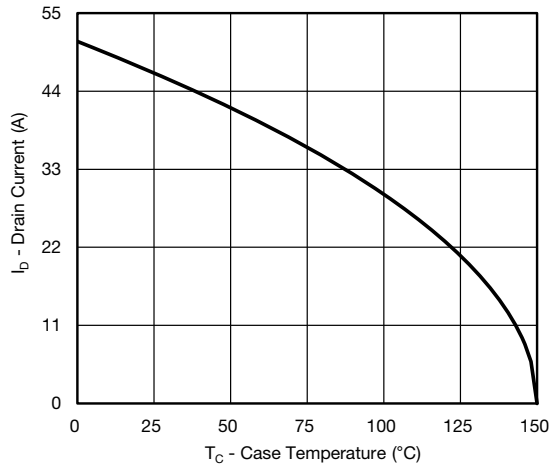


Single Pulse Power, Junction-to-Ambient

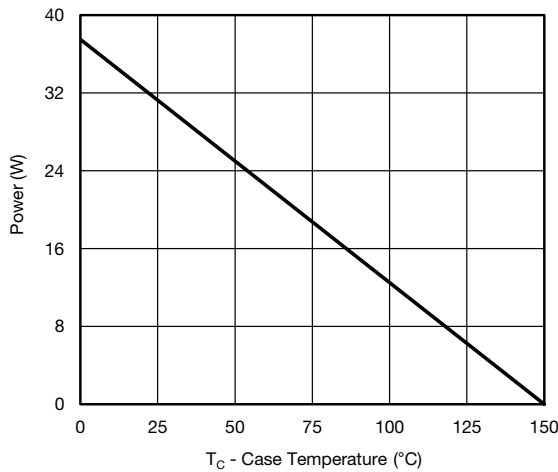


Safe Operating Area, Junction-to-Ambient

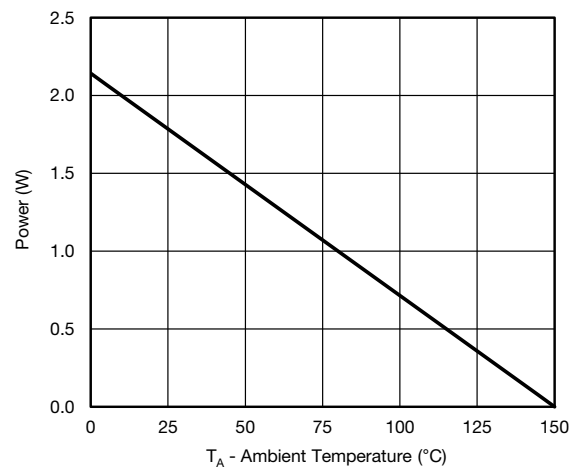
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating ^a



Power, Junction-to-Case

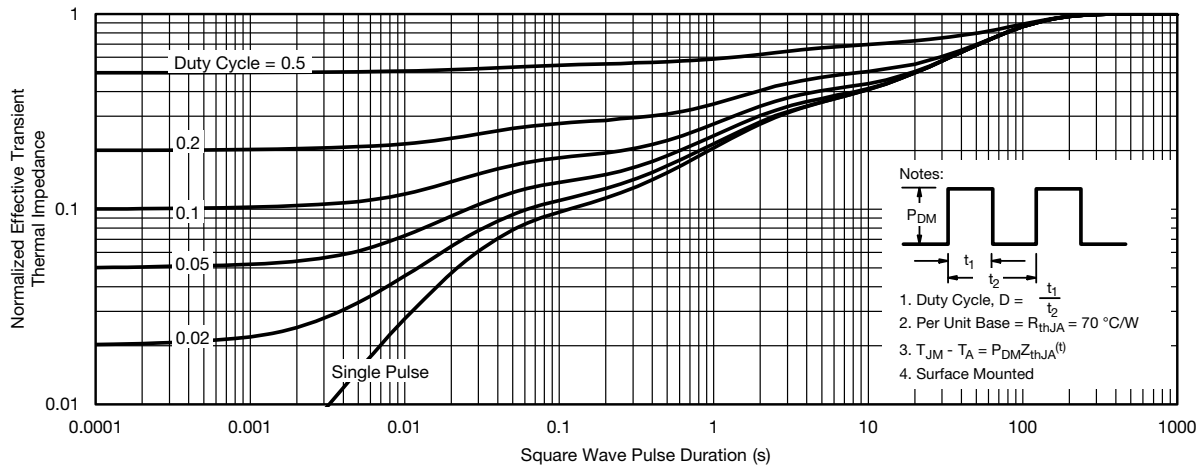


Power, Junction-to-Ambient

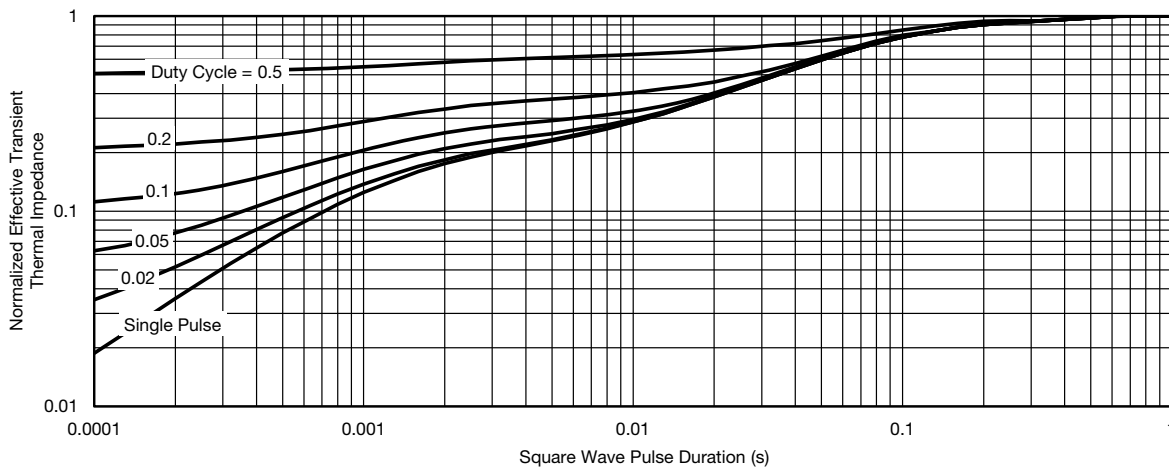
Note

- 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-8L Case Outline 1



Topside view



Backside view (single)



Backside view (dual)



DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.00	1.07	1.14	0.039	0.042	0.045
A1	0.00	-	0.127	0.00	-	0.005
b	0.33	0.41	0.48	0.013	0.016	0.019
b1	0.44	0.51	0.58	0.017	0.020	0.023
b2	4.80	4.90	5.00	0.189	0.193	0.197
b3	0.094			0.004		
b4	0.47			0.019		
c	0.20	0.25	0.30	0.008	0.010	0.012
D	5.00	5.13	5.25	0.197	0.202	0.207
D1	4.80	4.90	5.00	0.189	0.193	0.197
D2	3.86	3.96	4.06	0.152	0.156	0.160
D3	1.63	1.73	1.83	0.064	0.068	0.072
e	1.27 BSC			0.050 BSC		
E	6.05	6.15	6.25	0.238	0.242	0.246
E1	4.27	4.37	4.47	0.168	0.172	0.176
E2	3.18	3.28	3.38	0.125	0.129	0.133
F	-	-	0.15	-	-	0.006
L	0.62	0.72	0.82	0.024	0.028	0.032
L1	0.92	1.07	1.22	0.036	0.042	0.048
K	0.51			0.020		
W	0.23			0.009		
W1	0.41			0.016		
W2	2.82			0.111		
W3	2.96			0.117		
θ	0°	-	10°	0°	-	10°

ECN: S19-0643-Rev. E, 05-Aug-2019
DWG: 5976

Note

- Millimeters will gover



RECOMMENDED MINIMUM PAD FOR PowerPAK® SO-8L SINGLE



Recommended Minimum Pads
Dimensions in mm (inches)



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