

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

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
30	0.0042 at $V_{GS} = 10$ V	25	27
	0.0057 at $V_{GS} = 4.5$ V	22	

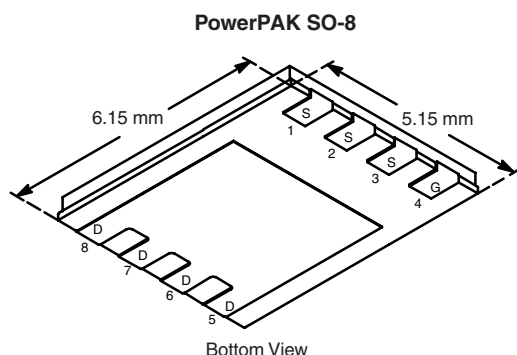
FEATURES

- Halogen-free available
- TrenchFET® Power MOSFET
- New Low Thermal Resistance PowerPAK® Package with Low 1.07 mm Profile
- Low Gate Charge
- 100 % R_g Tested

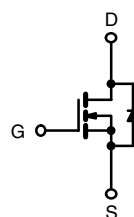


APPLICATIONS

- Synchronous Rectifier



Ordering Information: Si7892BDP-T1-E3 (Lead (Pb)-free)
Si7892BDP-T1-GE3 (Lead (Pb)-free and Halogen-free)



N-Channel MOSFET

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

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Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V _{DS}	30		V
Gate-Source Voltage		V _{GS}	± 20		
Continuous Drain Current (T _J = 150°C) ^a	T _A = 25 °C	I _D	25	15	A
	T _A = 70 °C		20	12	
Pulsed Drain Current (10 μs Pulse Width)		I _{DM}	60		
Continuous Source Current (Diode Conduction) ^a		I _S	4.1	1.5	
Avalanche Current	L = 0.1 mH	I _{AS}	40		mJ
Single Pulse Avalanche Energy		E _{AS}	80		
Maximum Power Dissipation ^a	T _A = 25 °C	P _D	5	1.8	W
	T _A = 70 °C		3.2	1.1	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150		°C
Soldering Recommendations (Peak Temperature) ^{b, c}			260		

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	20	25	°C/W
		53	70	
Maximum Junction-to-Case (Drain)	R_{thJC}	2.1	3.2	

Notes:

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

b. See Solder Profile (<http://www.vishay.com/ppg?73257>). The PowerPAK SO-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.

c. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

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

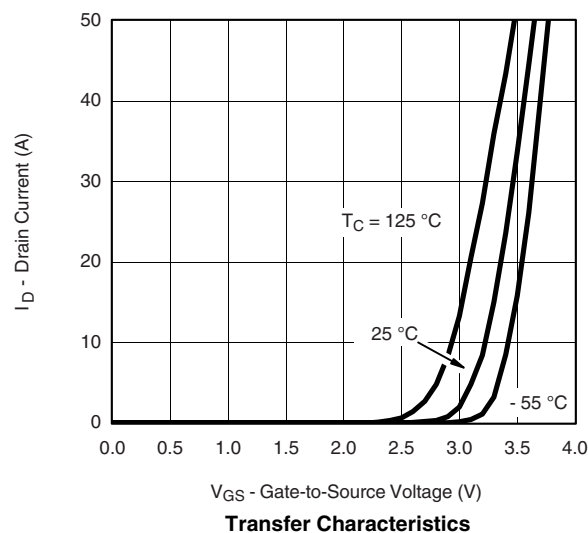
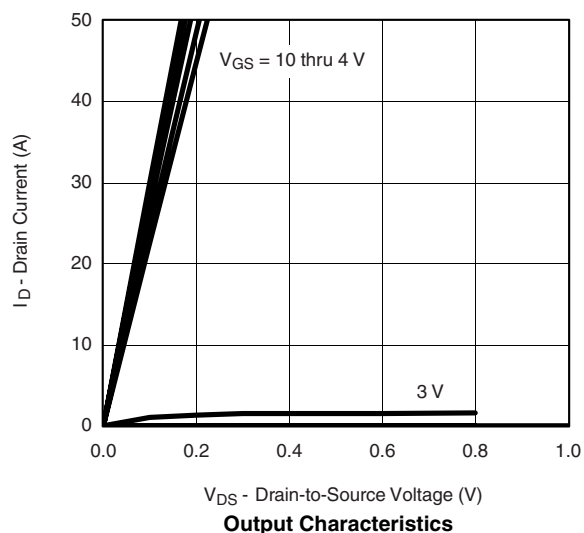
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	1.0		3.0	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\ \mu\text{A}$		28		$\text{mV}/^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 6.5		
Gate-Body 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
		$V_{DS} = 30\ \text{V}$, $V_{GS} = 0\ \text{V}$, $T_J = 55^\circ\text{C}$			5	
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	$R_{DS(on)}$	$V_{GS} = 10\ \text{V}$, $I_D = 25\ \text{A}$		0.0034	0.0042	Ω
		$V_{GS} = 4.5\ \text{V}$, $I_D = 22\ \text{A}$		0.0047	0.0057	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\ \text{V}$, $I_D = 25\ \text{A}$		85		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 4.5\ \text{A}$, $V_{GS} = 0\ \text{V}$		0.75	1.2	V
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 15\ \text{V}$, $V_{SS} = 0\ \text{V}$, $f = 1\ \text{Hz}$		3775		pF
Output Capacitance	C_{oss}			630		
Reverse Transfer Capacitance	C_{rss}			295		
Total Gate Charge	Q_g	$V_{DS} = 15\ \text{V}$, $V_{GS} = 4.5\ \text{V}$, $I_D = 25\ \text{A}$		27	40	nC
Gate-Source Charge	Q_{gs}			11.4		
Gate-Drain Charge	Q_{gd}			8.1		
Gate Resistance	R_g		0.5	1.2	2.0	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\ \text{V}$, $R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}$, $V_{GEN} = 10\ \text{V}$, $R_G = 6\ \Omega$		20	30	ns
Rise Time	t_r			13	20	
Turn-Off Delay Time	$t_{d(off)}$			62	100	
Fall Time	t_f			20	35	
Source-Drain Reverse Recovery	t_{rr}	$I_F = 2.9\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$		40	60	nC
Reverse Recovery Charge	Q_{rr}			40	60	

Notes:

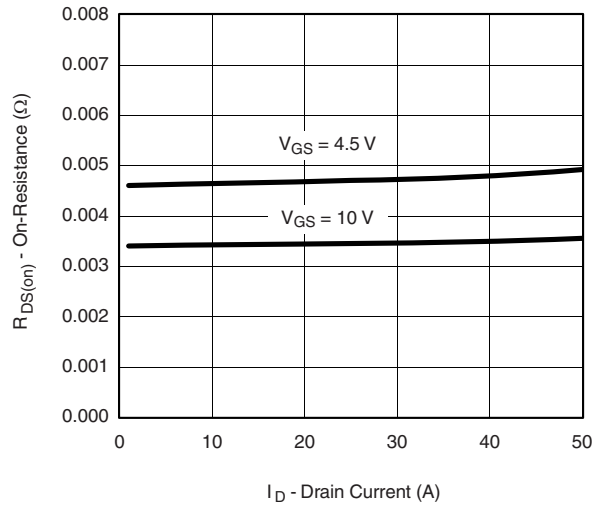
a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

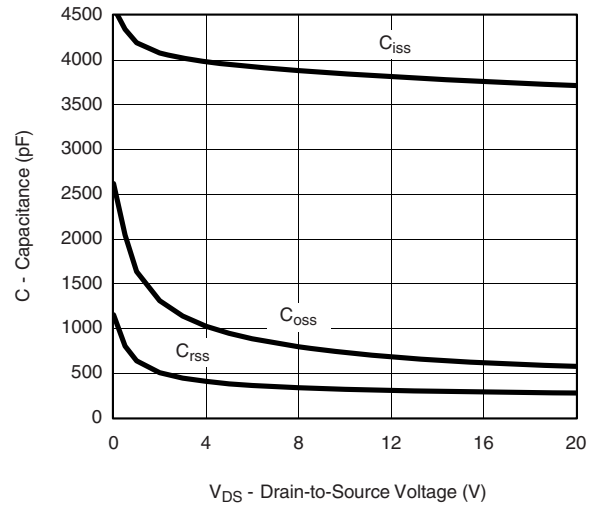
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25°C , unless otherwise noted

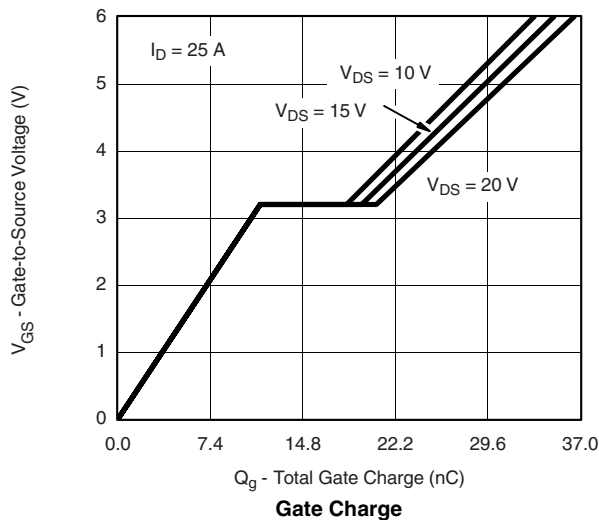
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



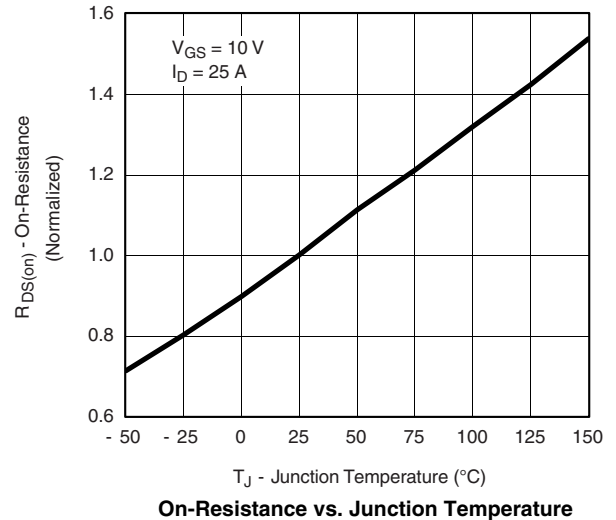
On-Resistance vs. Drain Current



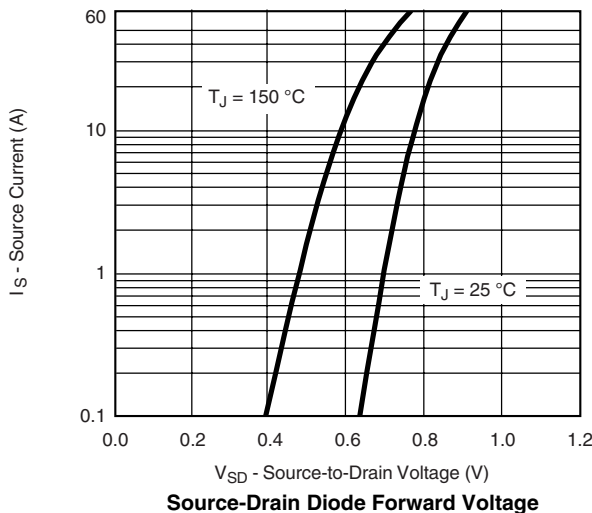
Capacitance



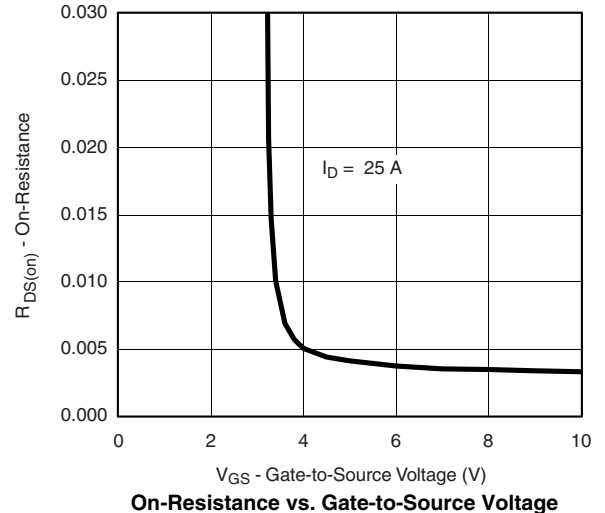
Gate Charge



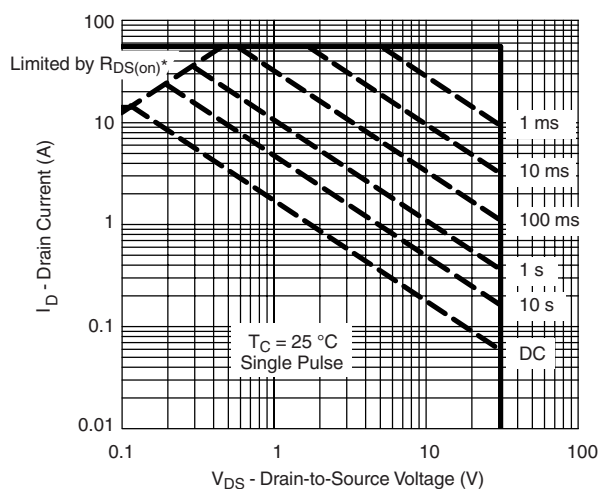
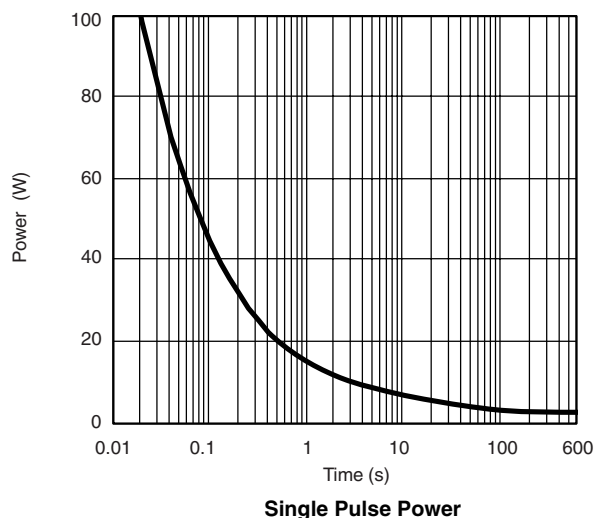
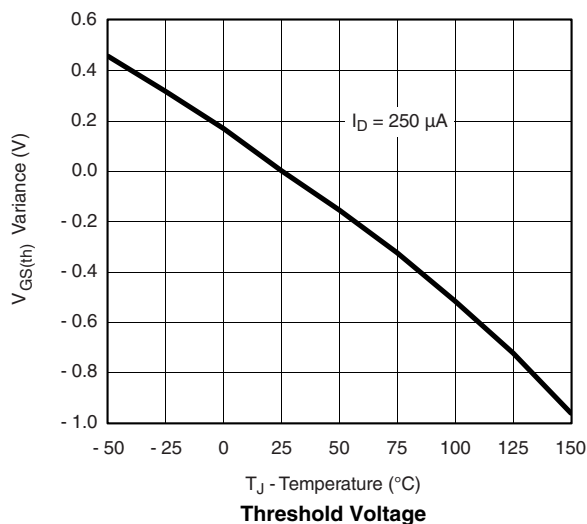
On-Resistance vs. Junction Temperature



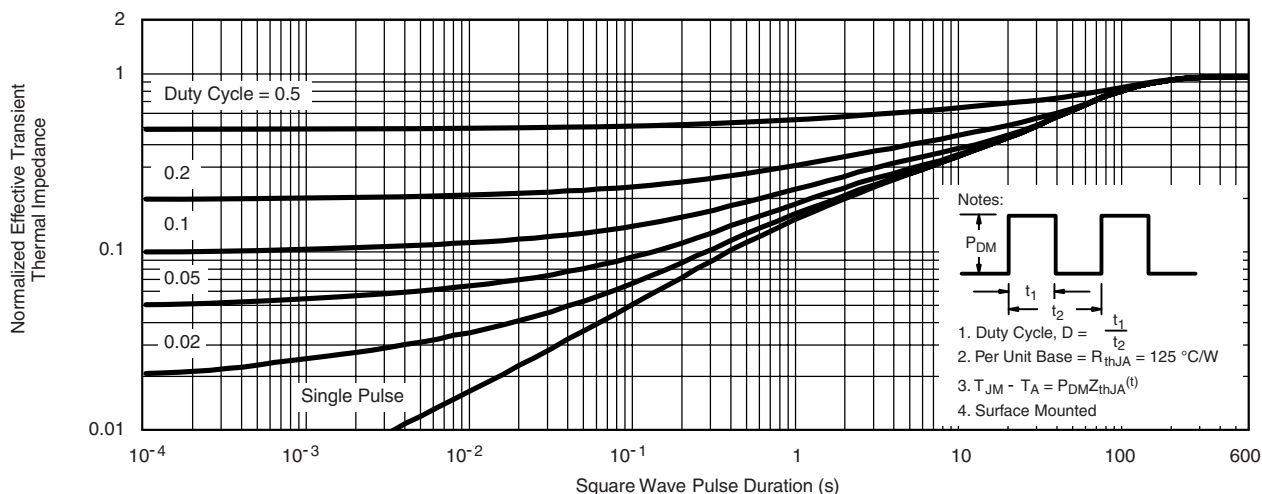
Source-Drain Diode Forward Voltage



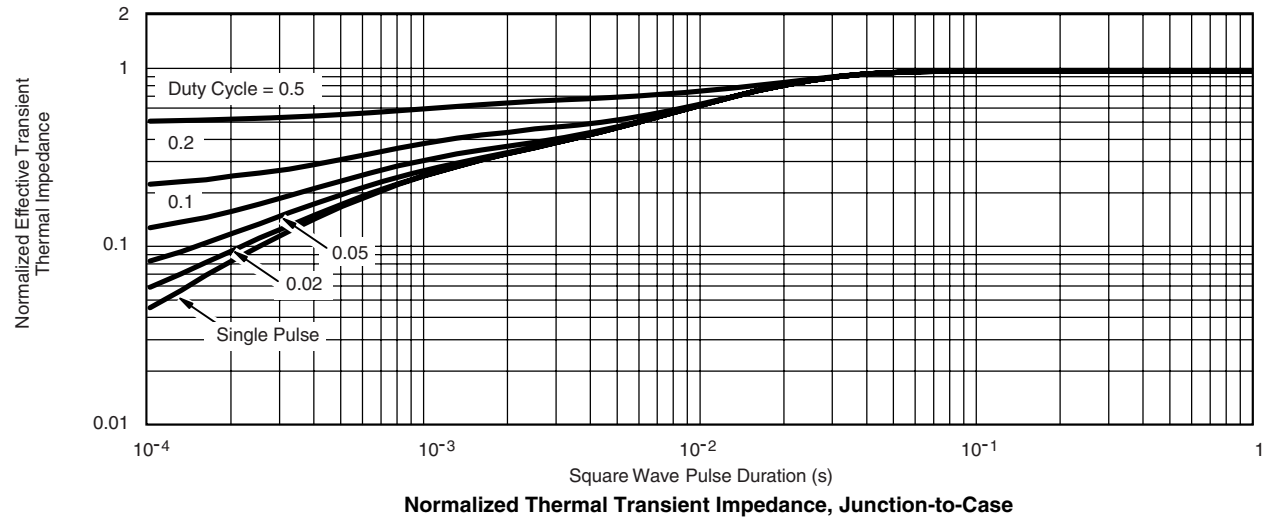
On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

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

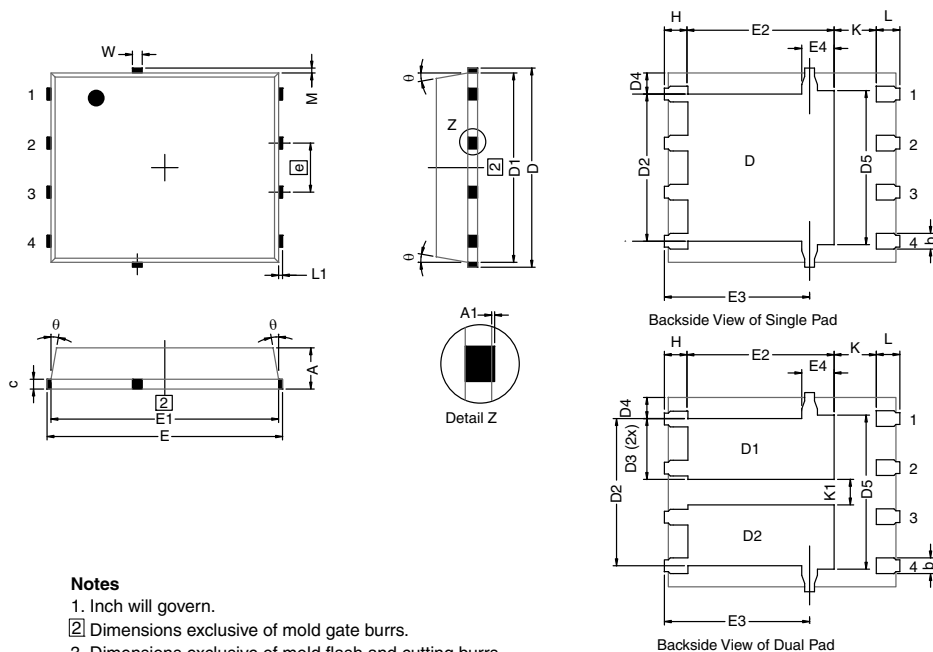
Safe Operating Area, Junction-to-Case

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



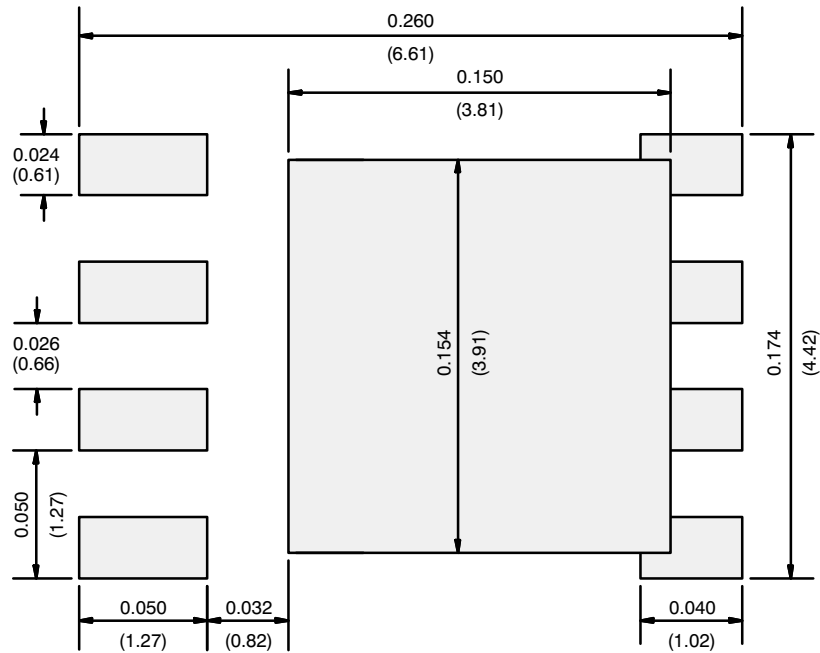
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PowerPAK® SO-8, (Single/Dual)



DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.97	1.04	1.12	0.038	0.041	0.044
A1		-	0.05	0	-	0.002
b	0.33	0.41	0.51	0.013	0.016	0.020
c	0.23	0.28	0.33	0.009	0.011	0.013
D	5.05	5.15	5.26	0.199	0.203	0.207
D1	4.80	4.90	5.00	0.189	0.193	0.197
D2	3.56	3.76	3.91	0.140	0.148	0.154
D3	1.32	1.50	1.68	0.052	0.059	0.066
D4	0.57 typ.			0.0225 typ.		
D5	3.98 typ.			0.157 typ.		
E	6.05	6.15	6.25	0.238	0.242	0.246
E1	5.79	5.89	5.99	0.228	0.232	0.236
E2 (for AL product)	3.30	3.48	3.66	0.130	0.137	0.144
E2 (for other product)	3.48	3.66	3.84	0.137	0.144	0.151
E3	3.68	3.78	3.91	0.145	0.149	0.154
E4 (for AL product)	0.58 typ.			0.023 typ.		
E4 (for other product)	0.75 typ.			0.030 typ.		
e	1.27 BSC			0.050 BSC		
K (for AL product)	1.45 typ.			0.057 typ.		
K (for other product)	1.27 typ.			0.050 typ.		
K1	0.56	-	-	0.022	-	-
H	0.51	0.61	0.71	0.020	0.024	0.028
L	0.51	0.61	0.71	0.020	0.024	0.028
L1	0.06	0.13	0.20	0.002	0.005	0.008
θ	0°	-	12°	0°	-	12°
W	0.15	0.25	0.36	0.006	0.010	0.014
M	0.125 typ.			0.005 typ.		
ECN: C13-0702-Rev. K, 20-May-13						
DWG: 5881						

RECOMMENDED MINIMUM PADS FOR PowerPAK® SO-8 Single



Recommended Minimum Pads
Dimensions in Inches/(mm)

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