SQJ146EP-T1_GE3 Datasheet

DiGi Electronics Part Number	SQJ146EP-T1_GE3-DG
Manufacturer	Vishay Siliconix
Manufacturer Product Number	SQJ146EP-T1_GE3
Description	MOSFET N-CH 40V 75A PPAK SO-8
Detailed Description	N-Channel 40 V 75A (Tc) 75W (Tc) Surface Mount PowerPAK® SO-8

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
SQJ146EP-T1_GE3	Vishay Siliconix
Series:	Product Status:
TrenchFET® Gen IV	Active
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
40 V	75A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
10V	7mOhm @ 15A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
3.5V @ 250µA	27 nC @ 10 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±20V	1500 pF @ 25 V
FET Feature:	Power Dissipation (Max):
-	75W (Tc)
Operating Temperature:	Grade:
-55°C ~ 175°C (TJ)	Automotive
Qualification:	Mounting Type:
AEC-Q101	Surface Mount
Supplier Device Package:	Package / Case:
PowerPAK® SO-8	PowerPAK® SO-8
Base Product Number:	
SQJ146	

Environmental & Export classification

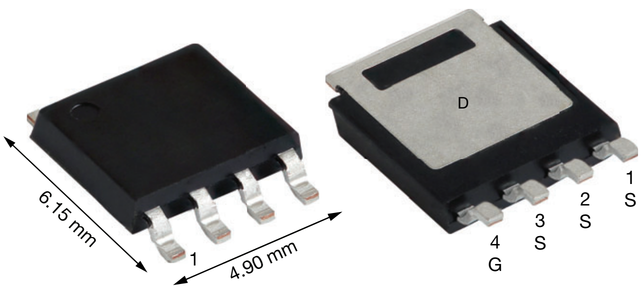
RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
ECCN:	HTSUS:
EAR99	8541.29.0095

SQJ146EP

Vishay Siliconix

Automotive N-Channel 40 V (D-S) 175 °C MOSFET

PowerPAK® SO-8L



Top View   Bottom View

FEATURES

- TrenchFET® Gen IV power MOSFET
- AEC-Q101 qualified
- 100 % R_g and UIS tested
- Q_{gd}/Q_{gs} ratio < 1 optimizes switching characteristics
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

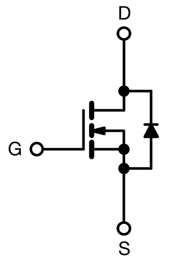
AUTOMOTIVE GRADE

Pb-free

RoHS COMPLIANT

HALOGEN FREE

PRODUCT SUMMARY	
V_{DS} (V)	40
$R_{DS(on)}$ (Ω) at V_{GS} = 10 V	0.007
I_D (A)	75
Configuration	Single
Package	PowerPAK SO-8L



N-Channel MOSFET

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

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V_{DS}	40	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current	T_C = 25 °C [a]	I_D	75	A
	T_C = 125 °C		43	
Continuous source current (diode conduction) [a]		I_S	62	
Pulsed drain current [b]		I_{DM}	200	
Single pulse avalanche current	L = 0.1 mH	I_{AS}	18.5	
Single pulse avalanche energy		E_{AS}	17	mJ
Maximum power dissipation [b]	T_C = 25 °C	P_D	75	W
	T_C = 125 °C		25	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +175	°C
Soldering recommendations (peak temperature) [d, e]			260	

THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-ambient	PCB mount [c]	R_{thJA}	70	°C/W
Junction-to-case (drain)		R_{thJC}	2	

Notes

a. Package limited

b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %

c. When mounted on 1" square Pcb (Fr4 material)

d. 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

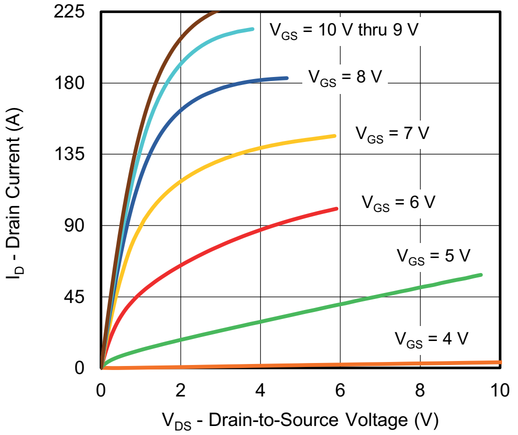
e. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components

SPECIFICATIONS (T_C = 25 °C, unless otherwise noted)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static							
Drain-source breakdown voltage	V_{DS}	V_{GS} = 0, I_D = 250 µA		40	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA		2.5	3.0	3.5	
Gate-source leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V		-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	V_{GS} = 0 V	V_{DS} = 40 V	-	-	1	µA
		V_{GS} = 0 V	V_{DS} = 40 V, T_J = 125 °C	-	-	50	
		V_{GS} = 0 V	V_{DS} = 40 V, T_J = 175 °C	-	-	150	
On-state drain current [a]	$I_{D(on)}$	V_{GS} = 10 V	V_{DS} ³ 5 V	10	-	-	A
Drain-source on-state resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 15 A	-	0.0055	0.007	Ω
		V_{GS} = 10 V	I_D = 15 A, T_J = 125 °C	-	-	0.012	
		V_{GS} = 10 V	I_D = 15 A, T_J = 175 °C	-	-	0.014	
Forward transconductance [b]	g_{fs}	V_{DS} = 15 V, I_D = 5 A		-	25	-	S
Dynamic [b]							
Input capacitance	C_{iss}	V_{GS} = 0 V	V_{DS} = 25 V, f = 1 MHz	-	1072	1500	pF
Output capacitance	C_{oss}			-	400	560	
Reverse transfer capacitance	C_{rss}			-	40	60	
Total gate charge [c]	Q_g	V_{GS} = 10 V	V_{DS} = 20 V, I_D = 10 A	-	18	27	nC
Gate-source charge [c]	Q_{gs}			-	6	-	
Gate-drain charge [c]	Q_{gd}			-	5	-	
Gate resistance	R_g	f = 1 MHz		2	4	6	Ω
Turn-on delay time [c]	$t_{d(on)}$	V_{DD} = 20 V, R_L = 5 Ω, $I_D \cong$ 4 A, V_{GEN} = 10 V, R_g = 1 Ω		-	12	12	ns
Rise time [c]	t_r			-	5	9	
Turn-off delay time [c]	$t_{d(off)}$			-	19	29	
Fall time [c]	t_f			-	5	9	
Source-Drain Diode Ratings and Characteristics [b]							
Pulsed current [a]	I_{SM}			-	-	200	A
Forward voltage	V_{SD}	I_F = 15 A, V_{GS} = 0 V		-	-	1.1	V
Body diode reverse recovery time	t_{rr}	I_F = 10 A, di/dt = 100 A/µs		-	21	32	ns
Body diode reverse recovery charge	Q_{rr}			-	8	12	nC
Reverse recovery fall time	t_a			-	10	14	ns
Reverse recovery rise time	t_b			-	11	17	
Body diode peak reverse recovery current	$I_{RM(REC)}$			-	0.7	1.0	A

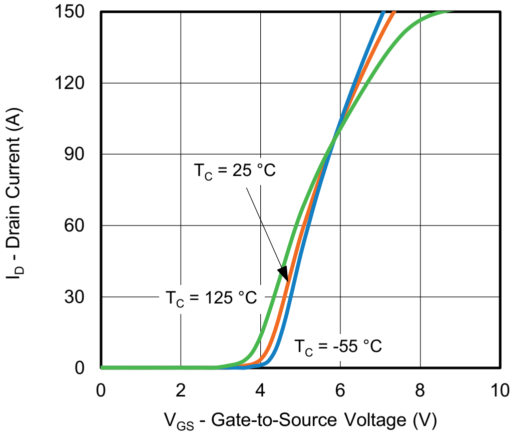
Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %
b. Guaranteed by design, not subject to production testing
c. Independent of operating temperature

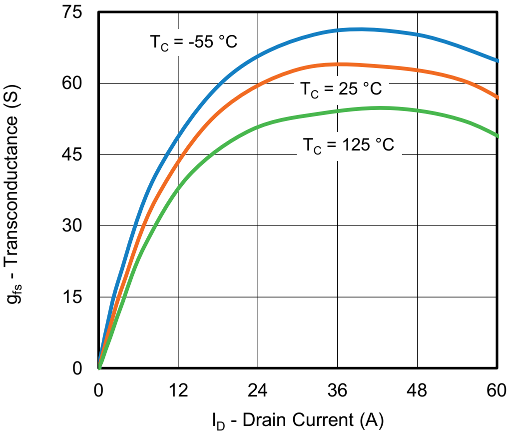
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



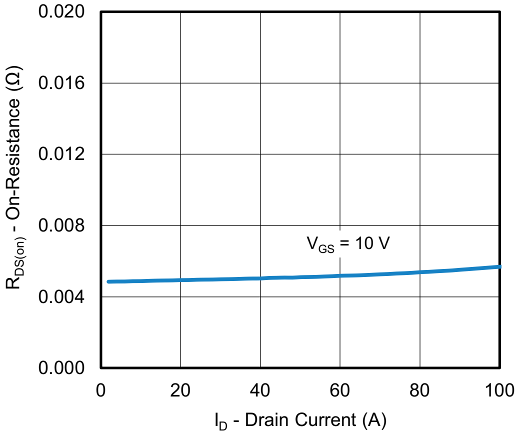
Output Characteristics



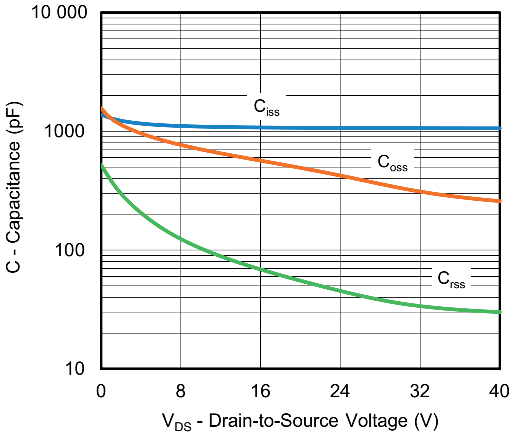
Transfer Characteristics



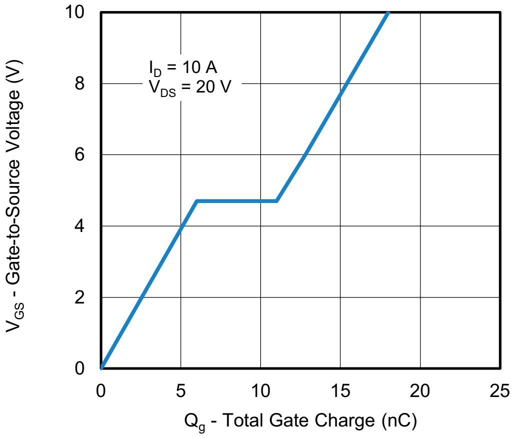
Transconductance



On-Resistance vs. Drain Current

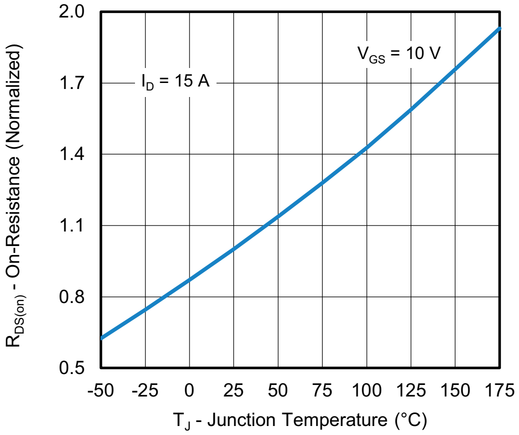


Capacitance

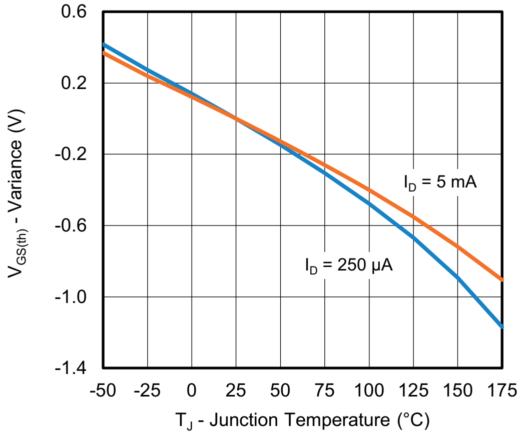


Gate Charge

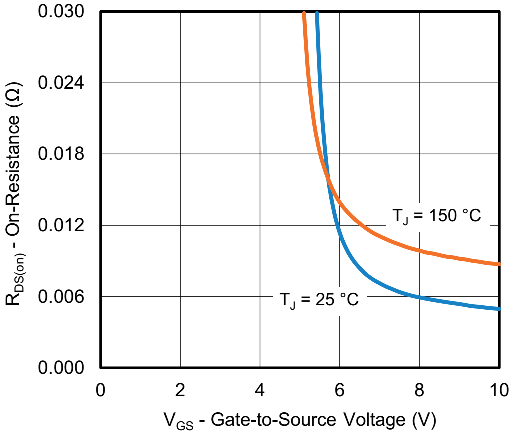
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



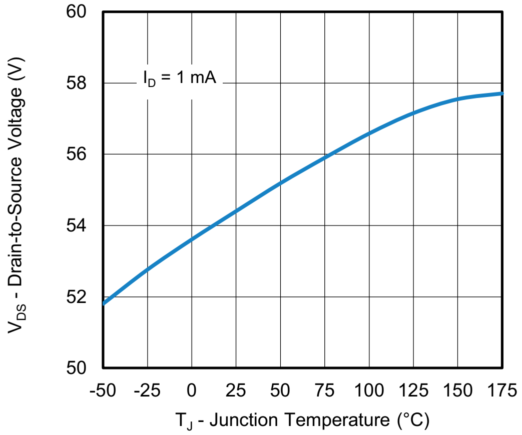
On-Resistance vs. Junction Temperature



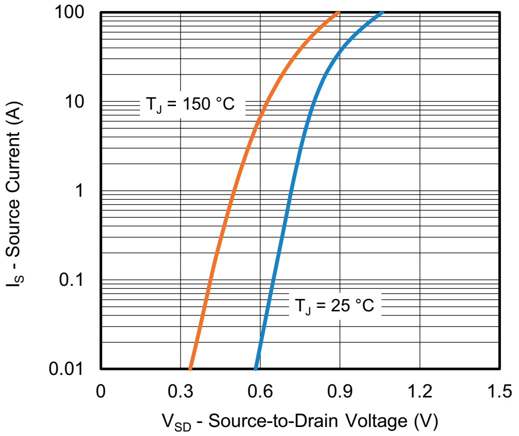
Threshold Voltage



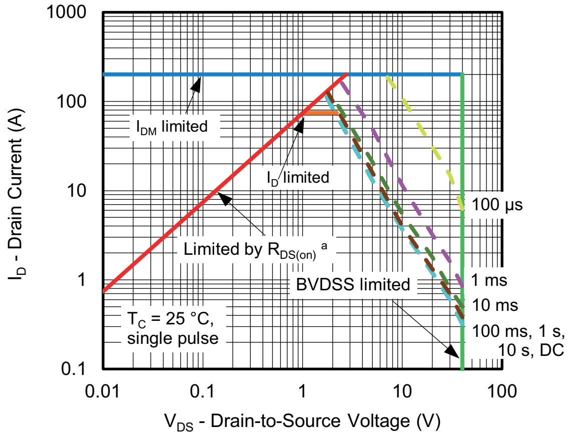
On-Resistance vs. Gate-to Source Voltage



Drain Source Breakdown vs. Junction Temperature



Source Drain Diode Forward Voltage

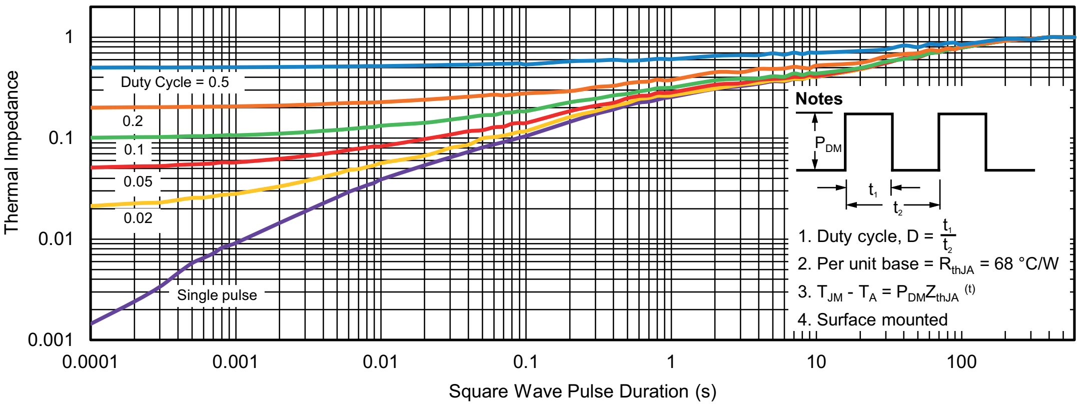


Safe Operating Area

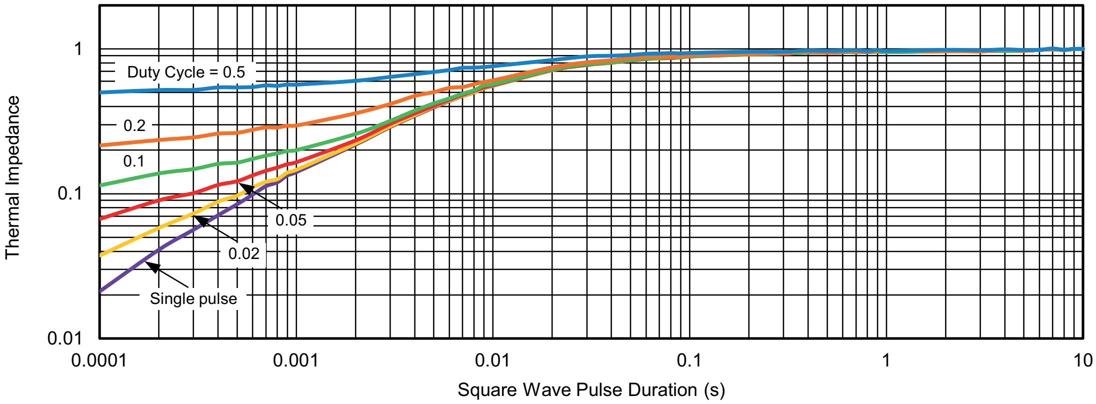
Note

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

TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction-to-Case (25 °C)

  are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions

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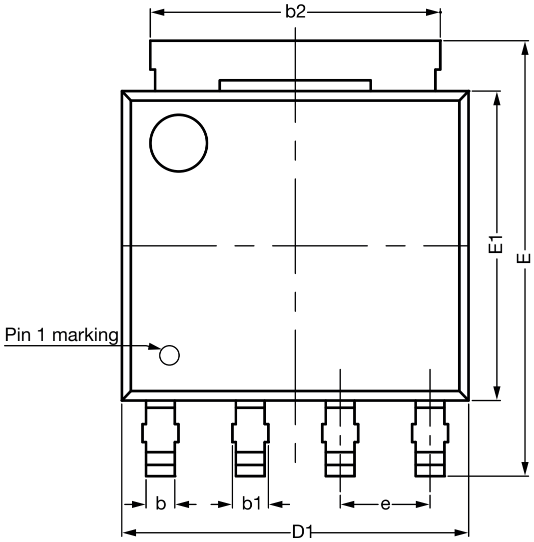
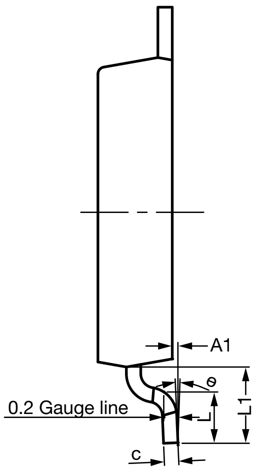
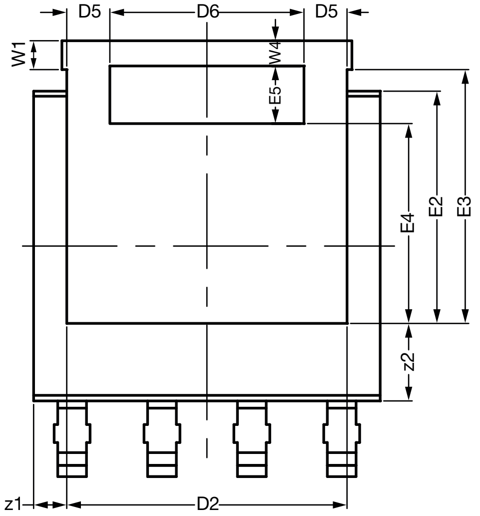
PowerPAK® SO-8L (PPKSO8LWLA) Case Outline 3

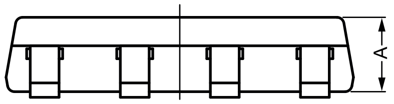


Topside view





Backside view (single)

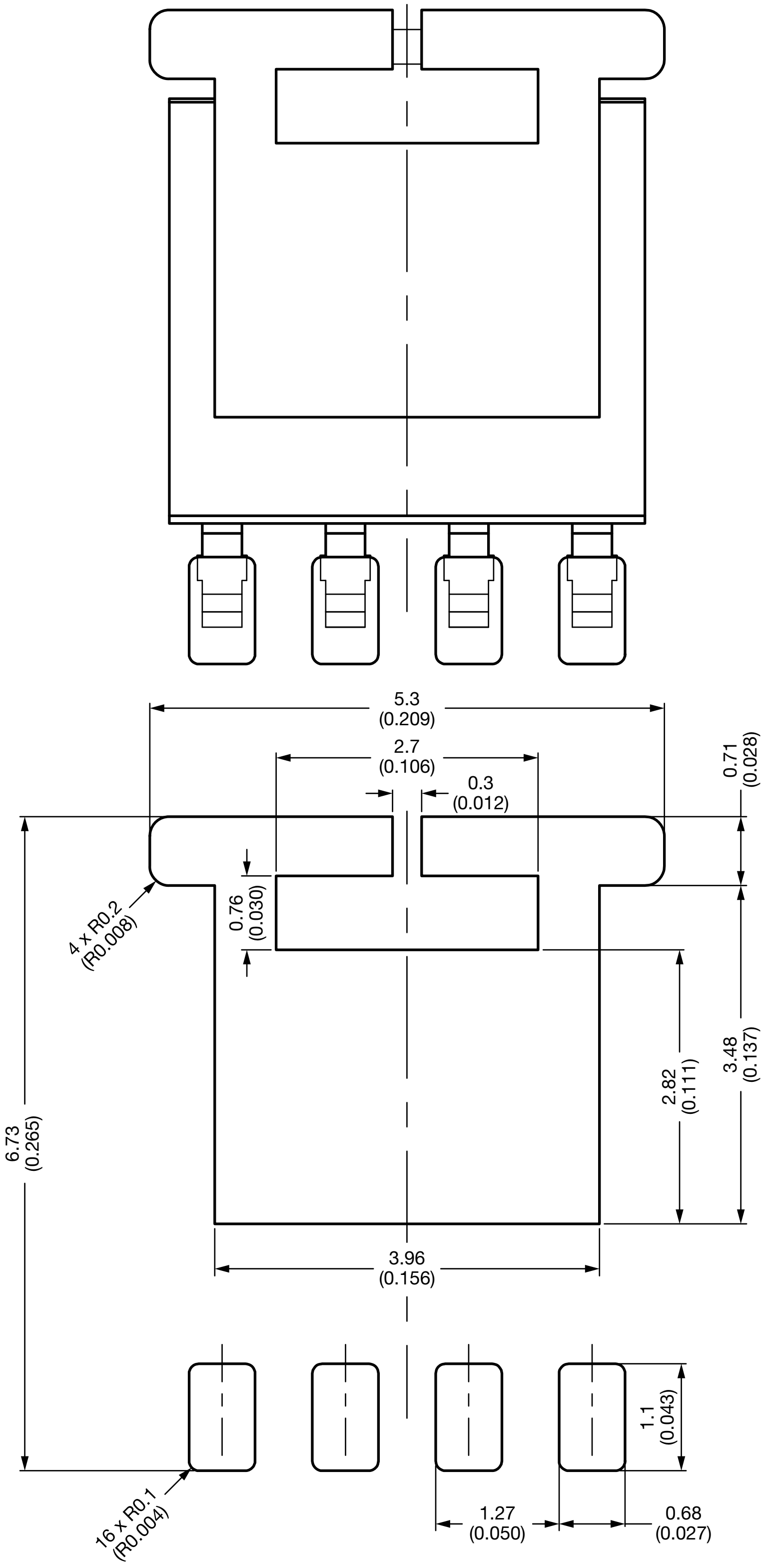


DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.00	1.05	1.10	0.039	0.041	0.043
A1	0.00	---	0.127	0.000	---	0.005
b	0.33	0.41	0.49	0.013	0.016	0.019
b1	0.43	0.51	0.59	0.017	0.020	0.023
b2	4.00	4.10	4.20	0.157	0.161	0.165
c	0.15	0.20	0.25	0.006	0.008	0.010
D1	4.80	4.90	5.00	0.189	0.193	0.197
D2	3.86	3.96	4.06	0.152	0.156	0.160
D5	0.51	0.61	0.71	0.020	0.024	0.028
D6	2.64	2.74	2.84	0.104	0.108	0.112
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
E3	3.48	3.58	3.68	0.137	0.141	0.145
E4	2.72	2.82	2.92	0.107	0.111	0.115
E5	0.71	0.81	0.91	0.028	0.032	0.036
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
W1	0.31	0.41	0.51	0.012	0.016	0.020
W4	0.31	0.36	0.41	0.012	0.014	0.016
z1	0.37	0.47	0.57	0.015	0.019	0.022
z2	0.99	1.09	1.19	0.039	0.043	0.047
θ	0°	---	5°	0°	---	5°
ECN: C23-1016-Rev. D, 18-Sep-2023 DWG: 6067						

Note

- Millimeter will govern

Recommended Land Pattern PowerPAK® SO-8L Single Short Ear



Dimensions in Millimeters (Inches)

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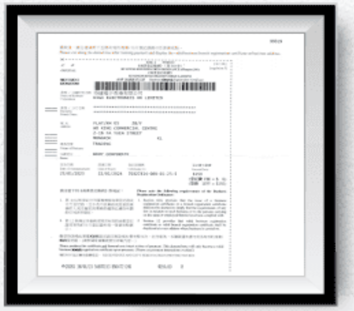

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