Revision in SQJ152ELP Datasheet from Rev. B to Rev. C

For further information, please contact your regional Vishay office.

CONTACT INFORMATION

Americas

Vishay Siliconix
2565 Junction Ave
-
San Jose CA United States 95134
Phone: 4089705799
Fax:
business-americas@vishay.com

Europe

Vishay Electronic GmbH
Dr.-Felix-Zandman-Platz 1
-
Selb Germany 95100
Phone: 49-9287-710
Fax:
business-europe@vishay.com

Asia

Vishay Intertechnology Asia Pte. Ltd
25 Tampiness Street 92
-
Singapore Singapore 528877
Phone: 65-6788-6668
Fax:
business-asia@vishay.com

Description of Change: As part of our continuous improvement program we are updating our datasheet specifications for gate resistance, (Rg), to reflect the current process capability. This new tighter specification is now aligned more closely to the actual distribution of devices being manufactured and better represents the electrical properties of the MOSFET. No changes have been made to the design of the device nor the form, fit and function. This simply reflects the maturity of the device based on data gathered from a high number of production lots.

This Advisory is for information only and there is no need for a response.

Classification of Change: Datasheet Revision

Expected Influence on Quality/Reliability/Performance: None

Part Numbers/Series/Families Affected: SQJ152ELP-T1_GE3-J, SQJ152ELP-T1_GE3, SQJ152ELP-T2_GE3, SQJ152ELP-T1_JE3,

Vishay Brand(S): Vishay Siliconix

Time Schedule:

Start Shipment Date: Sun Feb 12, 2023

Sample Availability: This is a datasheet revision only. There is no change to the materials or processes used in the manufacture of this part.

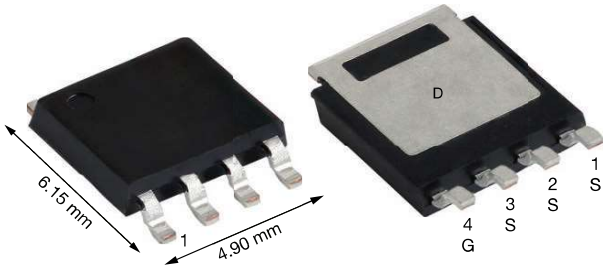
Product Identification: SQJ152ELP-T1_GE3-J, SQJ152ELP-T1_GE3, SQJ152ELP-T2_GE3, SQJ152ELP-T1_JE3

Qualification Data: N?A

Issued By: Lance Gurrola, business-americas@vishay.com

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

PowerPAK® SO-8L



Top View Bottom View

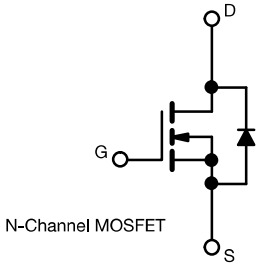
FEATURES

- TrenchFET® Gen IV power MOSFET
- AEC-Q101 qualified
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

RoHS COMPLIANT

HALOGEN FREE



N-Channel MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	40
$R_{DS(on)}$ (Ω) at V_{GS} = 10 V	0.0050
$R_{DS(on)}$ (Ω) at V_{GS} = 4.5 V	0.0075
I_D (A)	123
Configuration	Single
Package	PowerPAK SO-8L

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	I_D	123	A
	T_C = 125 °C		71	
Continuous source current (diode conduction)		I_S	124	
Pulsed drain current [a]		I_{DM}	168	
Single pulse avalanche current	L = 0.1 mH	I_{AS}	14	
Single pulse avalanche energy		E_{AS}	9.8	mJ
Maximum power dissipation [a]	T_C = 25 °C	P_D	136	W
	T_C = 125 °C		45	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +175	°C
Soldering recommendations (peak temperature) [c]			260	

THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-ambient	PCB mount [b]	R_{thJA}	42	°C/W
Junction-to-case (drain)		R_{thJC}	1.1	

Notes

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

b. When mounted on 1" square PCB (FR4 material)

c. See solder profile (www.vishay.com/doc?73257). 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

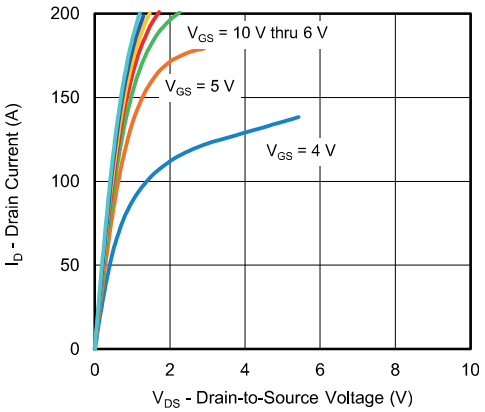
SPECIFICATIONS (T_C = 25 °C, unless otherwise noted)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static							
Drain-source breakdown voltage	V_{DS}	V_{GS} = 0, I_D = 250 µA		40	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA		1.2	1.7	2.2	
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	-	-	250	
On-state drain current [a]	$I_{D(on)}$	V_{GS} = 10 V	V_{DS} ≥ 5 V	30	-	-	A
Drain-source on-state resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 15 A	-	0.004	0.0050	Ω
		V_{GS} = 10 V	I_D = 15 A, T_J = 125 °C	-	-	0.0085	
		V_{GS} = 10 V	I_D = 15 A, T_J = 175 °C	-	-	0.0100	
		V_{GS} = 4.5 V	I_D = 15 A	-	0.0055	0.0075	
Forward transconductance [b]	g_{fs}	V_{DS} = 15 V, I_D = 10 A		-	69	-	S
Dynamic [b]							
Input capacitance	C_{iss}	V_{GS} = 0 V	V_{DS} = 25 V, f = 1 MHz	-	1166	1633	pF
Output capacitance	C_{oss}			-	412	577	
Reverse transfer capacitance	C_{rss}			-	57	80	
Total gate charge [c]	Q_g	V_{GS} = 10 V	V_{DS} = 20 V, I_D = 15 A	-	22.5	34	nC
Gate-source charge [c]	Q_{gs}			-	4	-	
Gate-drain charge [c]	Q_{gd}			-	4.3	-	
Gate resistance	R_g	f = 1 MHz		2.5	4.6	7.4	Ω
Turn-on delay time [c]	$t_{d(on)}$	V_{DD} = 20 V, R_L = 1.33 Ω I_D ≅ 15 A, V_{GEN} = 10 V, R_g = 1 Ω		-	9.6	13.5	ns
Rise time [c]	t_r			-	4.3	6.1	
Turn-off delay time [c]	$t_{d(off)}$			-	25	35	
Fall time [c]	t_f			-	8.5	12	
Source-Drain Diode Ratings and Characteristics [b]							
Pulsed current [a]	I_{SM}			-	-	168	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 = 6 A, di/dt = 100 A/µs		-	28	42	ns
Body diode reverse recovery charge	Q_{rr}			-	12	18	nC
Reverse recovery fall time	t_a			-	10	14	ns
Reverse recovery rise time	t_b			-	16	28	
Body diode peak reverse recovery current	$I_{RM(REC)}$			-	0.8	1.4	A

Notes

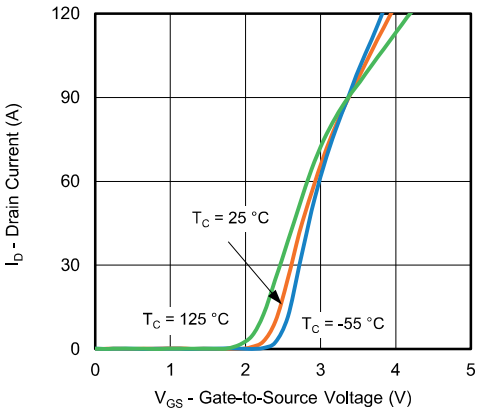
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %
b. Guaranteed by design, not subject to production testing
c. Independent of operating temperature

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.

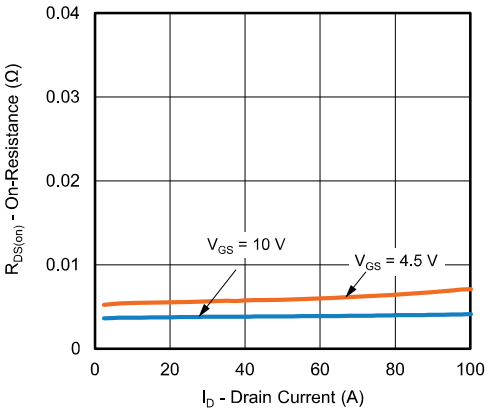
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



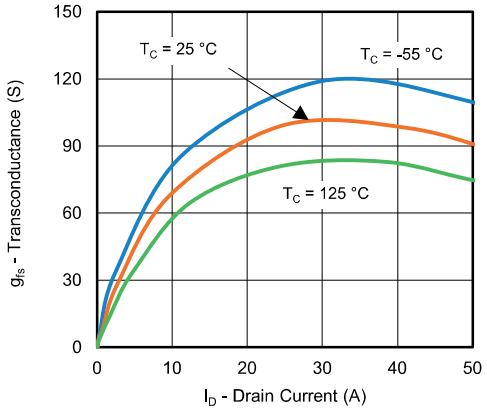
Output Characteristics



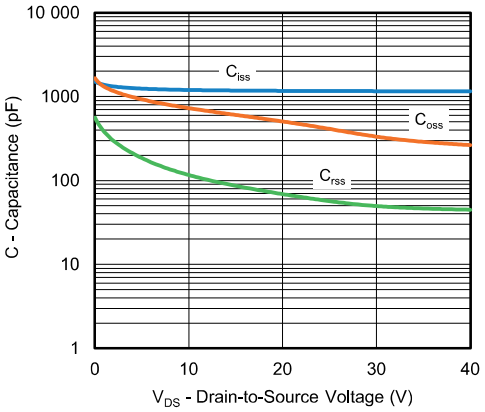
Transfer Characteristics



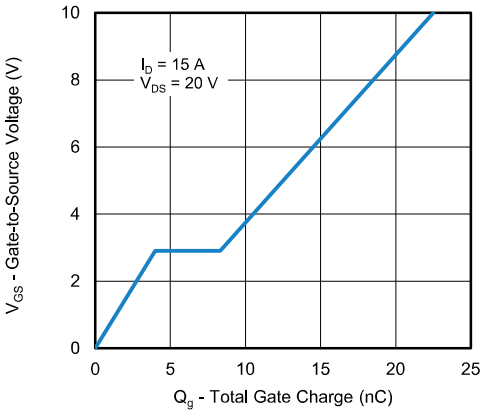
On-Resistance vs. Drain Current



Transconductance

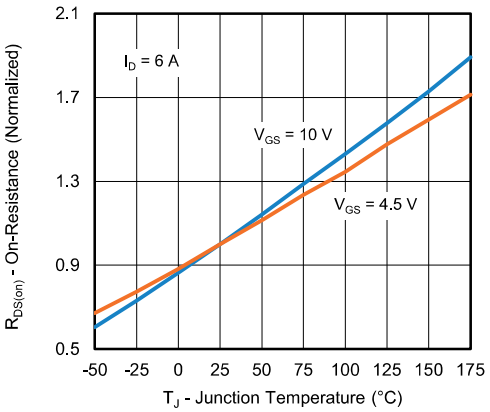


Capacitance

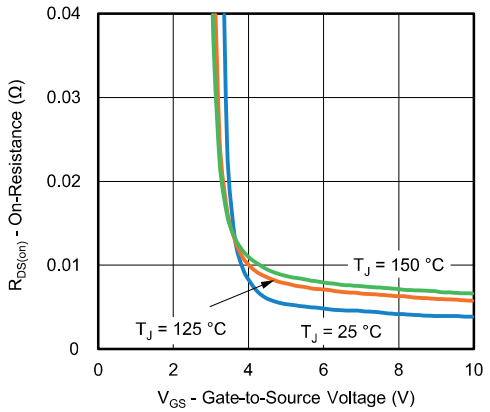


Gate Charge

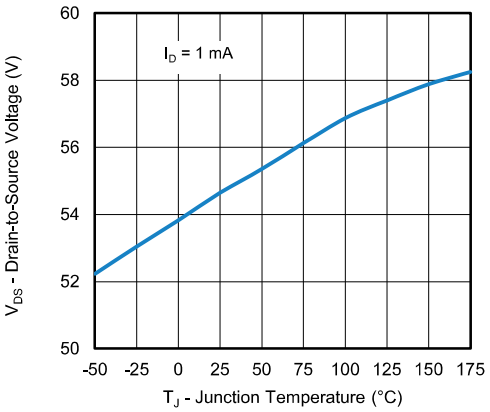
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



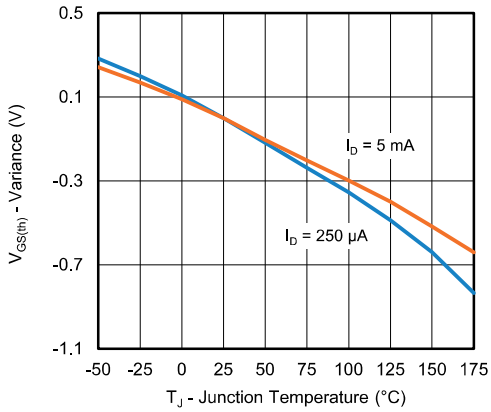
On-Resistance vs. Junction Temperature



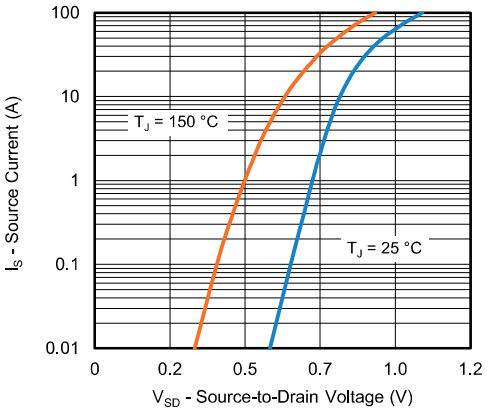
On-Resistance vs. Gate-to Source Voltage



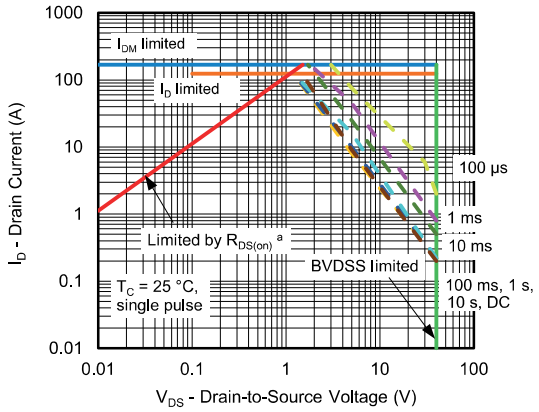
Drain Source Breakdown vs. Junction Temperature



Threshold Voltage



Source Drain Diode Forward Voltage

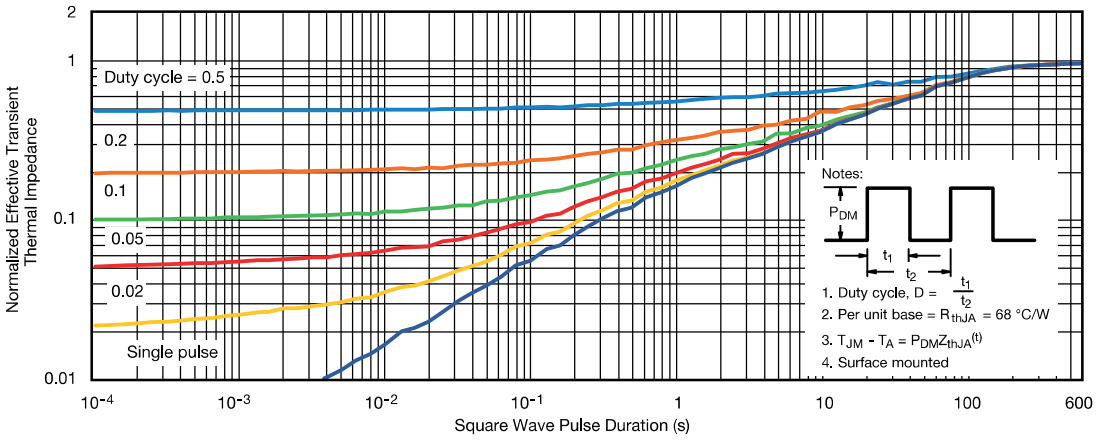


Safe Operating Area

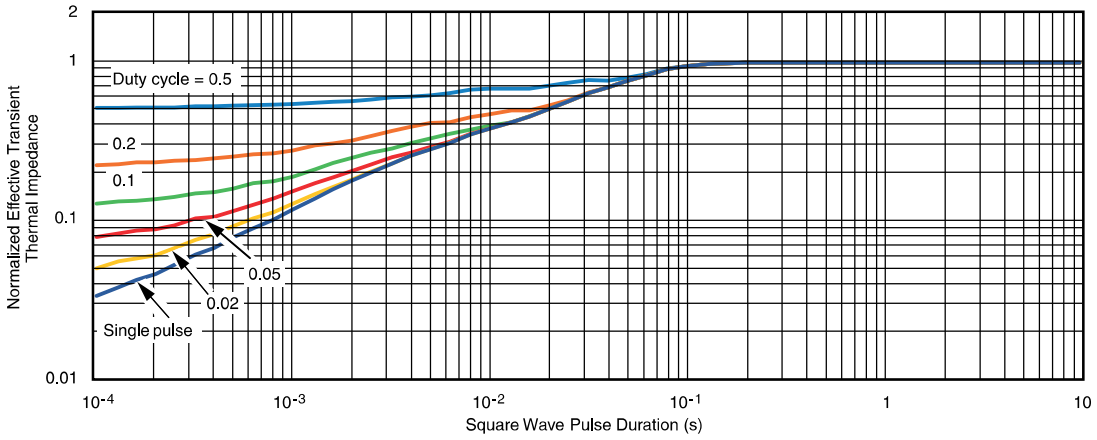
Note

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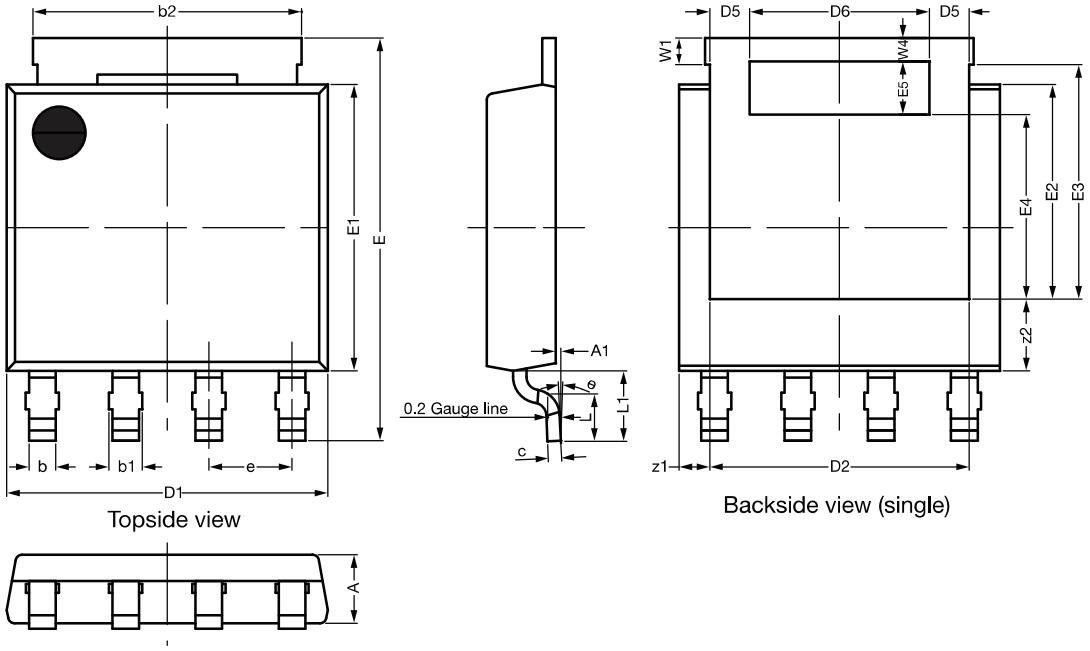
PowerPAK® SO-8L (PPKSO8LWLA) Case Outline 3



Topside view

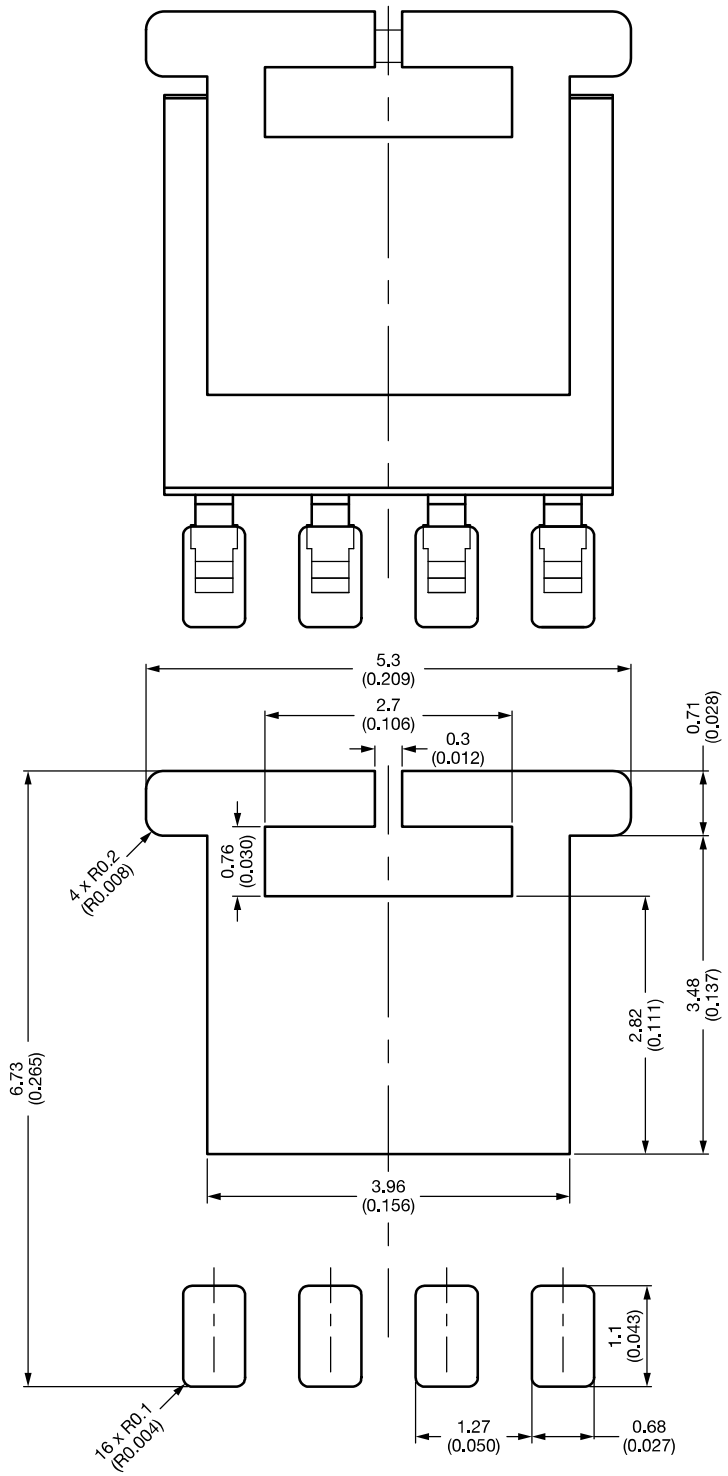
Backside view (single)

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: C22-1223-Rev. C, 19-Dec-2022 DWG: 6067						

Note

- Millimeter will govern

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



Dimensions in Millimeters (Inches)

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