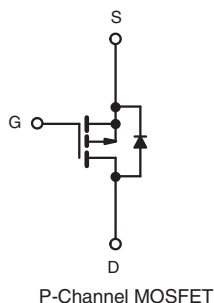


Automotive P-Channel 150 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY

V _{DS} (V)	-150
R _{DS(on)} (Ω) at V _{GS} = -10 V	1.77
I _D (A)	-0.84
Configuration	Single

SOT-23 (TO-236)



FEATURES

- TrenchFET® 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

Marking Code: 8Rxxx

ORDERING INFORMATION

Package	SOT-23
Lead (Pb)-free and Halogen-free	SQ2325ES-T1-GE3

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V _{DS}	-150	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current	I _D	T _C = 25 °C	A
		T _C = 125 °C	
Continuous Source Current (Diode Conduction)	I _S	-3.7	
Pulsed Drain Current ^a	I _{DM}	-2	
Single Pulse Avalanche Current	I _{AS}	4.8	
Single Pulse Avalanche Energy	E _{AS}	1.12	mJ
Maximum Power Dissipation ^a	P _D	T _C = 25 °C	W
		T _C = 125 °C	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient	R _{thJA}	166	°C/W
Junction-to-Foot (Drain)	R _{thJF}	50	

Notes

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- b. When mounted on 1" square PCB (FR4 material).

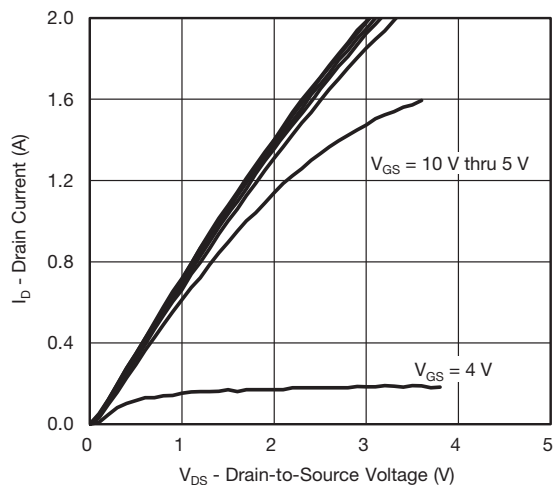
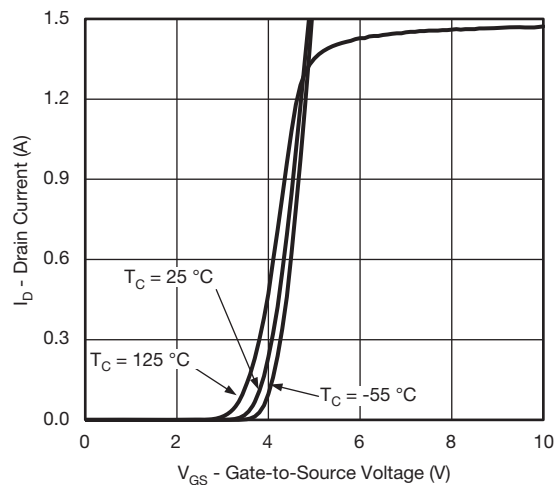
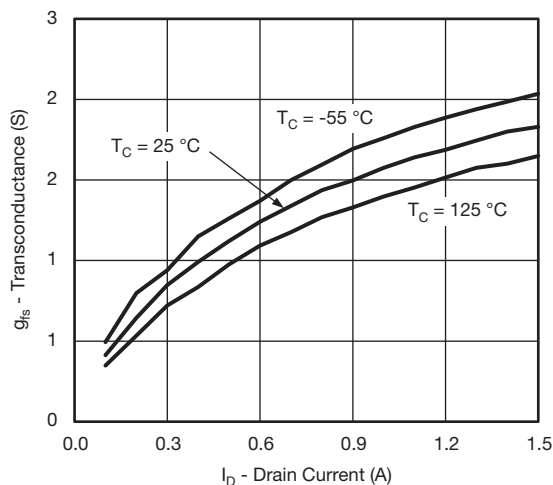
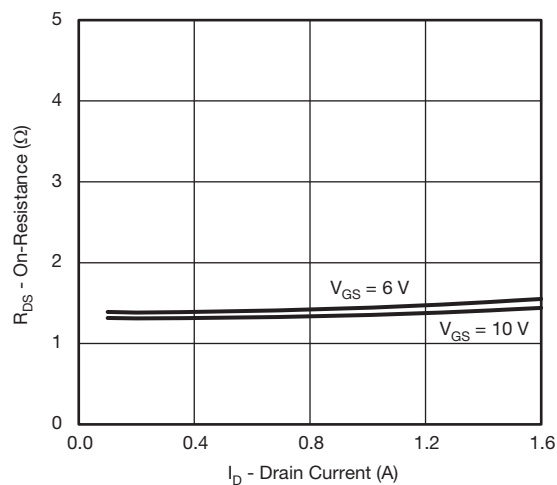
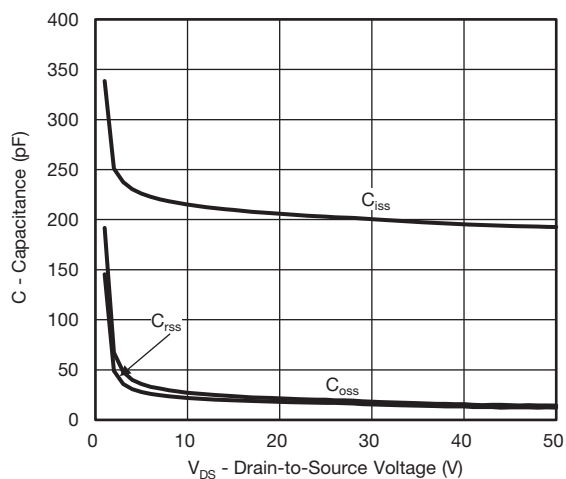
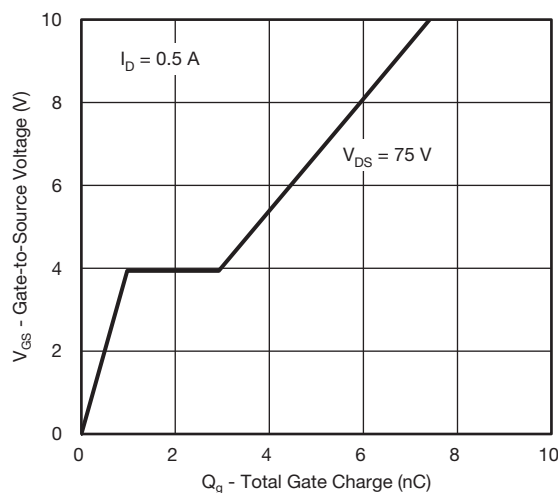


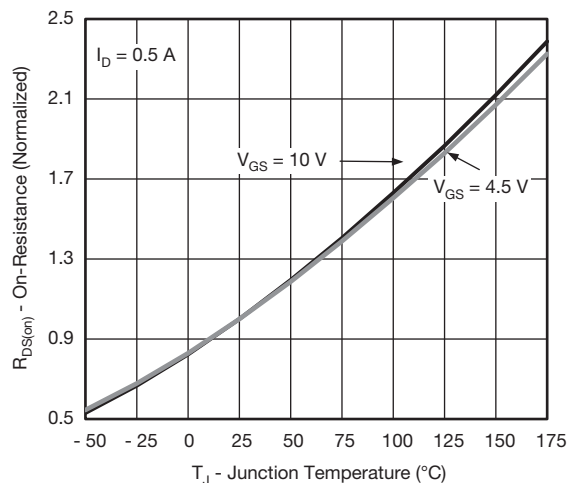
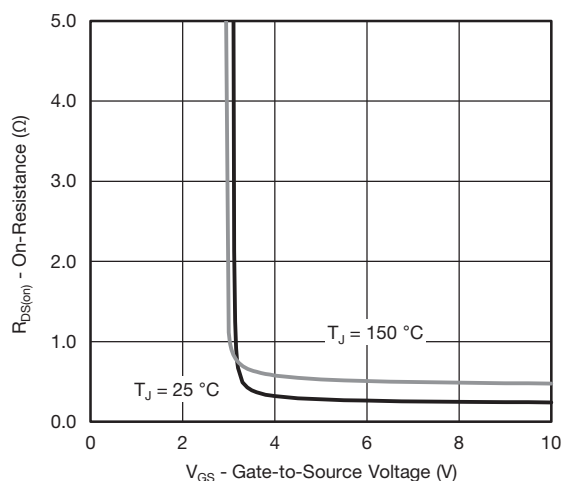
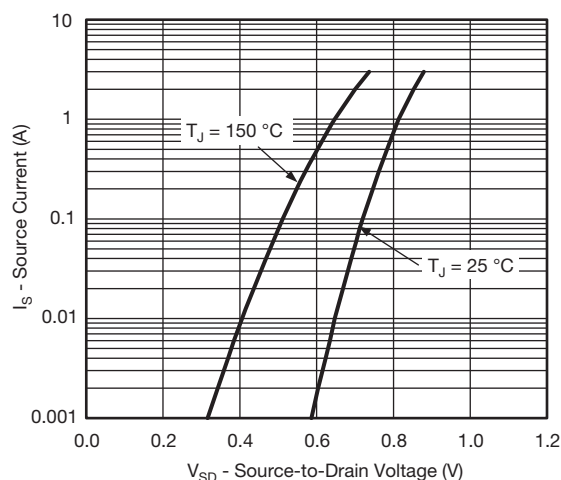
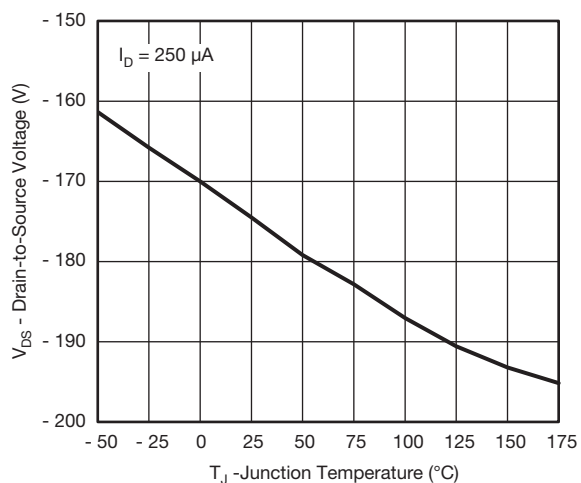
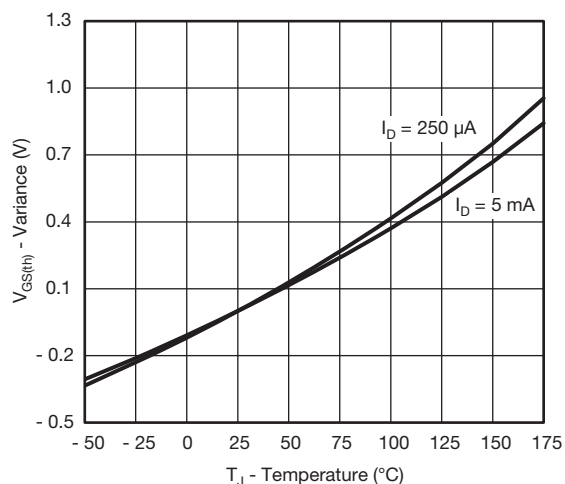
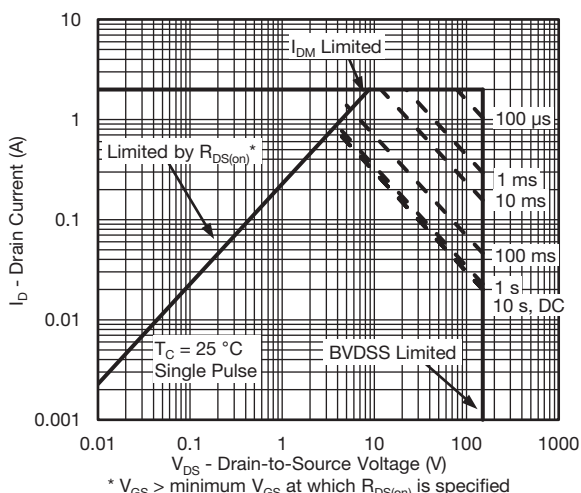
SPECIFICATIONS (T _C = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = -250 μA		-150	-	-	V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA		-2.5	-3	-3.5	
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} = -150 V	-	-	-1	μA
		V _{GS} = 0 V	V _{DS} = -150 V, T _J = 125 °C	-	-	-50	
		V _{GS} = 0 V	V _{DS} = -150 V, T _J = 175 °C	-	-	-150	
On-State Drain Current ^a	I _{D(on)}	V _{GS} = -10 V	V _{DS} ≥ 5 V	-0.8	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = -10 V	I _D = -0.5 A	-	1.3	1.77	Ω
		V _{GS} = -10 V	I _D = -0.5 A, T _J = 125 °C	-	-	3.4	
		V _{GS} = -10 V	I _D = -0.5 A, T _J = 175 °C	-	-	4.4	
Forward Transconductance ^b	g _{fs}	V _{DS} = -15 V, I _D = -0.5 A		-	2.2	-	S
Dynamic ^b							
Input Capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = -50 V, f = 1 MHz	-	200	250	pF
Output Capacitance	C _{OSS}			-	20	25	
Reverse Transfer Capacitance	C _{rss}			-	17	22	
Total Gate Charge ^c	Q _g	V _{GS} = -10 V	V _{DS} = -75 V, I _D = -0.5 A	-	7.4	10	nC
Gate-Source Charge ^c	Q _{gs}			-	1.1	-	
Gate-Drain Charge ^c	Q _{gd}			-	2.9	-	
Gate Resistance	R _g	f = 1 MHz		2.8	3.9	6.1	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = -75 V, R _L = 150 Ω I _D ≅ -0.5 A, V _{GEN} = -10 V, R _g = 1 Ω		-	8	12	ns
Rise Time ^c	t _r			-	14	18	
Turn-Off Delay Time ^c	t _{d(off)}			-	15	20	
Fall Time ^c	t _f			-	10	14	
Source-Drain Diode Ratings and Characteristics ^b							
Pulsed Current ^a	I _{SM}			-	-	-2	A
Forward Voltage	V _{SD}	I _F = -0.5 A, V _{GS} = 0 V		-	-0.8	-1.2	V

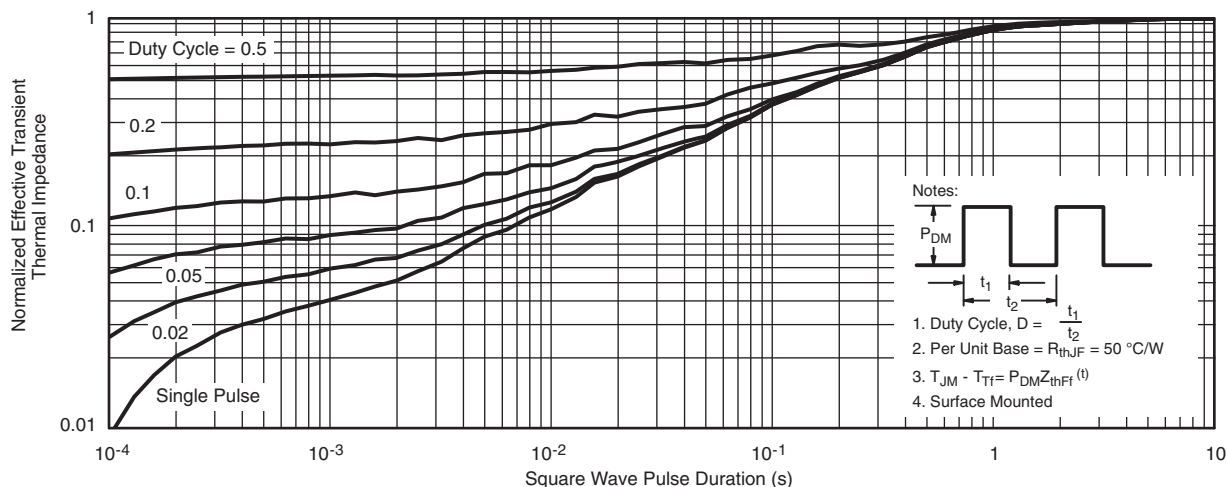
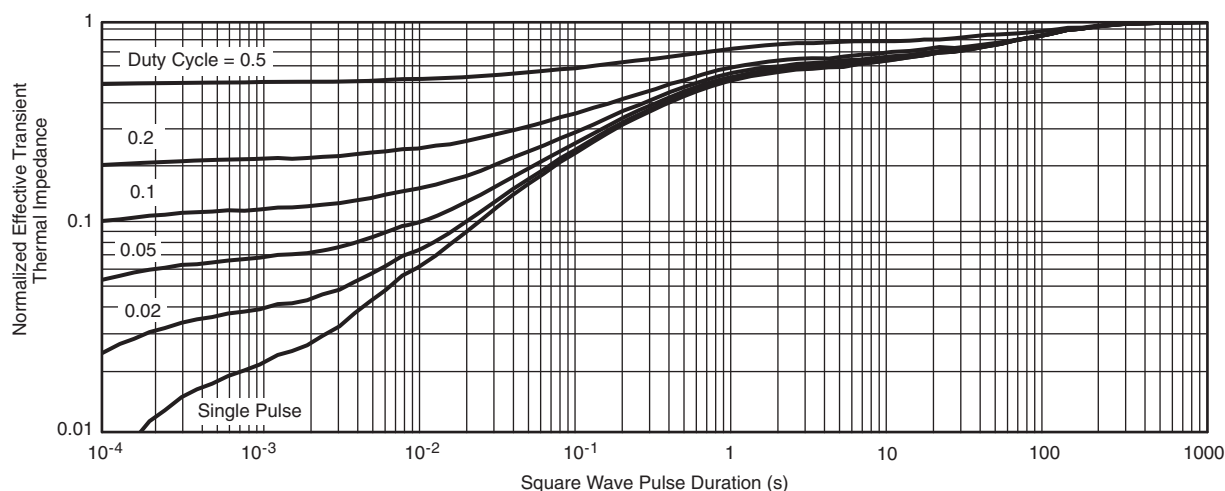
Notes

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
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 ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Output Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Drain Current

Capacitance

Gate Charge

TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

On-Resistance vs. Junction Temperature

On-Resistance vs. Gate-to-Source Voltage

Source-Drain Diode Forward Voltage

Drain Source Breakdown vs. Junction Temperature

Threshold Voltage

Safe Operating Area

**THERMAL RATINGS** ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)**Normalized Thermal Transient Impedance, Junction-to-Foot****Normalized Thermal Transient Impedance, Junction-to-Ambient****Note**

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient ($25\text{ }^{\circ}\text{C}$)
 - Normalized Transient Thermal Impedance Junction-to-Foot ($25\text{ }^{\circ}\text{C}$)
 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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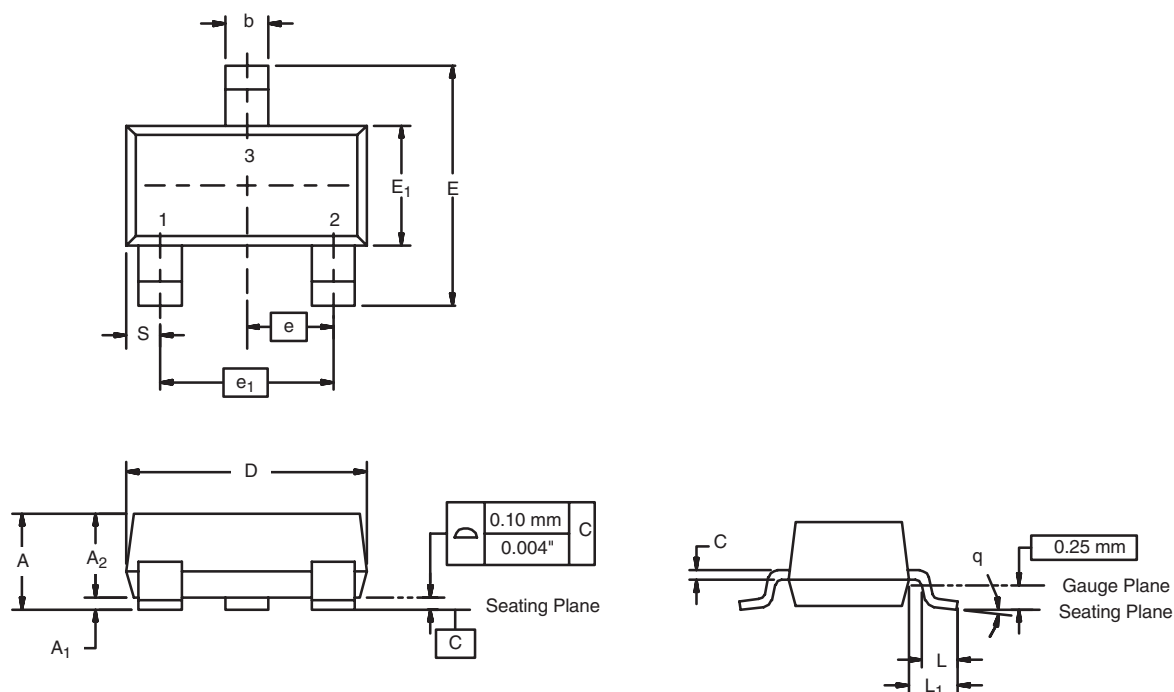


REVISION HISTORY ^a		
REVISION	DATE	DESCRIPTION OF CHANGE
B	30-Jan-15	Redesigned to meet AEC-Q101 rev D.

Note

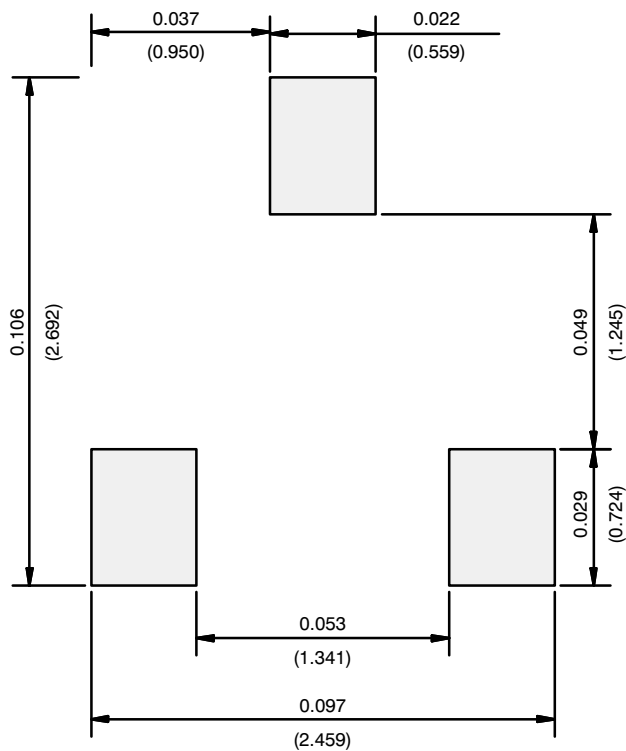
a. As of April 2014

SOT-23 (TO-236): 3-LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.89	1.12	0.035	0.044
A ₁	0.01	0.10	0.0004	0.004
A ₂	0.88	1.02	0.0346	0.040
b	0.35	0.50	0.014	0.020
c	0.085	0.18	0.003	0.007
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E ₁	1.20	1.40	0.047	0.055
e	0.95 BSC		0.0374 Ref	
e ₁	1.90 BSC		0.0748 Ref	
L	0.40	0.60	0.016	0.024
L ₁	0.64 Ref		0.025 Ref	
S	0.50 Ref		0.020 Ref	
q	3°	8°	3°	8°
ECN: S-03946-Rev. K, 09-Jul-01				
DWG: 5479				

RECOMMENDED MINIMUM PADS FOR SOT-23



Recommended Minimum Pads
Dimensions in Inches/(mm)

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