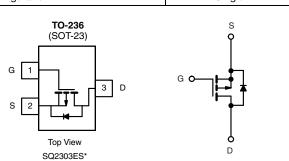
www.vishay.com

Vishay Siliconix

Automotive P-Channel 30 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY				
V _{DS} (V)	- 30			
$R_{DS(on)}(\Omega)$ at $V_{GS} = -10 \text{ V}$	0.170			
$R_{DS(on)}(\Omega)$ at $V_{GS} = -4.5 \text{ V}$	0.370			
I _D (A)	- 2.5			
Configuration	Single			



* Marking Code:8Cxxx

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- AEC-Q101 Qualified^c
- 100 % Rq and UIS Tested
- Compliant to RoHS Directive 2002/95/EC



ROHS COMPLIANT HALOGEN FREE

ORDERING INFORMATION	
Package	SOT-23
Lead (Pb)-free and Halogen-free	SQ2303ES-T1-GE3

P-Channel MOSFET

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	- 30	V
Sate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	T _C = 25 °C	1	- 2.5	
	T _C = 125 °C	- I _D	- 1.5	
Continuous Source Current (Diode Conduction)		Is	- 2.4	Α
Pulsed Drain Current ^a		I _{DM}	- 10	
Single Pulse Avalanche Current	L = 0.1 mH	I _{AS}	- 7	
Single Pulse Avalanche Energy	L=0.1 min	E _{AS}	2.4	mJ
Maximum Power Dissipation ^a	T _C = 25 °C	D	1.9	14/
	T _C = 125 °C	P_{D}	0.6	W
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to + 175	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount ^b	R_{thJA}	175	°C/W
Junction-to-Foot (Drain)		R_{thJF}	78	C/ VV

Notes

- a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$
- b. When mounted on 1" square PCB (FR-4 material).
- c. Parametric verification ongoing.

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PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
Static	1				L	L		
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = -250 \mu\text{A}$		- 30	-	-	V	
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} =	$V_{DS} = V_{GS}, I_D = -250 \mu A$		- 2.0	- 2.5	V	
Gate-Source Leakage	I _{GSS}	V _{DS} =	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$		-	± 100	nA	
		V _{GS} = 0 V	V _{DS} = - 30 V	-	-	- 1		
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V	V _{DS} = - 30 V, T _J = 125 °C	-	-	- 50	μΑ	
		$V_{GS} = 0 V$	V _{DS} = - 30 V, T _J = 175 °C	-	-	- 150		
On-State Drain Current ^a	I _{D(on)}	V _{GS} = - 10 V	V _{DS} ≤ - 5 V	- 8	-	-	Α	
		V _{GS} = - 10 V	I _D = - 1.7 A	-	0.130	0.170	Ω	
Drain Sauras On State Beginteness		V _{GS} = - 10 V	I _D = - 1.7 A, T _J = 125 °C	-	-	0.247		
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V	I _D = - 1.7 A, T _J = 175 °C	-	-	0.288		
	$V_{GS} = -4.5 \text{ V}$ $I_{D} = -1.3 \text{ A}$	I _D = - 1.3 A	-	0.280	0.370			
Forward Transconductanceb	9 _{fs}	V _{DS} =	V _{DS} = - 5 V, I _D = - 1.7 A		4	-	S	
Dynamic ^b								
Input Capacitance	C _{iss}			-	168	210	pF	
Output Capacitance	C _{oss}	$V_{GS} = 0 V$	V _{DS} = - 25 V, f = 1 MHz	-	40	50		
Reverse Transfer Capacitance	C _{rss}			-	28	35		
Total Gate Charge ^c	Qg			-	4.5	6.8		
Gate-Source Charge ^c	Q _{gs}	V _{GS} = - 10 V	$V_{DS} = -15 \text{ V}, I_{D} = -1.7 \text{ A}$	-	0.8	-	nC	
Gate-Drain Charge ^c	Q_{gd}			-	1.1	-		
Gate Resistance	R _g	f = 1 MHz		6.04	12.08	18.12	Ω	
Turn-On Delay Time ^c	t _{d(on)}			-	5	8		
Rise Time ^c	t _r	$V_{DD} = -15 \text{ V}, \text{ R}_{L} = 8.8 \Omega$ $I_{D} \cong -1.7 \text{ A}, \text{ V}_{GEN} = -10 \text{ V}, \text{ R}_{g} = 1 \Omega$		-	8	12	- ns	
Turn-Off Delay Time ^c	t _{d(off)}			-	12	18		
Fall Time ^c	t _f			-	8	12		
Source-Drain Diode Ratings and Char	acteristics ^b							
Pulsed Current ^a	I _{SM}			1	-	- 10	Α	
Forward Voltage	V _{SD}	I _F = - 1.5 A, V _{GS} = 0 V		-	- 0.85	- 1.2	V	

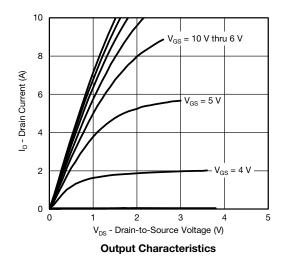
Notes

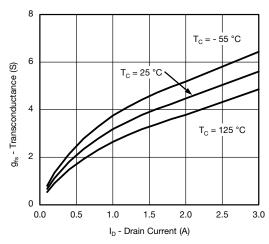
- a. Pulse test; pulse width \leq 300 μ s, duty cycle \leq 2 %.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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.

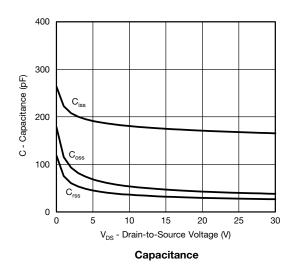


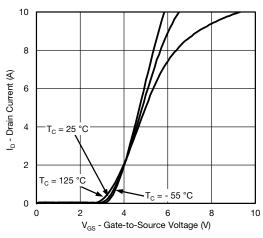
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



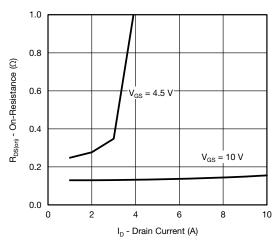


Transconductance

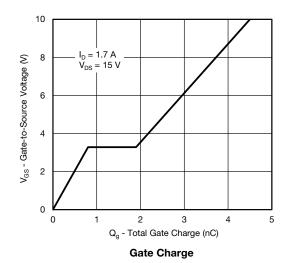




Transfer Characteristics

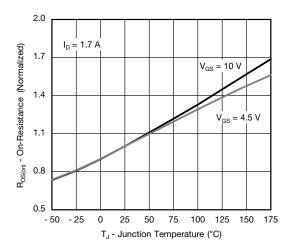


On-Resistance vs. Drain Current

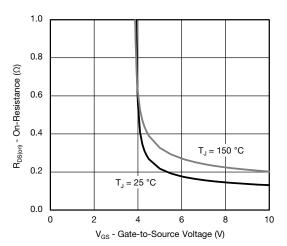




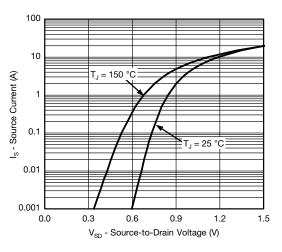
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



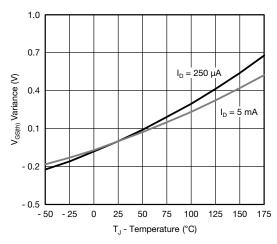
On-Resistance vs. Junction Temperature



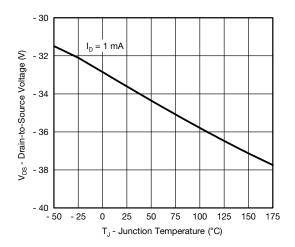
On-Resistance vs. Gate-to-Source Voltage



Source Drain Diode Forward Voltage



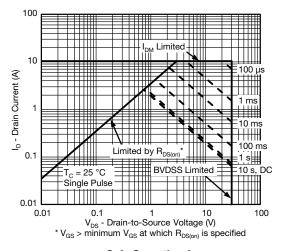
Threshold Voltage



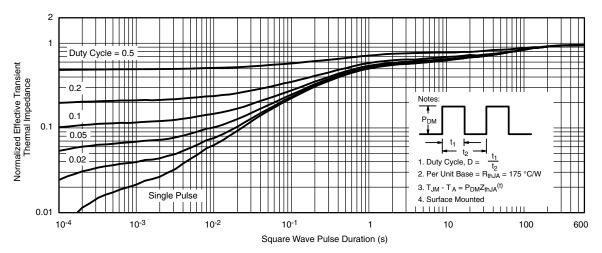
Drain Source Breakdown vs. Junction Temperature



THERMAL RATINGS ($T_A = 25$ °C, unless otherwise noted)



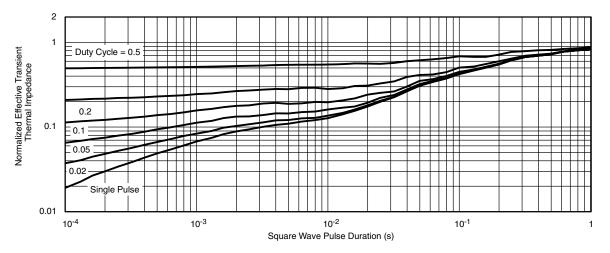
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Foot

Note

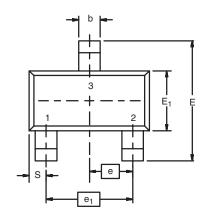
- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
 - Normalized Transient Thermal Impedance Junction-to-Foot (25 °C)

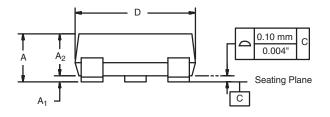
are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit 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.

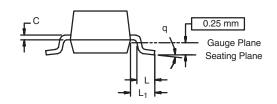
Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?67023.



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







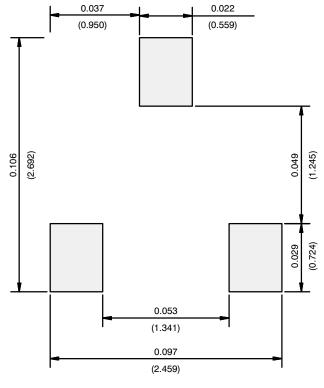
Dim	MILLIN	IETERS	INCHES		
	Min	Max	Min	Max	
Α	0.89	1.12	0.035	0.044	
A ₁	0.01	0.10	0.0004	0.004	
A ₂	0.88	1.02	0.0346	0.040	
b	0.35	0.50	0.014	0.020	
С	0.085	0.18	0.003	0.007	
D	2.80	3.04	0.110	0.120	
E	2.10	2.64	0.083	0.104	
E ₁	1.20	1.40	0.047	0.055	
е	0.95 BSC		0.0374 Ref		
e ₁	1.90 BSC		0.074	8 Ref	
L	0.40	0.60	0.016	0.024	
L ₁	0.64 Ref		0.025	i Ref	
S	0.50 Ref		0.50 Ref 0.020 Ref		
q	3°	8°	3°	8°	
ECN: S-03946-Rev. K. 09-	Jul-01				

DWG: 5479

Document Number: 71196 www.vishay.com 09-Jul-01



RECOMMENDED MINIMUM PADS FOR SOT-23



Recommended Minimum Pads Dimensions in Inches/(mm)

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APPLICATION NOTE



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