



P-Channel 12-V (D-S) MOSFET

PRODUCT SUMMARY				
V _{DS} (V)	$R_{DS(on)}(\Omega)$	I _D (A)		
	0.032 at V _{GS} = - 4.5 V	- 5.3		
- 12	0.042 at V _{GS} = - 2.5 V	- 4.6		
	0.059 at V _{GS} = - 1.8 V	- 3.9		

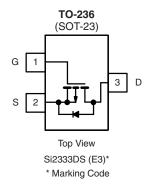
FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFET



APPLICATIONS

- Load Switch
- PA Switch



Ordering Information: Si2333DS-T1-E3 (Lead (Pb)-free) Si2333DS-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS T_{i}	_A = 25 °C, unle	ss otherwise r	noted		_
Parameter		Symbol	5 s	Steady State	Unit
Drain-Source Voltage		V _{DS}	- 12		V
Gate-Source Voltage		V _{GS}	± 8		
Continuous Dusin Comment /T 150 °C) a b	T _A = 25 °C	- I _D	- 5.3	- 4.1	٨
Continuous Drain Current $(T_J = 150 ^{\circ}C)^{a, b}$	T _A = 70 °C		- 4.2	- 3.3	
Pulsed Drain Current		I _{DM}	- 20		Α
Continuous Source Current (Diode Conduction) ^{a, b}		I _S	- 1.0	- 0.6	
Mariana Barra Biratani ah	T _A = 25 °C	D.	1.25 0.75		W
Maximum Power Dissipation ^{a, b}	T _A = 70 °C	- P _D	0.8	0.48	V V
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 t	o 150	°C

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Manipulation to Applicate	t ≤ 5 s	R _{thJA}	75	100		
Maximum Junction-to-Ambient ^a	Steady State	' ¹thJA	120	166	°C/W	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	40	50		

- a. Surface Mounted on 1" x 1" FR4 board.
- b. Pulse width limited by maximum junction temperature.

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			Limits				
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, I_D = -250 \mu\text{A}$	- 12			V	
Gate-Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_D = -250 \mu A$	- 0.40		- 1.0	V	
Gate-Body Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 8 \text{ V}$			± 100	nA	
Zava Cata Valtaga Drain Current	1	V _{DS} = - 9.6 V, V _{GS} = 0 V	-1		- 1		
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = -9.6 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55 ^{\circ}\text{C}$			- 10	μΑ	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \le -5 V$, $V_{GS} = -4.5 V$	- 20			Α	
		V _{GS} = - 4.5 V, I _D = - 5.3 A		0.025	0.032		
Drain-Source On-Resistance ^a	R _{DS(on)}	$V_{GS} = -2.5 \text{ V}, I_D = -4.6 \text{ A}$		0.033	0.042	Ω	
	` ′	V _{GS} = - 1.8 V, I _D = - 2.0 A		0.046	0.059		
Forward Transconductance ^a	9 _{fs}	V _{DS} = - 5 V, I _D = - 5.3 A		17		S	
Diode Forward Voltage	V_{SD}	I _S = - 1.0 A, V _{GS} = 0 V		- 0.7	- 1.2	V	
Dynamic ^b			•	•	•		
Total Gate Charge	Q_g			11.5	18	nC	
Gate-Source Charge	Q _{gs}	$V_{DS} = -6 \text{ V}, V_{GS} = -4.5 \text{ V}$ $I_{D} \cong -5.3 \text{ A}$		1.5			
Gate-Drain Charge	Q_{gd}	ID = - 3.3 A		3.2		1	
Input Capacitance	C _{iss}			1100		pF	
Output Capacitance	C _{oss}	$V_{DS} = -6 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		390			
Reverse Transfer Capacitance	C _{rss}			300		1	
Switching ^c	1			1			
Turn-On Time	t _{d(on)}			25	40		
	t _r	$V_{DD} = -6 \text{ V}, R_L = 6 \Omega$		45	70		
T 0# Time	t _{d(off)}	$I_D \cong$ - 1.0 A, V_{GEN} = - 4.5 V R_G = 6 Ω		72	110	ns	
Turn-Off Time	t _f	g - 2 2 2		60	90		

Notes:

- a. Pulse test: PW \leq 300 μ s, duty cycle \leq 2 %.
- b. For design aid only, not subject to production testing.
- c. Switching time is essentially independent of operating temperature.

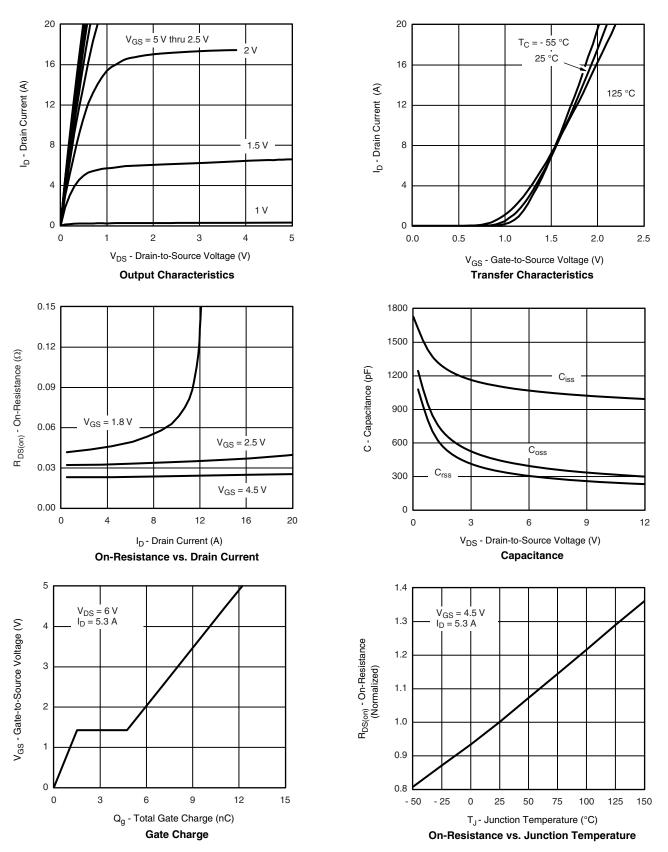
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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





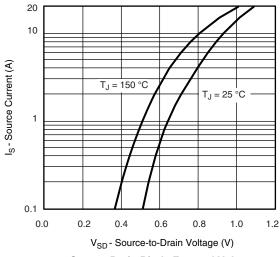


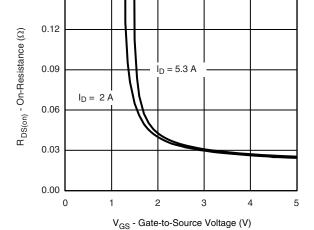
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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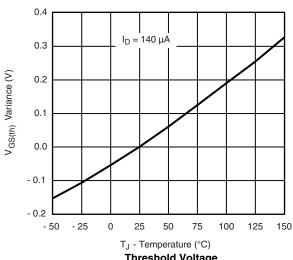


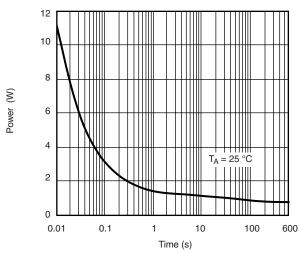


0.15

Source-Drain Diode Forward Voltage

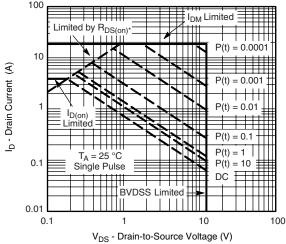






Threshold Voltage

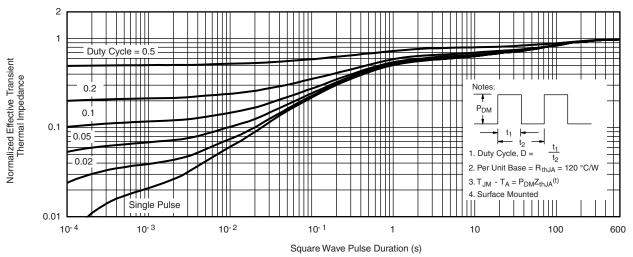
Single Pulse Power



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



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient

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?72023.

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







Dim	MILLI	METERS	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		0.0748 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°	
FCN: S-03946-Rev K 09-	lul-01	•			

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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