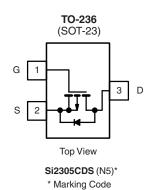




P-Channel 8 V (D-S) MOSFET

PRODUCT SUMMARY					
V _{DS} (V)	$R_{DS(on)}(\Omega)$	I _D (A) ^d	Q _g (Typ.)		
	0.035 at V _{GS} = - 4.5 V	- 5.8			
- 8	0.048 at V _{GS} = - 2.5 V	- 5.0	12 nC		
	0.065 at V _{GS} = - 1.8 V	- 4.3			



Ordering Information: Si2305CDS-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

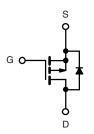
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



ROHS COMPLIANT HALOGEN FREE

APPLICATIONS

- · Load Switch for Portable Devices
- DC/DC Converter



P-Channel MOSFET

Parameter	Symbol	Limit	Unit		
Drain-Source Voltage	V_{DS}	- 8	V		
Gate-Source Voltage		V _{GS}	± 8	¬	
	T _C = 25 °C		- 5.8		
0 11 0 1/7 1/70 00)	T _C = 70 °C	l _D	- 4.7		
Continuous Drain Current (T _J = 150 °C)	T _A = 25 °C		- 4.4 ^{a, b}	А	
	T _A = 70 °C		- 3.5 ^{a, b}		
Pulsed Drain Current (10 µs Pulse Width)	I _{DM}	- 20			
	T _C = 25 °C	1	- 1.4		
Continuous Source-Drain Diode Current	T _A = 25 °C	I _S	- 0.8 ^{a, b}		
	T _C = 25 °C		1.7	10/	
	T _C = 70 °C	В	1.1		
Maximum Power Dissipation	T _A = 25 °C	P_{D}	0.96 ^{a, b}	W	
	T _A = 70 °C		0.62 ^{a, b}		
Operating Junction and Storage Temperature Ra	T _J , T _{stg}	- 55 to 150	°C		

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{a, c}	t ≤ 5 s	R _{thJA}	100	130	°C/W	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	60	75	C/VV	

Notes:

- a. Surface mounted on 1" x 1" FR4 board.
- b. t = 5 s.
- c. Maximum under steady state conditions is 175 °C/W.
- d. T_C = 25 °C.

Si2305CDS

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Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static	,						
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = -250 \mu\text{A}$	- 8			V	
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	J 050 A		- 9		mV/°C	
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I _D = - 250 μA		2.5			
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	- 0.4		- 1	V	
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 8 \text{ V}$			± 100	nA	
Zono Coto Valta na Dunia Comunant		$V_{DS} = -8 \text{ V}, V_{GS} = 0 \text{ V}$			- 1	μΑ	
Zero Gate Voltage Drain Current	IDSS	$V_{DS} = -8 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55 \text{ °C}$			- 10		
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \le -5 \text{ V}, V_{GS} = -4.5 \text{ V}$	- 10			Α	
		V _{GS} = - 4.5 V, I _D = - 4.4 A		0.028	0.035		
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 2.5 V, I _D = - 3.8 A		0.039	0.048	Ω	
		V _{GS} = - 1.8 V, I _D = - 2 A			0.065	1	
Forward Transconductance ^a	9 _{fs}	V _{DS} = - 4 V, I _D = - 4.4 A		17		S	
Dynamic ^b					l	l	
Input Capacitance	C _{iss}			960		pF	
Output Capacitance	C _{oss}	V _{DS} = - 4 V, V _{GS} = 0 V, f = 1 MHz		330			
Reverse Transfer Capacitance	C _{rss}			300			
Total Gate Charge	Qg	V _{DS} = - 4 V, V _{GS} = - 8 V, I _D = - 4.4 A		20	30		
Total Gate Charge	Qg	33		12	18	nC	
Gate-Source Charge	Q _{gs}	V _{DS} = - 4 V, V _{GS} = - 4.5 V, I _D = - 4.4 A		1.5			
Gate-Drain Charge	Q_{gd}			3.1			
Gate Resistance	R _g	f = 1 MHz	1	5.1	10.2	Ω	
Turn-On Delay Time	t _{d(on)}			20	30		
Rise Time	t _r	$V_{DD} = -4 \text{ V}, R_{L} = 1.1 \Omega$		20	30		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong -3.5 \text{ A}, V_{GEN} = -4.5 \text{ V}, R_g = 1 \Omega$		40	60	-	
Fall Time	t _f	Ţ		10	15	1	
Turn-On Delay Time	t _{d(on)}			10	15	ns	
Rise Time	t _r	$V_{DD} = -4 \text{ V, R}_{I} = 1.1 \Omega$		10	15	-	
Turn-Off Delay Time	t _{d(off)}	$I_D \cong -3.5 \text{ A}, V_{GEN} = -8 \text{ V}, R_g = 1 \Omega$		35	55		
Fall Time	t _f			10	15	1	
Drain-Source Body Diode Characterist	ics				l	l	
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			- 1.4		
Pulse Diode Forward Current	I _{SM}				- 20	A	
Body Diode Voltage	V _{SD}	I _S = - 3.5 A, V _{GS} = 0 V		- 0.8	- 1.2	V	
Body Diode Reverse Recovery Time	t _{rr}			35	55	ns	
Body Diode Reverse Recovery Charge	Q _{rr}	<u> </u>		14	25	nC	
Reverse Recovery Fall Time	t _a	$I_F = -3.5 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 ^{\circ}\text{C}$		16			
Reverse Recovery Rise Time	t _b	-		19		ns	

Notes:

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.

a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$

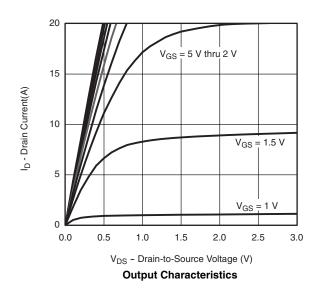
b. Guaranteed by design, not subject to production testing.

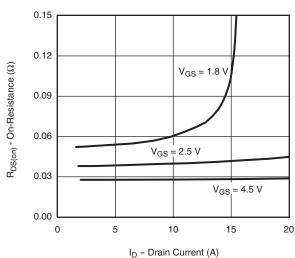




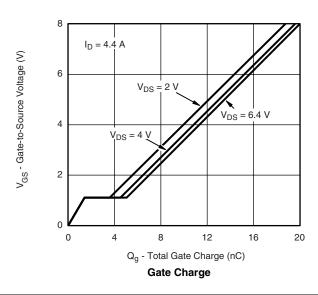


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





On-Resistance vs. Drain Current and Gate Voltage



T_C = 125 °C

T_C = -55 °C

T_C = -55 °C

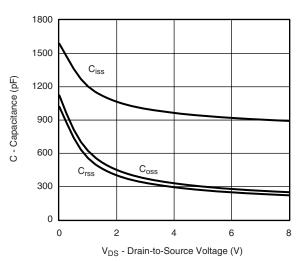
T_C = -55 °C

1

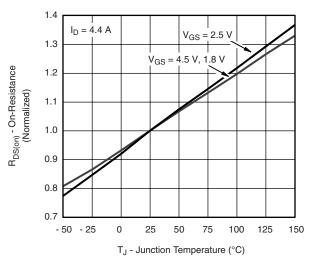
T_C = 25 °C

0
0.0
0.0
0.3
0.6
0.9
1.2
1.5

V_{GS} - Gate-to-Source Voltage (V) **Transfer Characteristics**



Capacitance

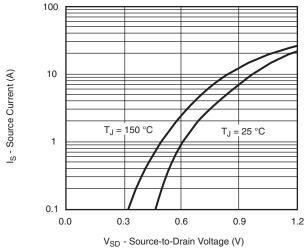


On-Resistance vs. Junction Temperature

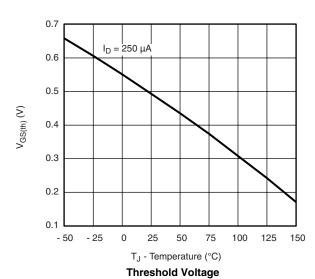
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TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Source-Drain Diode Forward Voltage



V_{GS} - Gate-to-Source Voltage (V)

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

On-Resistance vs. Gate-to-Source Voltage

 $I_D = 2 \text{ A}, T_J = 25 \text{ °C}$

= 2 A, T_J = 125 °C

I_D = 4.4 A, T_J = 25 °C

0.10

0.08

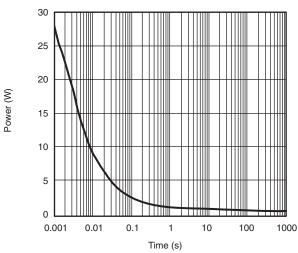
0.06

0.04

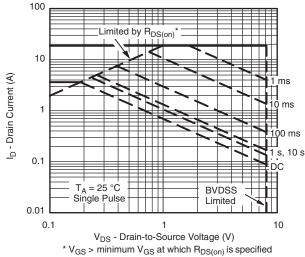
0.02

0.00

R_{DS(on)} - On-Resistance (Ω)



Single Pulse Power, Junction-to-Ambient



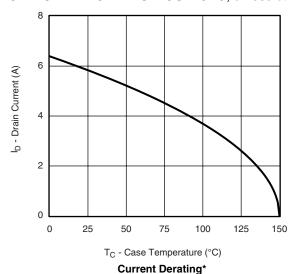
Safe Operating Area, Junction-to-Ambient

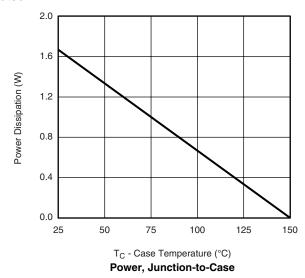
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TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



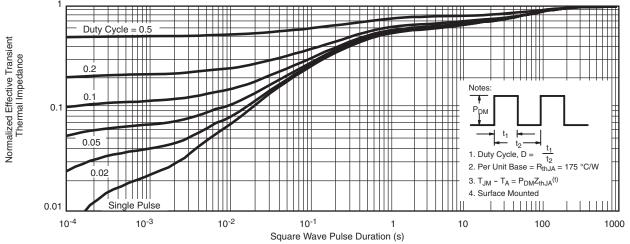


 $^{^*}$ The power dissipation P_D is based on $T_{J(max)}$ = 150 $^{\circ}$ C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package

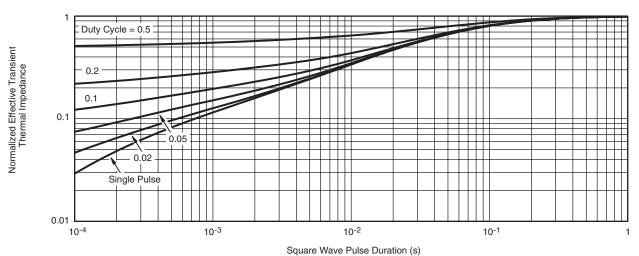
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TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient

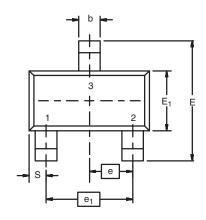


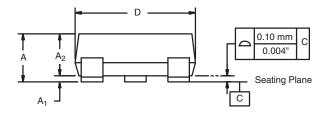
Normalized Thermal Transient Impedance, Junction-to-Foot

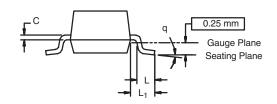
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SOT-23 (TO-236): 3-LEAD







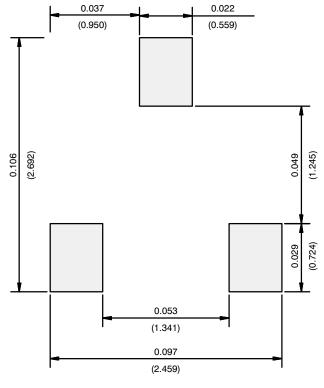
Dim	MILLIMETERS		INCHES		
	Min	Max	Min	Max	
Α	0.89	1.12	0.035	0.044	
A ₁	0.01	0.10	0.0004	0.004	
A ₂	0.88	1.02	0.0346	0.040	
b	0.35	0.50	0.014	0.020	
С	0.085	0.18	0.003	0.007	
D	2.80	3.04	0.110	0.120	
E	2.10	2.64	0.083	0.104	
E ₁	1.20	1.40	0.047	0.055	
е	0.95	0.95 BSC		4 Ref	
e ₁	1.90	BSC	0.0748 Ref		
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

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



RECOMMENDED MINIMUM PADS FOR SOT-23



Recommended Minimum Pads Dimensions in Inches/(mm)

Return to Index

APPLICATION NOTE



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