

P-Channel 1.8-V (G-S) MOSFET

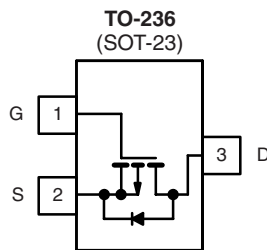
PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
- 12	0.050 at $V_{GS} = - 4.5$ V	- 3.85
	0.065 at $V_{GS} = - 2.5$ V	- 3.4
	0.100 at $V_{GS} = - 1.8$ V	- 2.7

FEATURES

- Halogen-free Option Available
- TrenchFET® Power MOSFETs: 1.8 V Rated



Available
RoHS*
COMPLIANT



Top View

Si2315BDS *(M5)

* Marking Code

Ordering Information: Si2315BDS-T1
Si2315BDS-T1-E3 (Lead (Pb)-free)
Si2315BDS-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted					
Parameter	Symbol	5 s	Steady State	Unit	
Drain-Source Voltage	V_{DS}	- 12		V	
Gate-Source Voltage	V_{GS}	± 8			
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	$T_A = 25$ °C	- 3.85	- 3.0	A
		$T_A = 70$ °C	- 3.0	- 2.45	
Pulsed Drain Current ^a	I_{DM}	- 12			
Continuous Source Current (Diode Conduction) ^a	I_S	- 1.0	- 0.62		
Power Dissipation ^a	P_D	$T_A = 25$ °C	1.19	0.75	W
		$T_A = 70$ °C	0.76	0.48	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150		°C	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typ.	Max.	Unit	
Maximum Junction-to-Ambient ^a	R_{thJA}	$t \leq 5$ s	85	105	°C/W
		Steady State	130	166	
Maximum Junction-to-Foot (Drain)	R_{thJF}	60	75		

Notes:

a. Surface Mounted on FR4 board.

b. $t \leq 5$ s.

For SPICE model information via the Worldwide Web: <http://www.vishay.com/www/product/spice.htm>.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

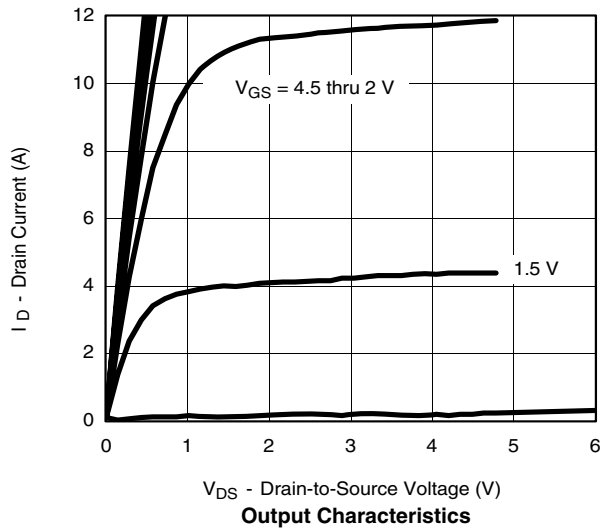
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$, $I_D = -10\text{ }\mu\text{A}$	-12			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$	-0.45		-0.90	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 8\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -12\text{ V}$, $V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -12\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}$, $V_{GS} = -4.5\text{ V}$	-6			A
		$V_{DS} \leq -5\text{ V}$, $V_{GS} = -2.5\text{ V}$	-3			
Drain-Source On Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}$, $I_D = -3.85\text{ A}$		0.040	0.050	Ω
		$V_{GS} = -2.5\text{ V}$, $I_D = -3.4\text{ A}$		0.050	0.065	
		$V_{GS} = -1.8\text{ V}$, $I_D = -2.7\text{ A}$		0.071	0.100	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\text{ V}$, $I_D = -3.85\text{ A}$		7		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -1.6\text{ A}$, $V_{GS} = 0\text{ V}$			-1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -6\text{ V}$, $V_{GS} = -4.5\text{ V}$ $I_D \cong -3.85\text{ A}$		8	15	nC
Gate-Source Charge	Q_{gs}			1.1		
Gate-Drain Charge	Q_{gd}			2.3		
Input Capacitance	C_{iss}	$V_{DS} = -6\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$		715		μF
Output Capacitance	C_{oss}			275		
Reverse Transfer Capacitance	C_{rss}			200		
Switching^b						
Turn-On Time	$t_{d(on)}$	$V_{DD} = -6\text{ V}$, $R_L = 6\text{ }\Omega$ $I_D \cong -1.0\text{ A}$, $V_{GEN} = -4.5\text{ V}$ $R_G = 6\text{ }\Omega$		15	20	ns
	t_r			35	50	
Turn-Off Time	$t_{d(off)}$			50	70	
	t_f			50	75	

Notes:

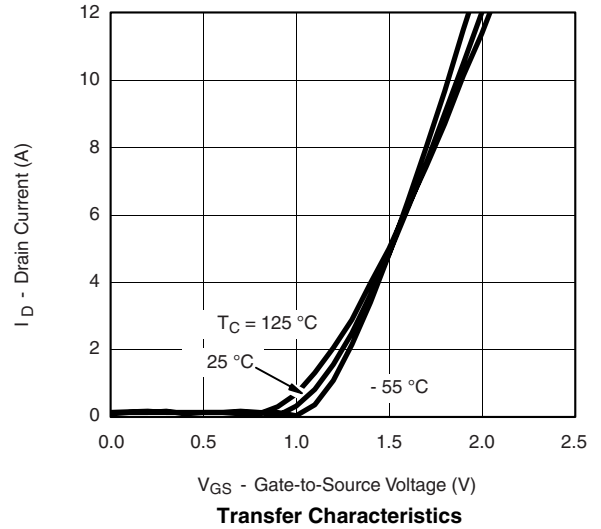
- a. For DESIGN AID ONLY, not subject to production testing.
 b. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.
 c. Switching time is essentially independent of operating temperature.

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.

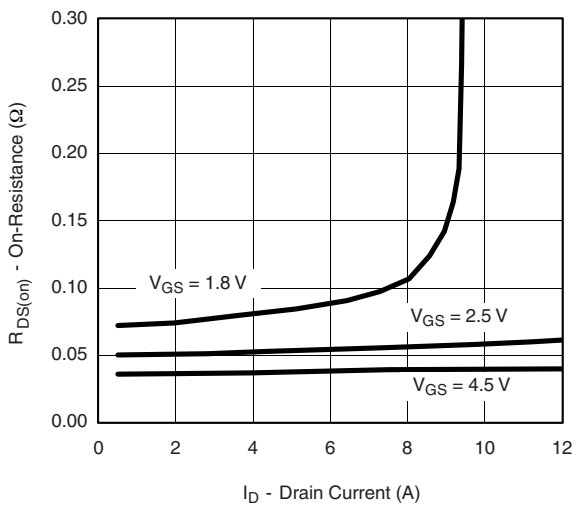
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



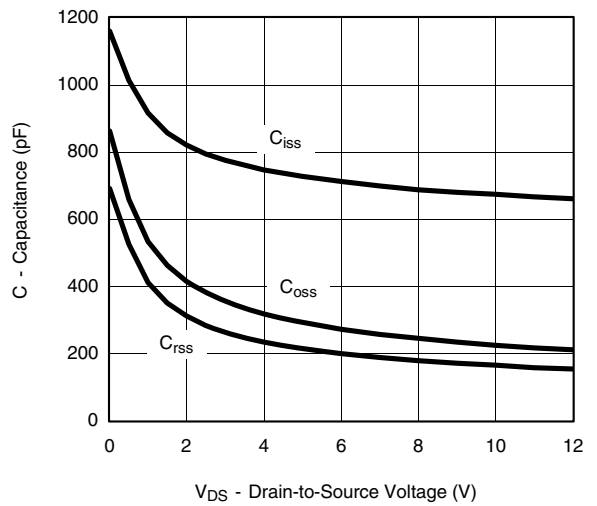
Output Characteristics



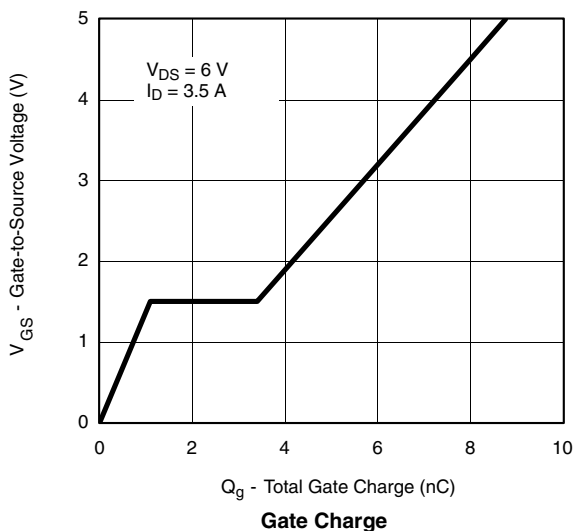
Transfer Characteristics



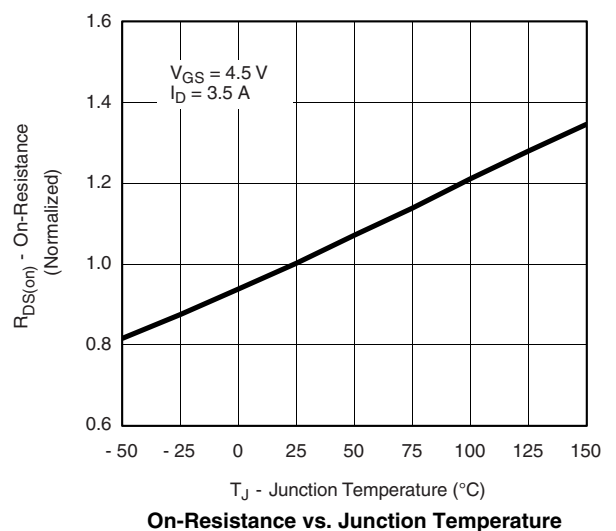
On-Resistance vs. Drain Current



Capacitance

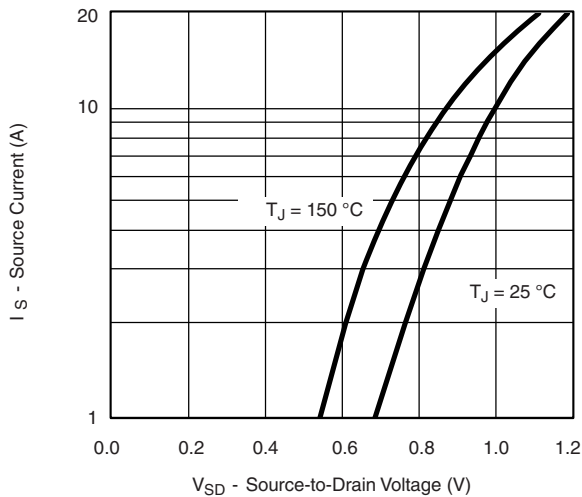


Gate Charge

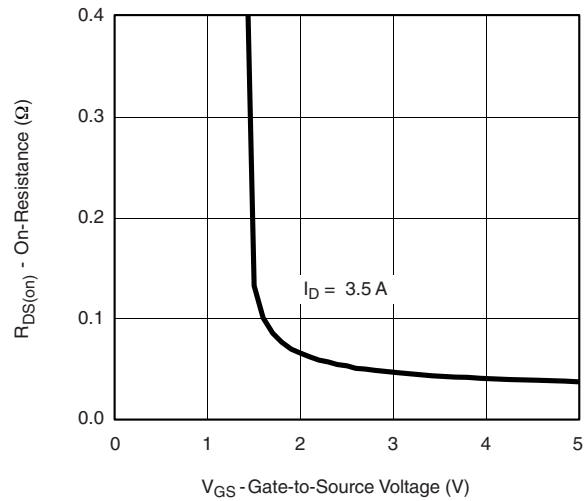


On-Resistance vs. Junction Temperature

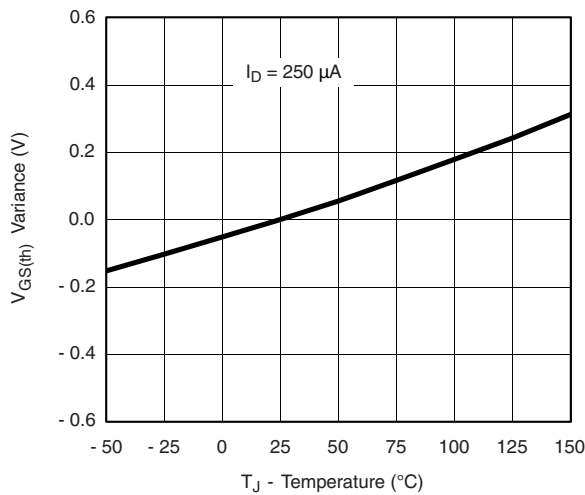
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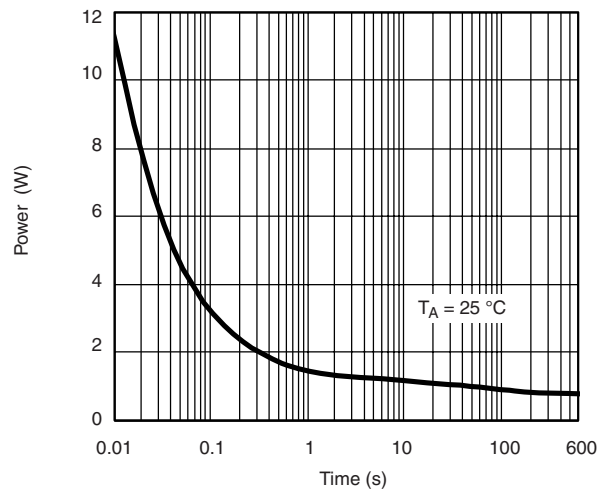
Source-Drain Diode Forward Voltage



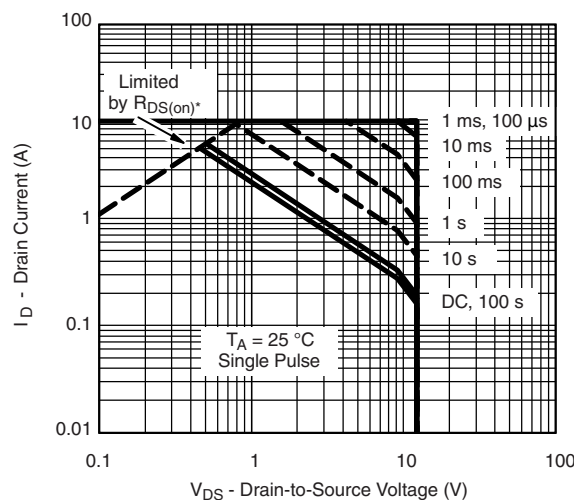
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



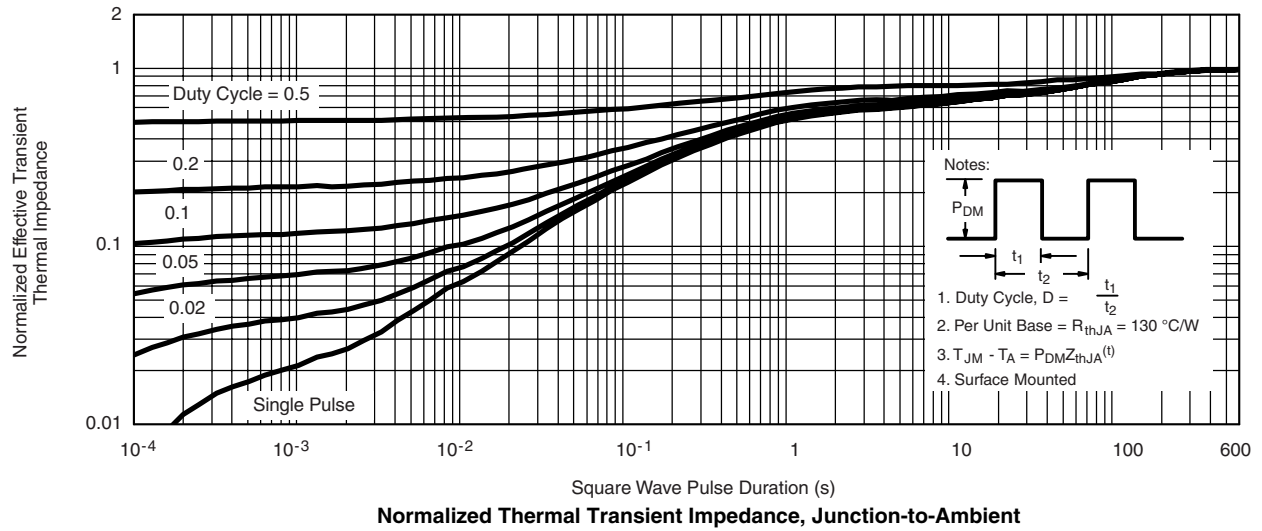
Single Pulse Power



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

Safe Operating Area

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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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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