

## P-Channel 30-V (D-S) MOSFET

### PRODUCT SUMMARY

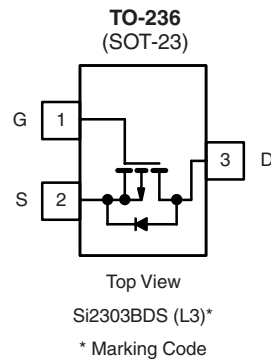
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>b</sup>
- 30	0.200 at $V_{GS} = - 10$ V	- 1.64
	0.380 at $V_{GS} = - 4.5$ V	- 1.0

### FEATURES

- Halogen-free Option Available



**RoHS\***  
COMPLIANT



**Ordering Information:** Si2303BDS-T1  
Si2303BDS-T1-E3 (Lead (Pb)-free)  
Si2303BDS-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	$V_{DS}$	- 30		V
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current ( $T_J = 150$ °C) <sup>b</sup>	$I_D$	- 1.64	- 1.49	A
		- 1.31	- 1.2	
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	- 10		
Continuous Source Current (Diode Conduction) <sup>b</sup>	$I_S$	- 0.75	- 0.6	
Power Dissipation <sup>b</sup>	$P_D$	0.9	0.7	W
		0.57	0.45	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150		°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b</sup>	$R_{thJA}$	120	145	°C/W
Maximum Junction-to-Ambient <sup>c</sup>		140	175	

Notes:

a. Pulse width limited by maximum junction temperature.

b. Surface Mounted on FR4 board,  $t \leq 5$  s.

c. Surface Mounted on FR4 board.

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	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = -10\text{ }\mu\text{A}$	- 30			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -250\text{ }\mu\text{A}$	- 1.0		- 3.0	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -30\text{ V}$ , $V_{GS} = 0\text{ V}$			- 1	$\mu\text{A}$
		$V_{DS} = -30\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 55\text{ }^{\circ}\text{C}$			- 10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}$ , $V_{GS} = -10\text{ V}$	- 6			A
Drain-Source On-Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}$ , $I_D = -1.7\text{ A}$		0.150	0.200	$\Omega$
		$V_{GS} = -4.5\text{ V}$ , $I_D = -1.3\text{ A}$		0.285	0.380	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -5\text{ V}$ , $I_D = -1.7\text{ A}$		2.0		S
Diode Forward Voltage	$V_{SD}$	$I_S = -0.75\text{ A}$ , $V_{GS} = 0\text{ V}$		- 0.85	- 1.2	V
Dynamic <sup>b</sup>						
Total Gate Charge	$Q_g$	$V_{DS} = -15\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D \cong -1.7\text{ A}$		4.3	10	nC
Gate-Source Charge	$Q_{gs}$			0.8		
Gate-Drain Charge	$Q_{gd}$			1.3		
Input Capacitance	$C_{iss}$	$V_{DS} = -15\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ MHz}$		180		pF
Output Capacitance	$C_{oss}$			50		
Reverse Transfer Capacitance	$C_{rss}$			35		
Switching <sup>c</sup>						
Turn-On Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}$ , $R_L = 15\text{ }\Omega$ $I_D \cong -1.0\text{ A}$ , $V_{GEN} = -4.5\text{ V}$ $R_G = 6\text{ }\Omega$		55	80	ns
	$t_r$			40	60	
Turn-Off Time	$t_{d(off)}$			10	20	
	$t_f$			10	20	

Notes:

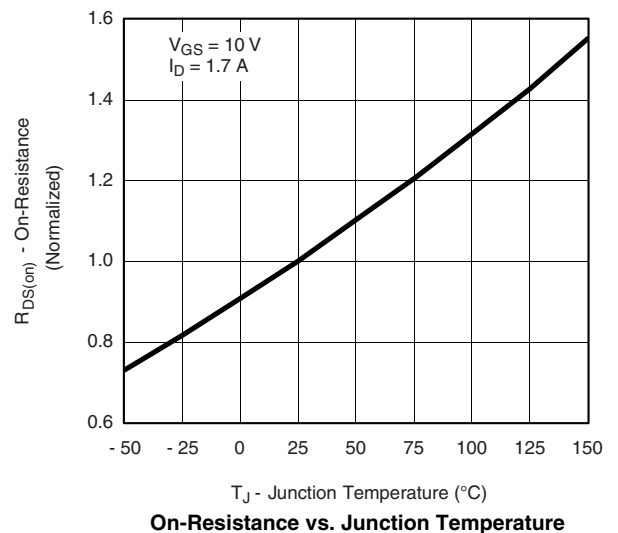
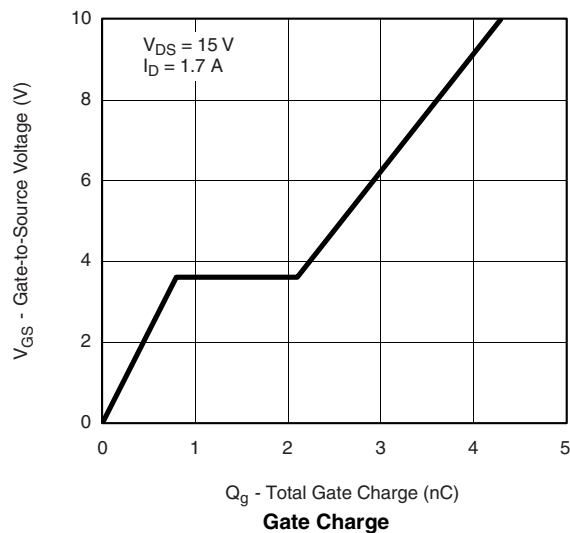
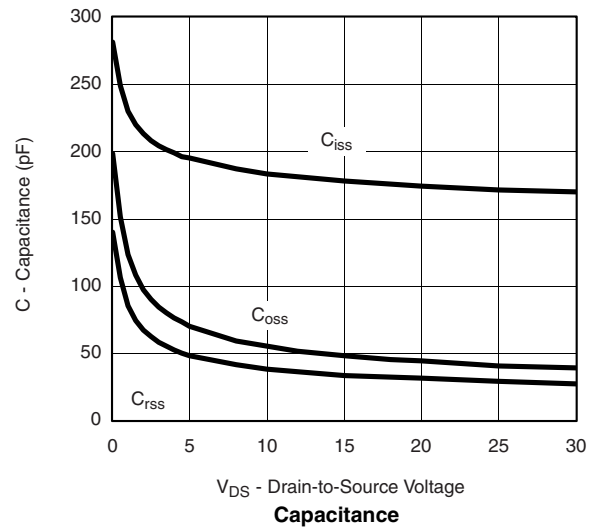
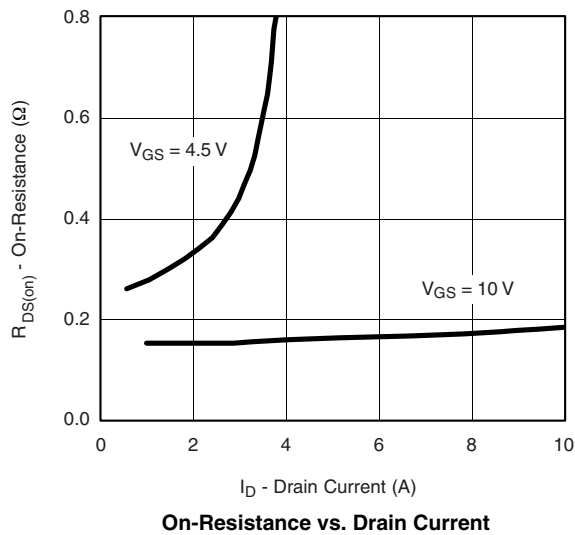
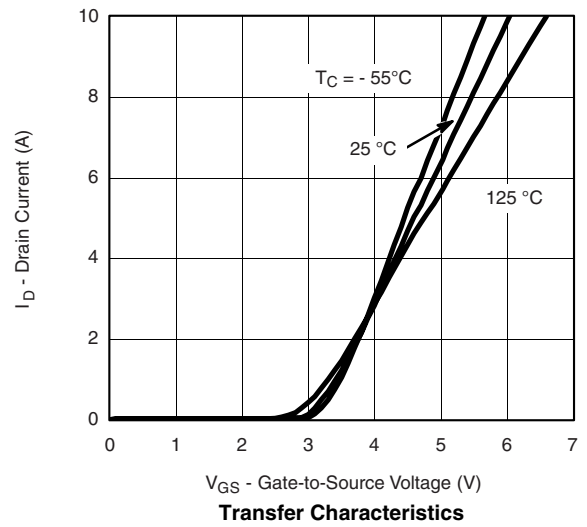
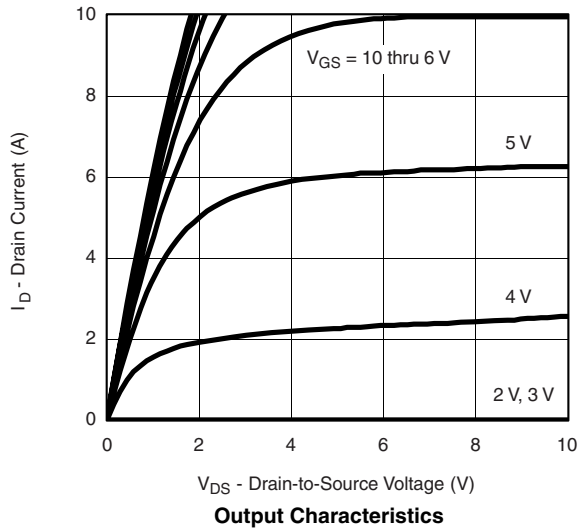
a. Pulse test:  $PW \leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

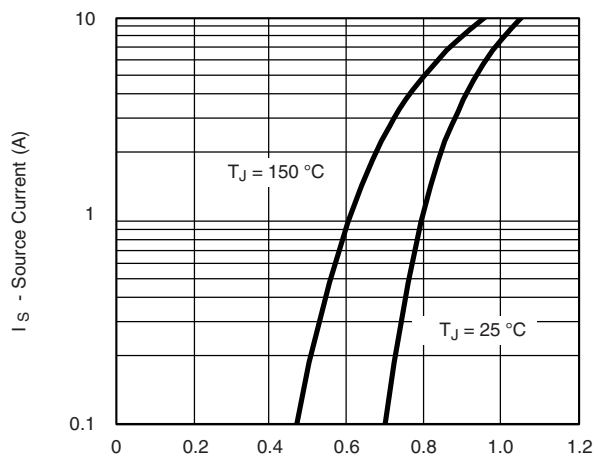
b. For DESIGN AID ONLY, not subject to production testing.

c. Switching time is essentially independent of operating temperature.

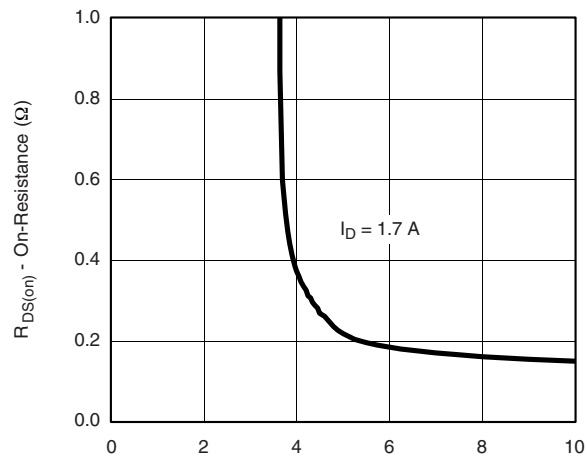
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

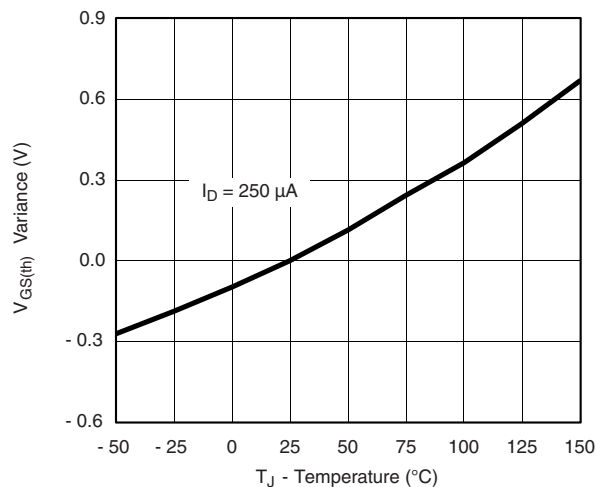


**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

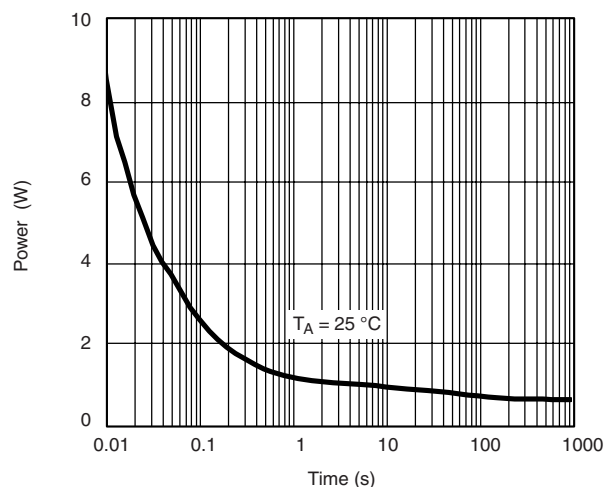
Source-Drain Diode Forward Voltage



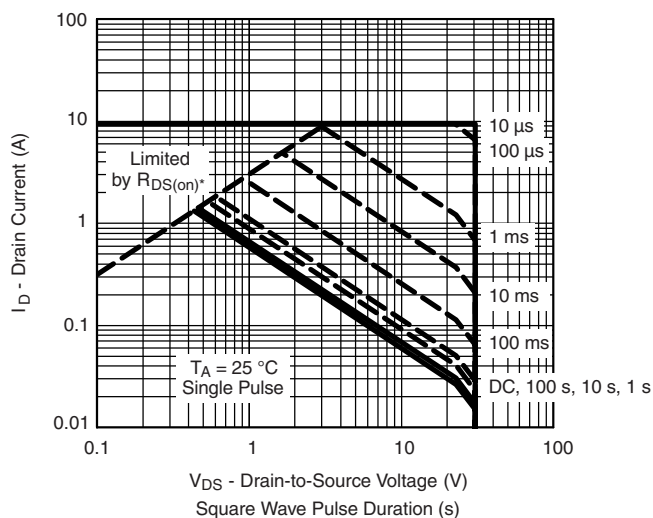
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



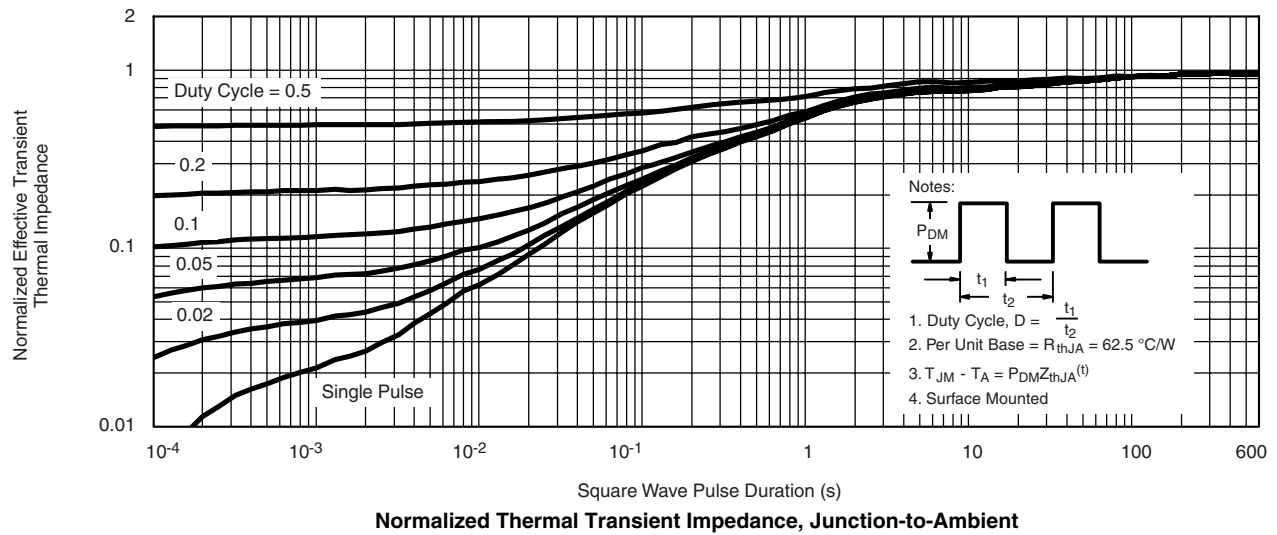
Single Pulse Power



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

Safe Operating Area, Junction-to-Case

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