

N-Channel 30-V (D-S) MOSFET

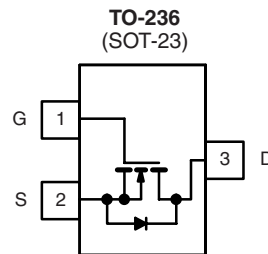
PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
30	0.070 at $V_{GS} = 10$ V	3.2	2.6
	0.105 at $V_{GS} = 4.5$ V	2.6	

FEATURES

- Halogen-free Option Available



RoHS
COMPLIANT



Top View
Si2304BDS (L4)*
* Marking Code

Ordering Information: Si2304BDS-T1-E3 (Lead (Pb)-free)
Si2304BDS-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}	± 20			
Continuous Drain Current ($T_J = 150$ °C) ^{a, b}	I_D	$T_A = 25$ °C	3.2	2.6	A
		$T_A = 70$ °C	2.5	2.1	
Pulsed Drain Current	I_{DM}	10			
Continuous Source Current (Diode Conduction) ^{a, b}	I_S	0.9	0.62		
Maximum Power Dissipation ^{a, b}	P_D	$T_A = 25$ °C	1.08	0.75	W
		$T_A = 70$ °C	0.69	0.48	
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 ^a	R_{thJA}	$t \leq 5$ s	90	115	°C/W
		Steady State	130	166	
Maximum Junction-to-Foot (Drain)	R_{thJF}	60	75		

Notes:

- Surface Mounted on FR4 board, $t \leq 5$ s.
- Pulse width limited by maximum junction temperature.
- Surface Mounted on FR4 board.

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

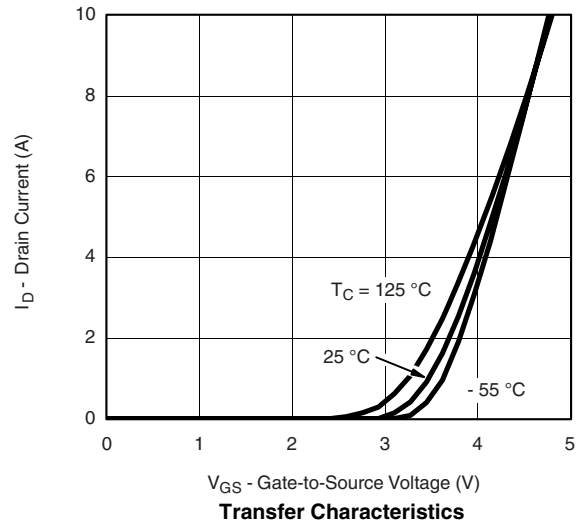
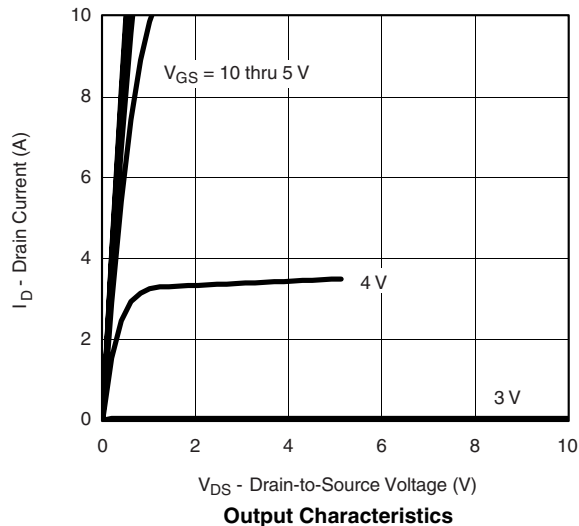
SPECIFICATIONS $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.5		3.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			0.5	μA
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10	
		$V_{DS} = 30\text{ V}, V_{GS} = 1.0\text{ V}, T_J = 25\text{ }^\circ\text{C}$			1	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 4.5\text{ V}, V_{GS} = 10\text{ V}$	6			A
Drain-Source On-Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}$		0.055	0.070	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 2.0\text{ A}$		0.080	0.105	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 4.5\text{ V}, I_D = 2.5\text{ A}$		6.0		S
Diode Forward Voltage	V_{SD}	$I_S = 1.25\text{ A}, V_{GS} = 0\text{ V}$		0.8	1.2	V
Dynamic						
Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 5\text{ V}, I_D = 2.5\text{ A}$		2.6	4	nC
Total Gate Charge	Q_{gt}	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}$		4.6	7	
Gate-Source Charge	Q_{gs}			0.8		
Gate-Drain Charge	Q_{gd}			1.15		
Gate Resistance	R_g	$f = 1.0\text{ MHz}$		3.0		Ω
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		225		pF
Output Capacitance	C_{oss}			50		
Reverse Transfer Capacitance	C_{rss}			28		
Switching						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$		7.5	12	ns
Rise Time	t_r			12.5	20	
Turn-Off Delay Time	$t_{d(off)}$			19	30	
Fall Time	t_f			15	25	

Notes:

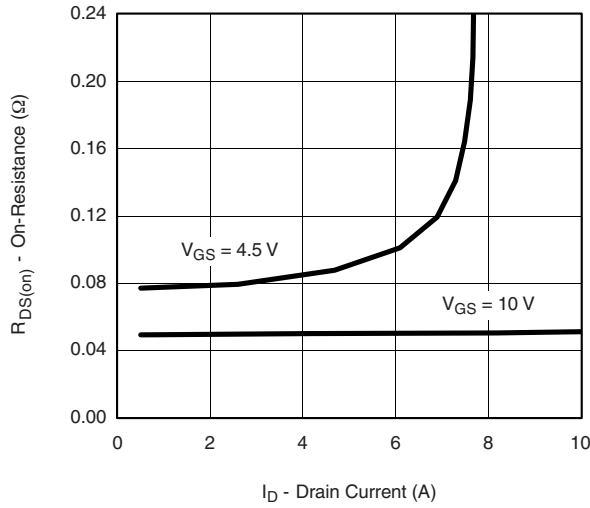
a. Pulse test: $PW \leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

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.

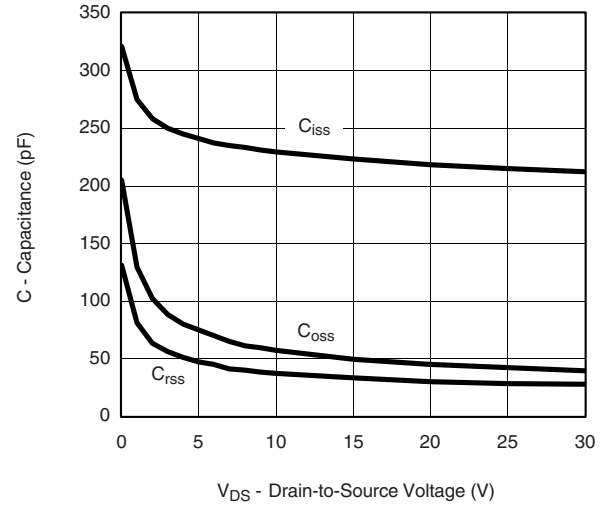
TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$, unless otherwise noted



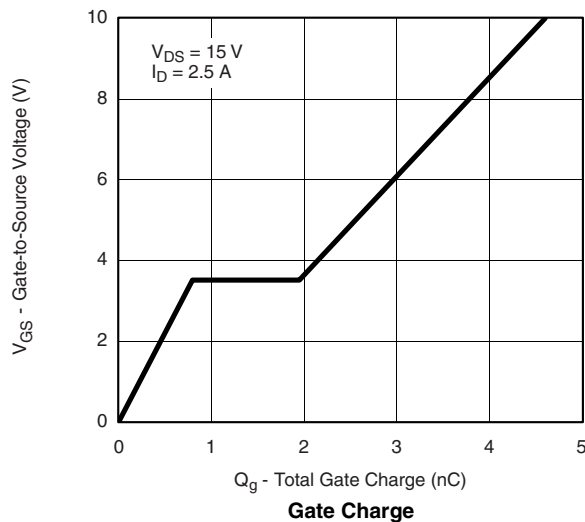
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



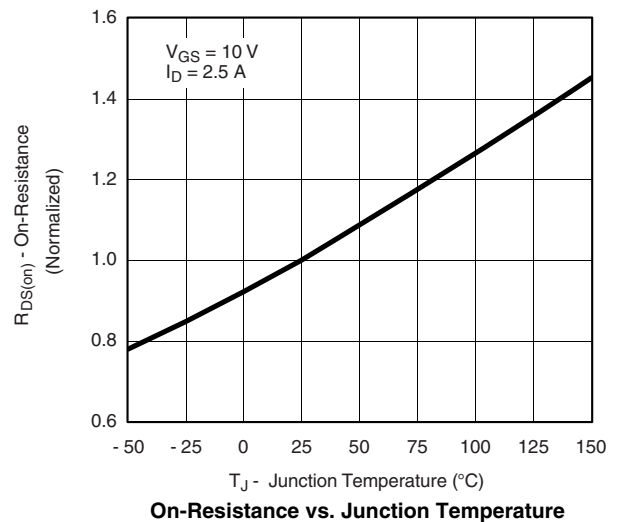
On-Resistance vs. Drain Current



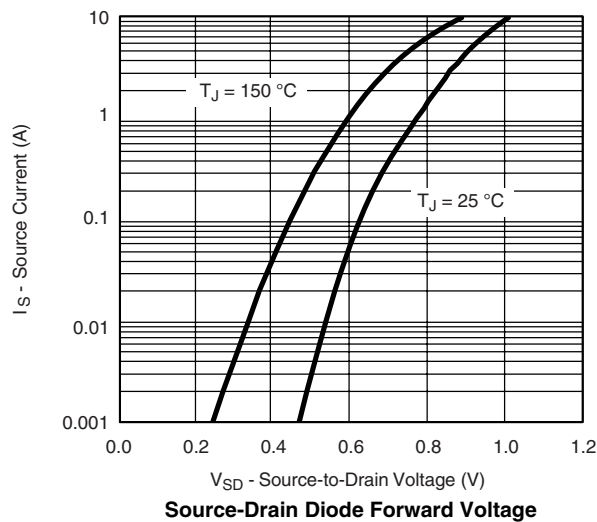
Capacitance



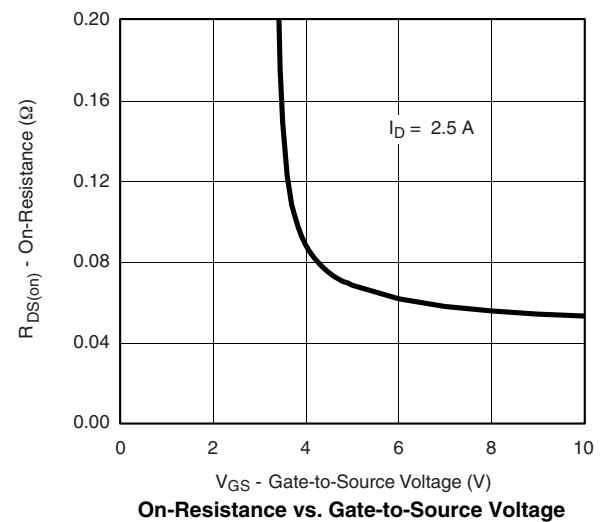
Gate Charge



On-Resistance vs. Junction Temperature

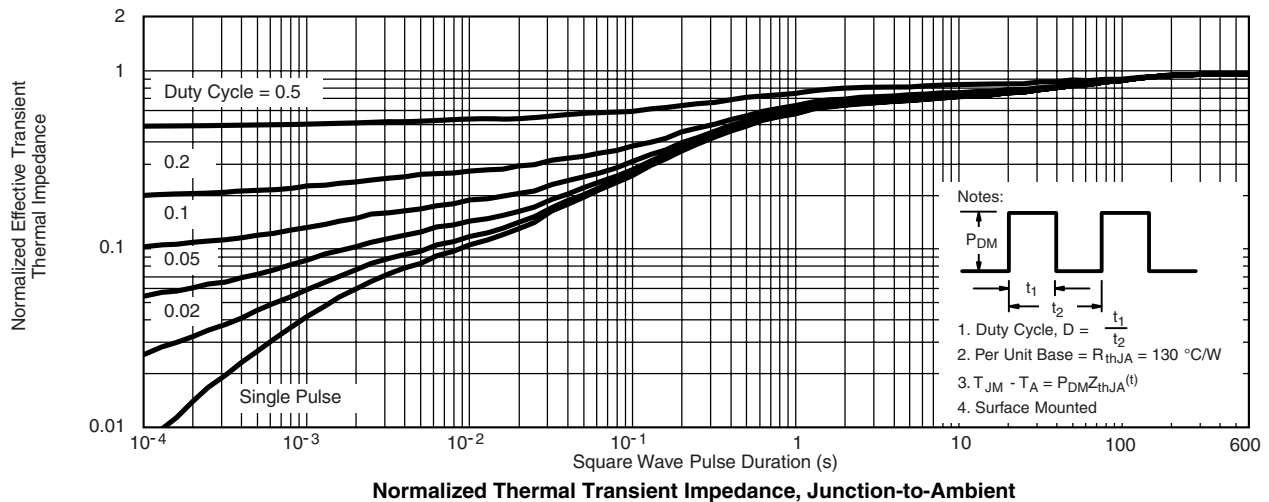
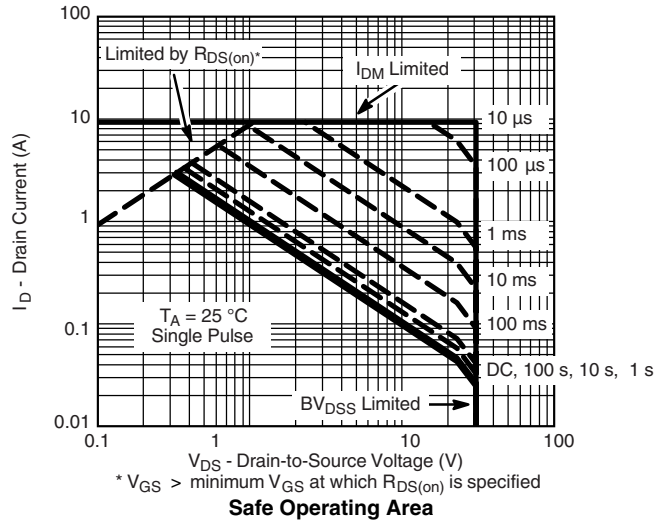
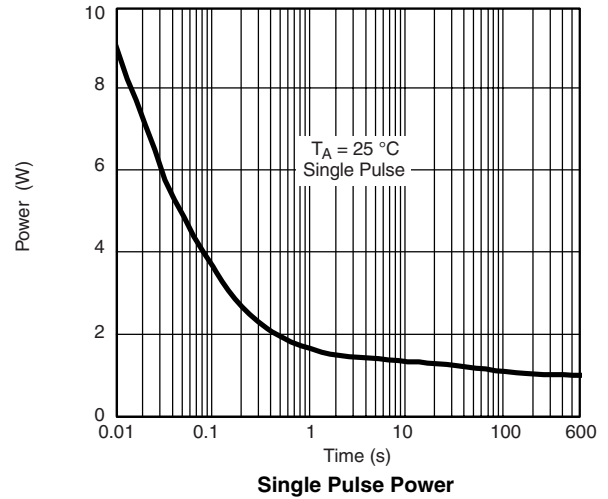
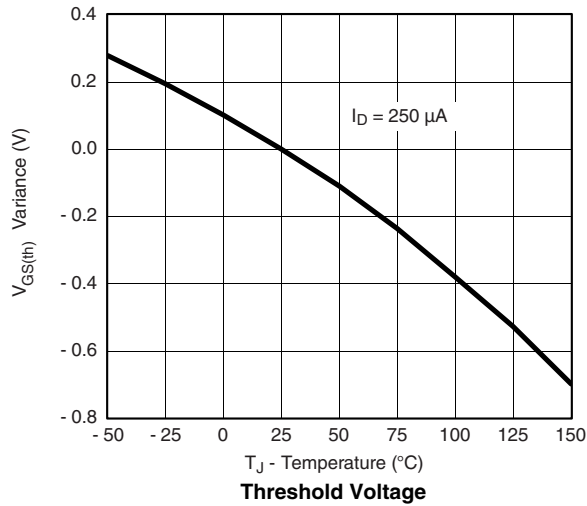


Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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