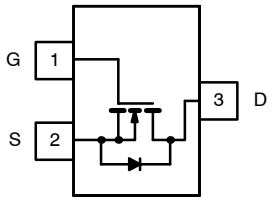
N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.070 @ V_{GS} = 10 V	3.2
	0.105 @ V_{GS} = 4.5 V	2.6

TO-236
(SOT-23)



Top View
Si2304BDS (L4)*
*Marking Code

Ordering Information: Si2304BDS-T1—E3

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	5 sec	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]	T_A = 25°C	I_D	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]	T_A = 25°C	P_D	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]	t ≤ 5 sec	R_{thJA}	90	115	°C/W
	Steady State		130	166	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	60	75	

Notes
a. Surface Mounted on FR4 Board, t ≤ 5 sec.
b. Pulse width limited by maximum junction temperature.
c. Surface Mounted on FR4 Board.

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

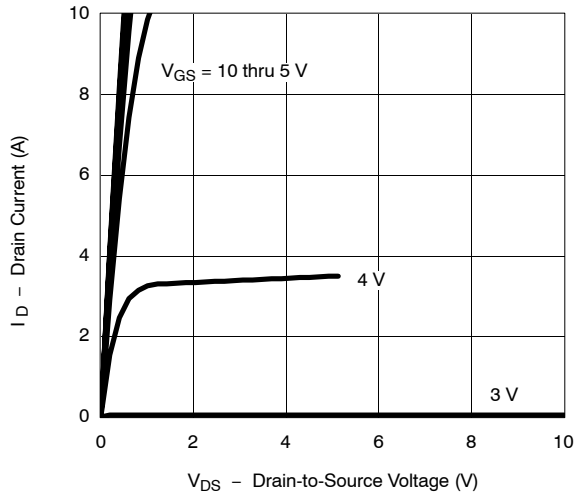
SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

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

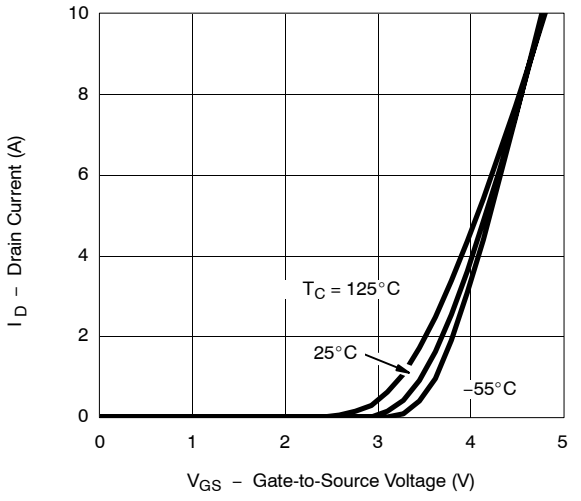
Notes
a. Pulse test: PW ≤300 µs duty cycle ≤2%.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Output Characteristics

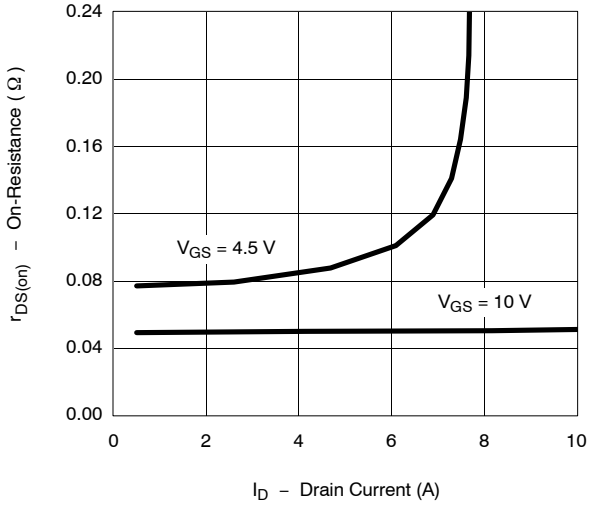


Transfer Characteristics

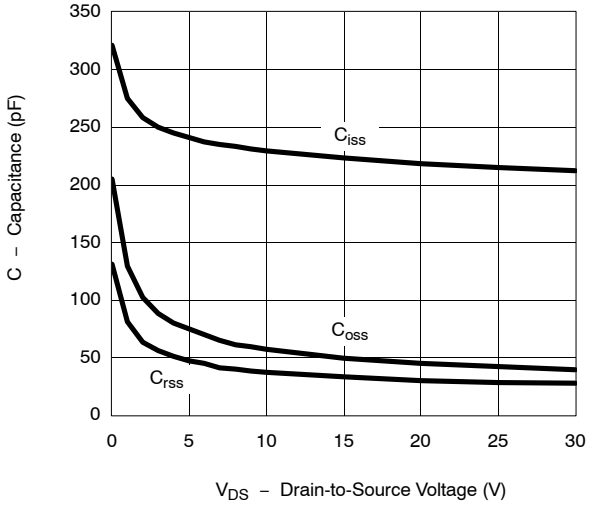


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

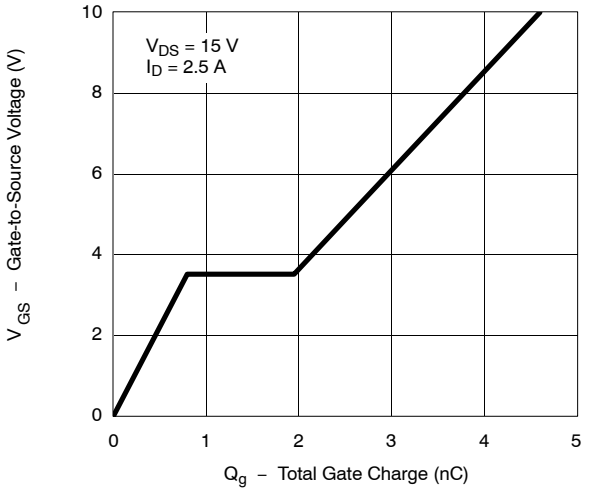
On-Resistance vs. Drain Current



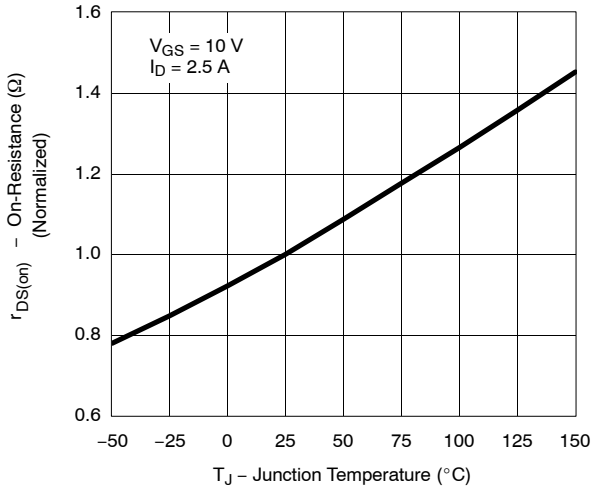
Capacitance



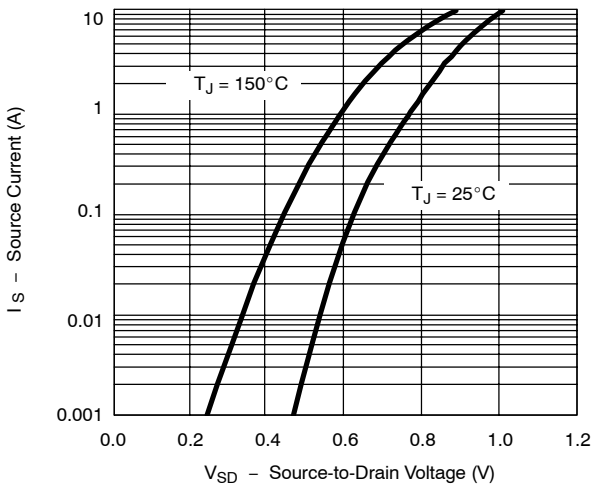
Gate Charge



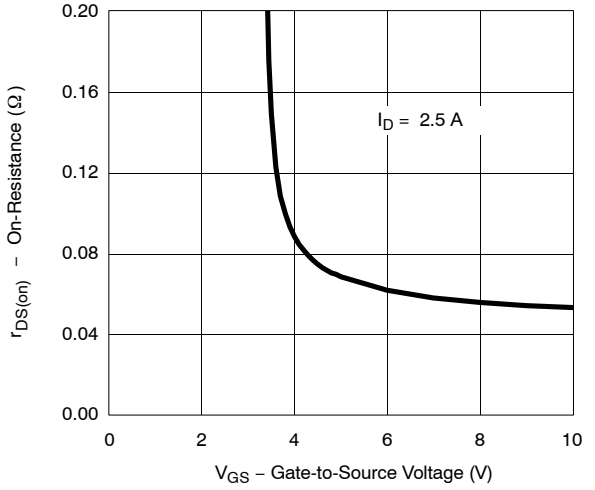
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

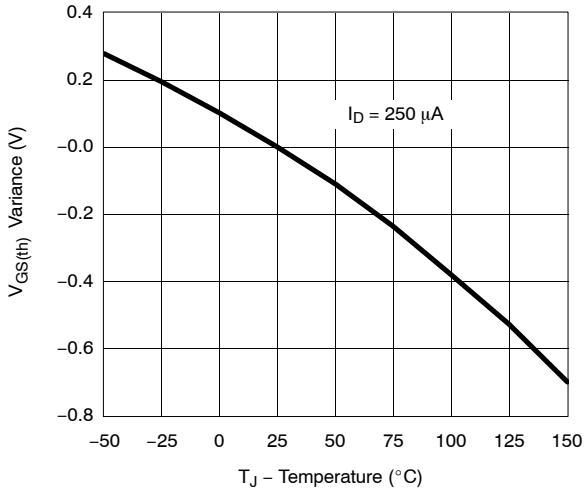


On-Resistance vs. Gate-to-Source Voltage

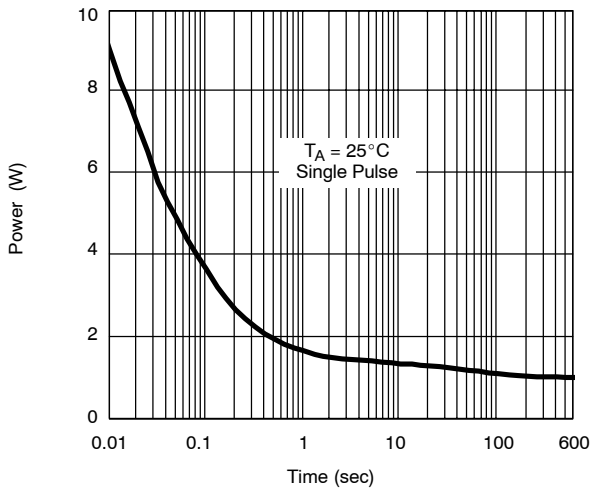


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

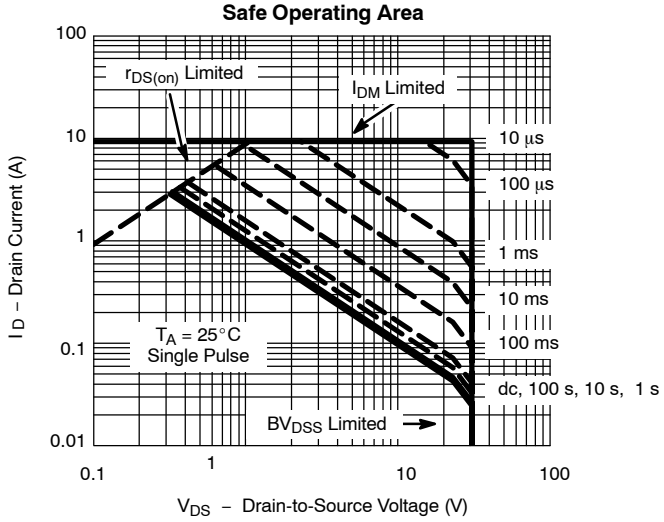
Threshold Voltage



Single Pulse Power



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient