N-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
20	0.057 at V_{GS} = 4.5 V	2.9	3.5
	0.075 at V_{GS} = 2.5 V	2.6	

FEATURES

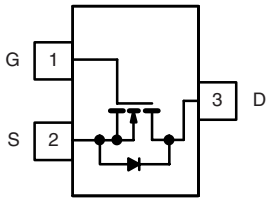
- **Halogen-free Option Available**
- TrenchFET® Power MOSFET

Pb-free
RoHS COMPLIANT

APPLICATIONS

- Load Switching for Portable Devices
- DC/DC Converter

TO-236
(SOT-23)



Top View

Si2302CDS (N2)*

* Marking Code

Ordering Information: Si2302CDS-T1-E3 (Lead (Pb)-free)
Si2302CDS-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}	20		V
Gate-Source Voltage		V_{GS}	± 8		
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25 °C	I_D	2.9	2.6	A
	T_A = 70 °C		2.3	2.1	
Pulsed Drain Current[b]		I_{DM}	10		
Continuous Source Current (Diode Conduction)[a]		I_S	0.72	0.6	
Power Dissipation[a]	T_A = 25 °C	P_D	0.86	0.71	W
	T_A = 70 °C		0.55	0.46	
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 s	R_{thJA}	120	145	°C/W
	Steady State		140	175	
Maximum Junction-to-Foot	Steady State	R_{thJF}	62	78	

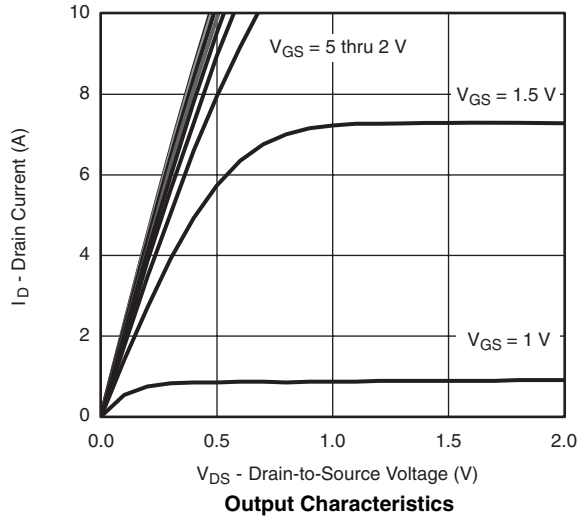
Notes:
a. Surface Mounted on 1" x 1" FR4 board.
b. Pulse width limited by maximum junction temperature.

SPECIFICATIONS T_A = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Limits**			**Unit**
			Min.	**Typ.**	**Max.**	
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	20			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	0.40		0.85	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 8 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0 V			1	µA
		V_{DS} = 20 V, V_{GS} = 0 V, T_J = 70 °C			75	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 10 V, V_{GS} = 4.5 V	6			A
Drain-Source On-Resistance[a]	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 3.6 A		0.045	0.057	Ω
		V_{GS} = 2.5 V, I_D = 3.1 A		0.056	0.075	
Forward Transconductance[a]	g_{fs}	V_{DS} = 5 V, I_D = 3.6 A		13		S
Diode Forward Voltage	V_{SD}	I_S = 0.95 A, V_{GS} = 0 V		0.7	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 3.6 A		3.5	5.5	nC
Gate-Source Charge	Q_{gs}			0.6		
Gate-Drain Charge	Q_{gd}			0.45		
Gate Resistance	R_g	f = 1.0 MHz	2.0	4.0	8.0	Ω
Switching						
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 10 V, R_L = 2.78 Ω $I_D \cong$ 3.6 A, V_{GEN} = 4.5 V, R_g = 1 Ω		8	15	ns
Rise Time	t_r			7	15	
Turn-Off Delay Time	$t_{d(off)}$			30	45	
Fall Time	t_f			7	15	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 3.6 A, dI/dt = 100 A/µs		8.5	15	
Body Diode Reverse Recovery Charge	Q_{rr}			2.0	4.0	nC

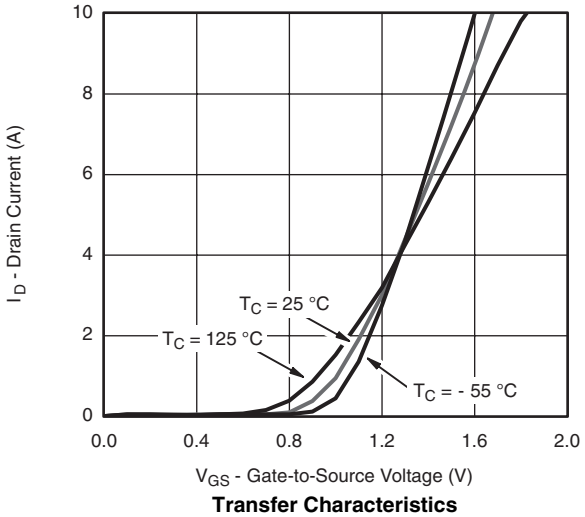
Notes:
a. Pulse test: Pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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

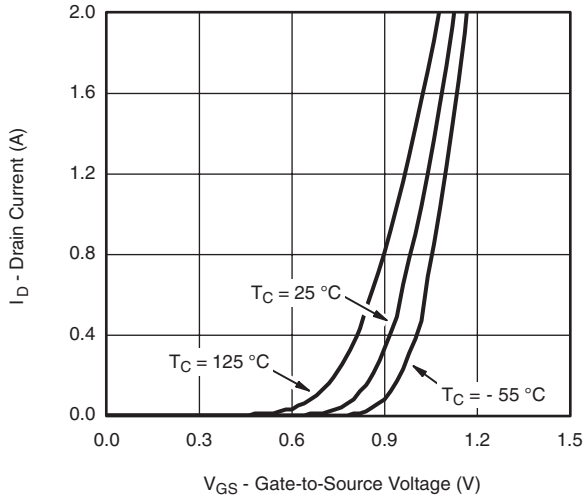


Output Characteristics

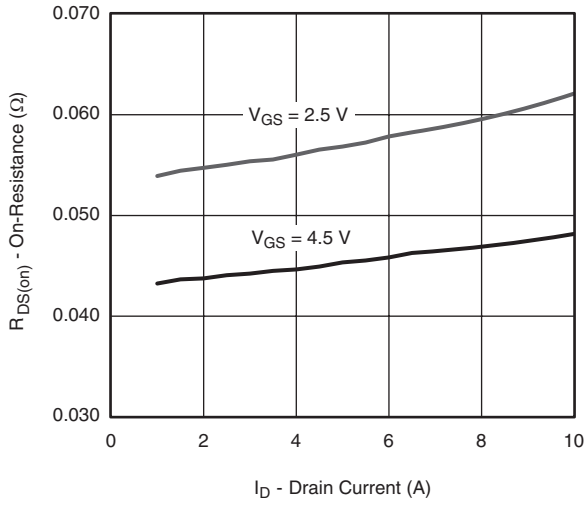


Transfer Characteristics

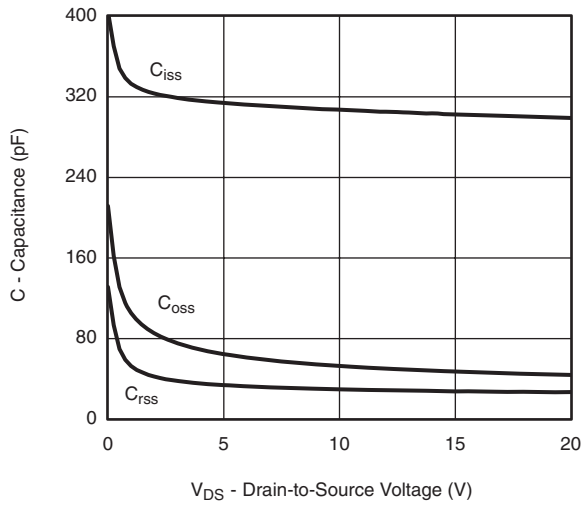
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



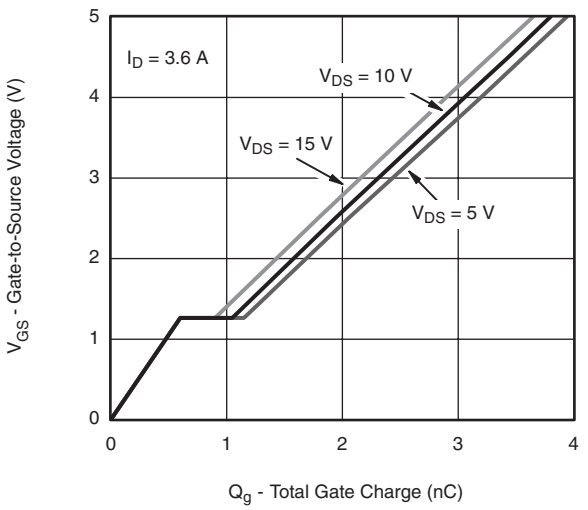
Transfer Characteristics



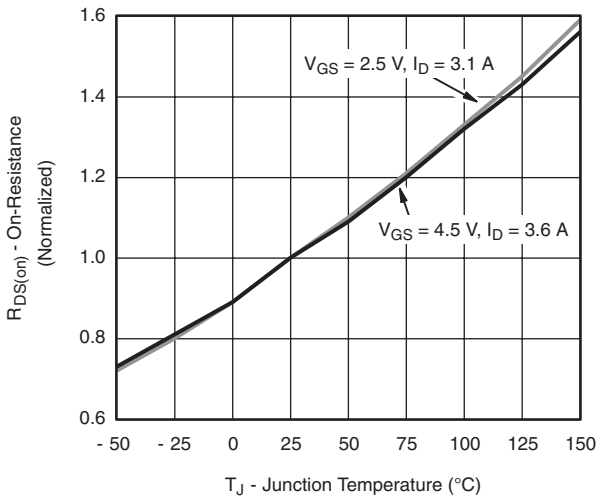
On-Resistance vs. Drain Current



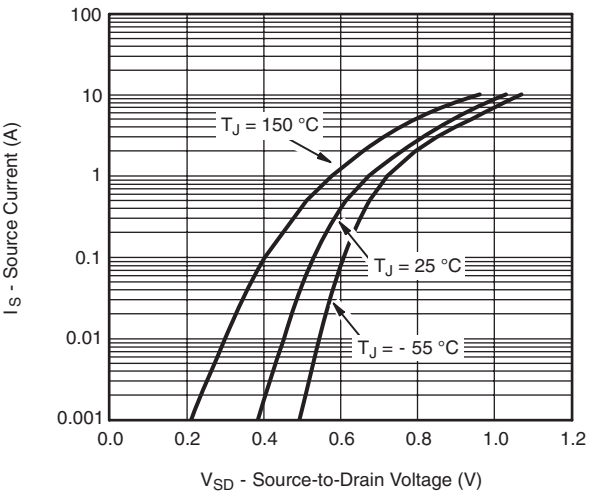
Capacitance



Gate Charge



On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

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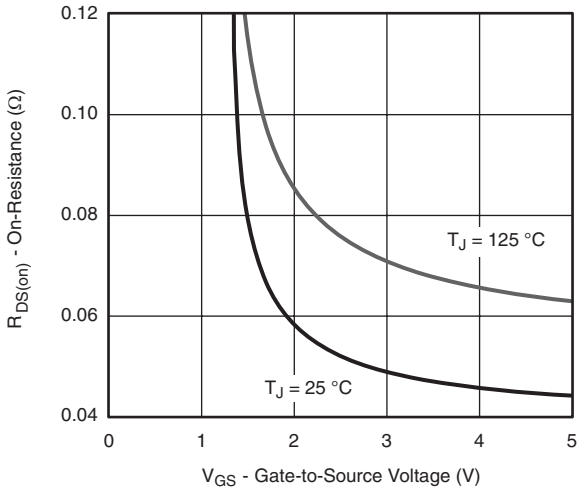
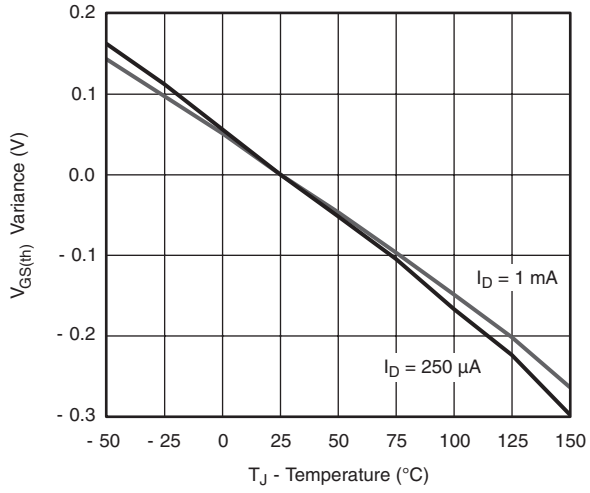
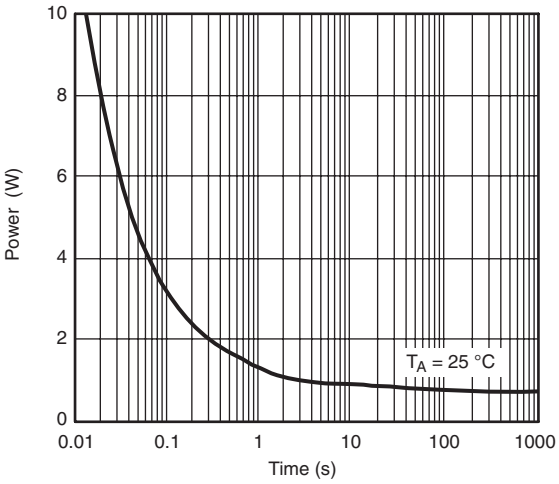


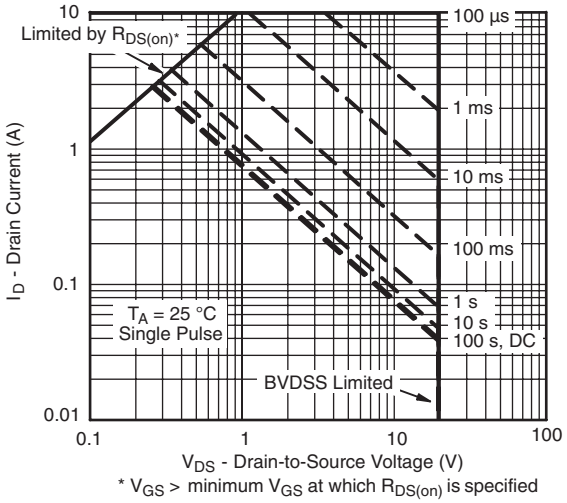
On-Resistance vs. Gate-to-Source Voltage



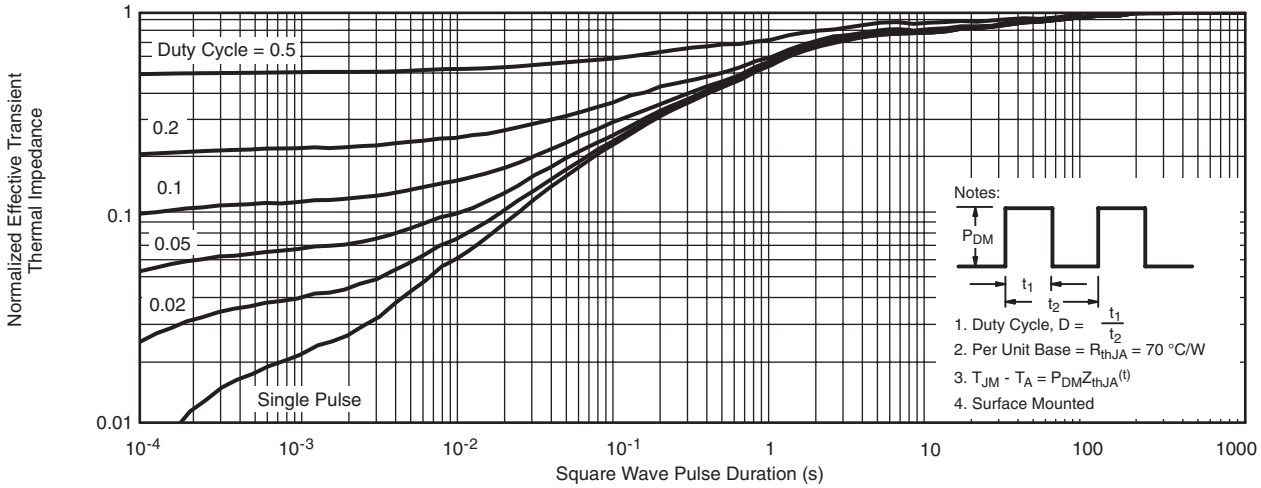
Threshold Voltage



Single Pulse Power



Safe Operating Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

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