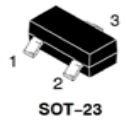
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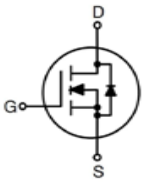
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Si2302CDS
N-Channel 20 V (D-S) MOSFET



SOT-23

1 – Gate
2 – Source
3 – Drain



FEATURES

- TrenchFET® power MOSFET

APPLICATIONS

- Load switching for portable devices
- DC/DC converter

Marking code: N2

PRODUCT SUMMARY	
V_{DS} (V)	20
$R_{DS(on)}$ max. (Ω) at V_{GS} = 4.5 V	0.057
$R_{DS(on)}$ max. (Ω) at V_{GS} = 2.5 V	0.075
Q_g typ. (nC)	3.5
I_D (A)	2.9
Configuration	Single

ORDERING INFORMATION	
Package	SOT-23
Lead (Pb)-free	Si2302CDS-T1-E3
Lead (Pb)-free and halogen-free	Si2302CDS-T1-GE3

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

PARAMETER		SYMBOL	5 S	STEADY STATE	UNIT
Drain-source voltage		V_{DS}	20	20	V
Gate-source voltage		V_{GS}	± 8	± 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	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	-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

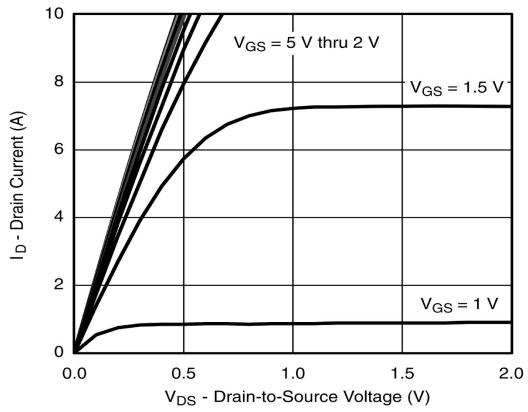
a. Surface mounted on 1" x 1" FR4 board
b. Pulse width limited by maximum junction temperature

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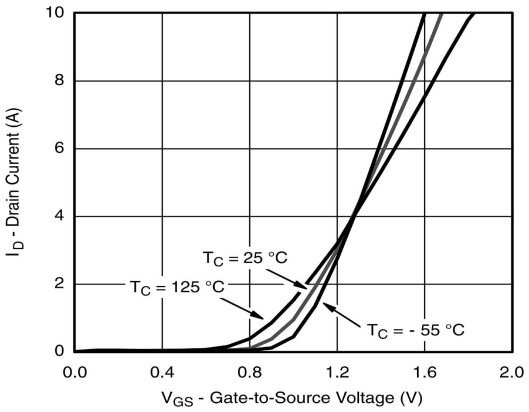
SPECIFICATIONS (T_A = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**LIMITS**			**UNIT**
			MIN.	**TYP.**	**MAX.**	
Static						
Drain-source breakdown voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	20	-	-	V
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	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	-	-	0.1	µA
		V_{DS} = 20 V, V_{GS} = 0 V, T_J = 50 °C	-	-	4	
		V_{DS} = 20 V, V_{GS} = 0 V, T_J = 70 °C	-	-	15	
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 MHz	2	4	8	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	4	nC

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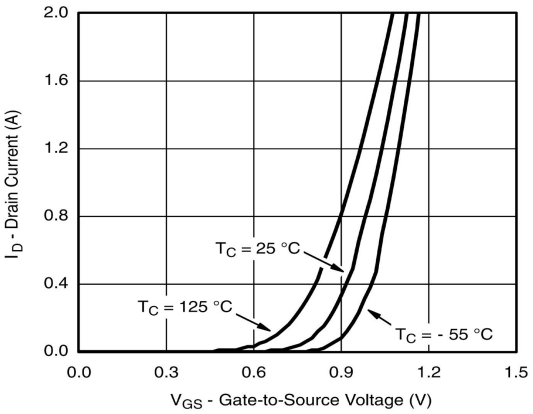
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



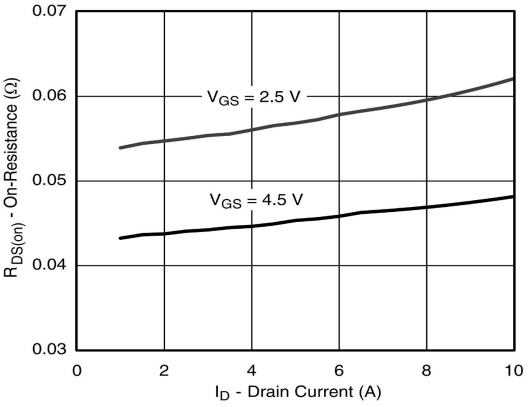
Output Characteristics



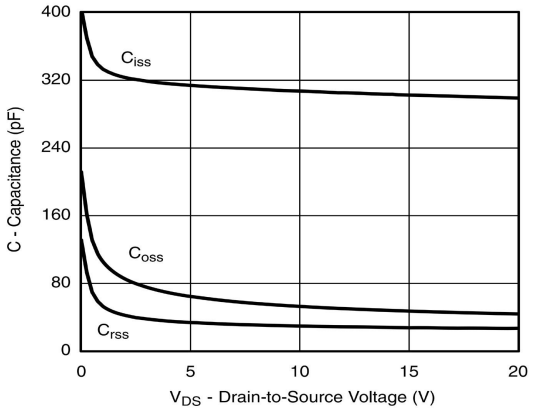
Transfer Characteristics



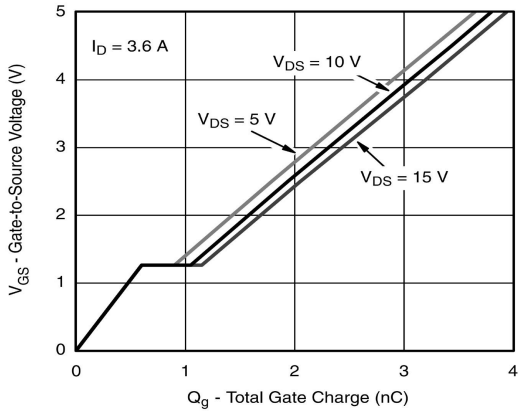
Transfer Characteristics



On-Resistance vs. Drain Current



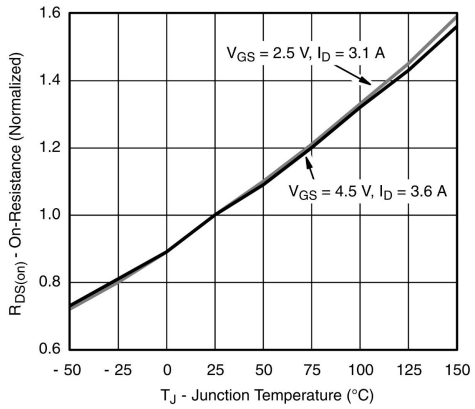
Capacitance



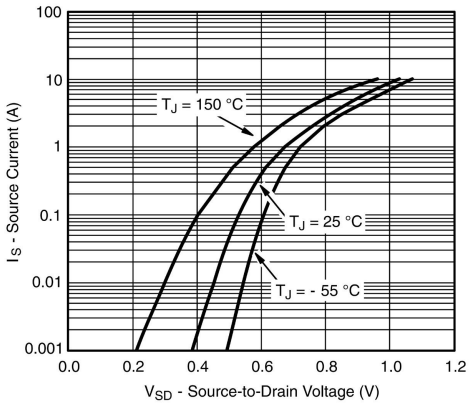
Gate Charge

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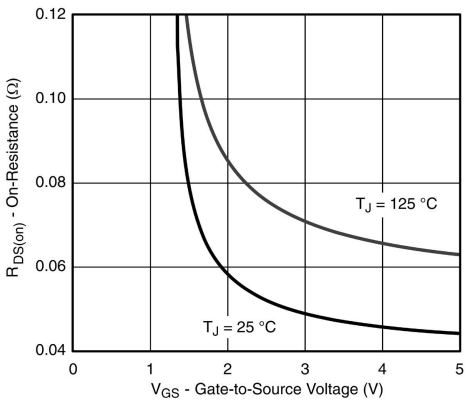
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



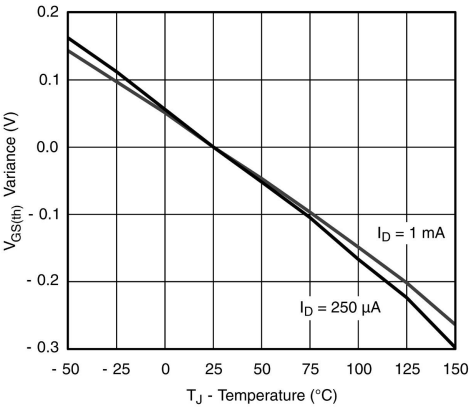
On-Resistance vs. Junction Temperature



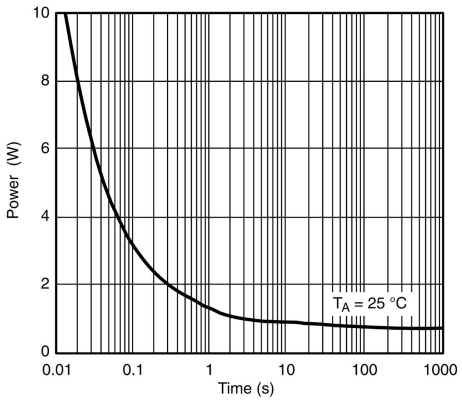
Source-Drain Diode Forward Voltage



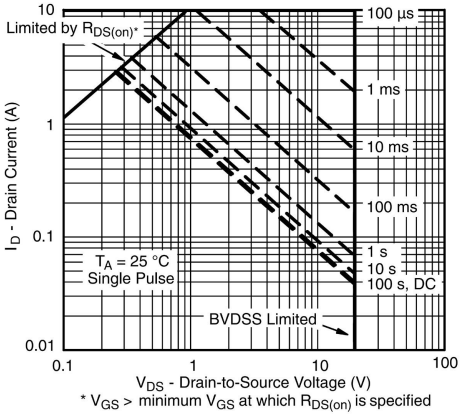
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



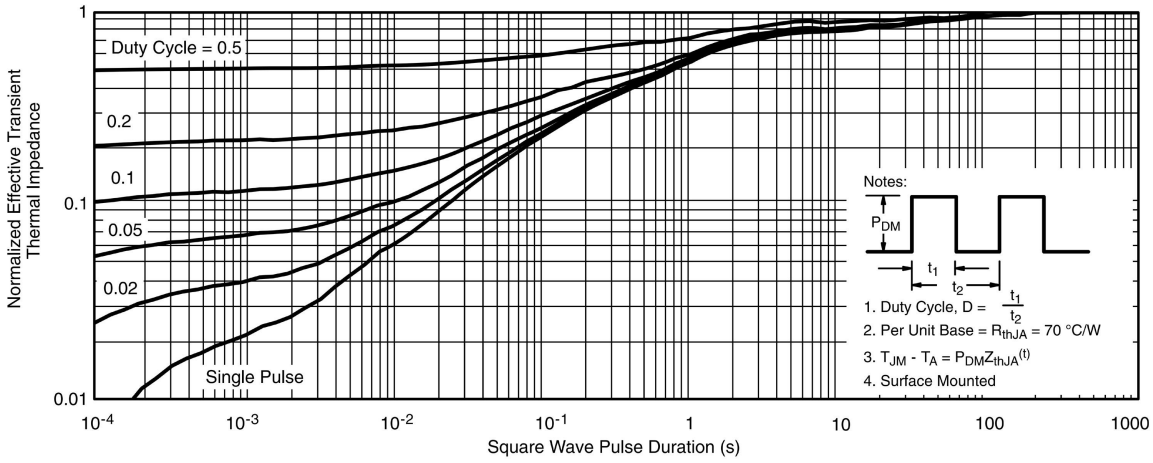
Single Pulse Power



Safe Operating Area, Junction-to-Ambient

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TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



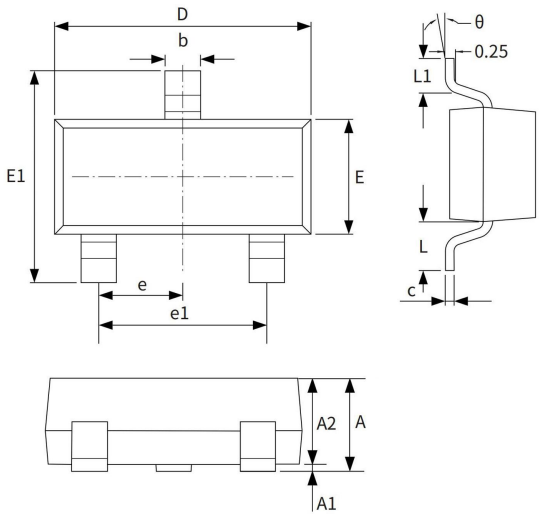
Normalized Thermal Transient Impedance, Junction-to-Ambient

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Ordering Information

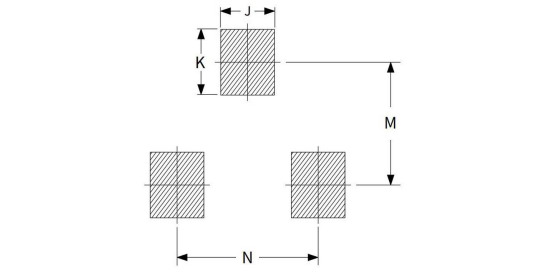
PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
SOT-23	R1	0.008	3000	30000	240000	7''

Package Outline Dimensions (SOT-23)



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.15	0.035	0.045
A1	-	0.10	-	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.50	0.012	0.020
c	0.10	0.20	0.004	0.008
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
E1	2.25	2.55	0.089	0.100
e	0.950TYP		0.037TYP	
e1	1.80	2.00	0.071	0.079
L	0.550REF		0.022REF	
L1	0.30	0.50	0.012	0.020
θ	-	8°	-	8°

Suggested Pad Layout



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
J	0.75	0.85	0.030	0.033
K	0.85	0.95	0.033	0.037
M	1.95	2.05	0.077	0.081
N	1.85	1.95	0.073	0.077