



# SI2302CDS

PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ.)
20	0.057 at V <sub>GS</sub> = 4.5 V	2.9	3.5
	0.075 at V <sub>GS</sub> = 2.5 V	2.6	

## FEATURES

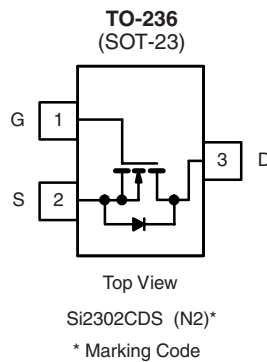
- Halogen-free Option Available
- TrenchFET® Power MOSFET



RoHS  
COMPLIANT

## APPLICATIONS

- Load Switching for Portable Devices
- DC/DC Converter



Ordering Information: Si2302CDS-T1-E3 (Lead (Pb)-free)  
Si2302CDS-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS T <sub>A</sub> = 25 °C, unless otherwise noted					
Parameter	Symbol	5 s	Steady State	Unit	
Drain-Source Voltage	V <sub>DS</sub>	20		V	
Gate-Source Voltage	V <sub>GS</sub>	± 8			
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25 °C	2.9	2.6	A
		T <sub>A</sub> = 70 °C	2.3	2.1	
Pulsed Drain Current <sup>b</sup>	I <sub>DM</sub>	10			
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	0.72	0.6		
Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25 °C	0.86	0.71	W
		T <sub>A</sub> = 70 °C	0.55	0.46	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150		°C	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	t ≤ 5 s	120	145	°C/W
		Steady State	140	175	
Maximum Junction-to-Foot	R <sub>thJF</sub>	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 $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	20			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.40		0.85	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, T_J = 70\text{ }^\circ\text{C}$			75	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = 4.5\text{ V}$	6			A
Drain-Source On-Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 3.6\text{ A}$		0.045	0.057	$\Omega$
		$V_{GS} = 2.5\text{ V}, I_D = 3.1\text{ A}$		0.056	0.075	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 5\text{ V}, I_D = 3.6\text{ A}$		13		S
Diode Forward Voltage	$V_{SD}$	$I_S = 0.95\text{ A}, V_{GS} = 0\text{ V}$		0.7	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 3.6\text{ A}$		3.5	5.5	nC
Gate-Source Charge	$Q_{gs}$			0.6		
Gate-Drain Charge	$Q_{gd}$			0.45		
Gate Resistance	$R_g$	$f = 1.0\text{ MHz}$	2.0	4.0	8.0	$\Omega$
<b>Switching</b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10\text{ V}, R_L = 2.78\text{ }\Omega$ $I_D \cong 3.6\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\text{ }\Omega$		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	$t_{rr}$	$I_F = 3.6\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$		8.5	15	nC
Body Diode Reverse Recovery Charge	$Q_{rr}$			2.0	4.0	

Notes:

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

b. Guaranteed by design, not subject to production testing.