



SI2301CDS

MOSFET PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a	Q_g (Typ.)
- 20	0.112 at $V_{GS} = - 4.5$ V	- 3.1	3.3 nC
	0.142 at $V_{GS} = - 2.5$ V	- 2.7	

FEATURES

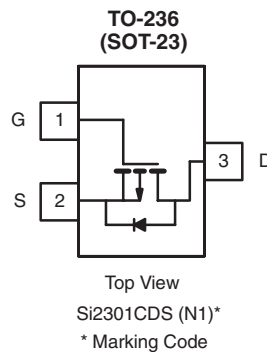
- Halogen-free Option Available
- TrenchFET® Power MOSFET



RoHS COMPLIANT

APPLICATIONS

- Load Switch



Ordering Information: Si2301CDS-T1-E3 (Lead (Pb)-free)
Si2301CDS-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 20	V
Gate-Source Voltage	V_{GS}	± 8	
Continuous Drain Current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	- 3.1
		$T_C = 70$ °C	- 2.5
		$T_A = 25$ °C	- 2.3 ^{b, c}
		$T_A = 70$ °C	- 1.8 ^{b, c}
Pulsed Drain Current	I_{DM}	- 10	A
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C	
		$T_A = 25$ °C	- 0.72 ^{b, c}
Maximum Power Dissipation	P_D	$T_C = 25$ °C	1.6
		$T_C = 70$ °C	1.0
		$T_A = 25$ °C	0.86 ^{b, c}
		$T_A = 70$ °C	0.55 ^{b, c}
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 ^{b, d}	R_{thJA}	120	145	°C/W
Maximum Junction-to-Foot (Drain)	R_{thJF}	62	78	

Notes:

- Based on $T_C = 25$ °C.
- Surface Mounted on 1" x 1" FR4 board.
- $t = 5$ s.
- Maximum under Steady State conditions is 175 °C/W.

MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-20			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		-18		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		2.2			
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-0.4		-1	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -4.5\text{ V}$	-6			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -2.8\text{ A}$		0.090	0.112	Ω
		$V_{GS} = -2.5\text{ V}, I_D = -2.0\text{ A}$		0.110	0.142	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\text{ V}, I_D = -2.8\text{ A}$		2.0		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		405		pF
Output Capacitance	C_{oss}		75			
Reverse Transfer Capacitance	C_{rss}		55			
Total Gate Charge	Q_g	$V_{DS} = -10\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -3\text{ A}$		5.5	10	nC
				3.3	6	
Gate-Source Charge	Q_{gs}	$V_{DS} = -10\text{ V}, V_{GS} = -2.5\text{ V}, I_D = -3\text{ A}$		0.7		
Gate-Drain Charge	Q_{gd}		1.3			
Gate Resistance	R_g	$f = 1\text{ MHz}$		6.0		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}, R_L = 10\text{ }\Omega$ $I_D = -1\text{ A}, V_{GEN} = -4.5\text{ V}, R_G = 1\text{ }\Omega$		11	20	ns
Rise Time	t_r		35	60		
Turn-Off Delay Time	$t_{d(off)}$		30	50		
Fall Time	t_f		10	20		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			-1.3	A
Pulse Diode Forward Current ^a	I_{SM}				-10	
Body Diode Voltage	V_{SD}	$I_S = -0.7\text{ A}$		-0.8	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -3.0\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		30	50	ns
Body Diode Reverse Recovery Charge	Q_{rr}		25	50	nC	
Reverse Recovery Fall Time	t_a		15		ns	
Reverse Recovery Rise Time	t_b		15			

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.