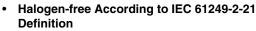


SI2302DS-T1-GE3 N-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY						
V _{DS} (V)	$R_{DS(on)}\left(\Omega\right)$	I _D (A) ^e	Q _g (Typ.)			
	0.028 at V _{GS} = 4.5 V	6 ^a				
20	0.042 at V _{GS} = 2.5 V	6 ^a	8.8 nC			
	0.050 at V _{GS} = 1.8 V	5.6				



FEATURES





- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



HALOGEN FREE

APPLICATIONS

- DC/DC Converters
- Load Switch for Portable Applications

	SOT-23		
G 1 S 2		3	D
	Top View		

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}	± 12	v	
T _C =			6 ^a		
Continuous Prain Current /T - 150 °C)	T _C = 70 °C] ,]	5.1		
Continuous Drain Current (T _J = 150 °C)	T _A = 25 °C	- I _D	5 ^{b, c}		
	T _A = 70 °C		4 ^{b, c}	Α	
Pulsed Drain Current		I _{DM}	20		
Continuous Source-Drain Diode Current T _C = 25 °C			1.75		
Continuous Source-Drain Diode Current	T _A = 25 °C	l _S	1.04 ^{b, c}		
	T _C = 25 °C		2.1		
Maximum Power Dissipation	T _C = 70 °C	P _D	1.3	w	
Maximum Fower Dissipation	T _A = 25 °C		1.25 ^{b, c}	VV	
	T _A = 70 °C]	0.8 ^{b, c}		
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150	°C	
Soldering Recommendations (Peak Tempera	ature)		260		

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{b, d}	t ≤ 5 s	R _{thJA}	80	100	°C/W	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	40	60]	

Notes:

- a. Package limited
- b. Surface Mounted on 1" x 1" FR4 board.
- d. Maximum under steady state conditions is 125 °C/W.
- e. Based on T_C = 25 °C.



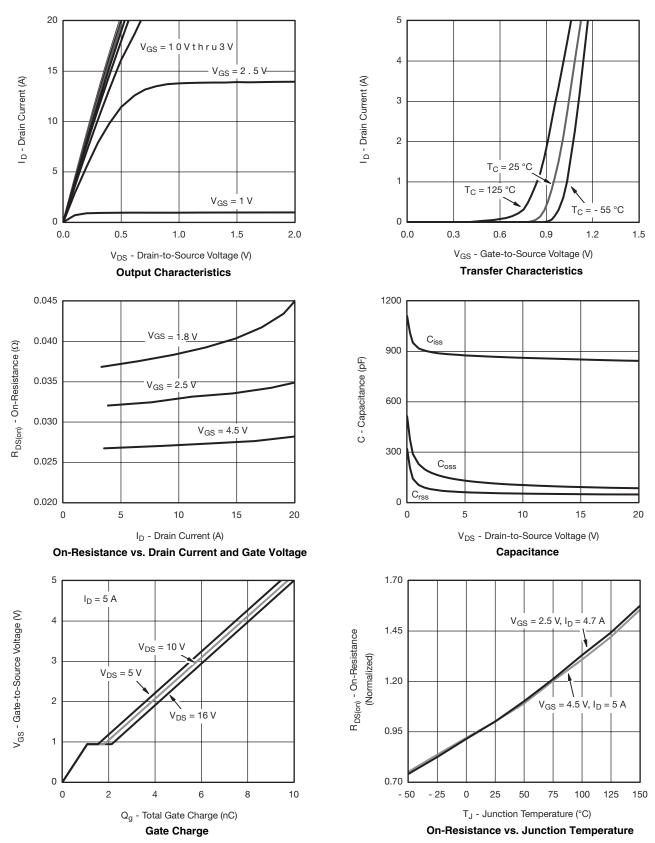
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static	<u> </u>		,				
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	20			V	
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I _D = 250 μA		25		mV/°C	
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I _D = 250 μA		- 2.6			
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}$, $I_{D} = 250 \mu A$	0.45		1.0	V	
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 8 \text{ V}$			± 100	nA	
	,	$V_{DS} = 20 \text{ V}, V_{GS} = 0 \text{ V}$			1	μΑ	
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = 20 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 70 \text{ °C}$			10		
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \le 5 \text{ V}, V_{GS} = 4.5 \text{ V}$	20			Α	
	. ,	$V_{GS} = 4.5 \text{ V}, I_D = 5.0 \text{ A}$		0.028			
Drain-Source On-State Resistance ^a	R _{DS(on)}	$V_{GS} = 2.5 \text{ V}, I_D = 4.7 \text{ A}$		0.042		Ω	
	` '	$V_{GS} = 1.8 \text{ V}, I_D = 4.3 \text{ A}$		0.050			
Forward Transconductance ^a	9 _{fs}	V _{DS} = 10 V, I _D = 5.0 A		24		S	
Dynamic ^b		-		l	l		
Input Capacitance	C _{iss}			865			
Output Capacitance	C _{oss}	$V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		105		pF	
Reverse Transfer Capacitance	C _{rss}			55			
·		$V_{DS} = 10 \text{ V}, V_{GS} = 5 \text{ V}, I_D = 5.0 \text{ A}$		12	18	+	
Total Gate Charge	Q_g	- 103		8.8	14	nC	
Gate-Source Charge	Q _{gs}	$V_{DS} = 10 \text{ V}, V_{GS} = 4.5 \text{ V}, I_{D} = 5.0 \text{ A}$		1.1			
Gate-Drain Charge	Q _{gd}	D3 - 7 d3 - 7 D - 1		0.7			
Gate Resistance	R _g	f = 1 MHz	0.5	2.4	4.8	Ω	
Turn-On Delay Time	t _{d(on)}			8	16		
Rise Time	t _r	V_{DD} = 10 V, R_L = 2.2 Ω		17	26	-	
Turn-Off Delay Time	t _{d(off)}	$I_D\cong 4$ A, $V_{GEN}=4.5$ V, $R_g=1$ Ω		31	47	-	
Fall Time	t _f			8	16	-	
Turn-On Delay Time	t _{d(on)}			5	10	ns	
Rise Time	t _r	V_{DD} = 10 V, R_L = 2.2 Ω		13	20	1	
Turn-Off Delay Time	t _{d(off)}	$I_D\cong 4$ A, $V_{GEN}=5$ V, $R_g=1$ Ω		21	32	-	
Fall Time	t _f			6	12	-	
Drain-Source Body Diode Characteristic	-		<u> </u>	<u> </u>			
Continuous Source-Drain Diode Current I _S T _C = 25 °C				1.75			
Pulse Diode Forward Current	I _{SM}	-			20	A	
Body Diode Voltage	V _{SD}	I _S = 4 A, V _{GS} = 0 V		0.75	1.2	V	
Body Diode Reverse Recovery Time	t _{rr}	- 40		12	20	ns	
Body Diode Reverse Recovery Charge	Q _{rr}			5	10	nC	
Reverse Recovery Fall Time	t _a	$I_F = 4$ A, $dI/dt = 100$ A/ μ s, $T_J = 25$ °C		7		<u> </u>	
Reverse Recovery Rise Time t _b				5		ns	

Notes:

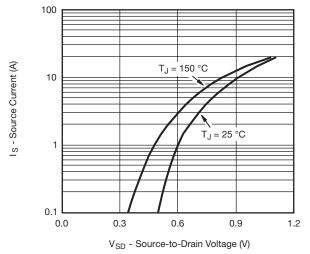
- a. Pulse test; pulse width \leq 300 $\mu s,$ duty cycle \leq 2 % b. Guaranteed by design, not subject to production testing.

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.

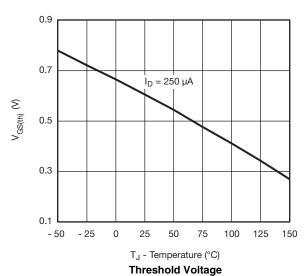








Source-Drain Diode Forward Voltage

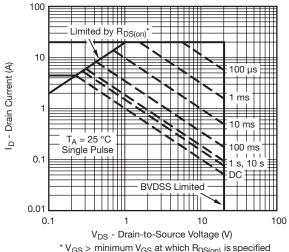


0.06 $I_D = 5 A$ R_{DS(on)} - On-Resistance (Ω) 0.05 0.04 T_J = 125 °C 0.03 $T_J = 25$ °C 0.02 0 4 6 V_{GS} - Gate-to-Source Voltage (V)

On-Resistance vs. Gate-to-Source Voltage



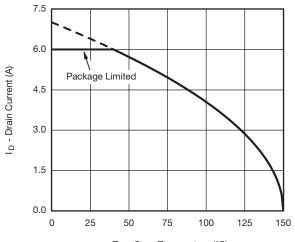
Single Pulse Power (Junction-to-Ambient)



* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

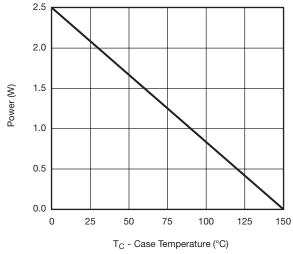
Safe Operating Area, Junction-to-Ambient

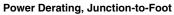


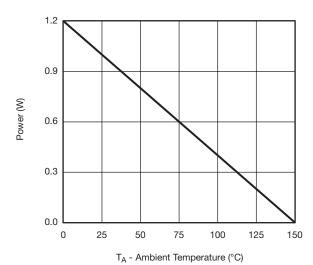


T_C - Case Temperature (°C)

Current Derating*



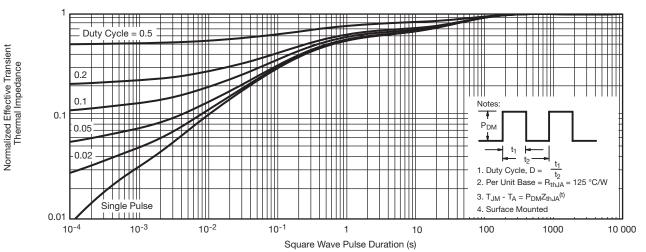




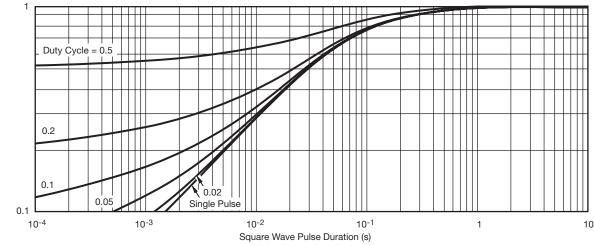
Power Derating, Junction-to-Ambient

^{*} The power dissipation P_D is based on $T_{J(max.)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.





Normalized Thermal Transient Impedance, Junction-to-Ambient

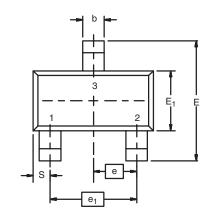


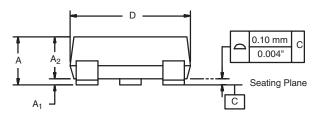
Normalized Thermal Transient Impedance, Junction-to-Foot

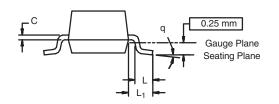
Normalized Effective Transient Thermal Impedance



SOT-23 (TO-236): 3-LEAD





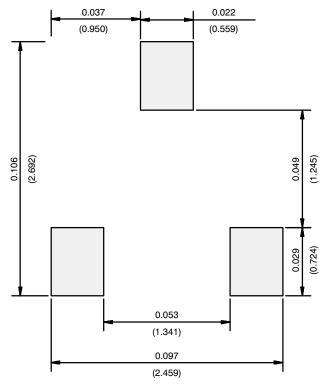


Dim	MILLIM	IETERS	INCHES		
	Min	Max	Min	Max	
Α	0.89	1.12	0.035	0.044	
A ₁	0.01	0.10	0.0004	0.004	
A ₂	0.88	1.02	0.0346	0.040	
b	0.35	0.50	0.014	0.020	
С	0.085	0.18	0.003	0.007	
D	2.80	3.04	0.110	0.120	
E	2.10	2.64	0.083	0.104	
E ₁	1.20	1.40	0.047	0.055	
е	0.95	BSC 0.0374 Ref		4 Ref	
e ₁	1.90	BSC	0.0748 Ref		
L	0.40	0.60	0.016	0.024	
L ₁	0.64 Ref		0.025 Ref		
S	0.50 Ref		0.020 Ref		
q	3°	8°	3°	8°	
ECN: S-03946-Rev. K. 09-	Jul-01	•			

DWG: 5479



RECOMMENDED MINIMUM PADS FOR SOT-23



Recommended Minimum Pads Dimensions in Inches/(mm)



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