P-Channel 2.5 V (G-S) MOSFET

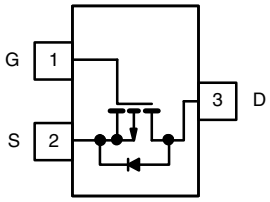
PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)[b]
- 20	0.100 at V_{GS} = - 4.5 V	- 2.4
	0.150 at V_{GS} = - 2.5 V	- 2.0

FEATURES

- **Halogen-free According to IEC 61249-2-21 Definition**
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC

Pb-free Available
RoHS* COMPLIANT
HALOGEN FREE Available

TO-236
(SOT-23)



Top View
Si2301 BDS (L1)*
* Marking Code

Ordering Information: Si2301BDS-T1-E3 (Lead (Pb)-free)
Si2301BDS-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)[b]	T_A = 25 °C	I_D	- 2.4	- 2.2	A
	T_A = 70 °C		- 1.9	- 1.8	
Pulsed Drain Current[a]		I_{DM}	- 10		
Continuous Source Current (Diode Conduction)[b]		I_S	- 0.72	- 0.6	
Power Dissipation[b]	T_A = 25 °C	P_D	0.9	0.7	W
	T_A = 70 °C		0.57	0.45	
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]	R_{thJA}	120	145	°C/W
Maximum Junction-to-Ambient[c]		140	175	

Notes:
a. Pulse width limited by maximum junction temperature.
b. Surface mounted on FR4 board, t ≤ 5 s.
c. Surface mounted on FR4 board.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

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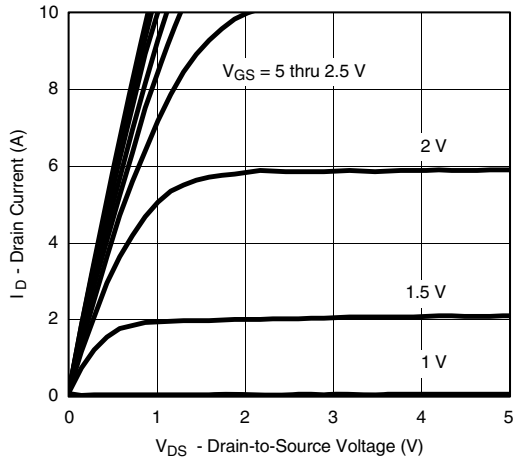
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Limits**			**Unit**
			Min.	**Typ.**	**Max.**	
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = - 250 µA	- 20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 0.45		- 0.95	
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 = 55 °C			- 10	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \leq$ - 5 V, V_{GS} = - 4.5 V	- 6			A
		$V_{DS} \leq$ - 5 V, V_{GS} = - 2.5 V	- 3			
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 4.5 V, I_D = - 2.8 A		0.080	0.100	Ω
		V_{GS} = - 2.5 V, I_D = - 2 A		0.110	0.150	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 5 V, I_D = - 2.8 A		6.5		S
Diode Forward Voltage	V_{SD}	I_S = - 0.75 A, V_{GS} = 0 V		- 0.80	- 1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = - 6 V, V_{GS} = - 4.5 V $I_D \cong$ - 2.8 A		4.5	10	nC
Gate-Source Charge	Q_{gs}			0.7		
Gate-Drain Charge	Q_{gd}			1.1		
Gate Resistance	R_g	f = 1 MHz	2	8	16	Ω
Input Capacitance	C_{iss}	V_{DS} = - 6 V, V_{GS} = 0 V, f = 1 MHz		375		pF
Output Capacitance	C_{oss}			95		
Reverse Transfer Capacitance	C_{rss}			65		
Switching[c]						
Turn-On Time	$t_{d(on)}$	V_{DD} = - 6 V, R_L = 6 Ω $I_D \cong$ - 1 A, V_{GEN} = - 4.5 V R_g = 6 Ω		20	30	ns
	t_r			40	60	
Turn-Off Time	$t_{d(off)}$			30	45	
	t_f			20	30	

Notes:
a. Pulse test: pulse width ≤ 300 µs duty cycle ≤ 2 %.
b. For DESIGN AID ONLY, not subject to production testing.
c. Switching time is essentially independent of operating temperature.

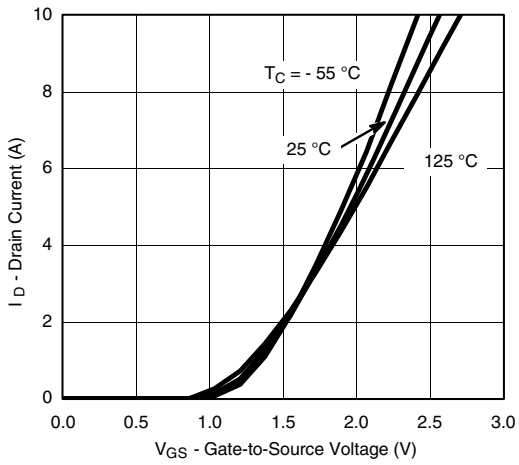
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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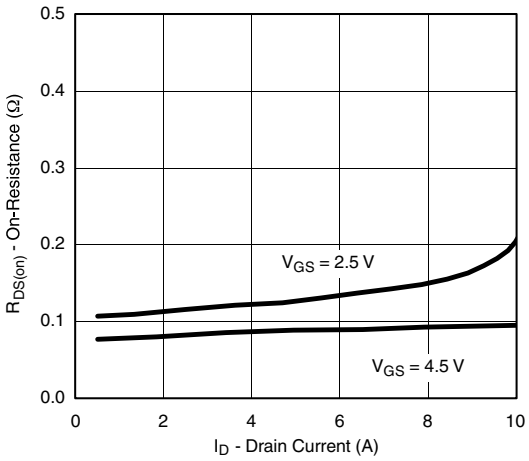
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



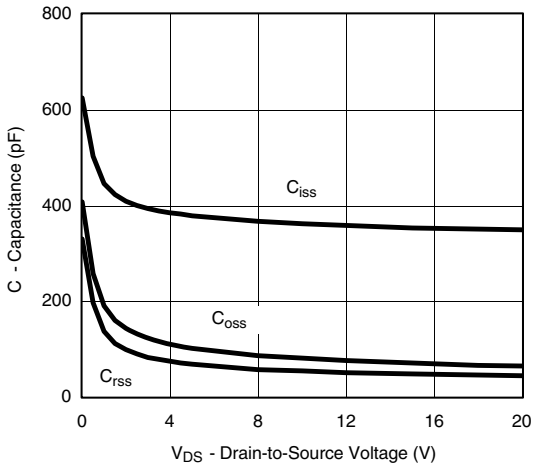
Output Characteristics



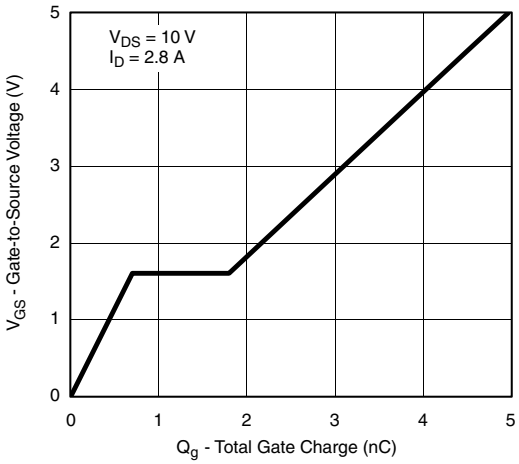
Transfer Characteristics



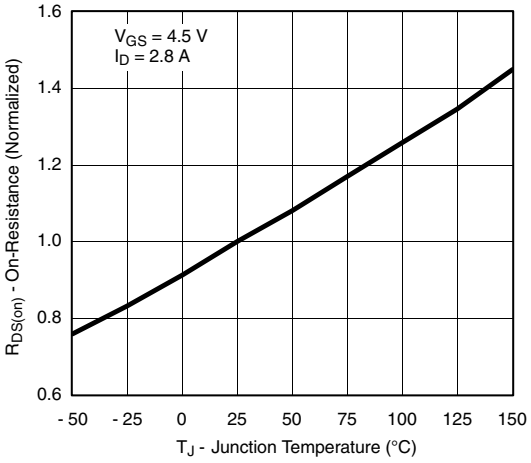
On-Resistance vs. Drain Current



Capacitance



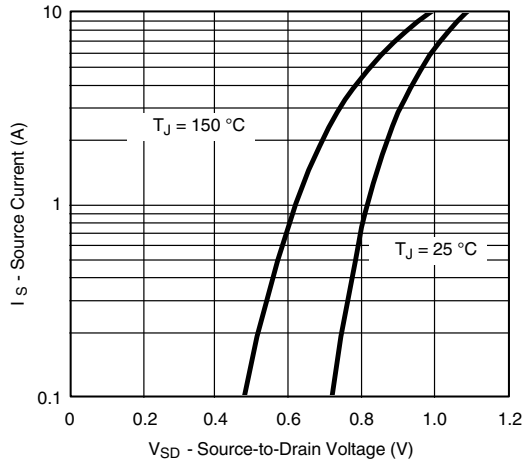
Gate Charge



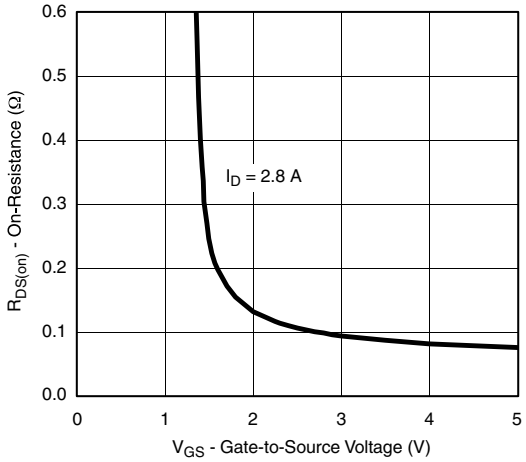
On-Resistance vs. Junction Temperature

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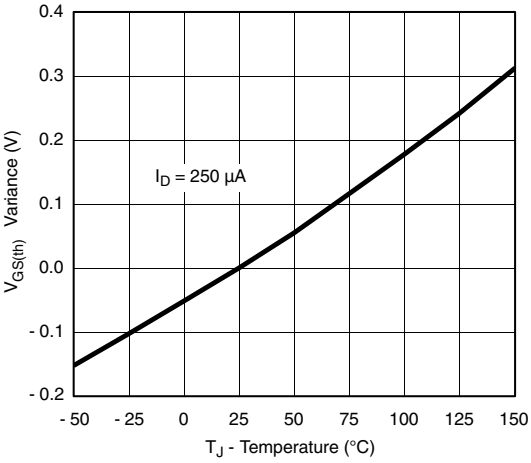
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



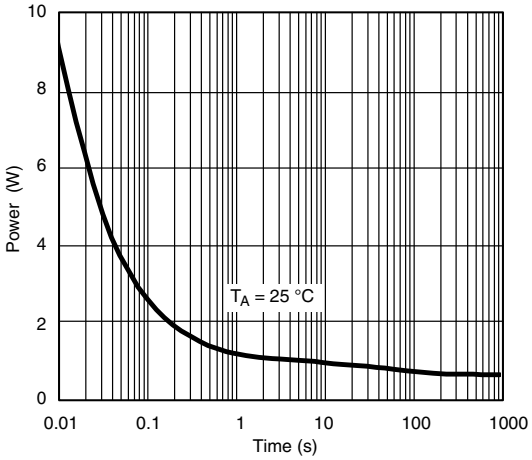
Source-Drain Diode Forward Voltage



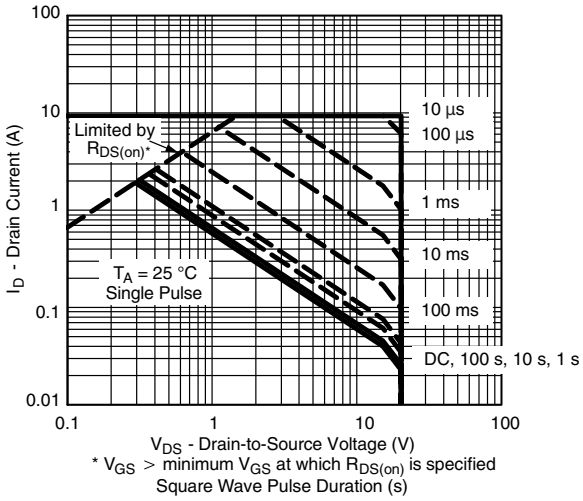
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



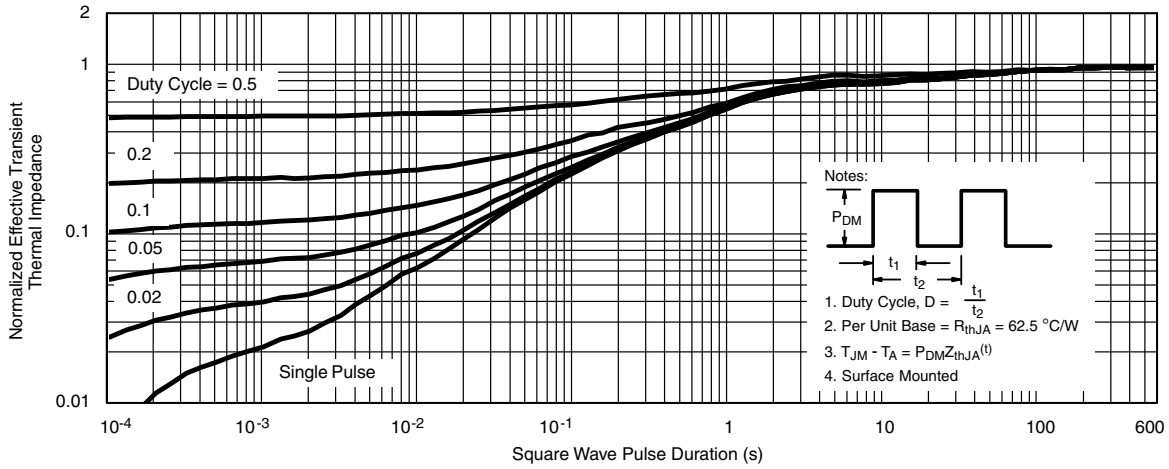
Single Pulse Power



Safe Operating Area

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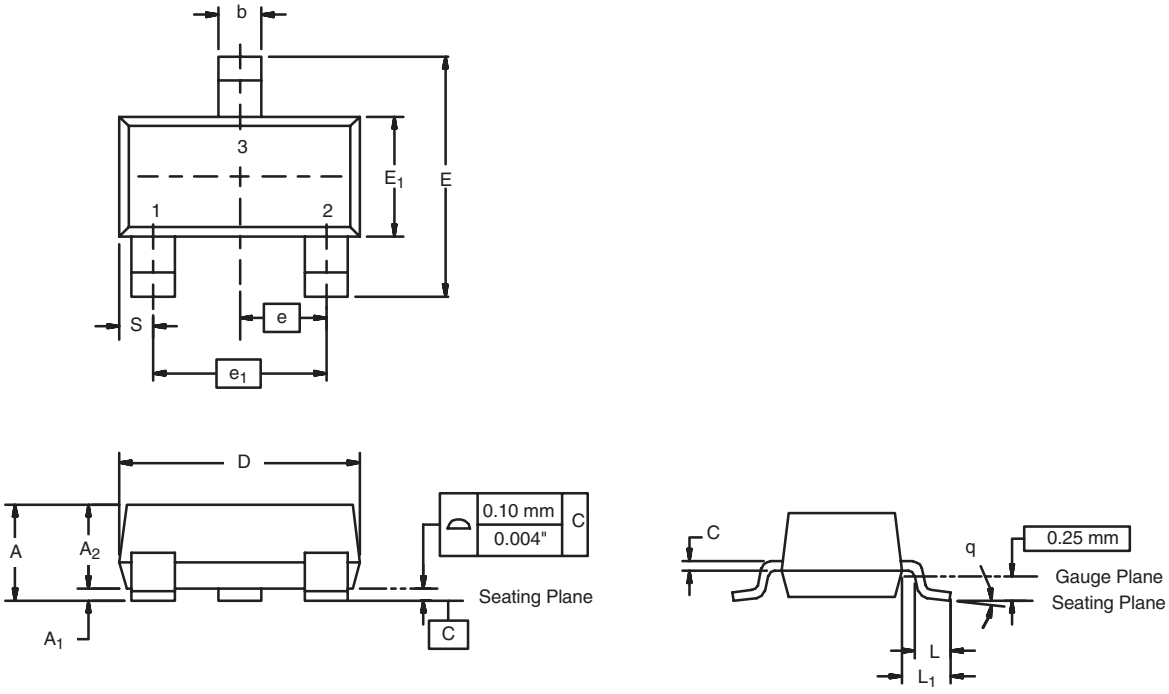


Normalized Thermal Transient Impedance, Junction-to-Ambient

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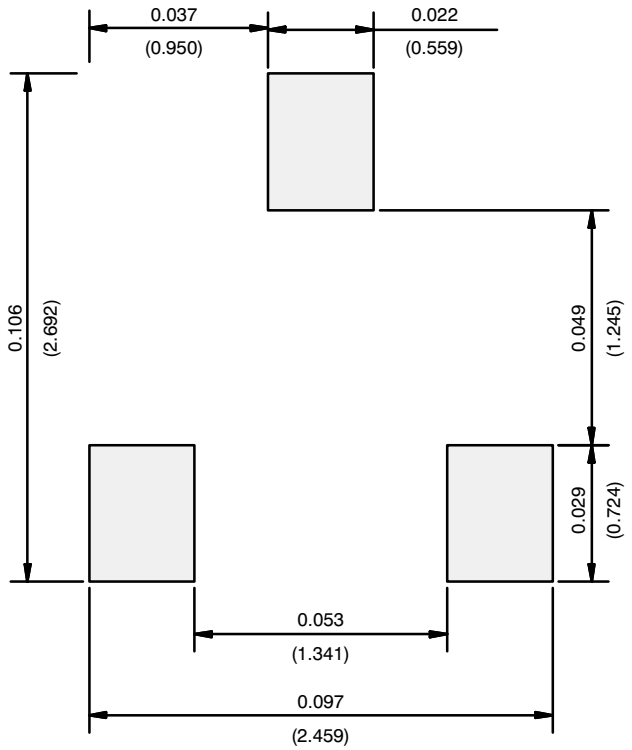
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SOT-23 (TO-236): 3-LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	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
c	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
e	0.95 BSC		0.0374 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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APPLICATION NOTE

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