

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
30	0.050 at $V_{GS} = 10$ V	3.4
	0.085 at $V_{GS} = 4.5$ V	2.6

FEATURES

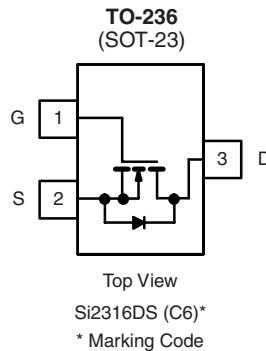
- Halogen-free Option Available
- TrenchFET[®] Power MOSFET

APPLICATIONS

- Battery Switch



RoHS*
COMPLIANT



Ordering Information: Si2316DS-T1
Si2316DS-T1-E3 (Lead (Pb)-free)
Si2316DS-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}	30		V	
Gate-Source Voltage	V_{GS}	± 20			
Continuous Drain Current ($T_J = 150$ °C) ^{a, b}	I_D	$T_A = 25$ °C	3.4	2.9	A
		$T_A = 70$ °C	2.7	2.3	
Pulsed Drain Current ^b	I_{DM}	16			
Continuous Source Current (Diode Conduction) ^{a, b}	I_S	0.8			
Power Dissipation ^{a, b}	P_D	$T_A = 25$ °C	0.96	0.7	W
		$T_A = 70$ °C	0.6	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 ^a	R_{thJA}	$t \leq 5$ s	100	130	°C/W
		Steady State	140	175	
Maximum Junction-to-Foot (Drain)	R_{thJF}	60	75		

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

b. Pulse width limited by maximum junction temperature.

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

SPECIFICATIONS $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.8			
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			0.5	μA
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 4.5\text{ V}, V_{GS} = 10\text{ V}$	6			A
		$V_{DS} \geq 4.5\text{ V}, V_{GS} = 4.5\text{ V}$	4			
Drain-Source On-Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 3.4\text{ A}$		0.042	0.050	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 2.6\text{ A}$		0.068	0.085	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 4.5\text{ V}, I_D = 3.4\text{ A}$		6.0		S
Diode Forward Voltage	V_{SD}	$I_S = 0.8\text{ A}, V_{GS} = 0\text{ V}$		0.8	1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 3.4\text{ A}$		4.3	7	nC
Gate-Source Charge	Q_{gs}			0.65		
Gate-Drain Charge	Q_{gd}			1.2		
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		215		pF
Output Capacitance	C_{oss}			90		
Reverse Transfer Capacitance	C_{rss}			55		
Switching						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong 1.0\text{ A}, V_{GEN} = 10\text{ V}, R_G = 6\text{ }\Omega$		9	15	ns
Rise Time	t_r			9	15	
Turn-Off Delay Time	$t_{d(off)}$			14	20	
Fall Time	t_f			6	12	

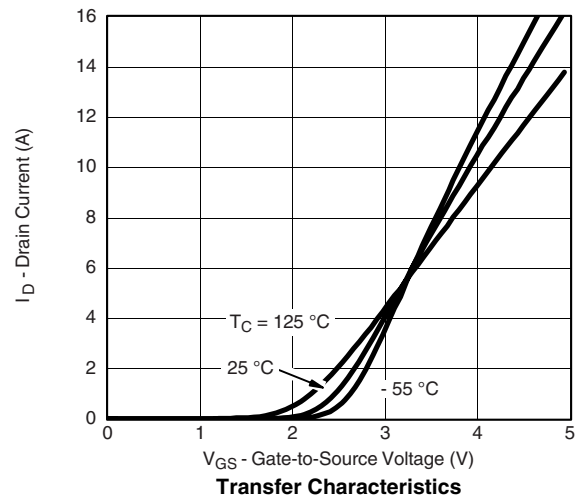
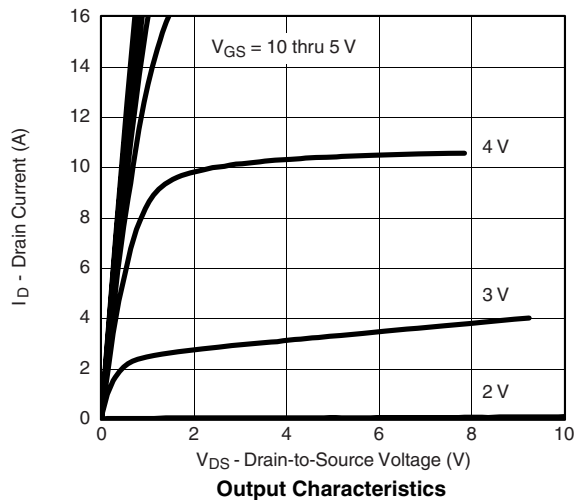
Notes:

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

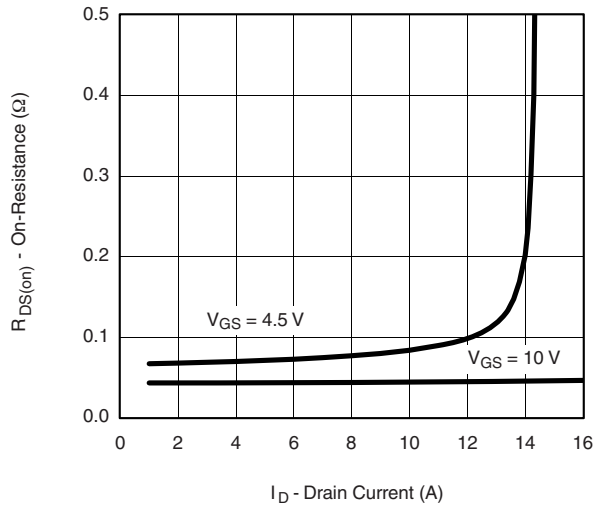
b. Guaranteed by design, not subject to production testing.

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.

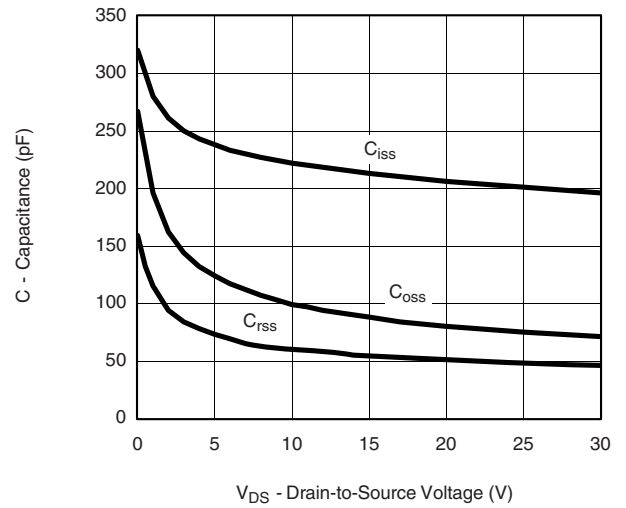
TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$, unless otherwise noted



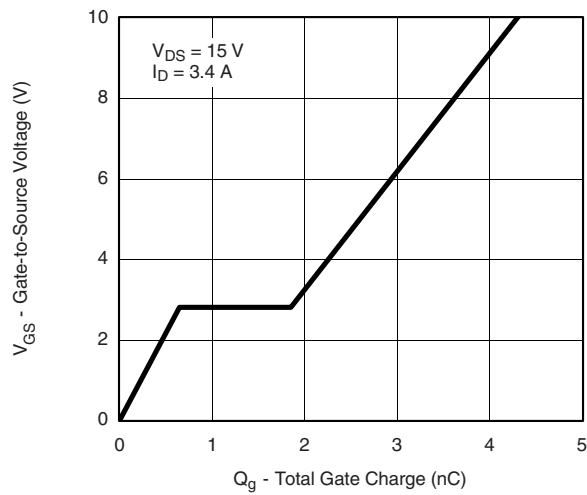
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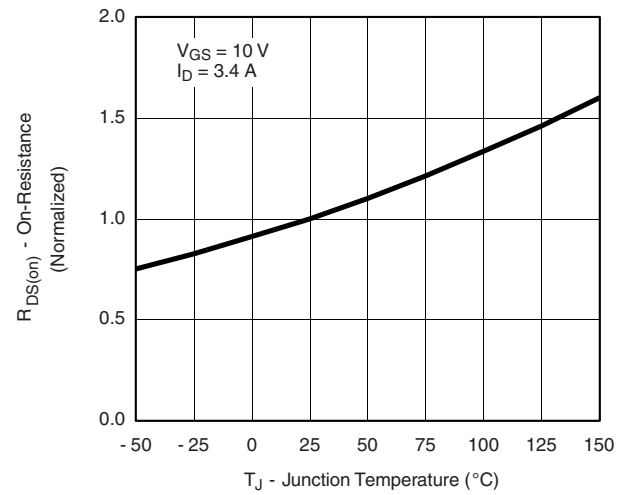
On-Resistance vs. Drain Current



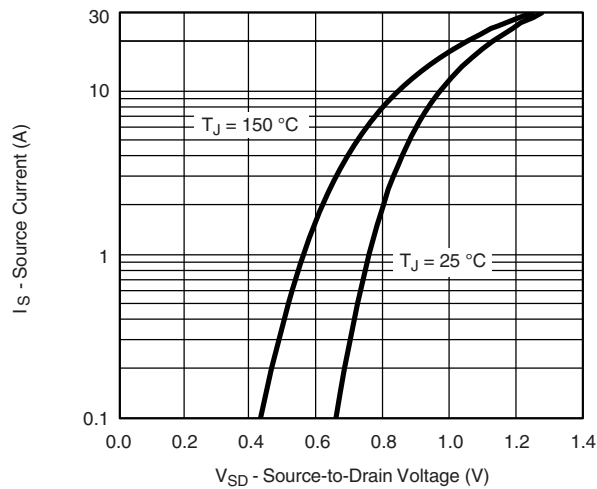
Capacitance



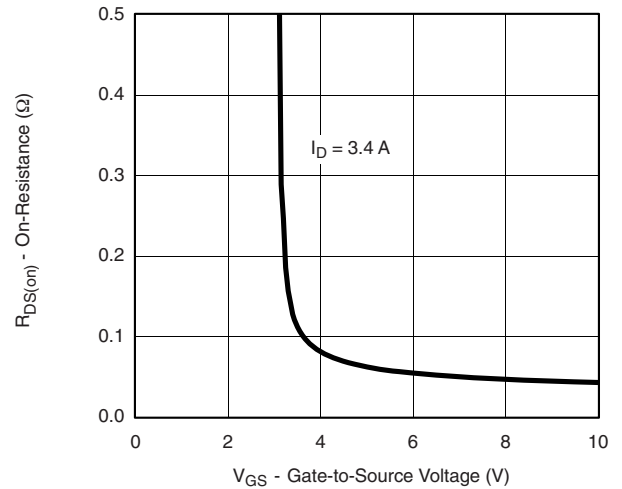
Gate Charge



On-Resistance vs. Junction Temperature

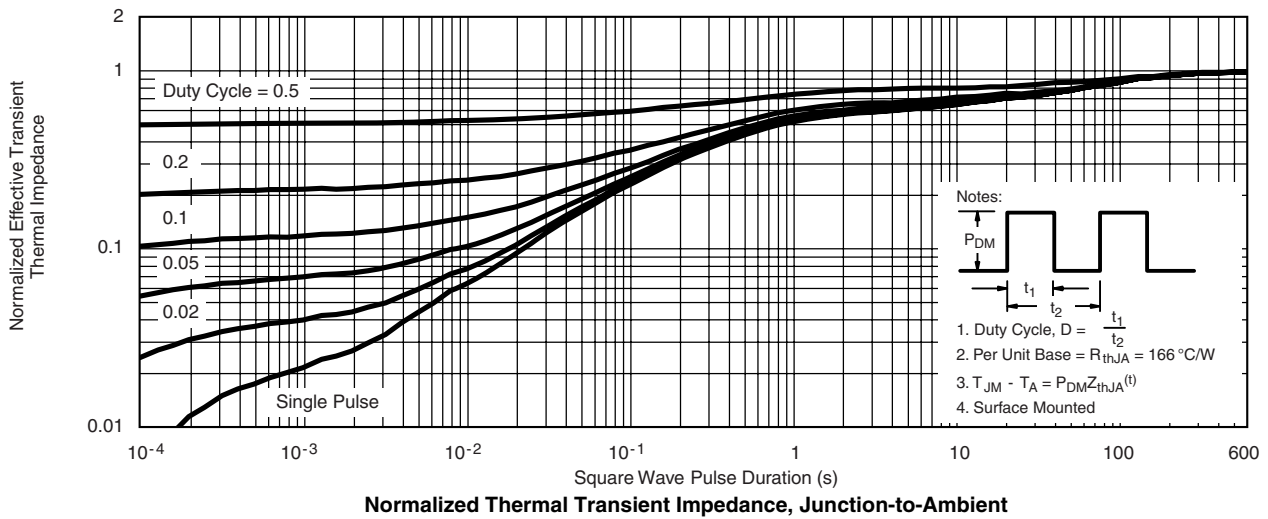
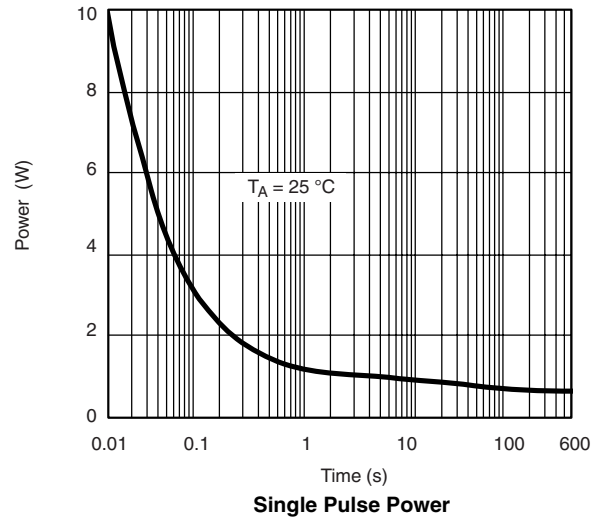
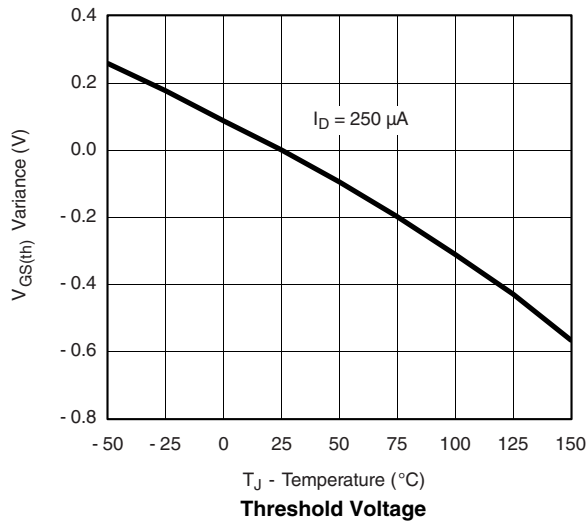


Source-Drain Diode Forward Voltage



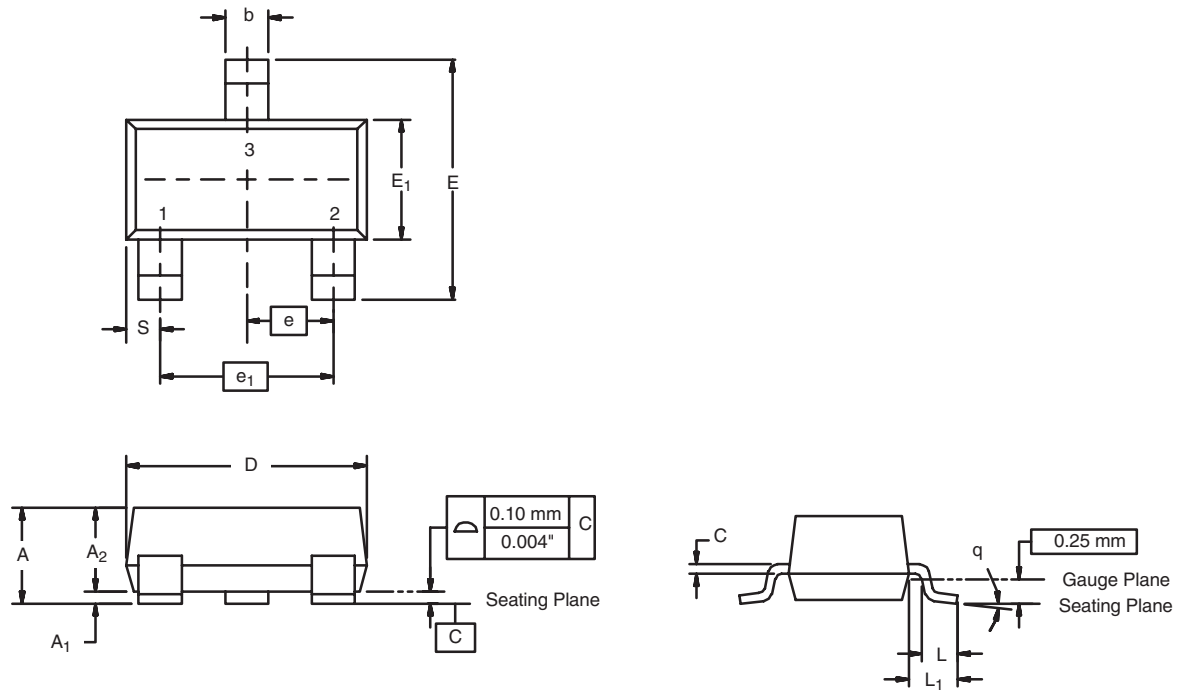
On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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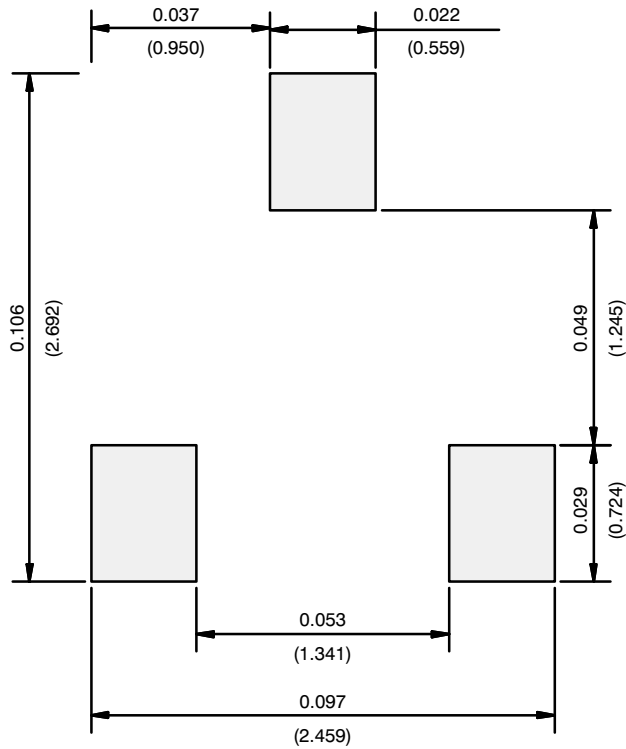
SOT-23 (TO-236): 3-LEAD



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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