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

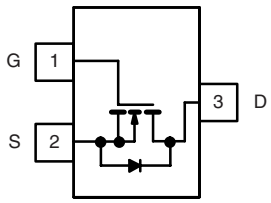
Pb-free Available

RoHS* COMPLIANT

APPLICATIONS

- Battery Switch

TO-236
(SOT-23)



Top View

Si2316DS (C6)*

* Marking Code

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]	T_A = 25 °C	I_D	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]	T_A = 25 °C	P_D	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]	t ≤ 5 s	R_{thJA}	100	130	°C/W
	Steady State		140	175	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	60	75	

Notes:
a. Surface Mounted on 1" x 1" FR4 board.
b. Pulse width limited by maximum junction temperature.

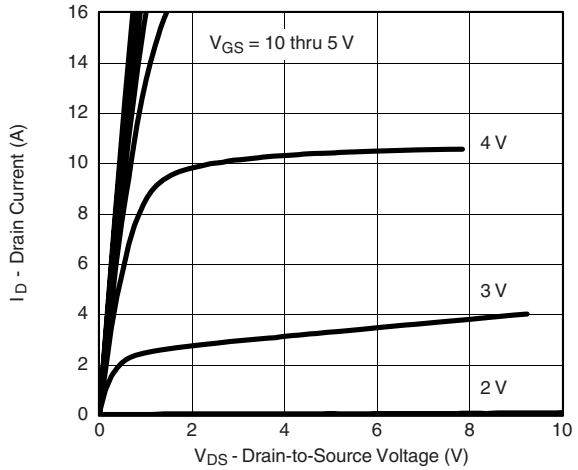
* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS T_A = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Limits**			**Unit**
			Min.	**Typ.**	**Max.**	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 µA	30			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	0.8			
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			0.5	µA
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 55 °C			10	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 4.5 V, V_{GS} = 10 V	6			A
		$V_{DS} \geq$ 4.5 V, V_{GS} = 4.5 V	4			
Drain-Source On-Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 3.4 A		0.042	0.050	Ω
		V_{GS} = 4.5 V, I_D = 2.6 A		0.068	0.085	
Forward Transconductance[a]	g_{fs}	V_{DS} = 4.5 V, I_D = 3.4 A		6.0		S
Diode Forward Voltage	V_{SD}	I_S = 0.8 A, V_{GS} = 0 V		0.8	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 3.4 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 V, V_{GS} = 0 V, f = 1 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 V, R_L = 15 Ω $I_D \cong$ 1.0 A, V_{GEN} = 10 V, R_G = 6 Ω		9	15	ns
Rise Time	t_r			9	15	
Turn-Off Delay Time	$t_{d(off)}$			14	20	
Fall Time	t_f			6	12	

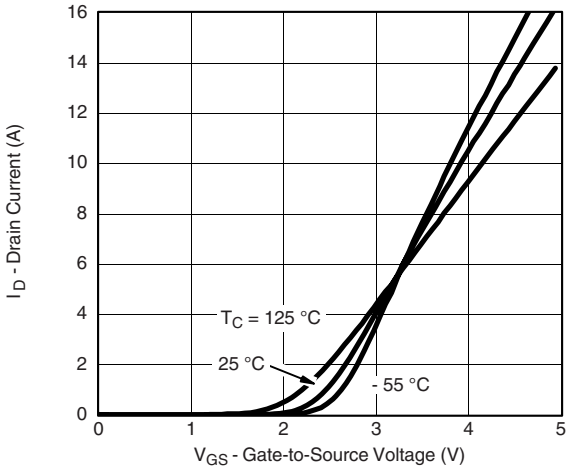
Notes:
a. Pulse test; PW ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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 °C, unless otherwise noted

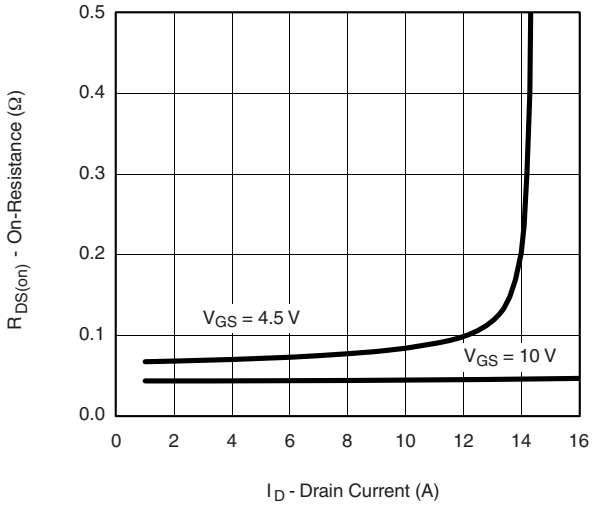


Output Characteristics

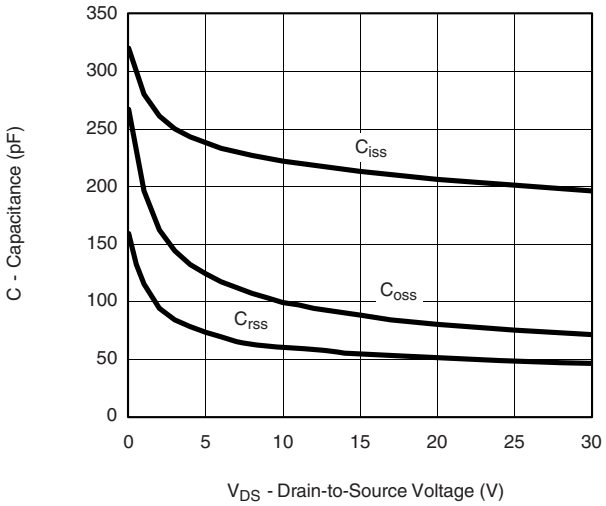


Transfer Characteristics

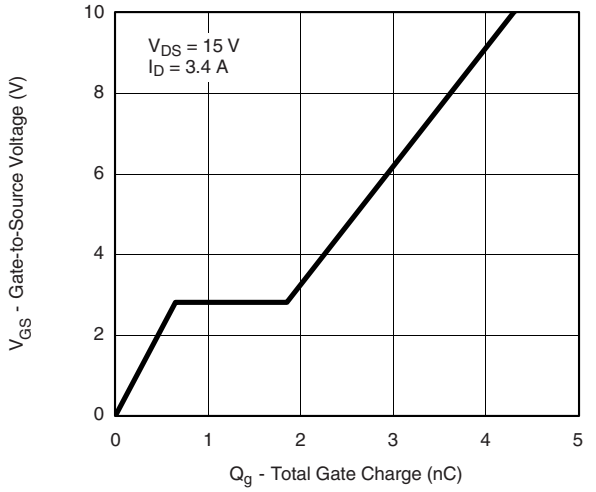
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



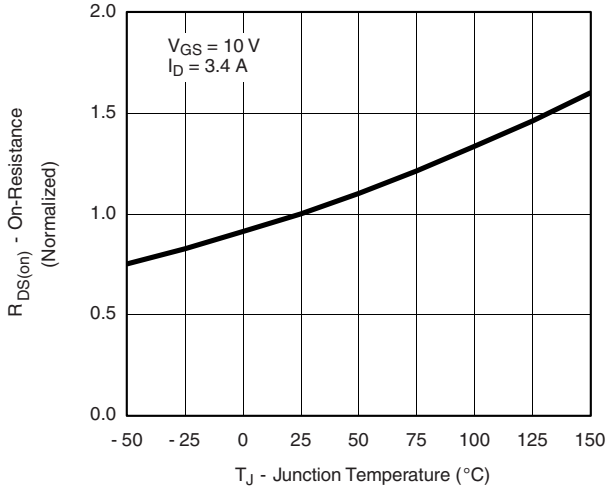
On-Resistance vs. Drain Current



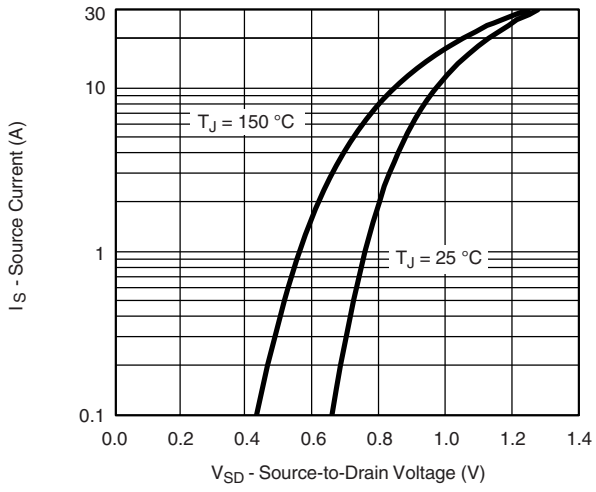
Capacitance



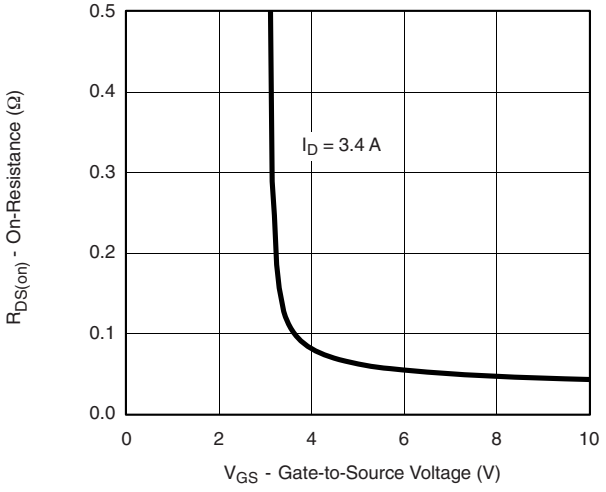
Gate Charge



On-Resistance vs. Junction Temperature

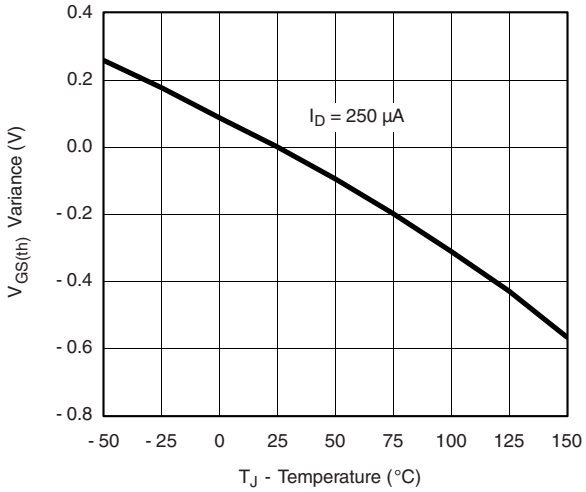


Source-Drain Diode Forward Voltage

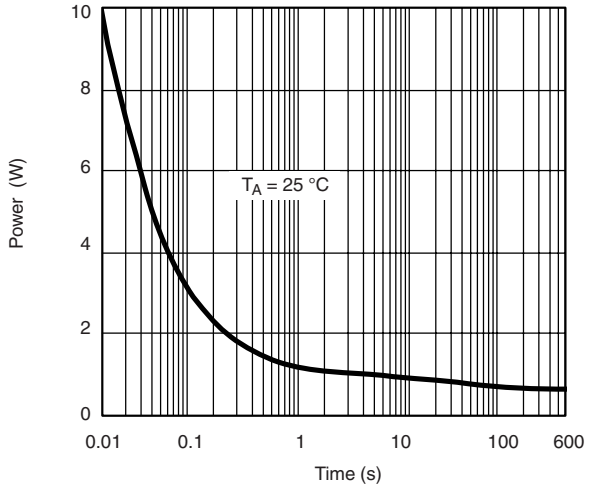


On-Resistance vs. Gate-to-Source Voltage

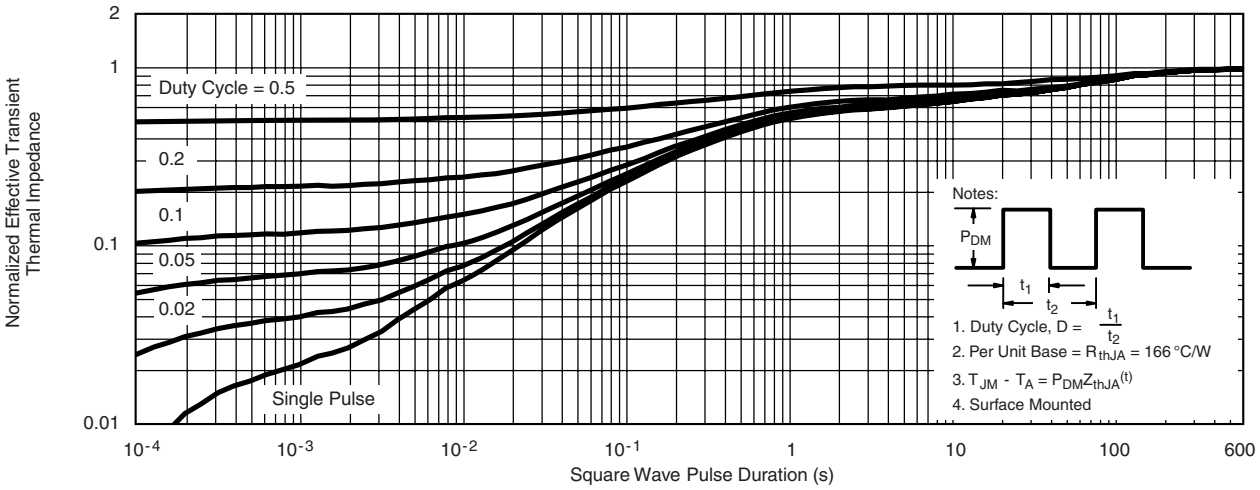
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Threshold Voltage



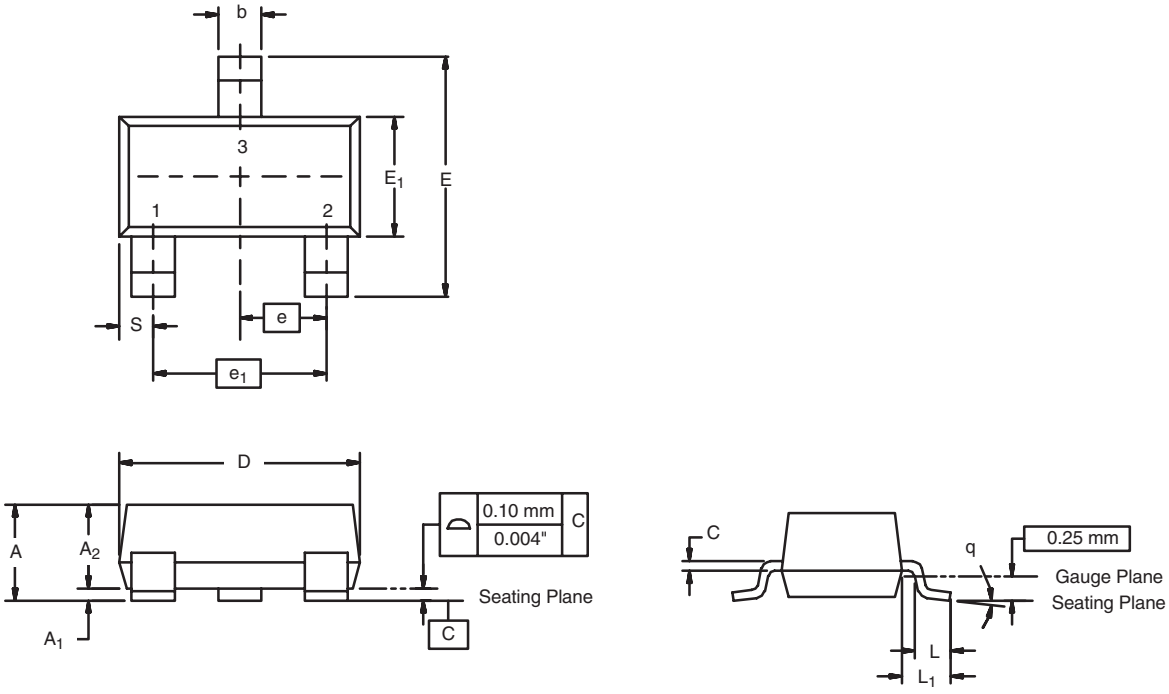
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

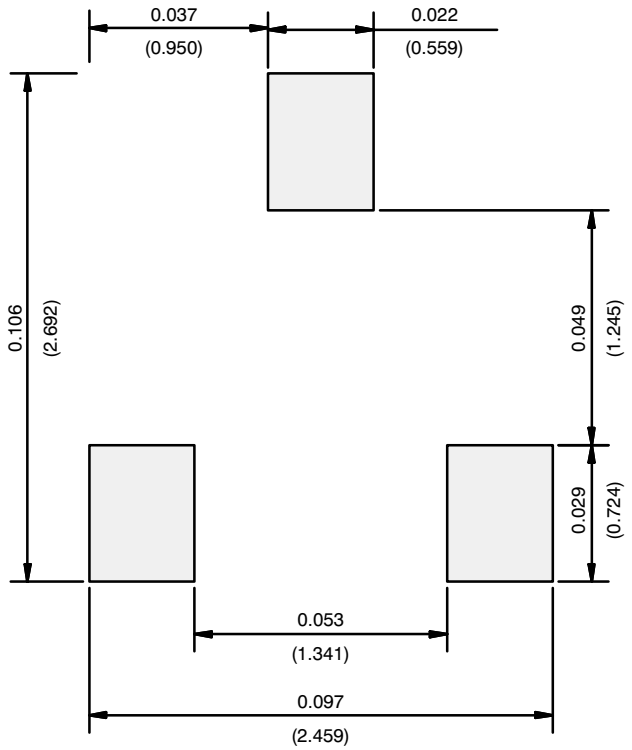
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SOT-23 (TO-236): 3-LEAD



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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