



SI2316BDS

PRODUCT SUMMARY			
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ)
30	0.050 at V _{GS} = 10 V	4.5	3.16 nC
	0.080 at V _{GS} = 4.5 V	3.4	

FEATURES

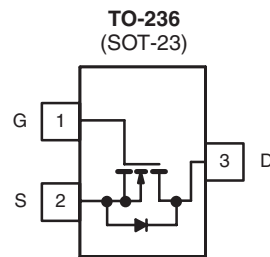
- TrenchFET® Power MOSFET
- PWM Optimized
- 100 % R_g tested



RoHS
COMPLIANT

APPLICATIONS

- Battery Switch
- DC/DC Converter



Top View
SI2316DS (M6)*
*Marking Code

Ordering Information: SI2316BDS-T1-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	30	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	4.5	A
	T _C = 70 °C	3.6	
	T _A = 25 °C	3.9 ^{b, c}	
	T _A = 70 °C	3.13 ^{b, c}	
Pulsed Drain Current	I _{DM}	20	
Continuous Source-Drain Diode Current	T _C = 25 °C	1.39	
	T _A = 25 °C	1.04 ^{b, c}	
Maximum Power Dissipation	T _C = 25 °C	1.66	W
	T _C = 70 °C	1.06	
	T _A = 25 °C	1.25 ^{b, c}	
	T _A = 70 °C	0.8 ^{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}	≤ 5 sec	R _{thJA}	80	100	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	60	75	

Notes:

- Based on T_C = 25 °C.
- Surface Mounted on 1" x 1" FR4 Board.
- t = 5 sec.
- Maximum under Steady State conditions is 130 °C/W.

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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}	$V_{DS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		23.92		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			5.2		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		3	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	20			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 3.9\text{ A}$		0.041	0.050	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 3.3\text{ A}$		0.064	0.080	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 3.9\text{ A}$		6		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		350		pF
Output Capacitance	C_{oss}			65		
Reverse Transfer Capacitance	C_{rss}			37		
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 3.9\text{ A}$		6.35	9.6	nC
		$V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 3.9\text{ A}$		3.16	4.8	
Gate-Source Charge	Q_{gs}			1.56		
Gate-Drain Charge	Q_{gd}			1.1		
Gate Resistance	R_g	$f = 1\text{ MHz}$		2.6	3.9	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 4.8\text{ }\Omega$ $I_D \cong 3.13\text{ A}, V_{GEN} = 10\text{ V}, R_G = 1\text{ }\Omega$		4.5	6.75	ns
Rise Time	t_r			11	16.5	
Turn-Off Delay Time	$t_{d(off)}$			12	18	
Fall Time	t_f			7	10.5	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 6.25\text{ }\Omega$ $I_D = 2.4\text{ A}, V_{GEN} = 4.5\text{ V}, R_G = 1\text{ }\Omega$		20	30	ns
Rise Time	t_r			65	98	
Turn-Off Delay Time	$t_{d(off)}$			11	17	
Fall Time	t_f			23	35	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			1.39	A
Pulse Diode Forward Current ^a	I_{SM}				20	
Body Diode Voltage	V_{SD}	$I_S = 2.0\text{ A}$		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 2.0\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		10	15	ns
Body Diode Reverse Recovery Charge	Q_{rr}			4	6	nC
Reverse Recovery Fall Time	t_a			6.6		ns
Reverse Recovery Rise Time	t_b			3.5		

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.