

»Features

$V_{DS} = -20V$
 $I_D = -2.2A$
 $R_{DS(ON)} @V_{GS} = -4.5V, Typ = 95m\Omega$
 $R_{DS(ON)} @V_{GS} = -2.5V, Typ = 130m\Omega$

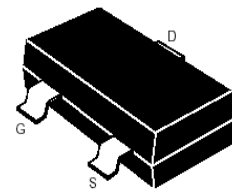
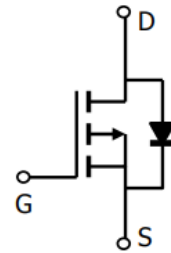
»General Description

- Advanced trench process technology
- High power and current handling capability
- Lead free product is acquired
- SOT-23 for Surface Mount Package.

»Application

- PWM applications
- Load switch

»Pin Configurations



»Absolute Maximum Ratings @ $T_A=25^\circ C$ unless otherwise noted

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	-20	V
Gate-source voltage		V_{GS}	± 12	V
Continuous Drain Current ($T_J = 150^\circ C$)	$T_C=25^\circ C$	I_D	-2.2	A
	$T_C=70^\circ C$		-1.5	
	$T_A=25^\circ C$		-2.2 ^{b,c}	
	$T_A=70^\circ C$		-1.4 ^{b,c}	
Continuous Source-Drain Diode Current	$T_C=25^\circ C$	I_S	-1.5	
	$T_A=25^\circ C$		-1 ^{b,c}	
Pulsed Drain Current ($t = 300 \mu s$)		I_{DM}	-8	
Maximum power dissipation	$T_C=25^\circ C$	P_D	1.7	W
	$T_C=70^\circ C$		1.1	
	$T_A=25^\circ C$		1 ^{b,c}	
	$T_A=70^\circ C$		0.6 ^{b,c}	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55—150	$^\circ C$

»THERMAL CHARACTERISTICS

Parameter		Symbol	Typ	Max	Unit
Maximum junction-to-ambient ^a	≤ 5 s	R _{θJA}	120	145	°C/W
	Steady-State		140	175	
Maximum junction-to-foot	Steady-State	R _{θJC}	62	78	

Notes

- a. Surface mounted on 1" x 1" FR4 board
b. Pulse width limited by maximum junction temperature

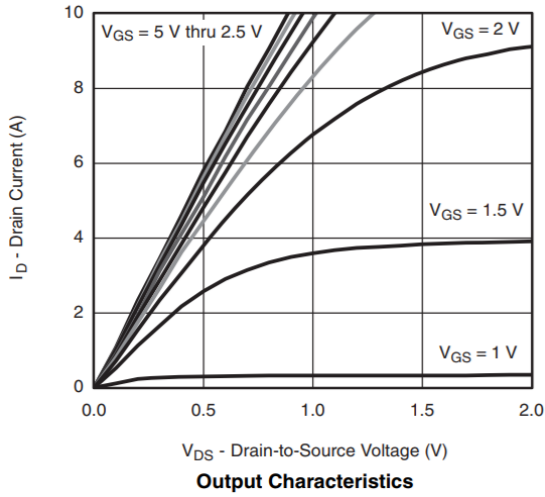
»Electrical Characteristics @T_A=25°C unless otherwise noted

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-20	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V	-	-	-1	μA
Gate-body leakage	I _{GSS}	V _{DS} =0V, V _{GS} =±12V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.5	-0.65	-1.0	V
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} =-4.5V, I _D =-2A	-	95	120	mΩ
		V _{GS} =-2.5V, I _D =-1A	-	130	150	
Forward transconductance ^a	g _{fs}	V _{DS} =-5V, I _D =-1A	-	5	-	S
Dynamic Characteristics ^b						
Input capacitance	C _{ISS}	V _{DS} =-10V, V _{GS} =0V f=1.0MHz	-	280	-	pF
Output capacitance	C _{OSS}		-	60	-	
Reverse transfer capacitance	C _{RSS}		-	48	-	
Switching Characteristics						
Turn-on delay time	t _{D(ON)}	V _{DD} =-10V I _D =-2A V _{GEN} =-4.5V R _L =9.1ohm R _{GEN} =1ohm	-	13	-	ns
Rise time	t _r		-	21	-	
Turn-off delay time	t _{D(OFF)}		-	23	-	
Fall time	t _f		-	9	-	
Total gate charge	Q _g	V _{DS} =-10V, I _D =-2A V _{GS} =-4.5V	-	4.8	-	nC
Gate-source charge	Q _{gs}		-	0.8	-	
Gate-drain charge	Q _{gd}		-	1.2	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V _{SD}	V _{GS} =0V, I _S =-1A	-	-0.81	-1.2	V

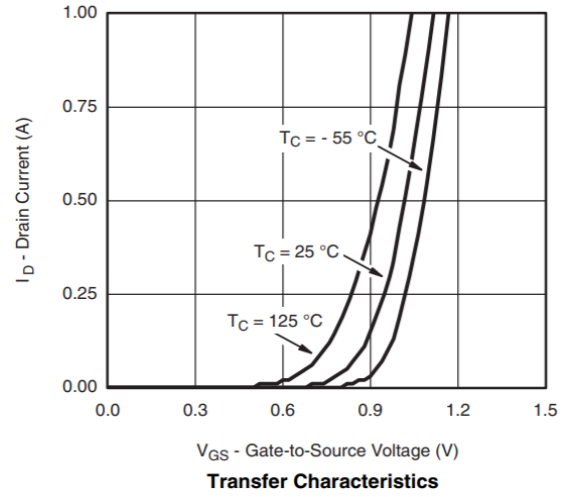
Notes

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

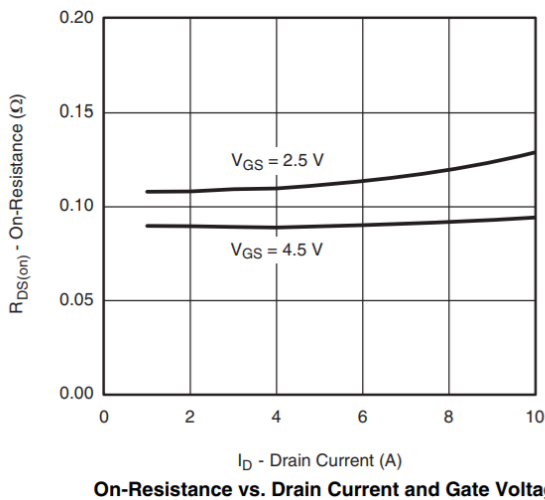
» **Electrical Characteristics** @ $T_A=25^\circ\text{C}$ unless otherwise noted



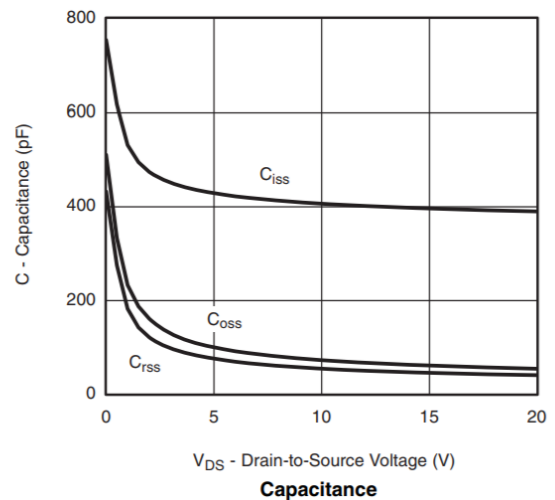
Output Characteristics



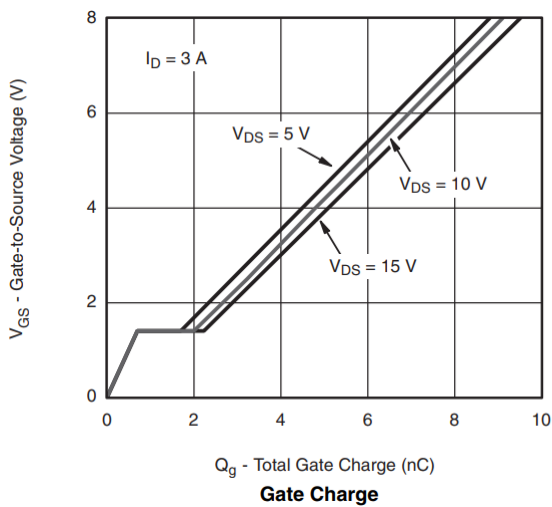
Transfer Characteristics



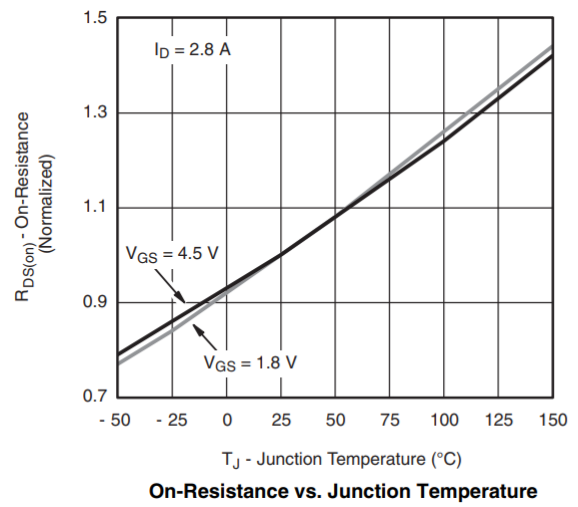
On-Resistance vs. Drain Current and Gate Voltage



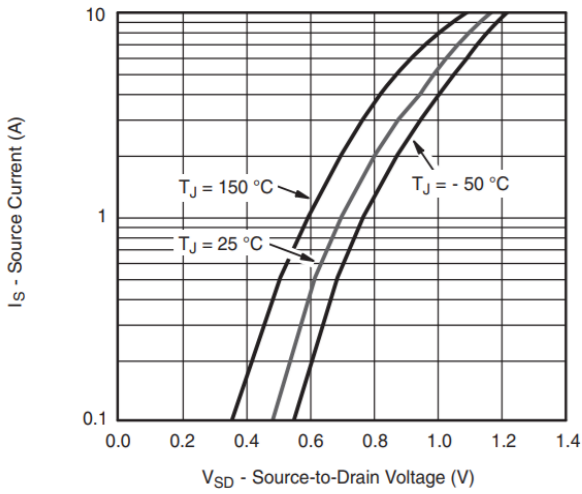
Capacitance



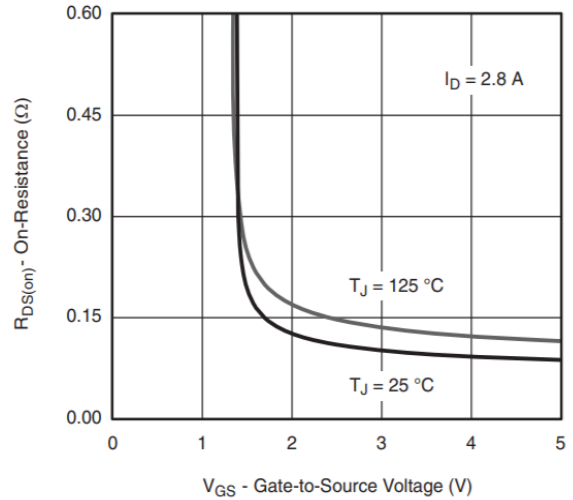
Gate Charge



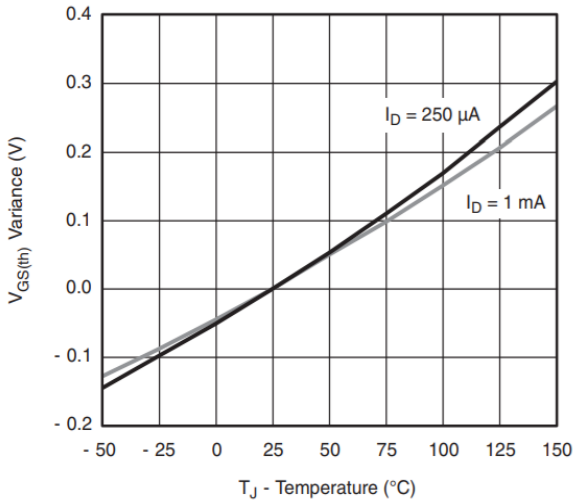
On-Resistance vs. Junction Temperature



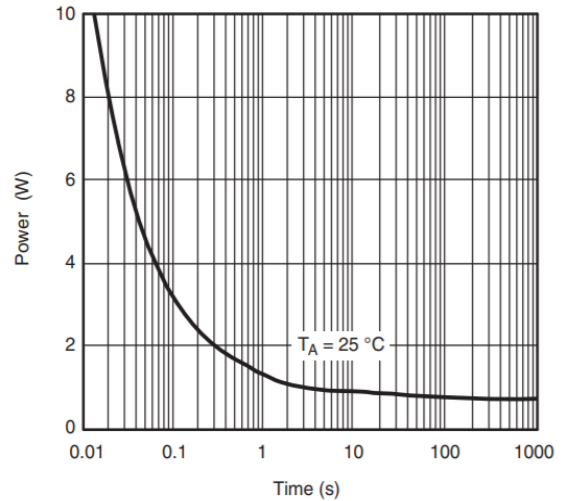
Source-Drain Diode Forward Voltage



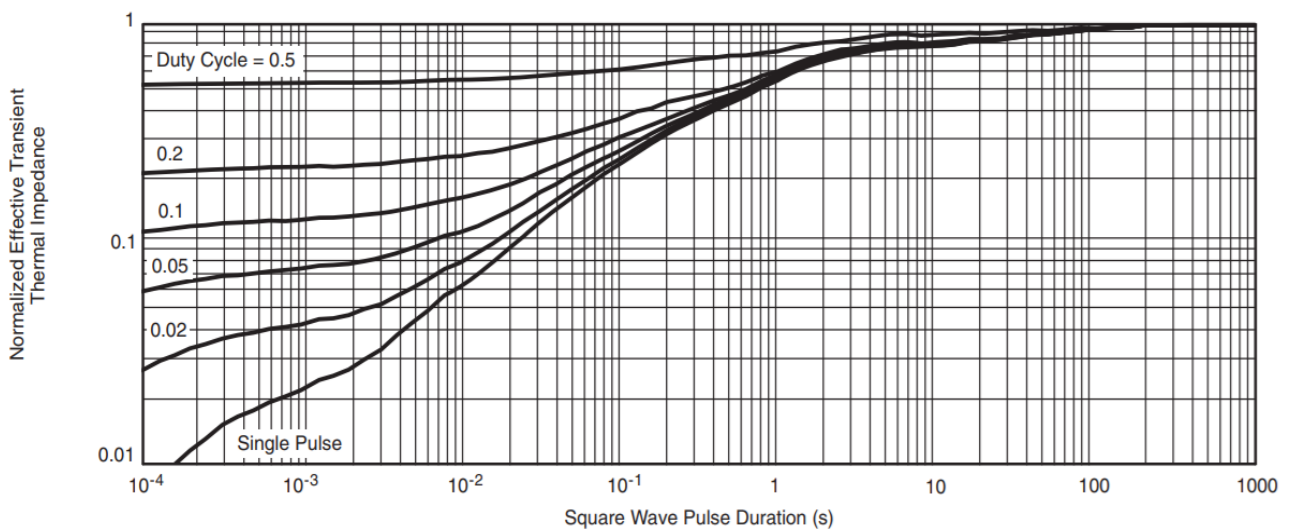
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



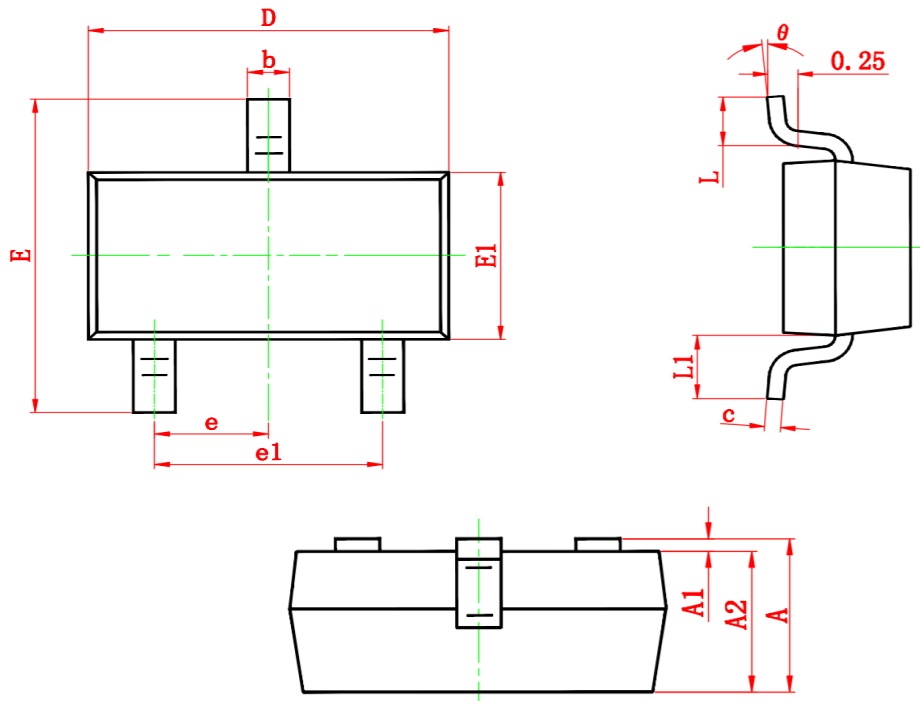
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

»Package Information

SOT-23



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	2.250	2.550	0.089	0.100
E1	1.200	1.400	0.047	0.055
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.300	0.500	0.012	0.020
L1	0.550 REF.		0.022 REF.	
θ	0°	8°	0°	8°

»Ordering information

Order code	Package	Marking	Base qty	Delivery mode
SI2301F	SOT-23	2301F	3K	Tape and reel