-20V P-Channel Enhancement Mode MOSFET

Description

The SX3415BI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = -20V I_D =-4.5A

RDS(ON) < 40mΩ @ VGS=4.5V

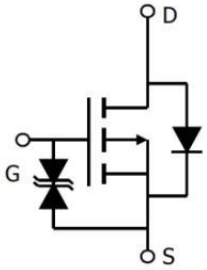
ESD=2500V HBM

Application

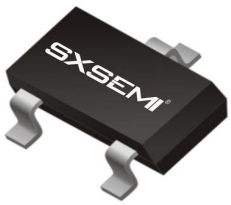
Battery protection

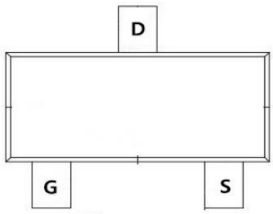
Load switch

Uninterruptible power supply



SOT-23





Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-20	V
VGS	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-4.5	A
I_D@T_C=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-3.0	A
IDM	Pulsed Drain Current[2]	-17	A
P_D@T_C=25℃	Total Power Dissipation[3]	1.1	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-Ambient [1]	125	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case[1]	110	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D= -250μA	-20	-	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS} = -20V, V_{GS} = 0V,	-	-	-1	μA
IGSS	Gate to Body Leakage Current	V_{DS} =0V, V_{GS} = ±10V	-	-	±10	uA
VGS(th)	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D= -250μA	-0.4	-0.7	-1.0	V
RDS(on)	Static Drain-Source on-Resistance	V_{GS} =-4.5V, I_D =-4A	-	31	40	mΩ
		V_{GS} =-2.5V, I_D =-3A	-	40	56	
Ciss	Input Capacitance	V_{DS} = -10V, V_{GS} = 0V, f = 1.0MHz	-	289	-	pF
Coss	Output Capacitance		-	98	-	pF
Crss	Reverse Transfer Capacitance		-	22	-	pF
Q_g	Total Gate Charge	V_{DS} = -10V, I_D = -4.1A, V_{GS} = -4.5V	-	9	-	nC
Qgs	Gate-Source Charge		-	1	-	nC
Qgd	Gate-Drain(“Miller”) Charge		-	2.6	-	nC
td(on)	Turn-on Delay Time	V_{DD} = -10V, R_G = 1Ω, V_{GEN}=-4.5V,R_L=1.2Ω	-	12	-	ns
tr	Turn-on Rise Time		-	35	-	ns
td(off)	Turn-off Delay Time		-	30	-	ns
t_f	Turn-off Fall Time		-	10	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	-4.1	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-16.4	A
VSD	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = -4.1A	-	-	-1.2	V

Note :

1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.

2、The data tested by pulsed , pulse width ≦300us , duty cycle ≦2%

3、The power dissipation is limited by 150℃junction temperature

4、The data is theoretically the same as I D and I DM , in real applications , should be limited by total power dissipation.

Typical Characteristics

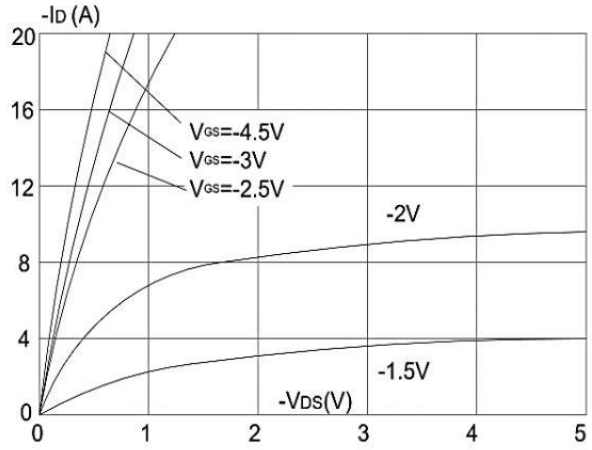


Figure1: Output Characteristics

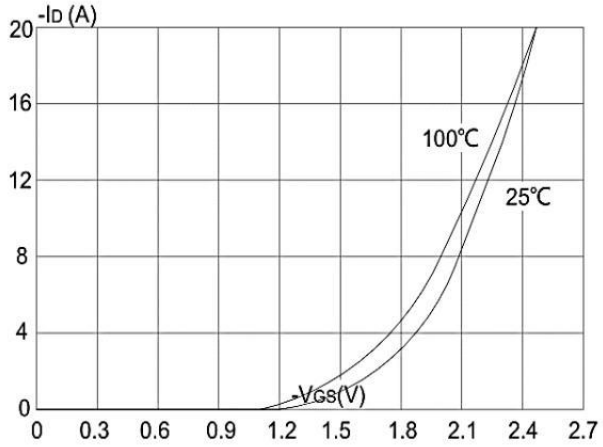


Figure 2: Typical Transfer Characteristics

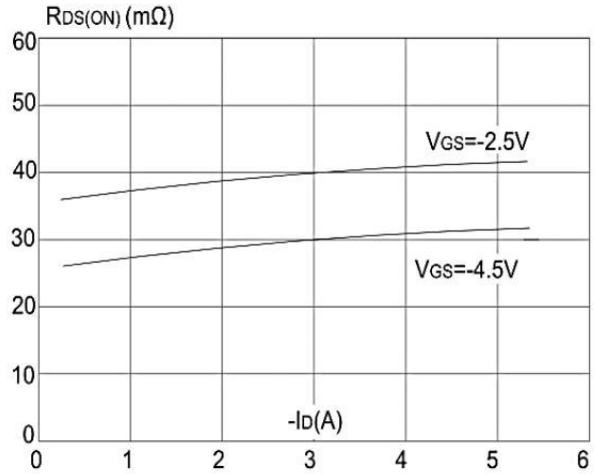


Figure 3:On-resistance vs. Drain Current

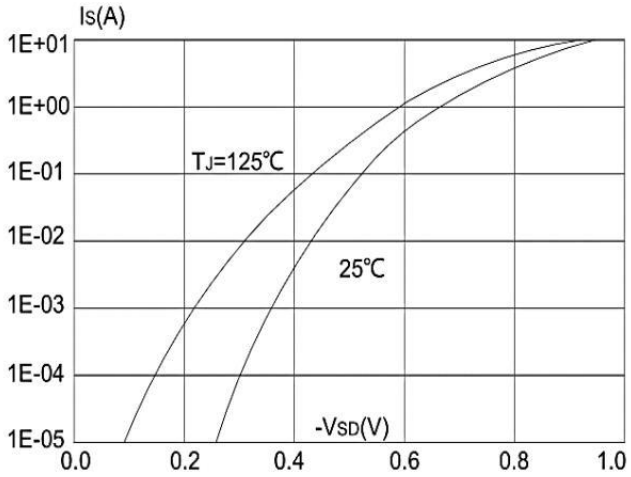


Figure 4: Body Diode Characteristics

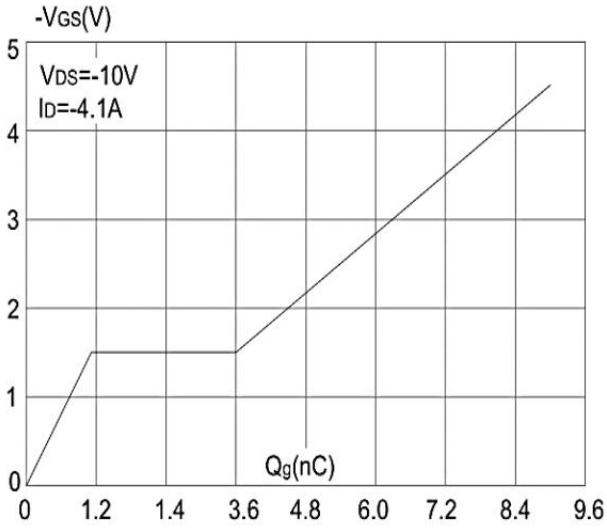


Figure 5: Gate Charge Characteristics

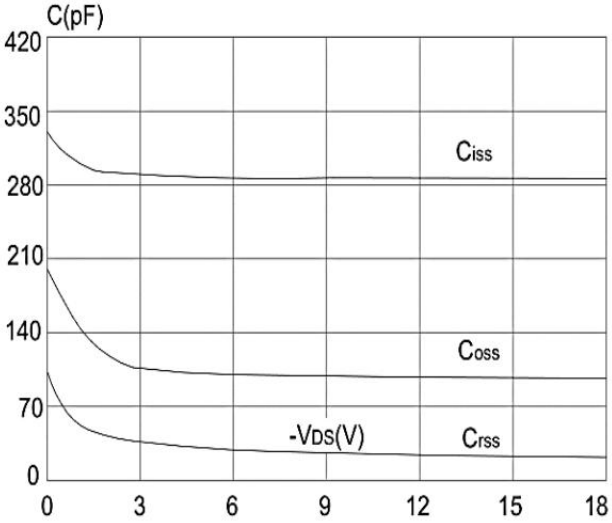


Figure 6: Capacitance Characteristics

Typical Characteristics

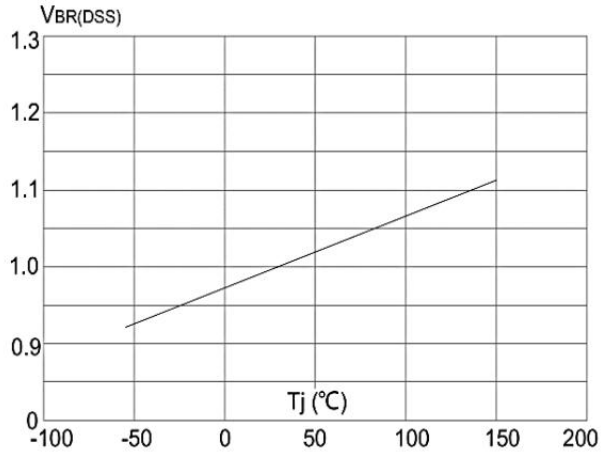


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

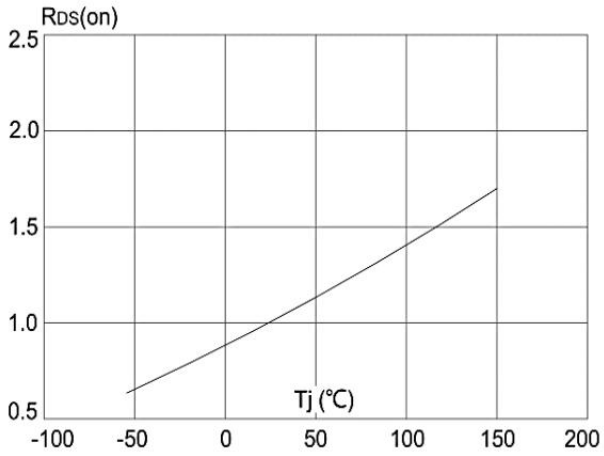


Figure 8: Normalized on Resistance vs. Junction Temperature

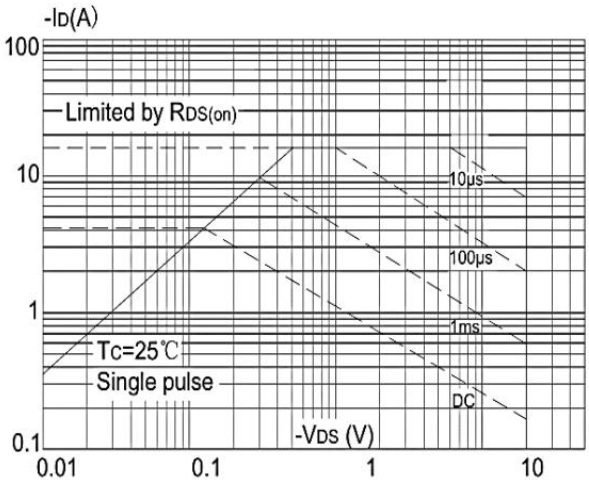


Figure 9: Maximum Safe Operating Area

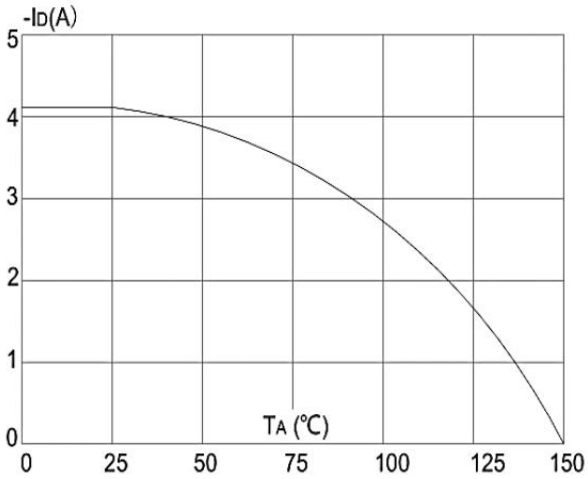


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

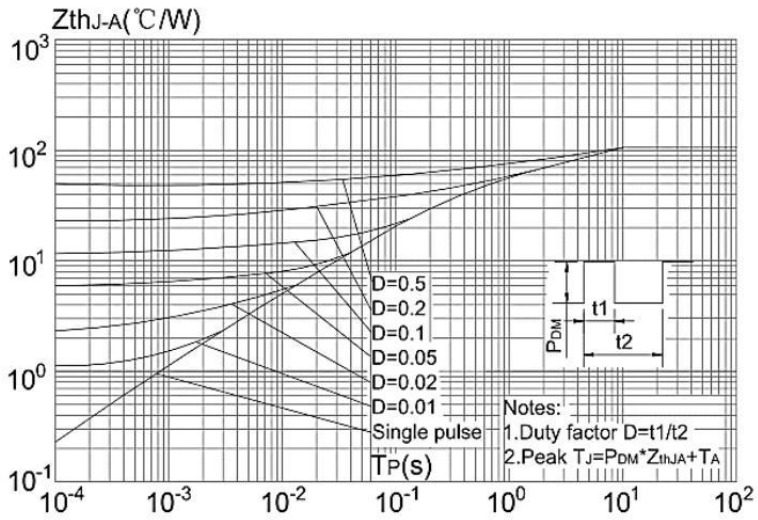
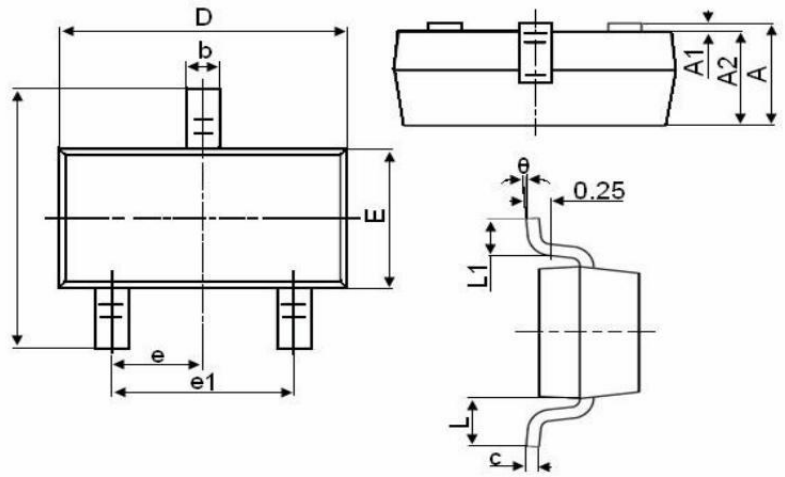


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

Package Mechanical Data-SOT23-XC-Single



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOT23		3000