

Description

The TX3416AI 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

$V_{DS} = 20V$ $I_D = 6A$

$R_{DS(ON)} < 17m\Omega$ @ $V_{GS}=4.5V$

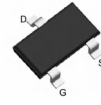
ESD=2500HBM

Application

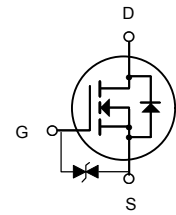
Battery protection

Load switch

Uninterruptible power supply



SOT-23



N-Channel MOSFET

Absolute Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Drain Current-Continuous	6	A
I_{DM}	Drain Current-Pulsed (Note 1)	30	A
P_D	Maximum Power Dissipation	1.4	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	89	$^{\circ}C/W$

Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
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 Current	I _{GSS}	V _{GS} =±10V, V _{DS} =0V	-	-	±10	μA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.45	0.7	1.0	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =6.5A	-	14	17	mΩ
		V _{GS} =2.5V, I _D =5.5A	-	18	23	mΩ
		V _{GS} =1.8V, I _D =5A	-	28	40	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =6.5A	8	-	-	S
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, F=1.0MHz	-	660	-	PF
Output Capacitance	C _{oss}		-	160	-	PF
Reverse Transfer Capacitance	C _{rss}		-	87	-	PF
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V, R _L =1.5Ω V _{GS} =5V, R _{GEN} =3Ω	-	0.5		nS
Turn-on Rise Time	t _r		-	1		nS
Turn-Off Delay Time	t _{d(off)}		-	12		nS
Turn-Off Fall Time	t _f		-	4		nS
Total Gate Charge	Q _g	V _{DS} =10V, I _D =6.5A, V _{GS} =4.5V	-	8		nC
Gate-Source Charge	Q _{gs}		-	2.5	-	nC
Gate-Drain Charge	Q _{gd}		-	3	-	nC
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V, I _S =6.5A	-	-	1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	6.5	A

Notes:

Repetitive Rating: Pulse width limited by maximum junction temperature.

Surface Mounted on FR4 Board, t ≤ 10 sec.

Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

Guaranteed by design, not subject to production

Typical Characteristics

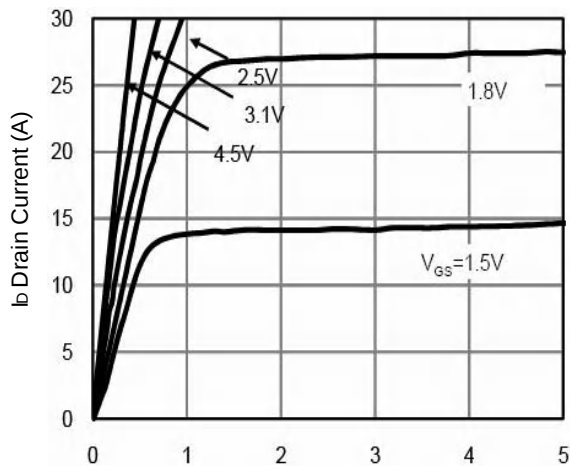


Fig.1 Typical Output Characteristics

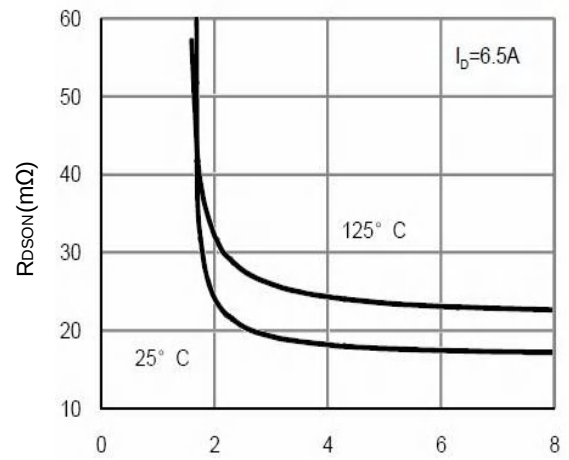


Fig.2 On-Resistance vs. Gate-Source

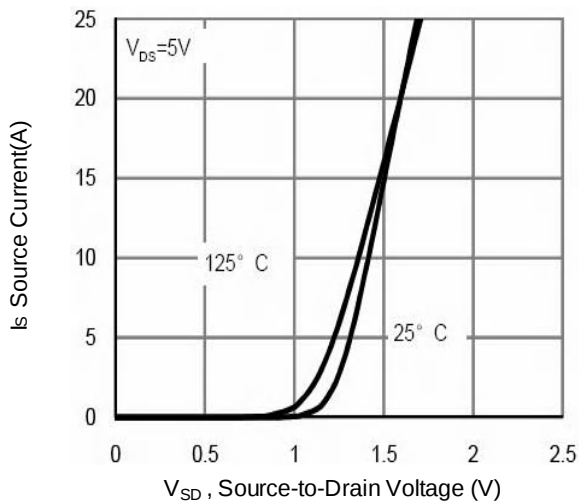


Fig.3 Forward Characteristics of Reverse

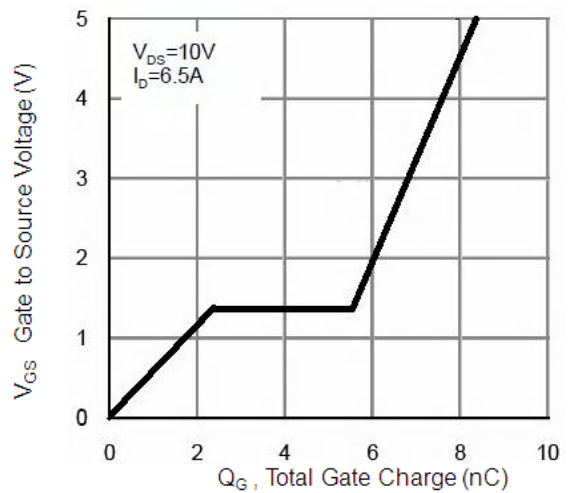


Fig.4 Gate-Charge Characteristics

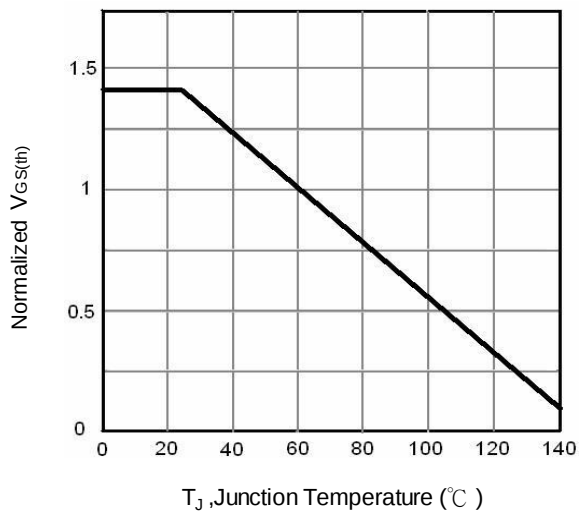


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

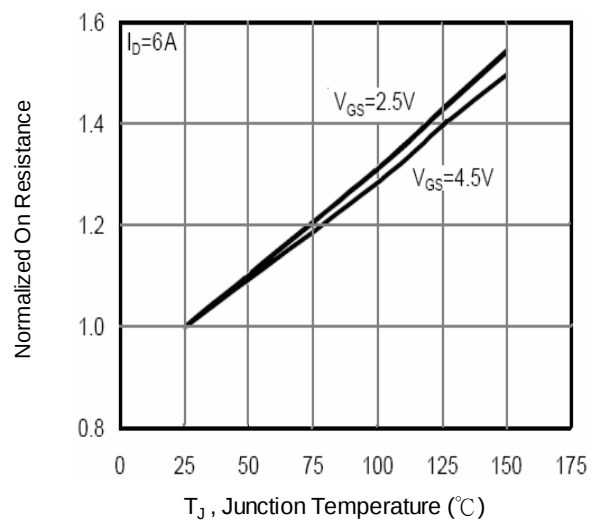


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

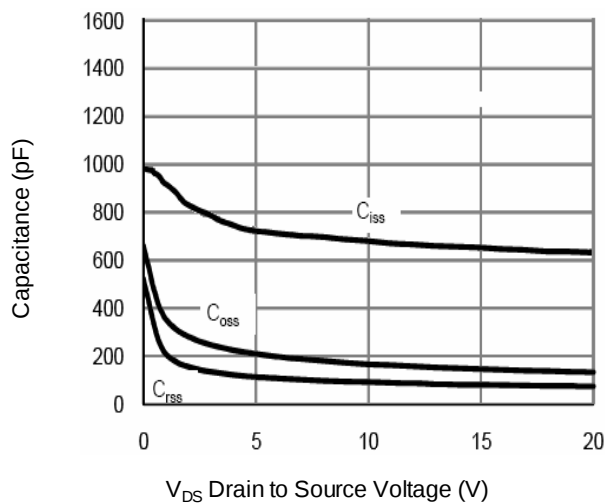


Fig.7 Capacitance

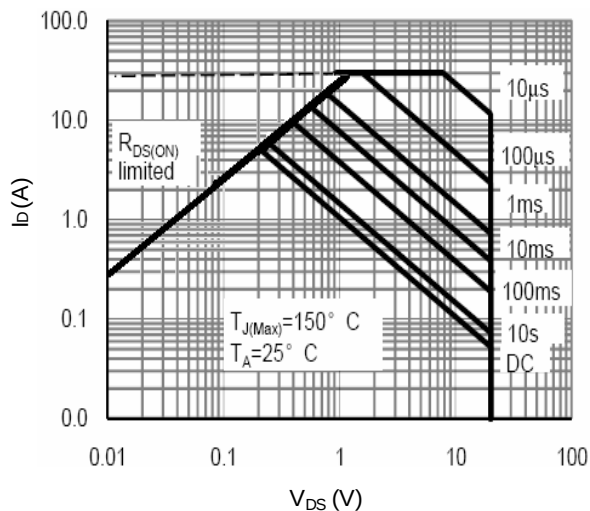


Fig.8 Safe Operating Area

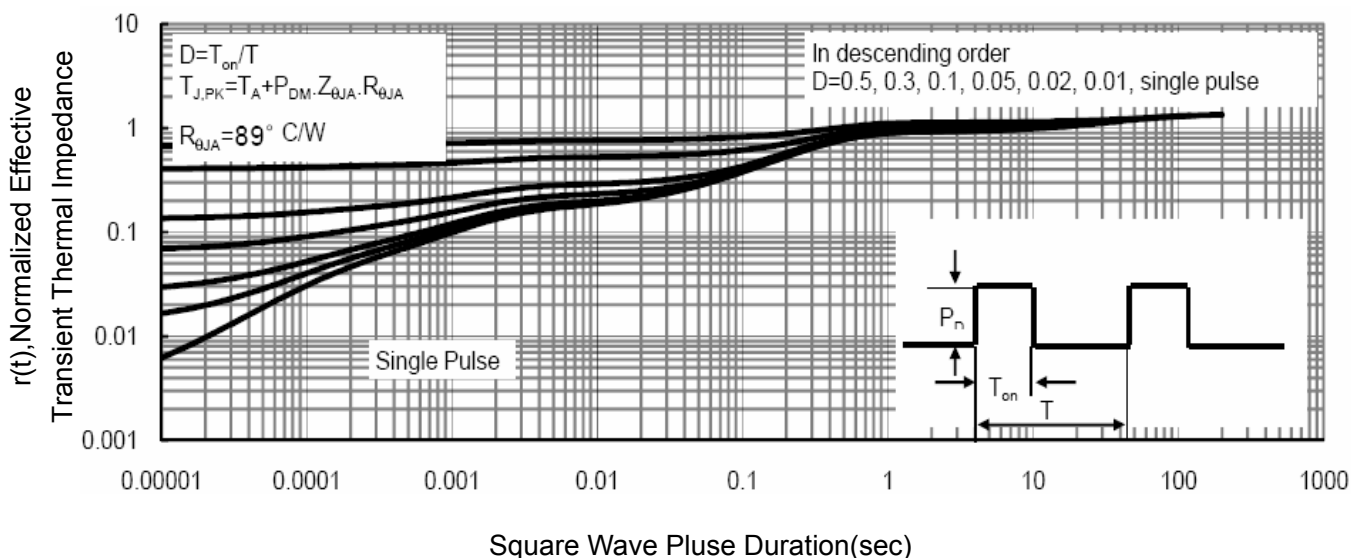


Fig.9 Normalized Maximum Transient Thermal Impedance

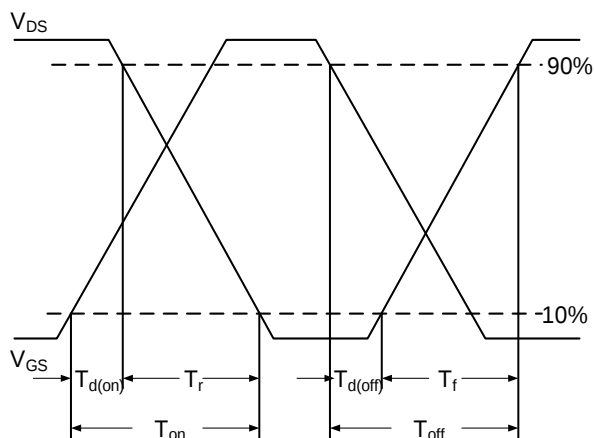


Fig.10 Switching Time Waveform

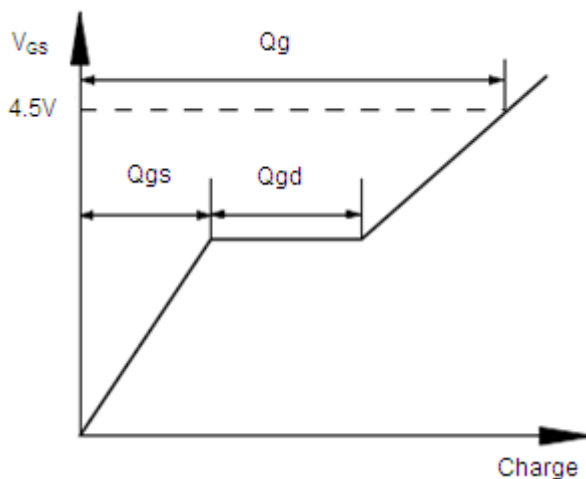
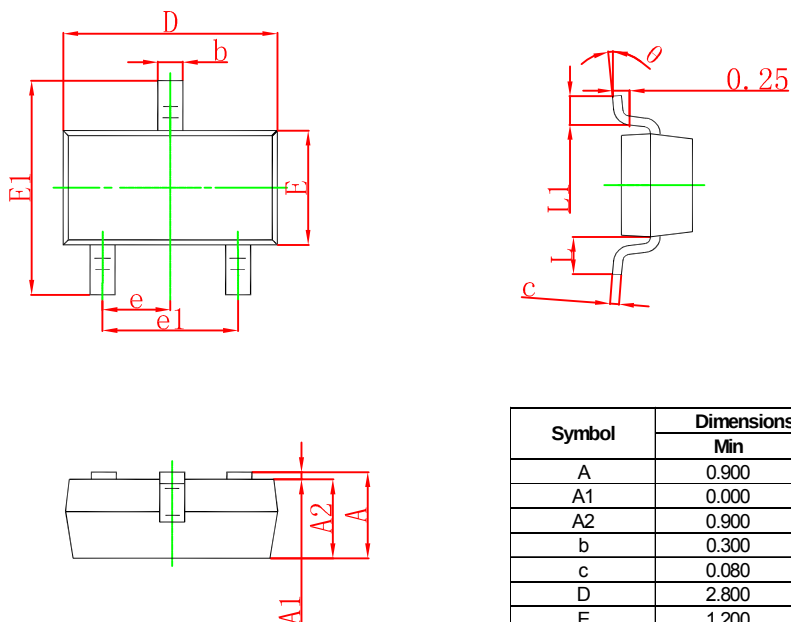


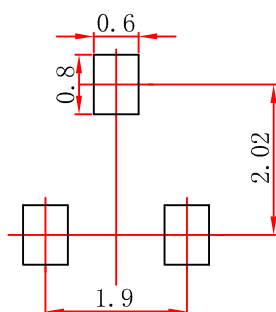
Fig.11 Gate Charge Waveform

SOT-23 Package Outline Dimensions



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	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout



Note:
1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

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