N-Channel Enhancement Mode MOSFET

GENERAL DESCRIPTION

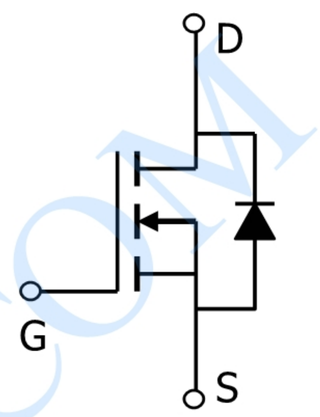
The AO3400 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application..

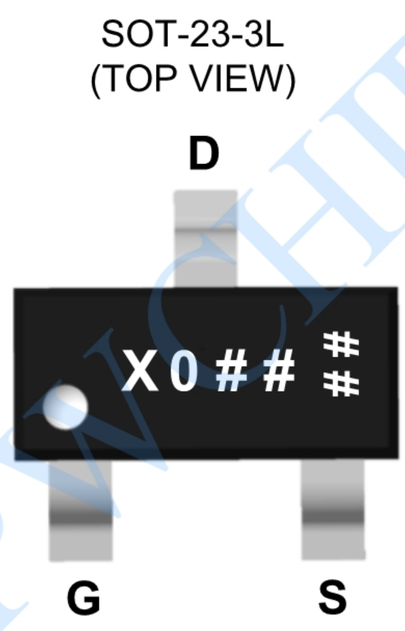
FEATURES

VDS = 30V ID =5.8A

RDS(ON) < 25mΩ @ VGS=10V

Available in a 3-Pin SOT23-3 Package





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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current	ID@TA=25℃	5.8	A
Continuous Drain Current	ID@TA=70℃	4.9	A
Pulsed Drain Current[2]	I_{DM}	20	A
Total Power Dissipation [3]	P_D@TA=25℃	1	W
Storage Temperature Range	T_{STG}	-55 To 150	℃
Operating Junction Temperature Range	T_J	-55 To 150	℃
Thermal Resistance Junction-ambient[1]	$R_{\theta JA}$	125	℃/W
Thermal Resistance Junction-Ambient 1 (t ≤10s)	$R_{\theta JC}$	80	

ELECTRICAL CHARACTERISTICS

(TA = 25°C, unless otherwise noted.)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30		---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.029	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=5.8A	---	21	25	mΩ
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=5A	---	23	32	mΩ
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=2.5V , I_D=4A	---	31	49	mΩ
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.5	0.85	1.2	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-2.82	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=5A	---	25	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.5	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=5.8A	---	11.5	---	nC
Q_{gs}	Gate-Source Charge		---	1.6	---	
Q_{gd}	Gate-Drain Charge		---	2.9	---	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3Ω I_D=5A	---	5	---	ns
T_r	Rise Time		---	47.	---	
Td(off)	Turn-Off Delay Time		---	26	---	
T_f	Fall Time		---	8	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	530	---	pF
Coss	Output Capacitance		---	130	---	
Crss	Reverse Transfer Capacitance		---	36	---	
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	5.8	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	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

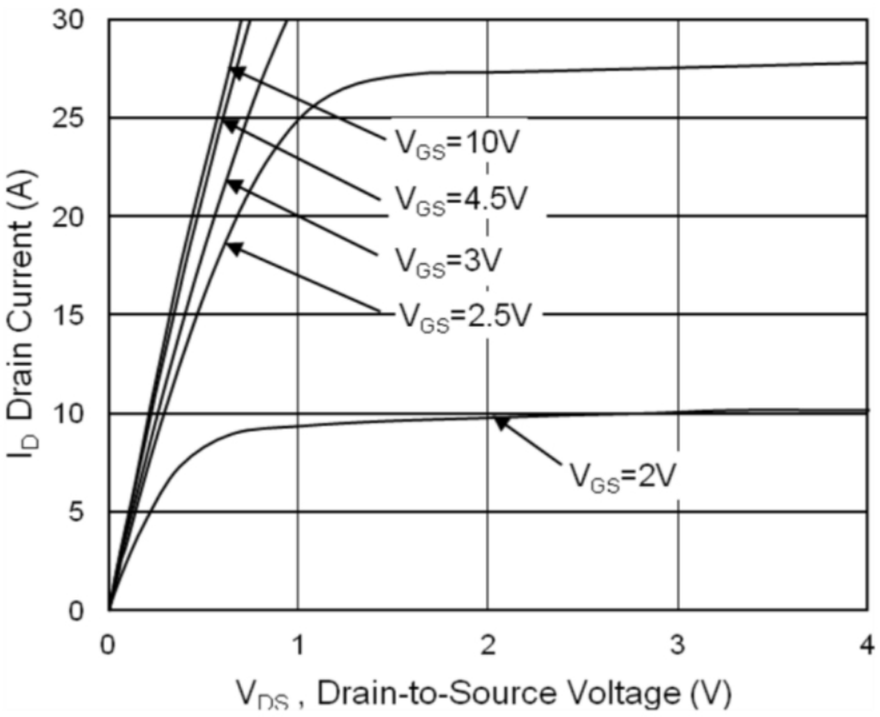


Fig.1 Typical Output Characteristics

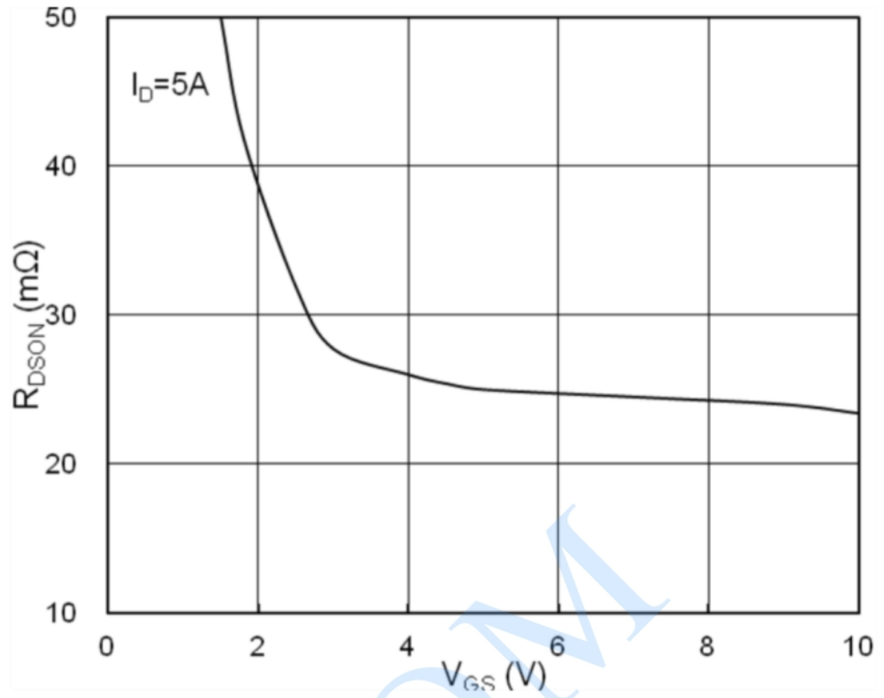


Fig.2 On-Resistance vs. Gate-Source

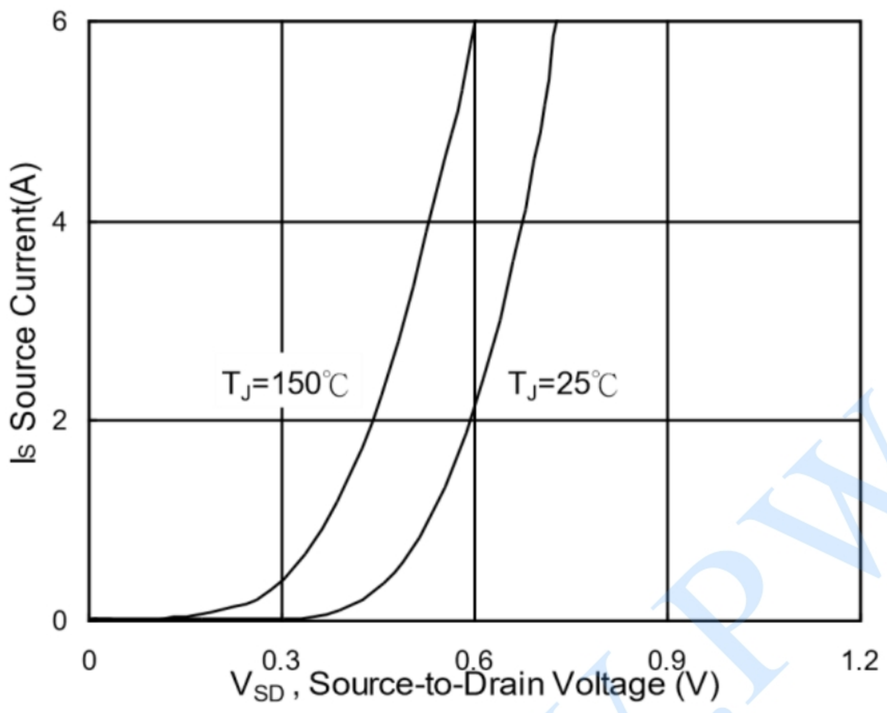


Fig.3 Forward Characteristics Of Reverse

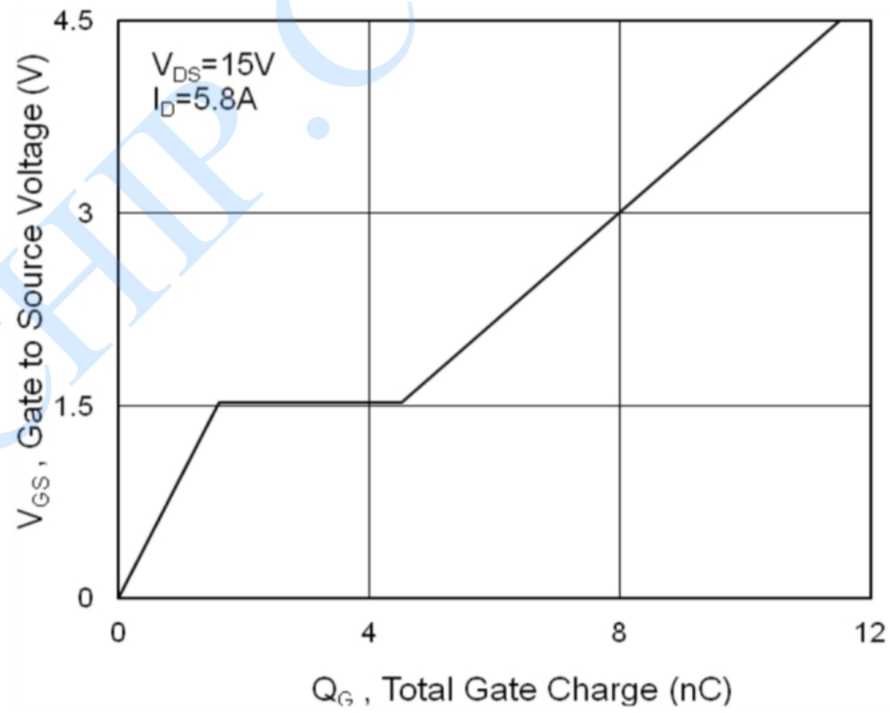


Fig.4 Gate-Charge Characteristics

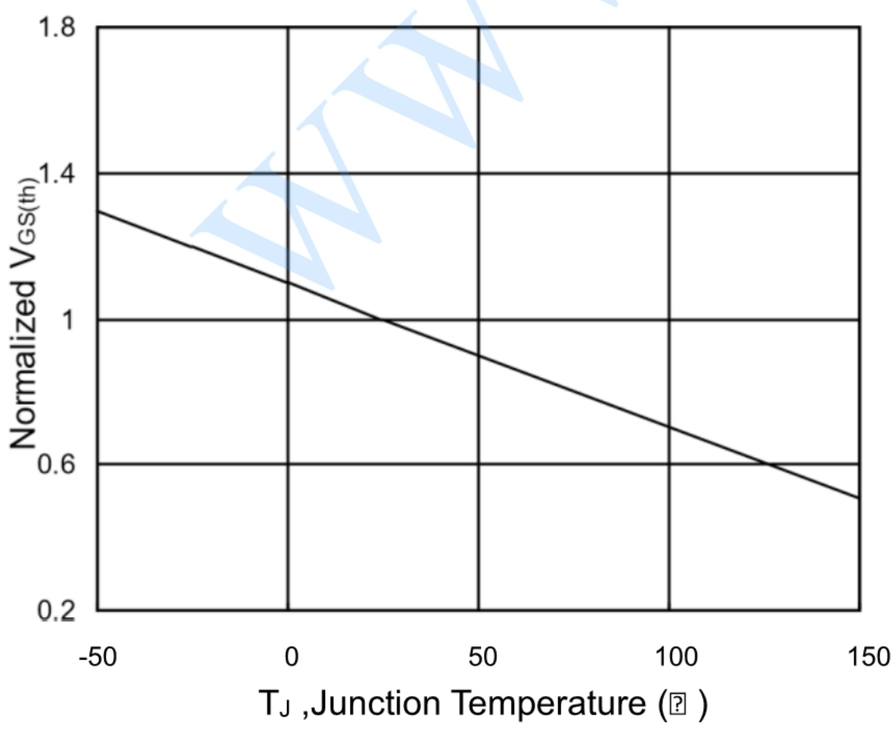


Fig.5 Normalized VGS(th) vs. TJ

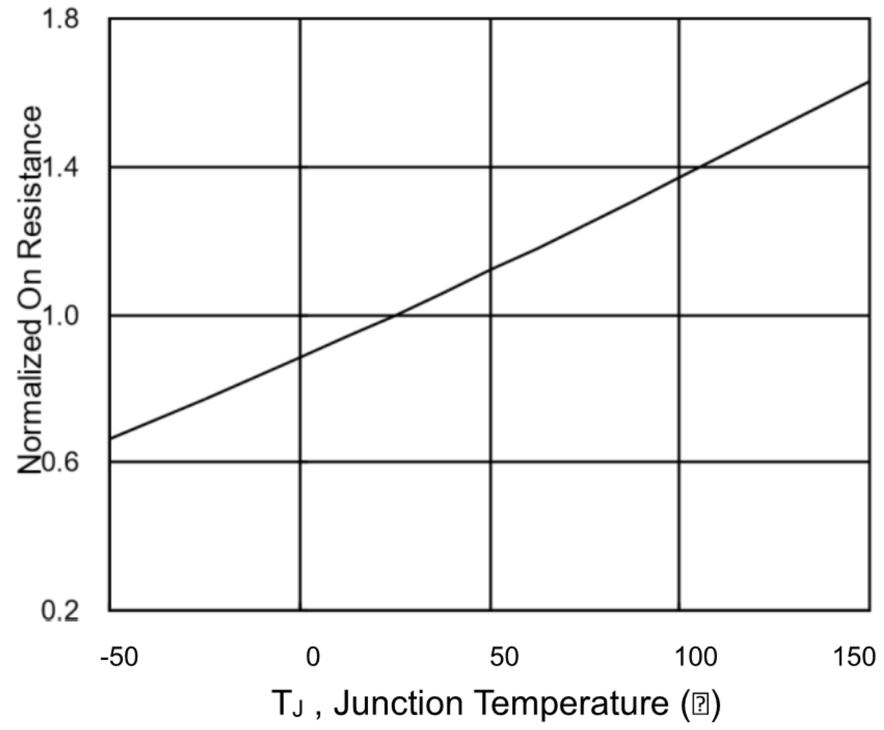


Fig.6 Normalized RDSON vs. TJ

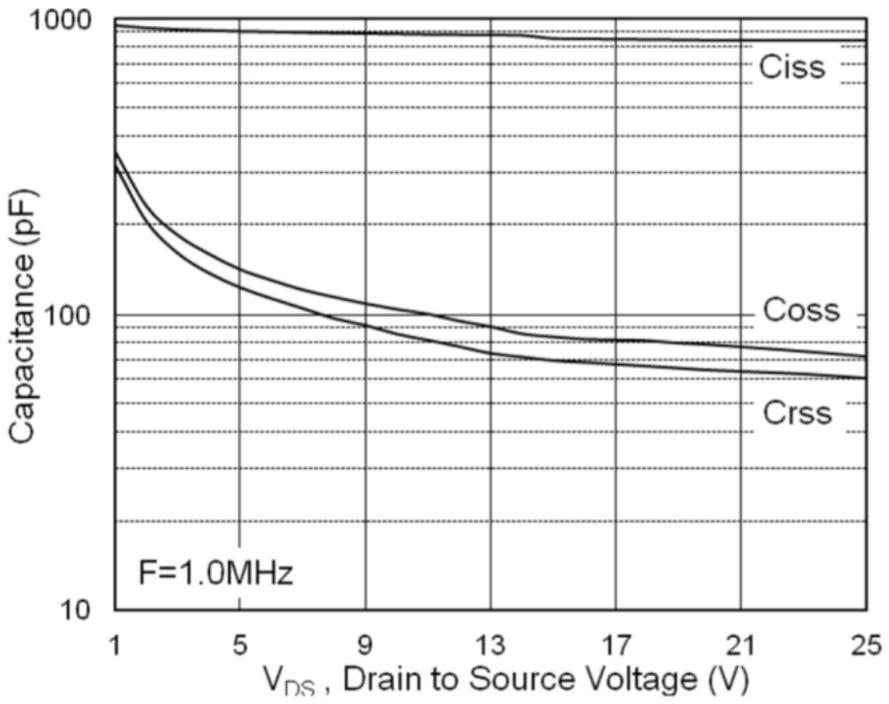


Fig.7 Capacitance

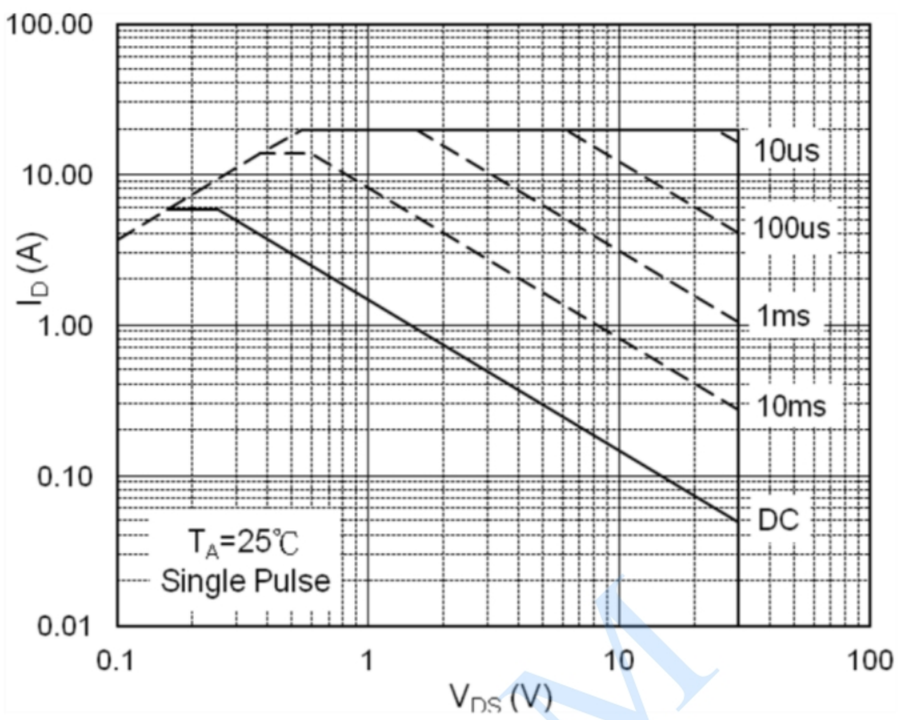


Fig.8 Safe Operating Area

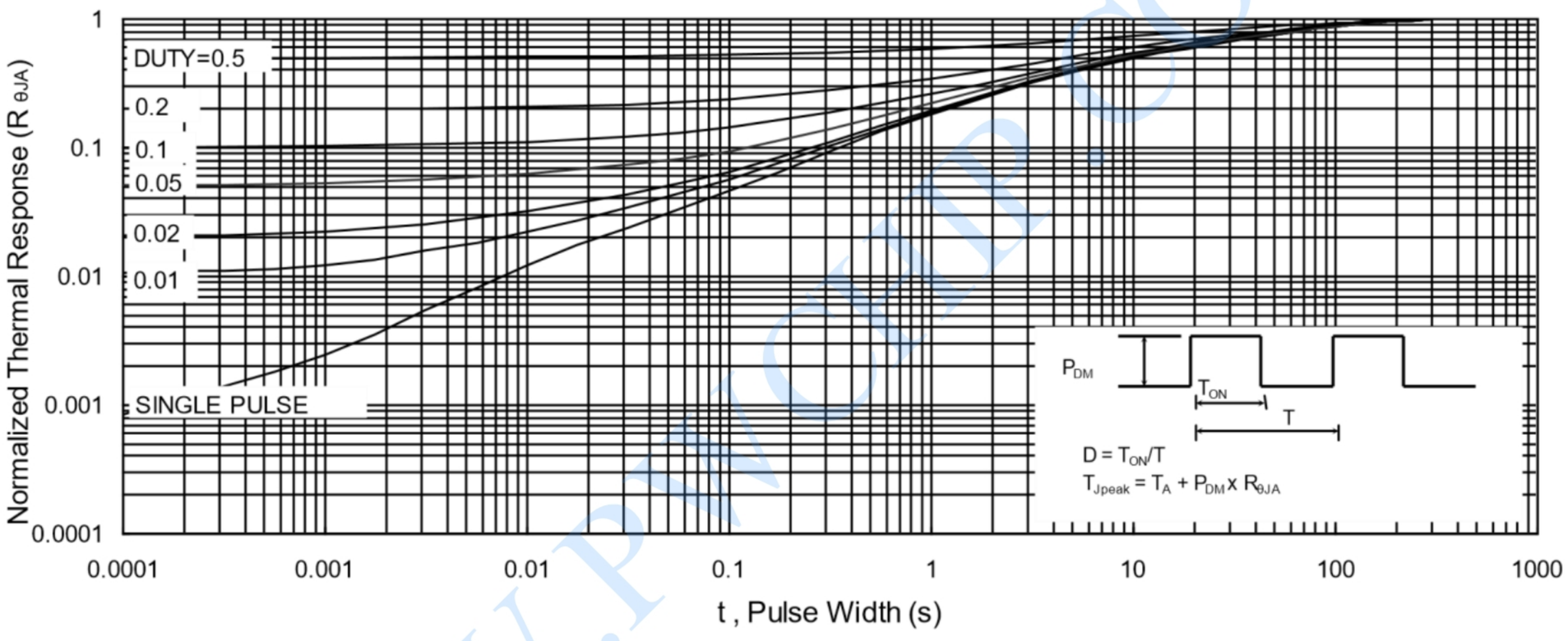


Fig.9 Normalized Maximum Transient Thermal Impedance

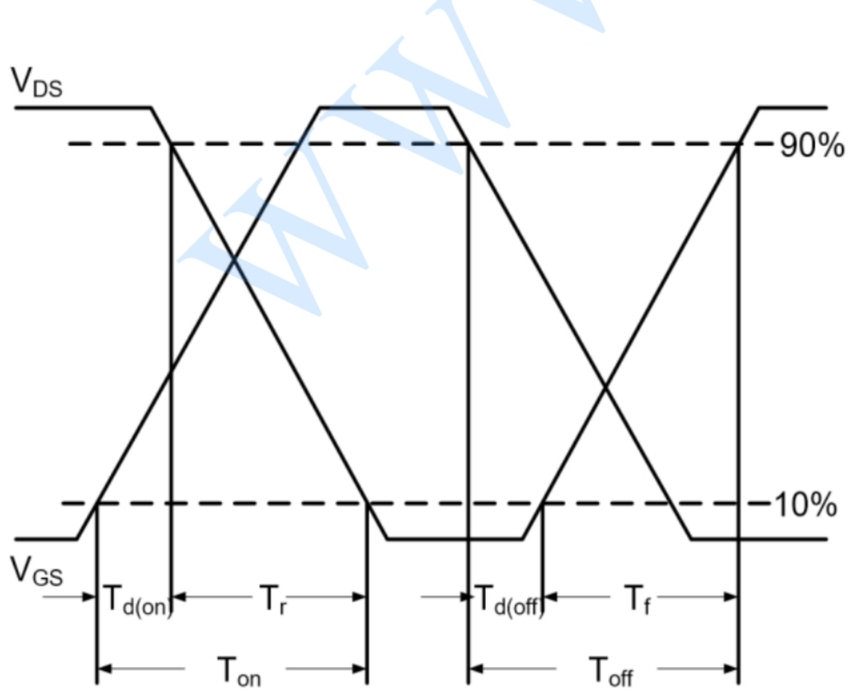


Fig.10 Switching Time Waveform

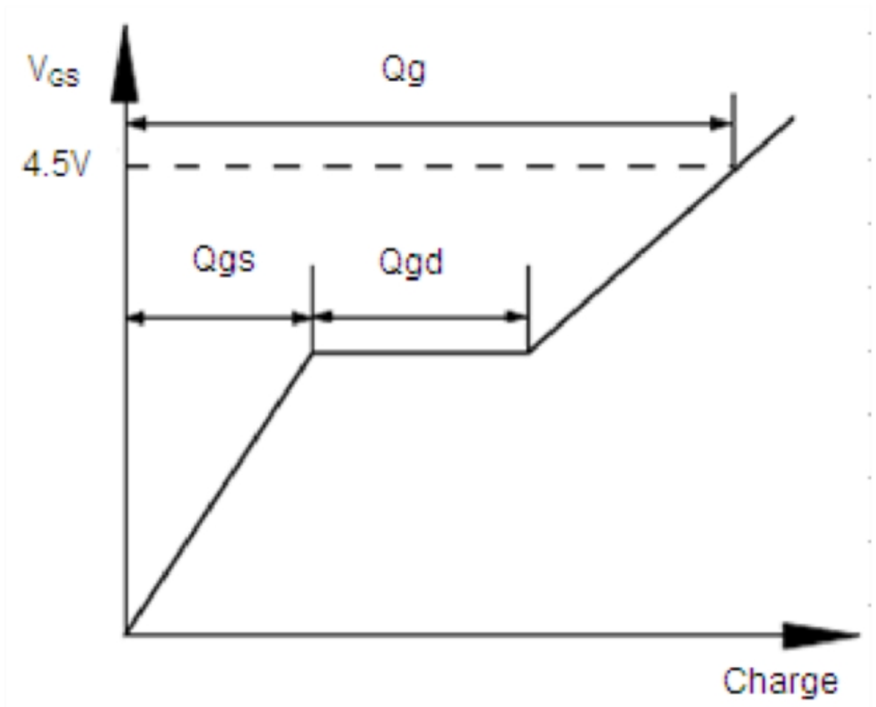
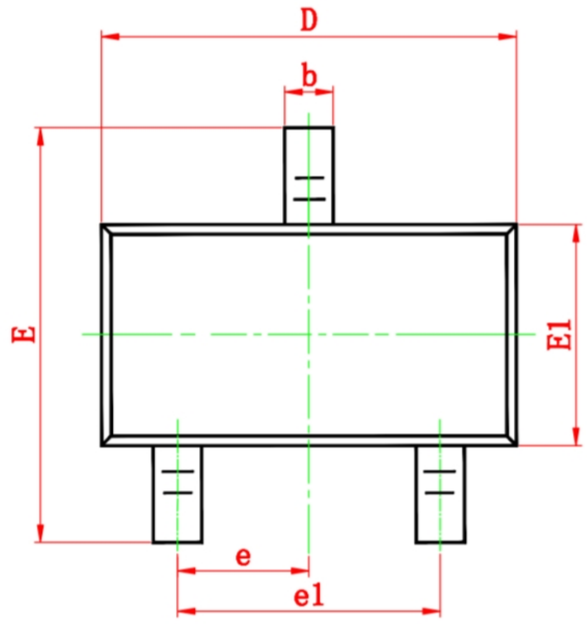
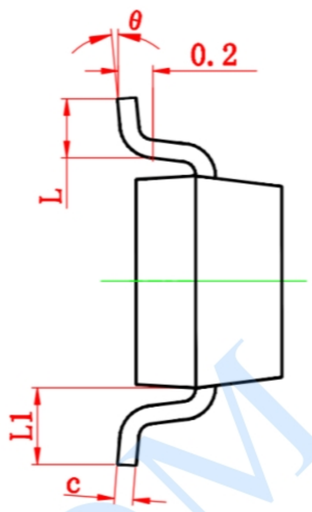
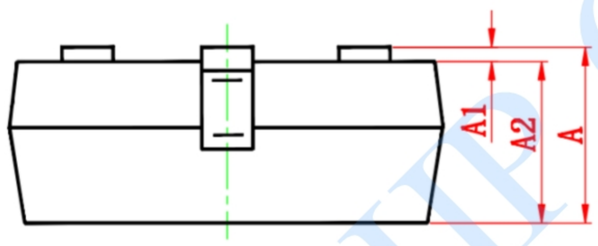


Fig.11 Gate Charge Waveform

PACKAGE DESCRIPTION







Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Notes

1. All dimensions are in millimeters.
2. Tolerance ±0.10mm (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.