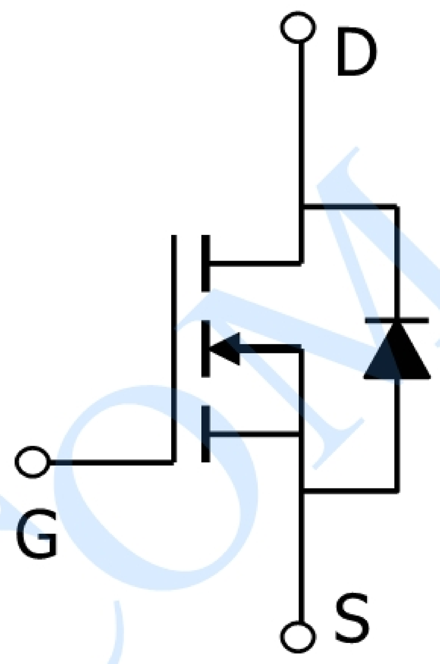
N-Channel Enhancement Mode MOSFET

GENERAL DESCRIPTION

The PW2308 uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

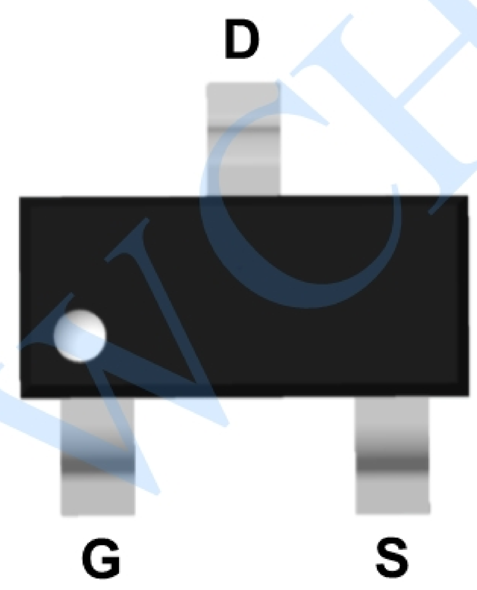
FEATURES

VDS =60V, ID =5A
RDS(ON) < 38mΩ @ VGS=10V
Available in a 3-Pin SOT23-3 Package



Application

Battery protection
Load switch
Automative lighting



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, VGS @ 10V (NOTE1)	ID@TA=25℃	5.8	A
	ID@TA=70℃	3.5	
Pulsed Drain Current (NOTE2)	I_{DM}	18	A
Single Pulse Avalanche Energy (NOTE3)	EAS	22	mJ
Avalanche Current	I_{AS}	21	A
Total Power Dissipation (NOTE4)	P_D @TA=25℃	1.5	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃
Thermal Resistance Junction-Ambient (NOTE1)	$R_{\theta JA}$	85	℃/W
Thermal Resistance Junction-Case (NOTE1)	$R_{\theta JC}$	25	℃/W

Note 1、 The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

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

Note 3、 The EAS data shows Max. rating . The test condition is VDD=25V,VGS=10V,L=0.1mH,IAS=21A

Note 4、 The power dissipation is limited by 150℃ junction temperature

ELECTRICAL CHARACTERISTICS

(TA = 25°C, unless otherwise noted.)

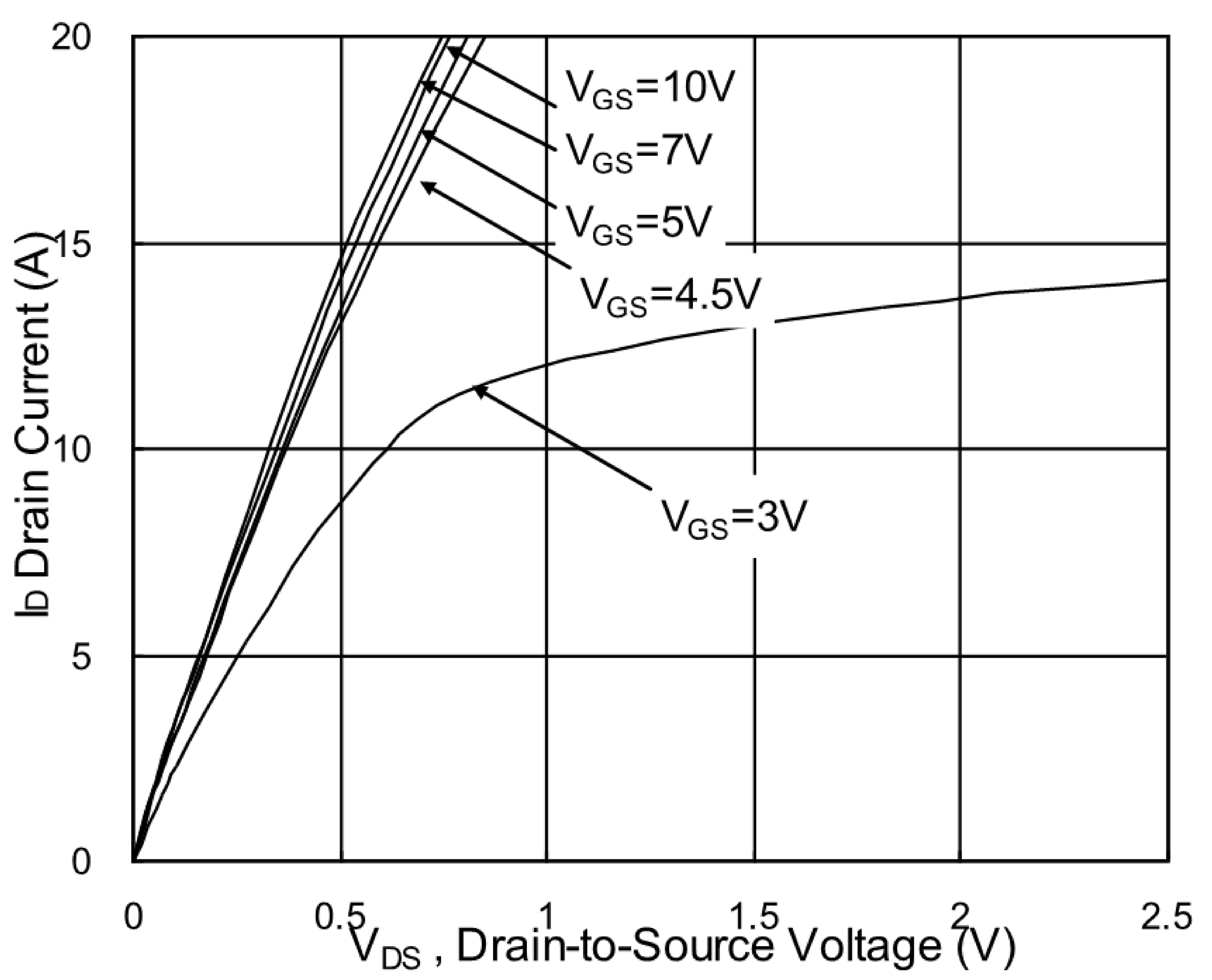
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	60			V
△BV_{DSS}/△T_J	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA		0.044		V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance (NOTE2)	V_{GS}=10V , I_D=1.5A		28	38	mΩ
		V_{GS}=4.5V , I_D=2A		35	50	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	1.0	1.76	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			-4.08		mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=48V , V_{GS}=0V , T_J=25℃			1	uA
		V_{DS}=48V , V_{GS}=0V , T_J=55℃			5	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V			±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=4A		28.3		S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz		2.5		Ω
Q_g	Total Gate Charge (10V)	V_{DS}=48V , V_{GS}= 10V , I_D=4A		19		nC
Q_{gs}	Gate-Source Charge			2.6		nC
Q_{gd}	Gate-Drain Charge			4.1		nC
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=30V , V_{GS}= 10V , R_G=3.3Ω, I_D= 4A		3		ns
T_r	Rise Time			34		ns
$T_{d(off)}$	Turn-Off Delay Time			23		ns
T_f	Fall Time			6		ns
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz		1027		pF
C_{oss}	Output Capacitance			65		pF
C_{rss}	Reverse Transfer Capacitance			46		pF
I_S	Continuous Source Current(NOTE1, 3)	V_G=V_D=0V , Force Current			4.5	A
I_{SM}	Pulsed Source Current(NOTE2, 3)				18	A
V_{SD}	Diode Forward Voltage (NOTE2)	V_{GS}=0V , I_S=1A , T_J=25℃			1.2	V
trr	Reverse Recovery Time	I_F=4A ,dI/dt=100A/μs , T_J=25℃		12.1		nS
Q_{rr}	Reverse Recovery Charge			6.7		nC

Note 1. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

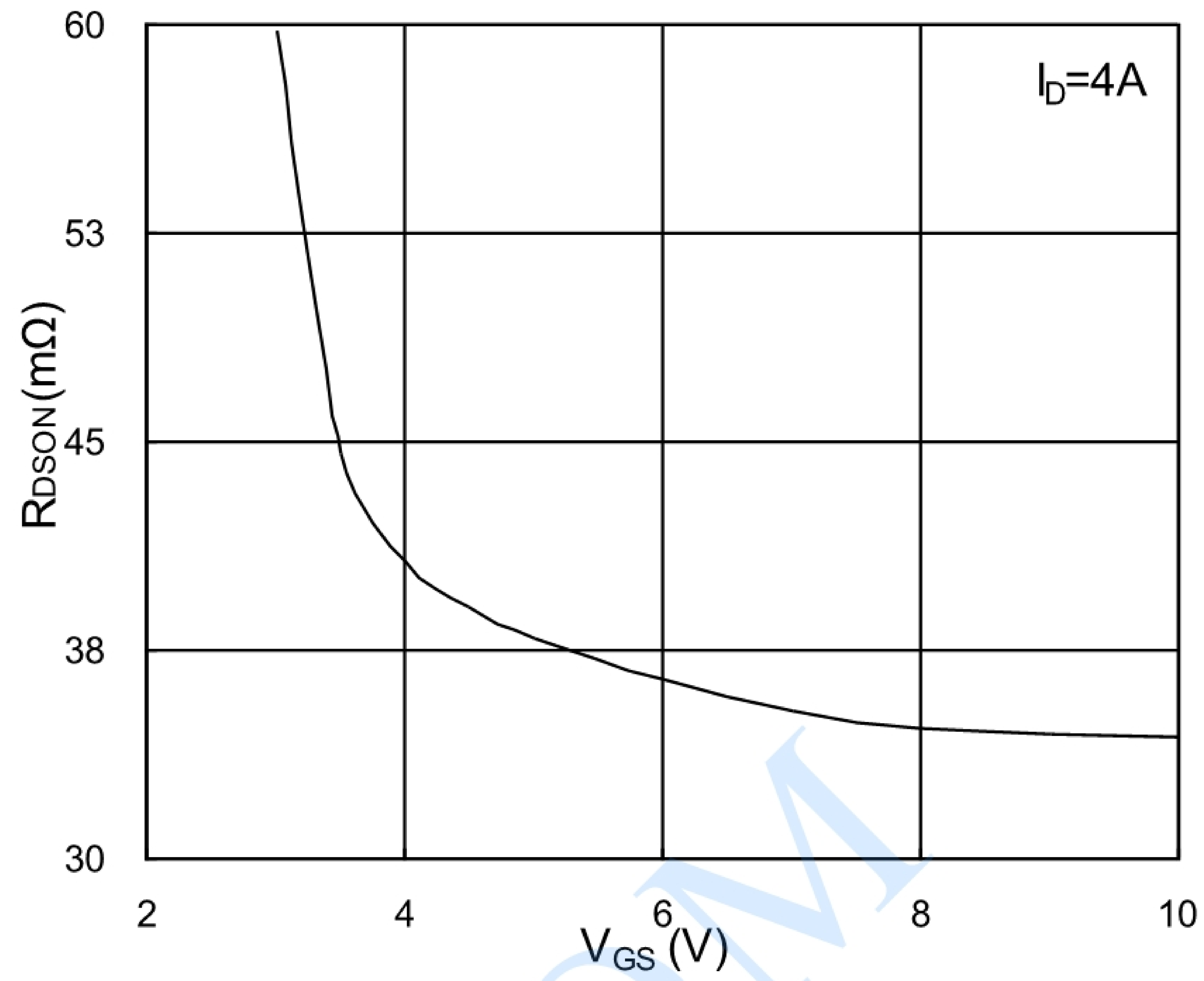
Note 2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

Note 3. The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

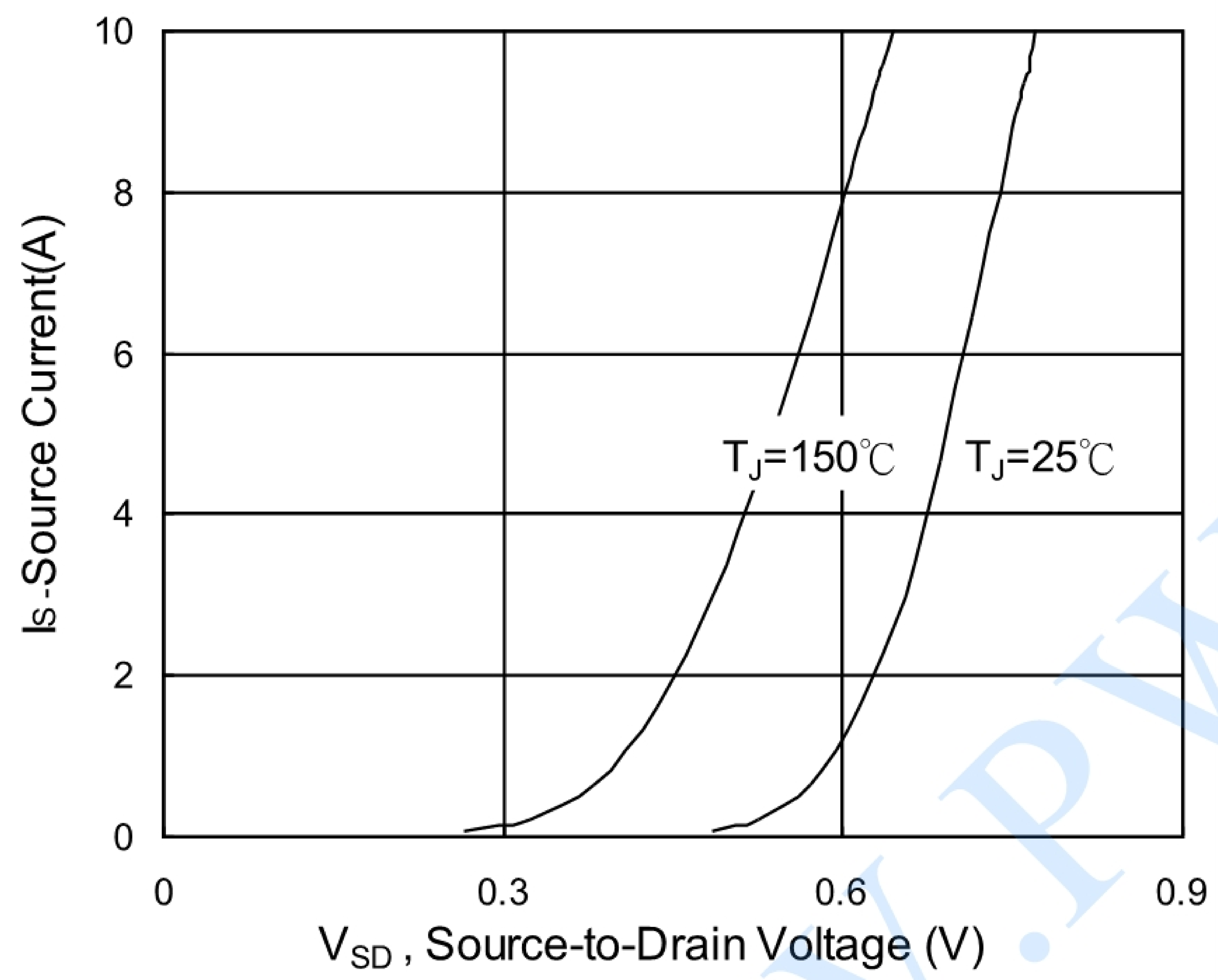
Thermal Characteristics



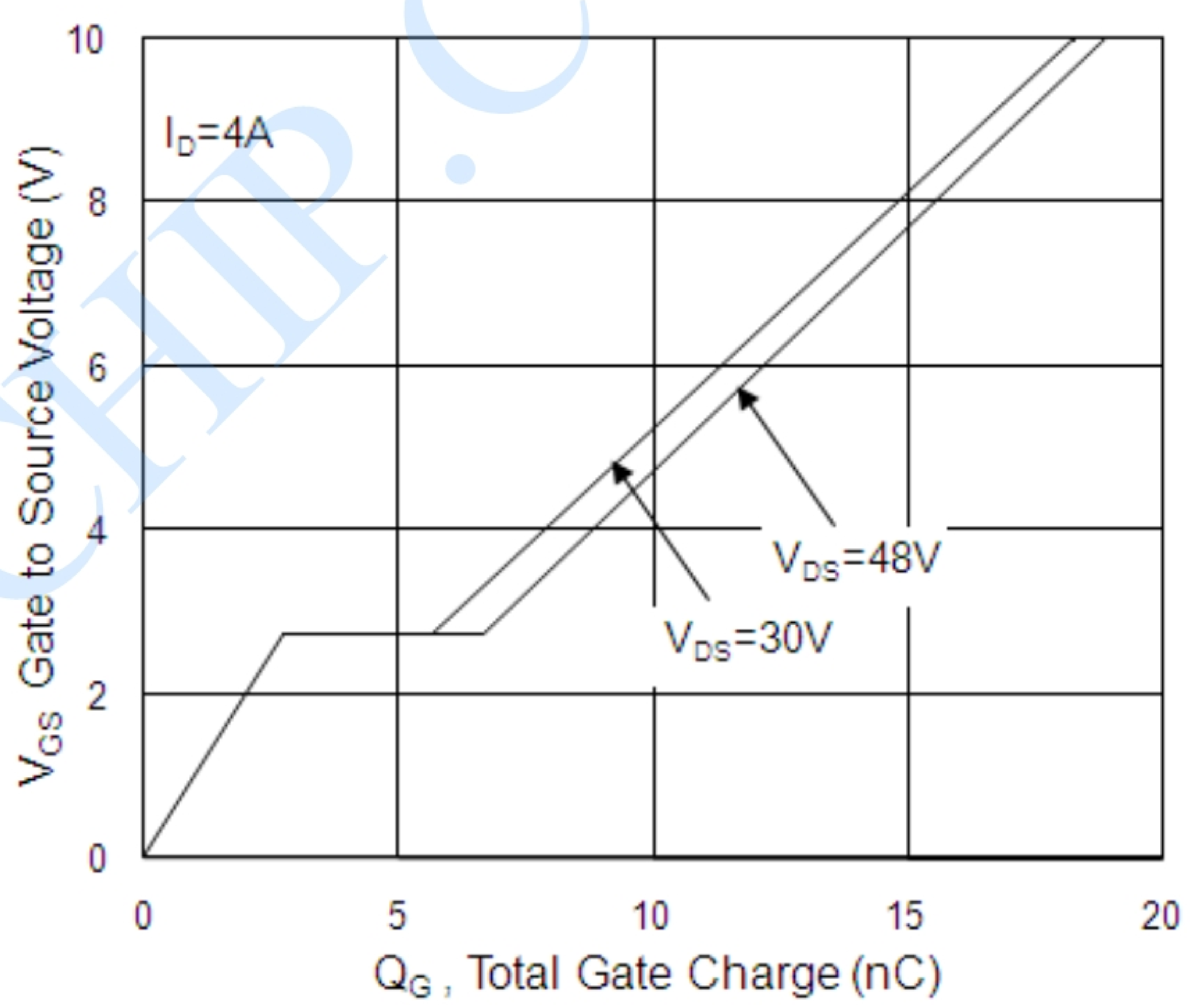
Typical Output Characteristics



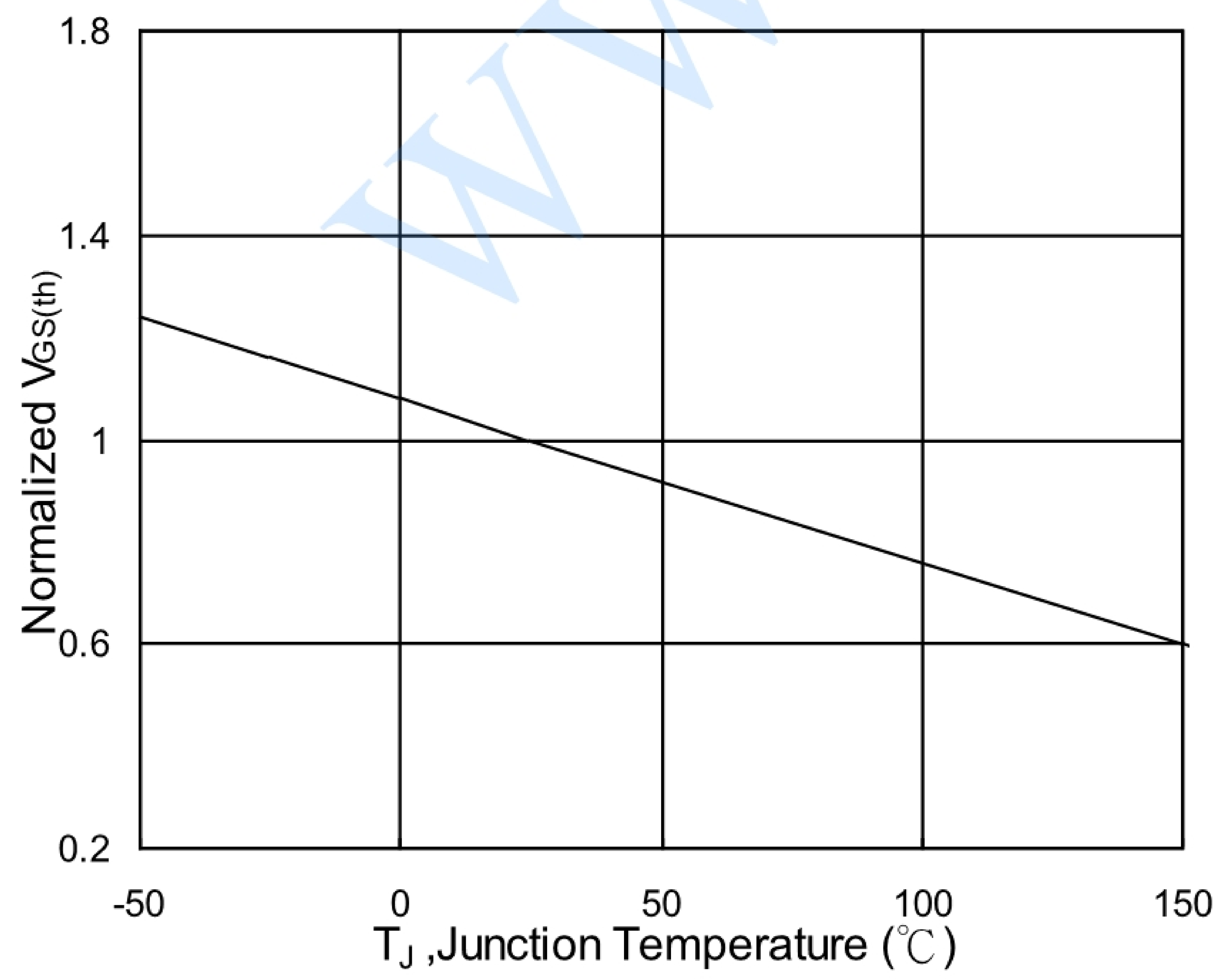
On-Resistance v.s Gate-Source



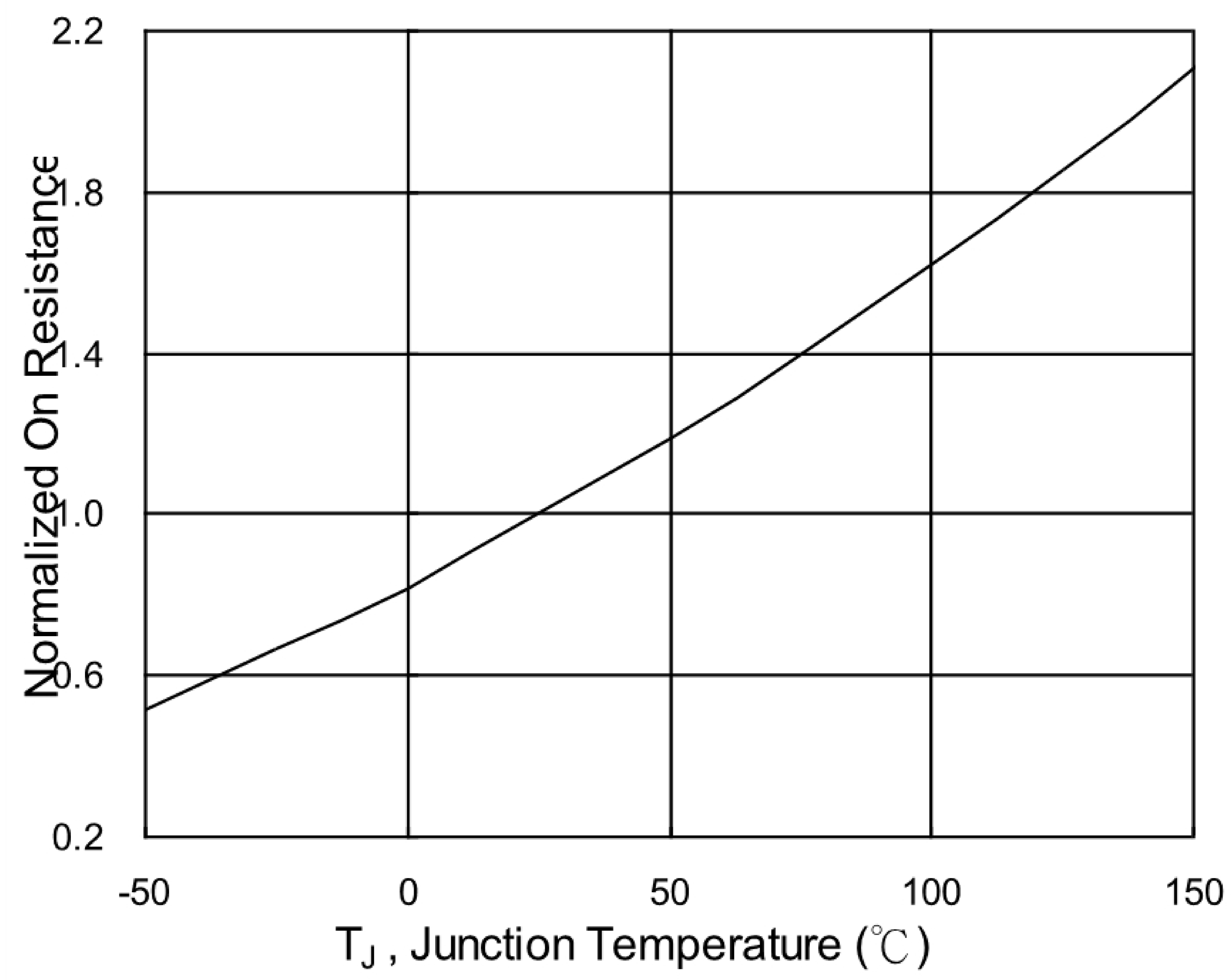
Forward Characteristics Of Reverse



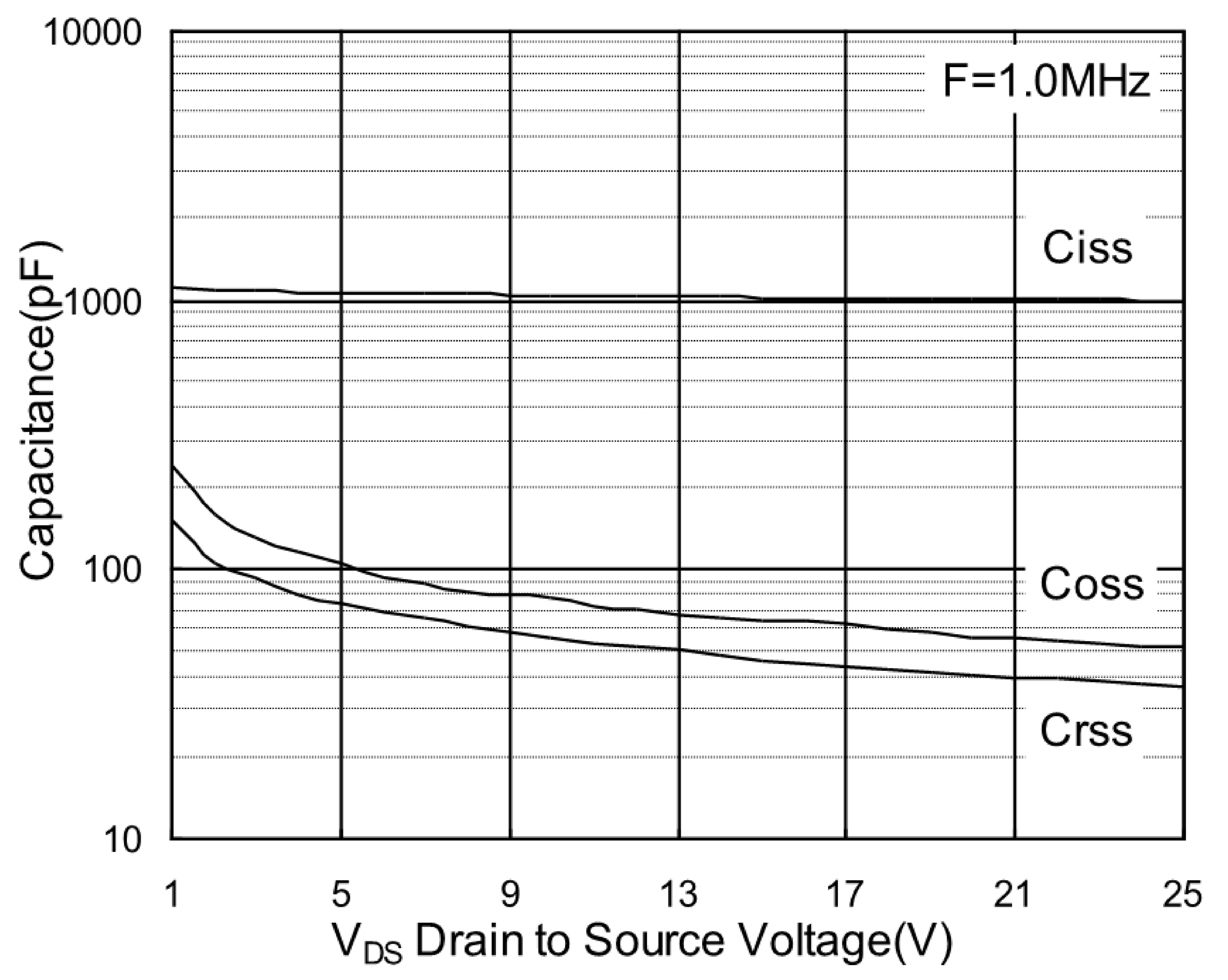
Gate-Charge Characteristics



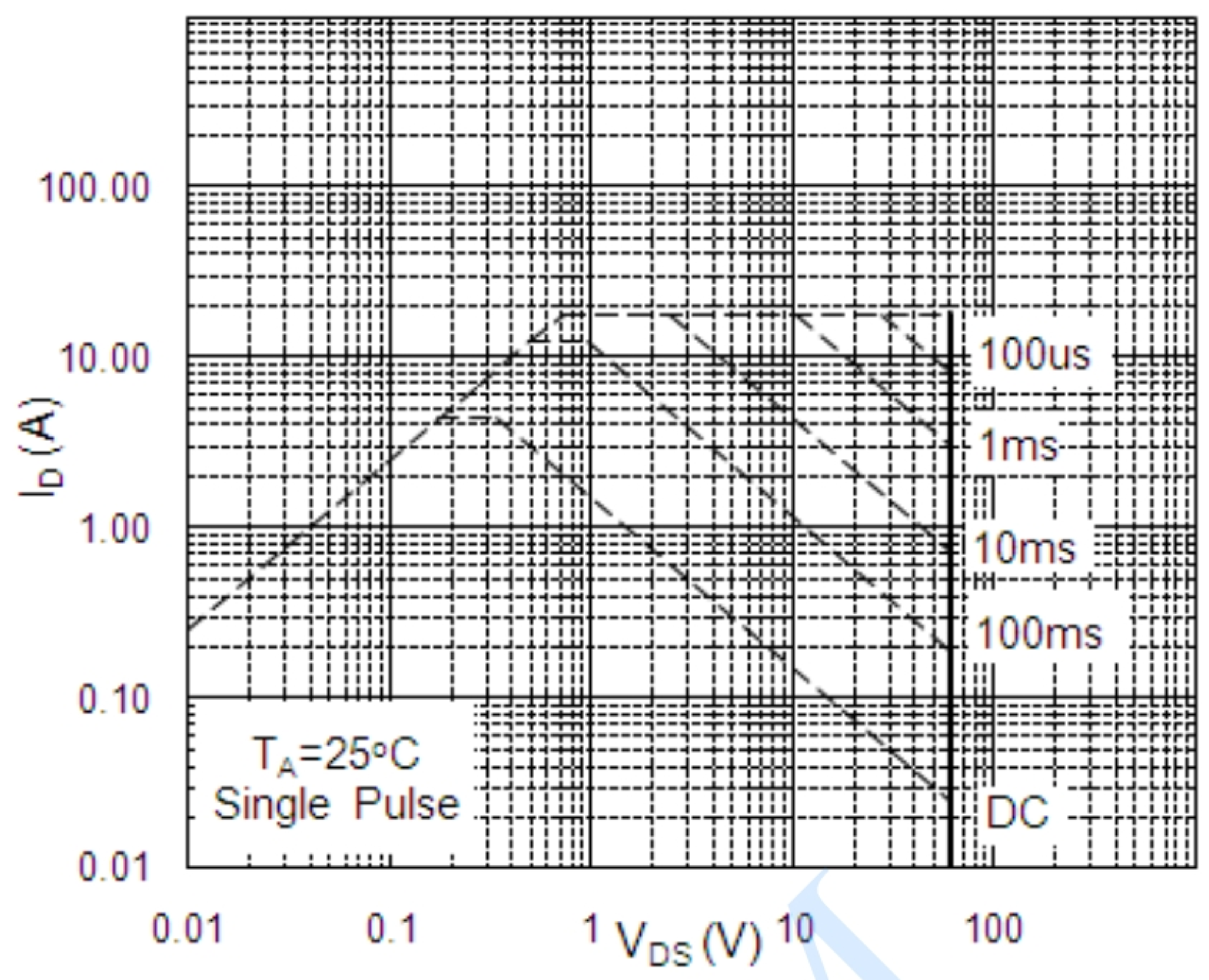
Normalized VGS(th) v.s TJ



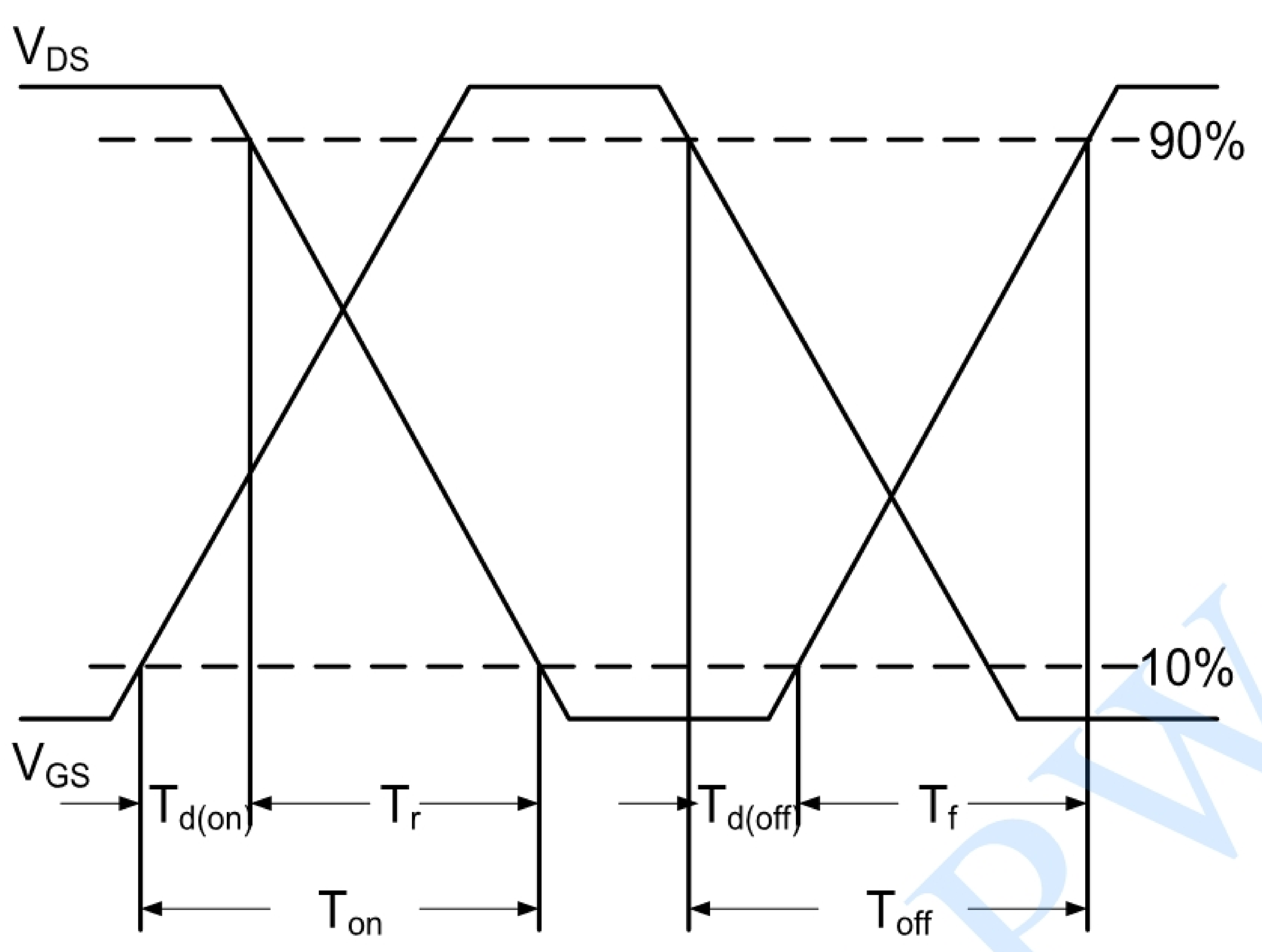
Normalized RDSON v.s TJ



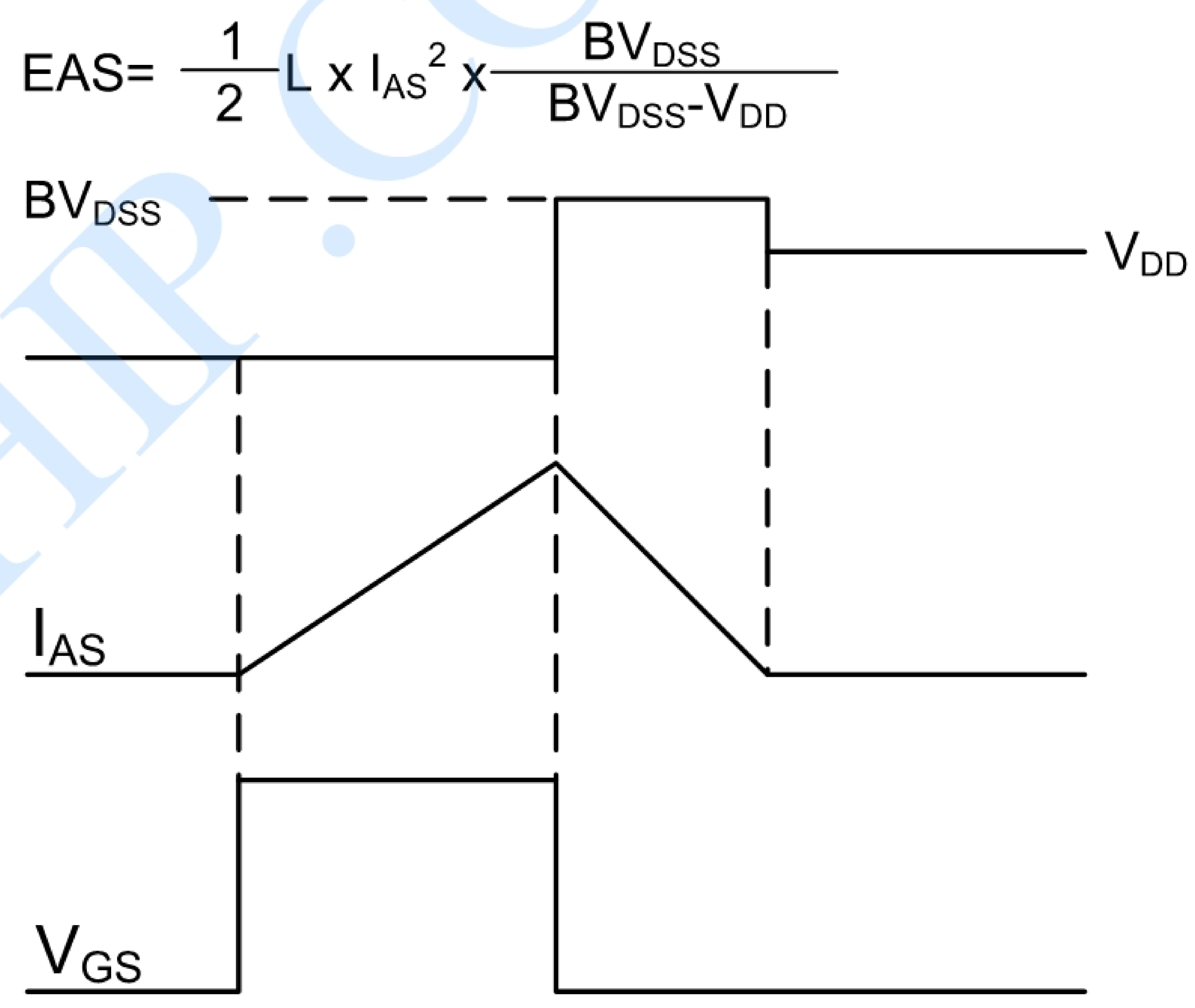
Capacitance



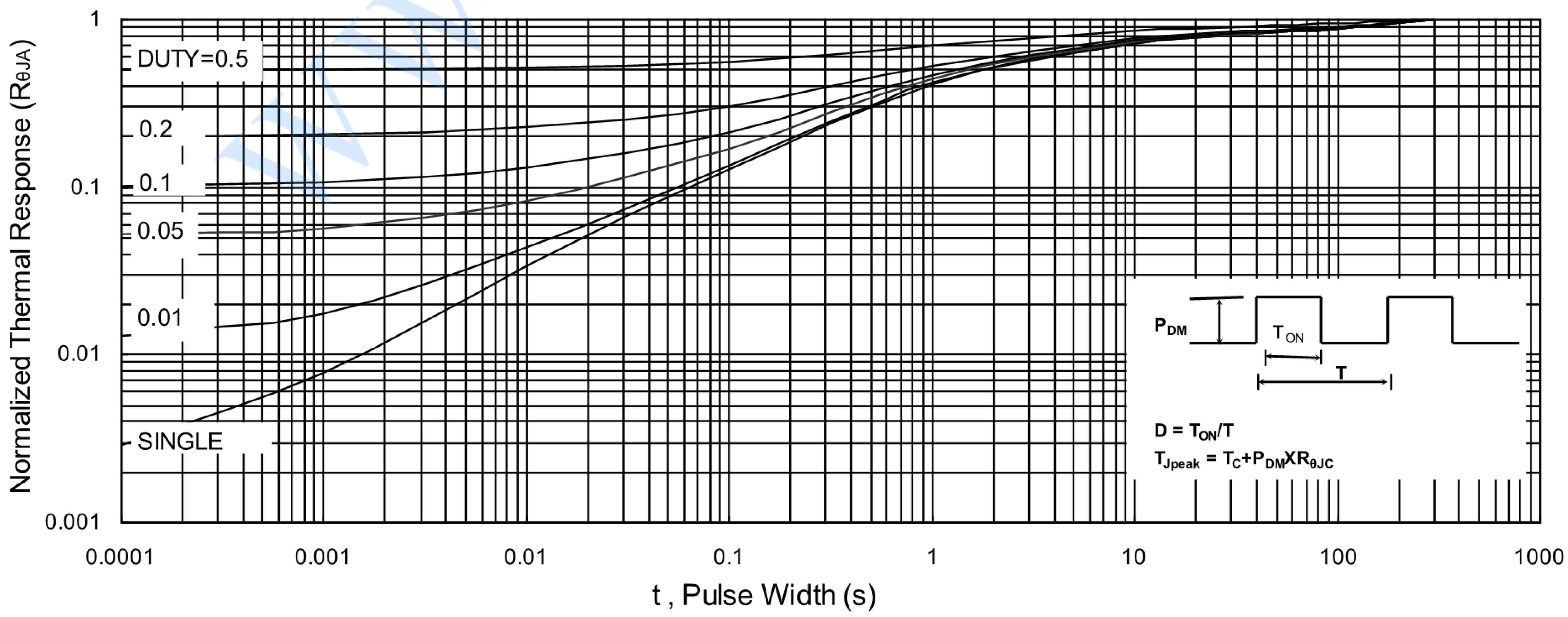
Safe Operating Area



Switching time waveform



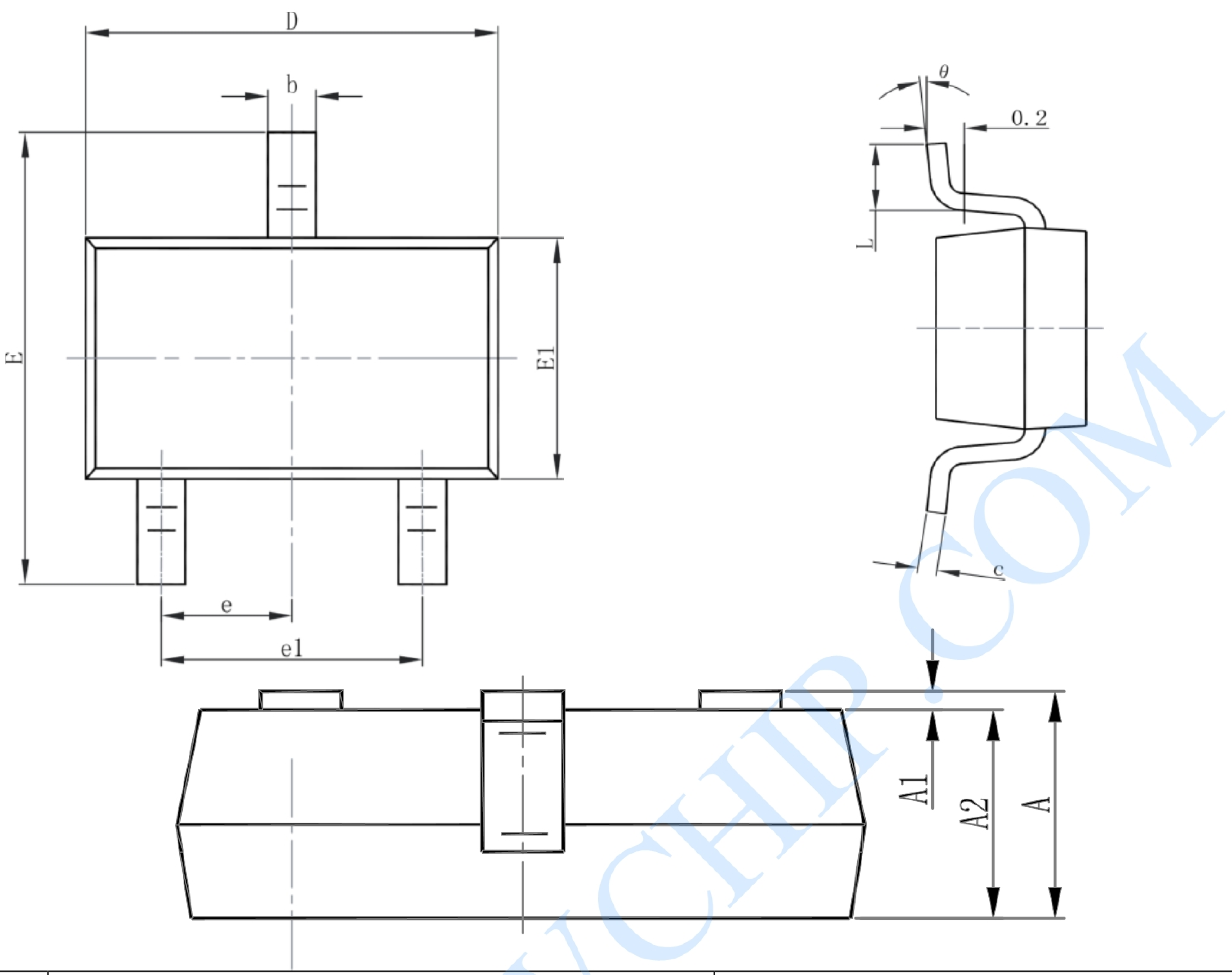
Unclamped Inductive Switching Waveform



Normalized Maximum Transient Thermal Impedance

PACKAGE DESCRIPTION

SOT23-3L



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.

IMPORTANT NOTICE

Wuxi PWChip Semi Technology CO., LTD (PW) reserves the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any products or services. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete.

PW assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using PW components.

PW products are not authorized for use in safety-critical applications (such as life support devices or systems) where a failure of the PW product would reasonably be expected to affect the safety or effectiveness of that devices or systems.

The information included herein is believed to be accurate and reliable. However, PW assumes no responsibility for its use; nor for any infringement of patents or other rights of third parties which may result from its use.