



# ACE2302B

## N-Channel Enhancement Mode MOSFET

### Description

The ACE2302B uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V while retaining a 12V  $V_{GS(MAX)}$  rating. This device is suitable for use as a uni-directional or bi-directional load switch.

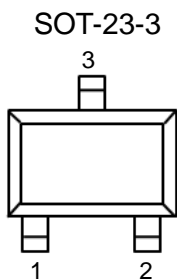
### Features

- $V_{DS}=20V$
- $I_D=6A$  ( $V_{GS}=10V$ )
- $R_{DS(ON)}=26m\Omega$  (typ.) @  $V_{GS}=10V$
- $R_{DS(ON)}=28m\Omega$  (typ.) @  $V_{GS}=4.5V$
- $R_{DS(ON)}=42m\Omega$  (typ.) @  $V_{GS}=2.5V$

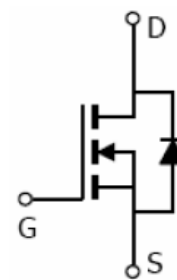
### Absolute Maximum Ratings

Parameter	Symbol	Max	Unit	
Drain-Source Voltage	$V_{DSS}$	20	V	
Gate-Source Voltage	$V_{GSS}$	$\pm 12$	V	
Drain Current (Continuous)	$I_D$	$T_A=25^\circ C$	6	A
		$T_A=70^\circ C$	4.8	
Drain Current (Pulsed)	$I_{DM}$	20	A	
Power Dissipation	$T_A=25^\circ C$	$P_D$	1.4	W
Operating temperature / storage temperature	$T_J/T_{STG}$	-55~150	$^\circ C$	

### Packaging Type



SOT-23-3	Description	Function
1	G	Gate
2	S	Source
3	D	Drain



### Ordering information

ACE2302B XX + H

- └─ Halogen - free
- └─ Pb - free
- └─ BM : SOT-23-3



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### Electrical Characteristics

$T_A=25^{\circ}\text{C}$ , unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20	24		V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	$\mu A$
Gate threshold voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_{DS}=250\mu A$	0.6	0.74	1	V
Gate leakage current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$			100	nA
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=6A$		19.5	26	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$		22.6	28	
		$V_{GS}=2.5V, I_D=4A$		31	42	
Forward transconductance	$g_{FS}$	$V_{DS}=10V, I_D=6A$		5		S
Diode forward voltage	$V_{SD}$	$I_{SD}=1.7A, V_{GS}=0V$		0.78	1	V
Maximum body-diode continuous current	$I_S$				1.7	A
Switching						
Total gate charge	$Q_g$	$V_{GS}=4.5V, V_{DS}=10V, I_D=6A$		6.3	8.1	nC
Gate-source charge	$Q_{gs}$			1.7	2.2	
Gate-drain charge	$Q_{gd}$			1.4	1.8	
Turn-on delay time	$t_{d(on)}$	$V_{GS}=10V, I_D=1A, R_G=6\Omega, V_{GS}=4.5V$		10.4	20.8	ns
Turn-on rise time	$T_r$			4.4	8.8	
Turn-off delay time	$t_{d(off)}$			27.4	54.8	
Turn-off fall time	$T_f$			4.2	8.4	
Dynamic						
Input capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=8V, f=1.0MHz$		522.3		pF
Output capacitance	$C_{oss}$			98.5		
Reverse transfer capacitance	$C_{rss}$			74.7		

Note :

- The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}\text{C}$ . The value in any given application depends on the user's specific board design.
- Repetitive rating, pulse width limited by junction temperature.
- The current rating is based on the  $t \leq 10s$  junction to ambient thermal resistance rating.



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## Typical Performance Characteristics

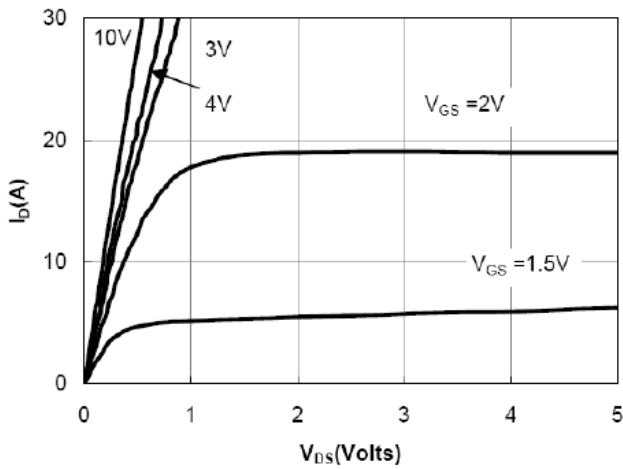


Figure 1: On-Regions Characteristics

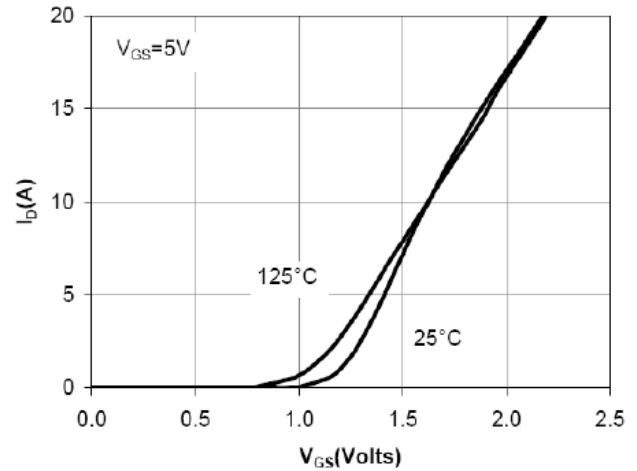


Figure 2: Transfer Characteristics

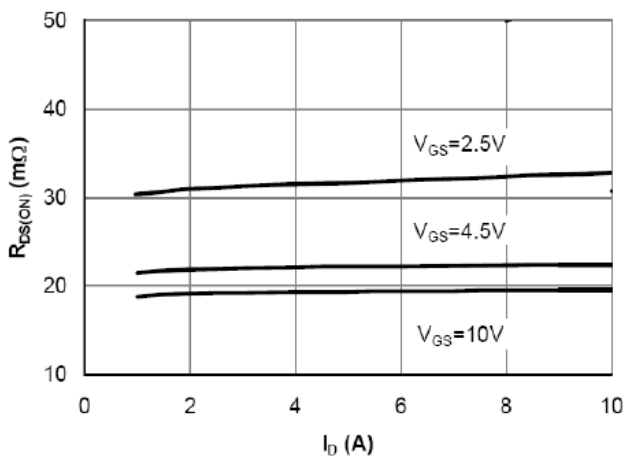


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

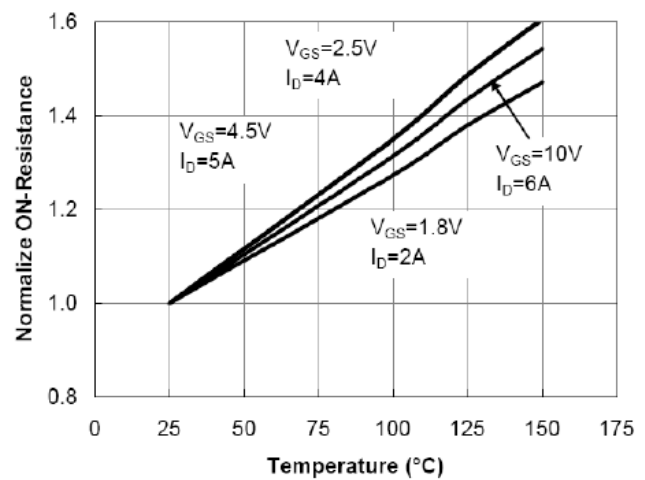


Figure 4: On-Resistance vs. Junction Temperature

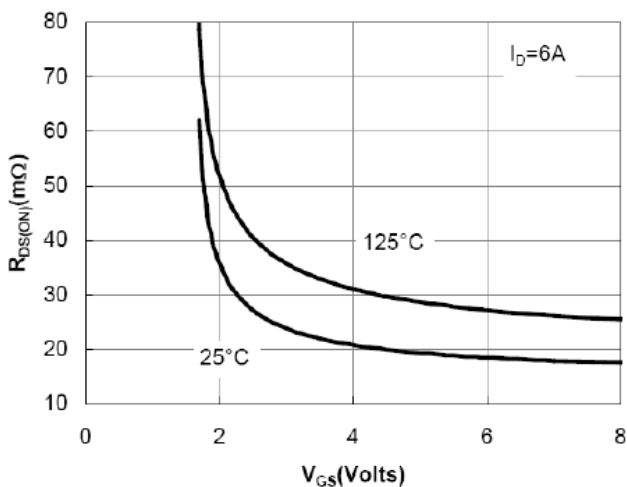


Figure 5: On-Resistance vs. Gate-Source Voltage

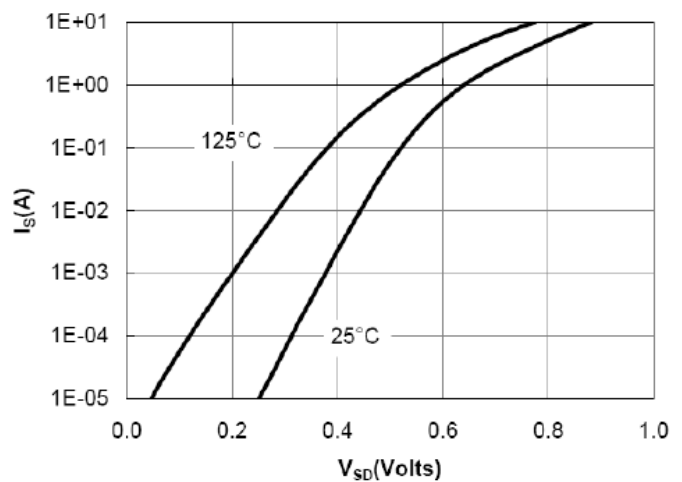


Figure 6: Body-Diode Characteristics



Typical Performance Characteristics

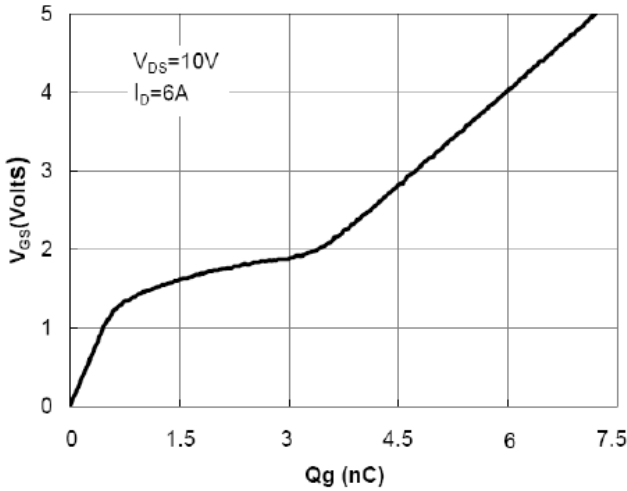


Figure 7: Gate-Charge Characteristics

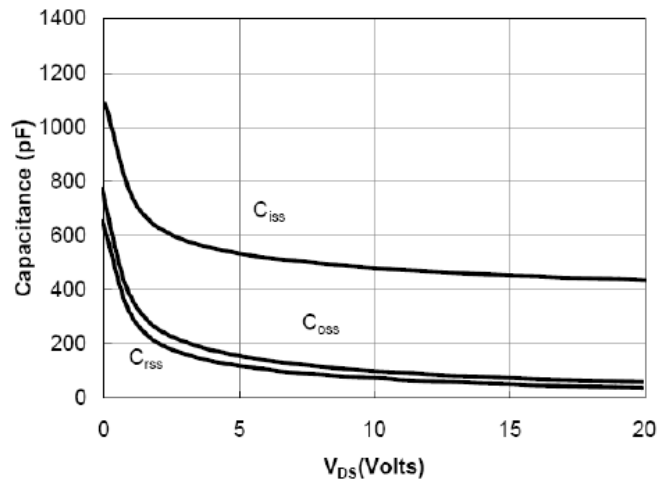


Figure 8: Capacitance Characteristics

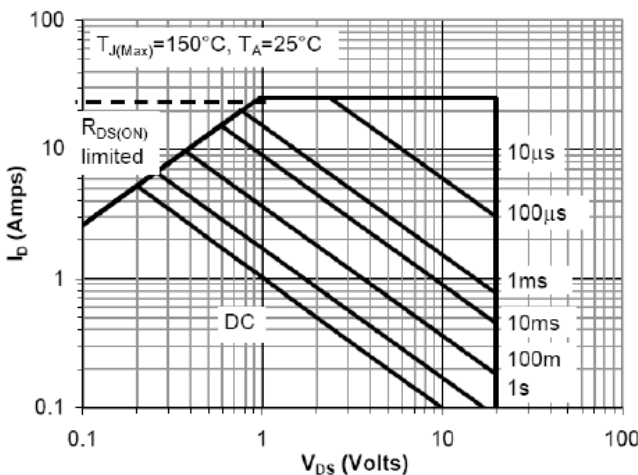


Figure 9: Maximum Forward Biased Safe Operating Area

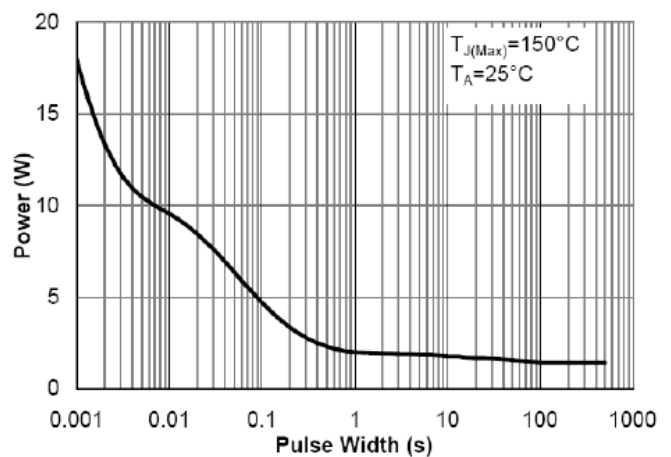


Figure 10: Single Pulse Power Rating Junction-to-Ambient

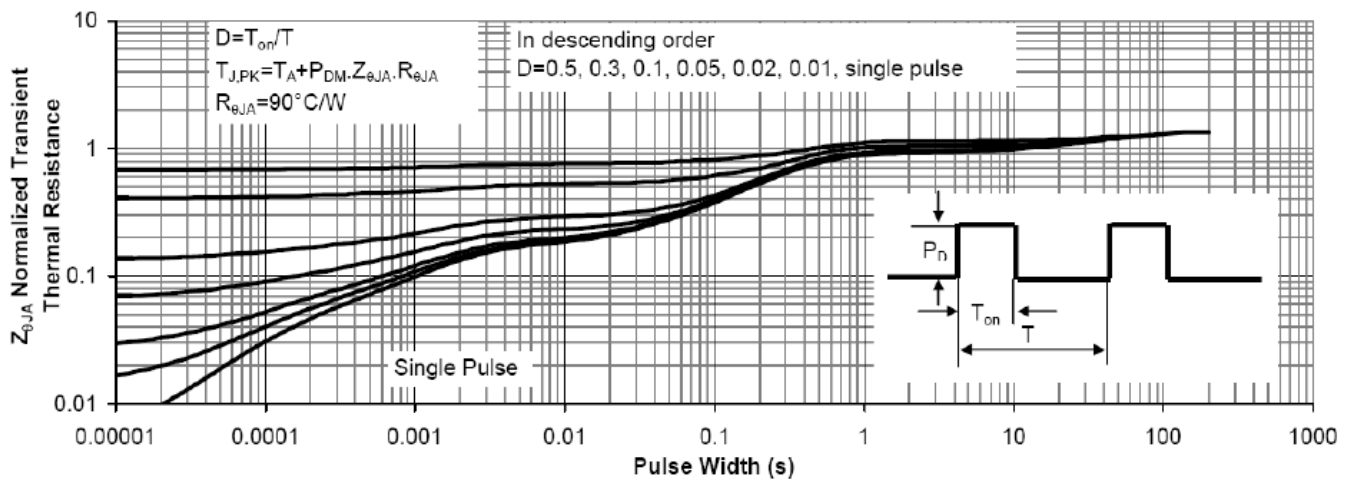


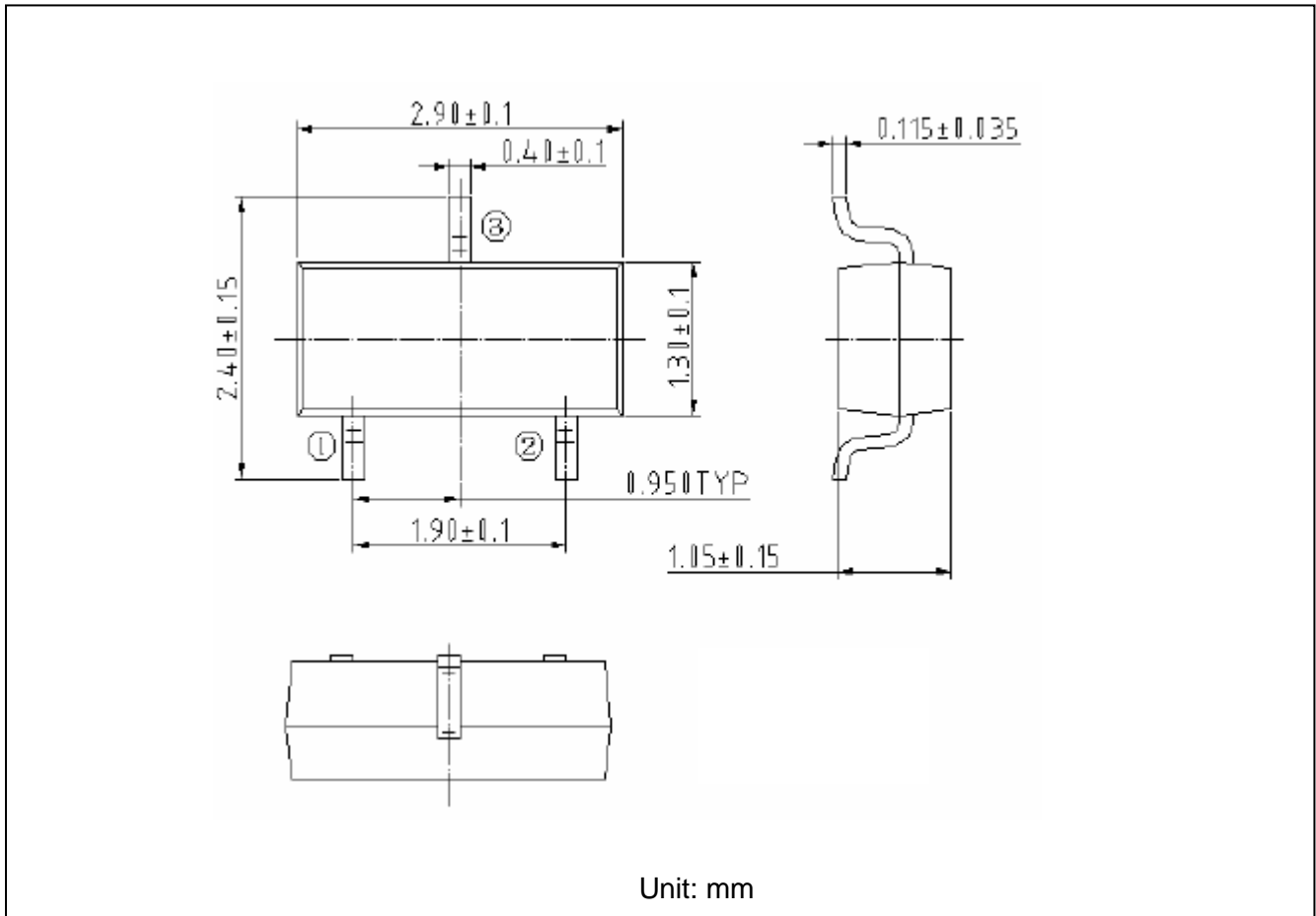
Figure 11: Normalized Maximum Transient Thermal Impedance



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## Packing Information

### SOT-23-3





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### Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Electronics Co., LTD. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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