



ACE2302M N-Channel 20-V MOSFET

Description

ACE2302M uses advanced trench technology to provide excellent $R_{DS(ON)}$.

This device particularly suits for low voltage application such as power management of desktop computer or notebook computer power management, DC/DC converter.

Features

- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

Applications

- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

Absolute Maximum Ratings

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current ^a	I_D	$T_A=25^\circ\text{C}$	3.4
		$T_A=70^\circ\text{C}$	2.7
Pulse Drain Current ^b	I_{DM}	10	A
Continuous Source Current (Diode Conduction) ^a	I_S	1.6	A
Power Dissipation ^a	P_D	$T_A=25^\circ\text{C}$	1.3
		$T_A=70^\circ\text{C}$	0.8
Operating Temperature / Storage Temperature	T_J/T_{STG}	-55/150	$^\circ\text{C}$

*1 $P_w \leq 10 \mu\text{s}$, Duty cycle $\leq 1\%$

*2 When mounted on a 1*0.75*0.062 inch glass epoxy board%

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$R_{\theta JA}$	t ≤ 10 sec	100
		Steady State	166

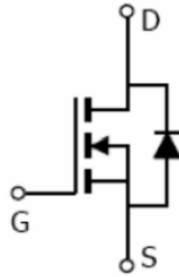
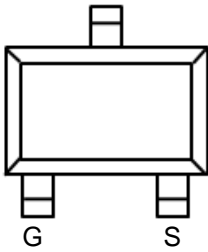


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Packaging Type

SOT-23-3

D



Ordering information

ACE2302MBM + 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	Conditions	Min.	Typ.	Max.	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	0.4			V
Gate-Body Leakage	$V_{GS(th)}$	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 8 \text{ V}$			± 100	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16 \text{ V}, V_{GS} = 0 \text{ V}$			1	μA
		$V_{DS} = 16 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$			25	
On-State Drain Current a	$I_{D(on)}$	$V_{DS} = 5 \text{ V}, V_{GS} = 4.5 \text{ V}$	5			A
Drain-Source On-Resistance a	$R_{DS(on)}$	$V_{GS} = 4.5 \text{ V}, I_D = 2.7 \text{ A}$			76	$\text{m}\Omega$
		$V_{GS} = 2.5 \text{ V}, I_D = 2.2 \text{ A}$			103	
Forward Transconductance a	g_{fs}	$V_{DS} = 15 \text{ V}, I_D = 2.7 \text{ A}$		8		S
Diode Forward Voltage a	V_{SD}	$I_S = 0.8 \text{ A}, V_{GS} = 0 \text{ V}$		0.77		V
Dynamic b						
Total Gate Charge	Q_g	$V_{DS} = 10 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 2.7 \text{ A}$		1.8		nC
Gate-Source Charge	Q_{gs}			0.2		
Gate-Drain Charge	Q_{gd}			0.6		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 10 \text{ V}, R_L = 3.8 \Omega, I_D = 2.7 \text{ A},$ $V_{GEN} = 4.5 \text{ V}, R_{GEN} = 6 \Omega$		7		nS
Rise Time	t_r			15		
Turn-Off Delay Time	$t_{d(off)}^*$			25		
Fall Time	t_f			11		
Input Capacitance	C_{iss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		73		pF
Output Capacitance	C_{oss}			25		
Reverse Transfer Capacitance	C_{rss}			20		

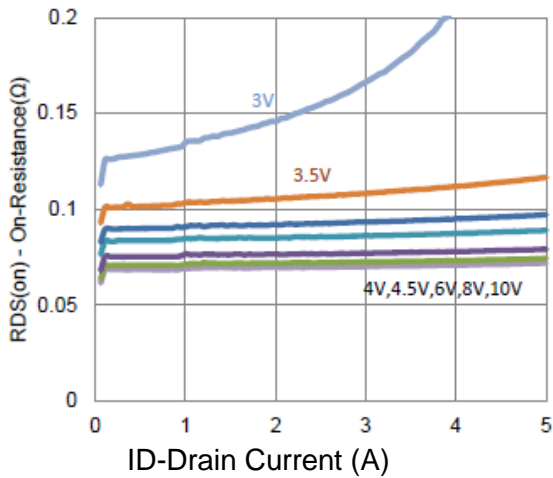
Notes

- Pulse test: $PW \leq 300 \mu\text{s}$ duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

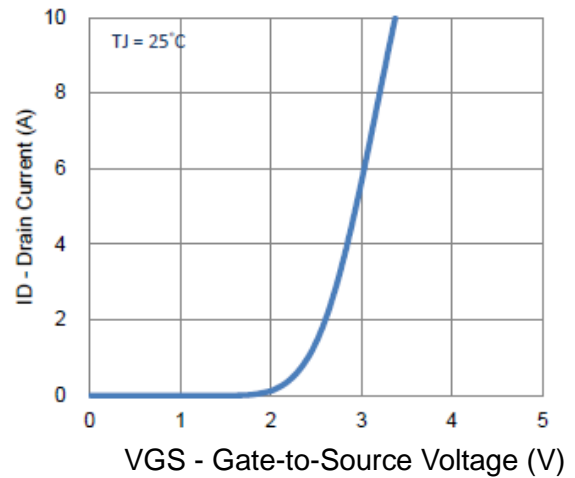


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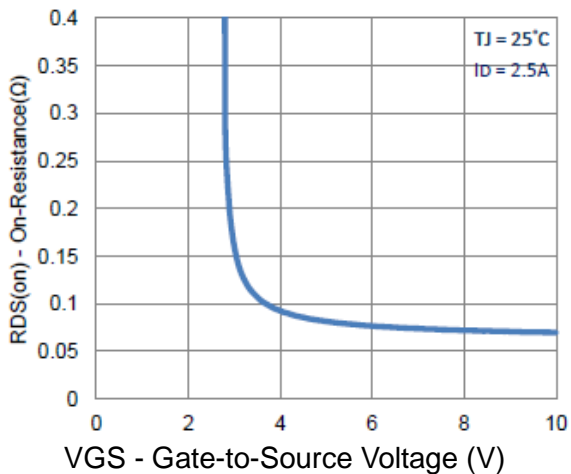
Typical Performance Characteristics



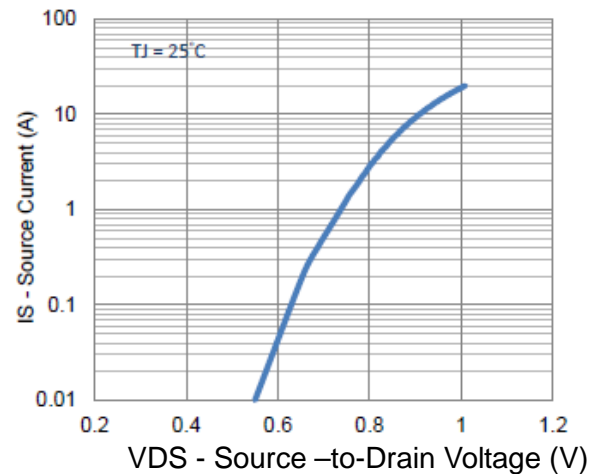
1. On-Resistance vs. Drain Current



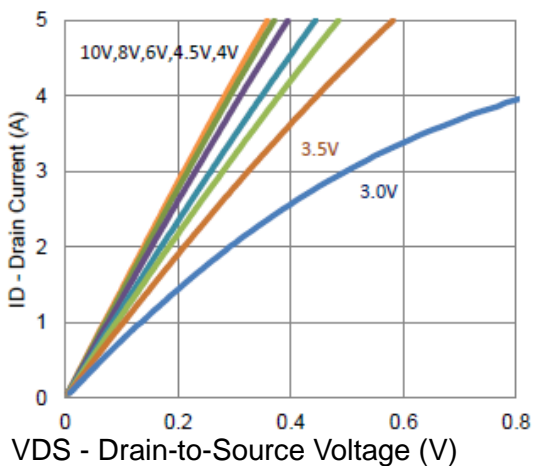
2. Transfer Characteristics



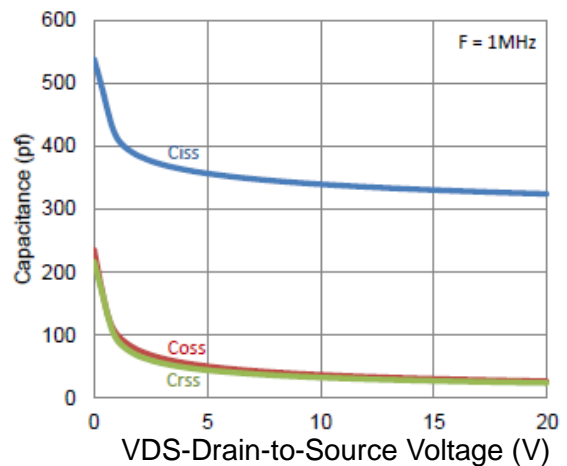
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage



5. Output Characteristics

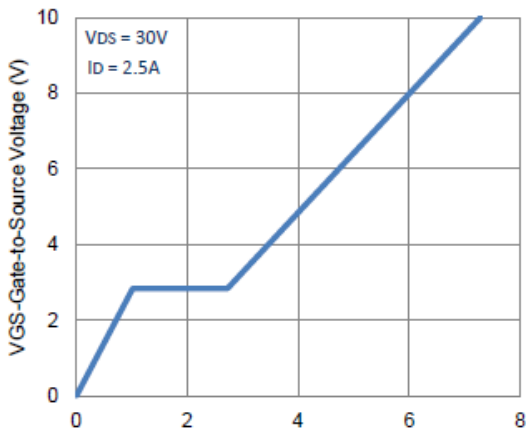


6. Capacitance

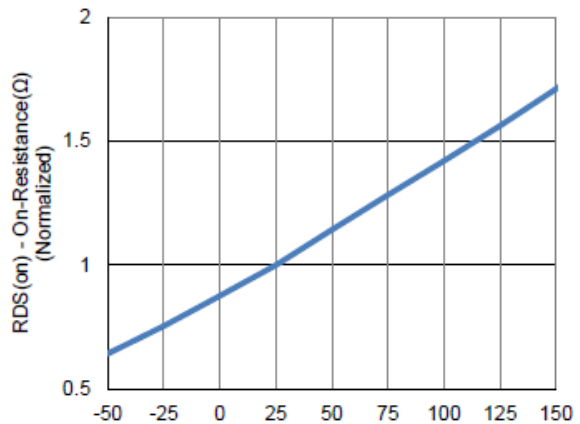


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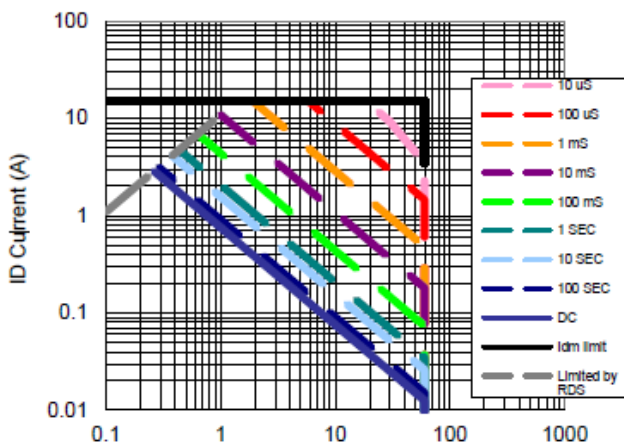
Typical Performance Characteristics



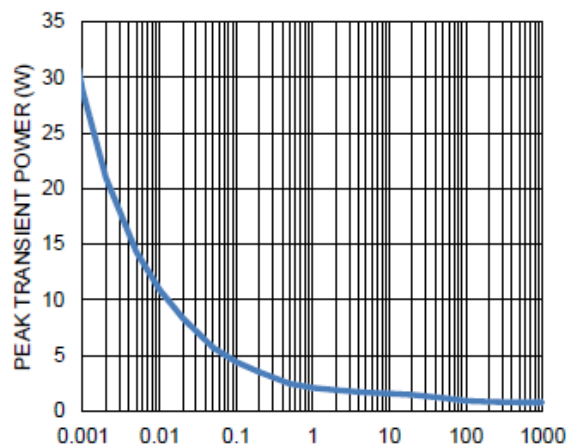
7. Gate Charge



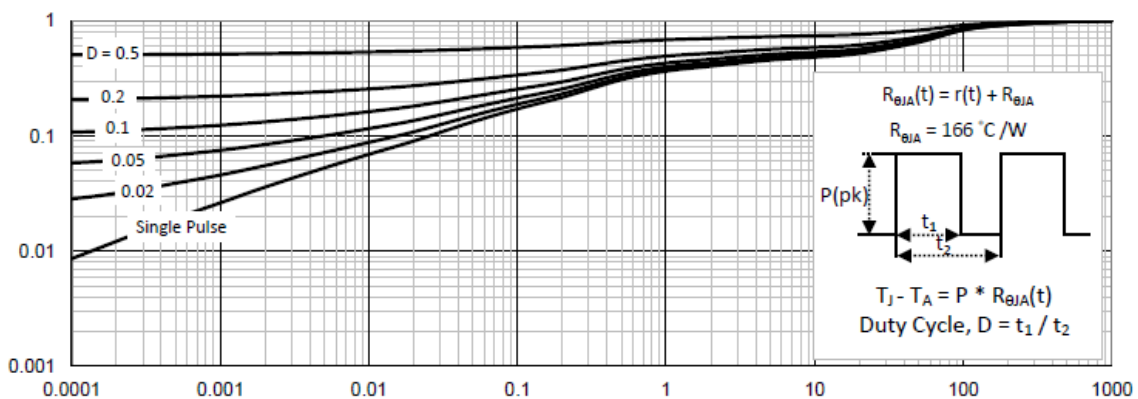
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



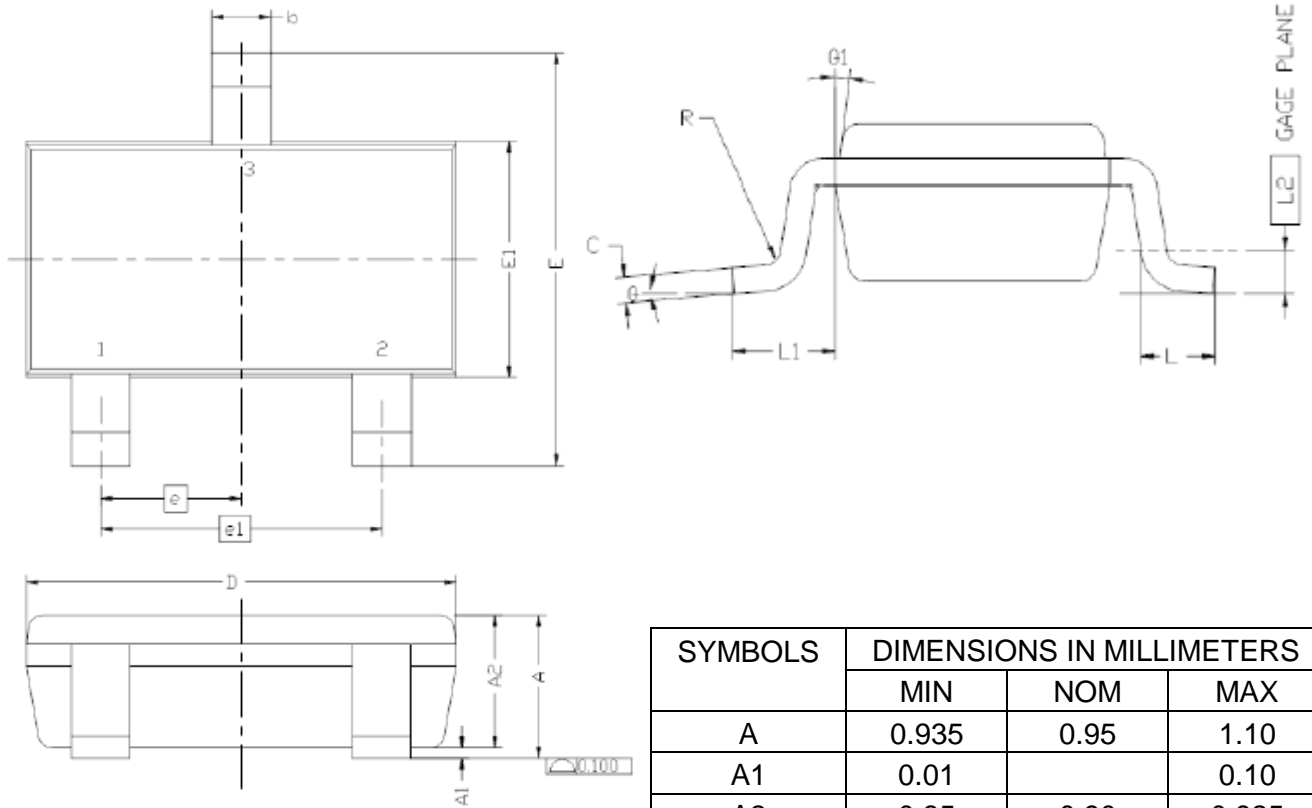
11. Normalized Thermal Transient Junction to Ambient



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Packing Information

SOT-23-3



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.935	0.95	1.10
A1	0.01		0.10
A2	0.85	0.90	0.925
B	0.30	0.40	0.50
C	0.10	0.15	0.25
D	2.70	2.90	3.10
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95BSC		
e1	1.90BSC		
L	0.30	0.40	0.60
L1	0.60REF		
L2	0.25BSC		
R	0.10		
θ	0°	4°	8°
θ_1	7°NOM		

Unit: mm



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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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