



# ACE2398M N-Channel 60-V MOSFET

## Description

ACE2398M 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	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>a</sup>	$I_D$	$T_A=25^\circ\text{C}$	2.2
		$T_A=70^\circ\text{C}$	1.7
Pulse Drain Current <sup>b</sup>	$I_{DM}$	10	A
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	1.9	A
Power Dissipation <sup>a</sup>	$P_D$	$T_A=25^\circ\text{C}$	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

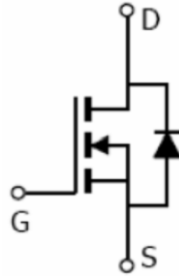
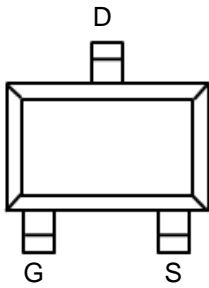
Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient <sup>a</sup>	$R_{\theta JA}$	t $\leq 10$ sec	100
		Steady State	166



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## Packaging Type

SOT-23-3



## Ordering information

ACE2398M BM + 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
<b>Static</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$	1			V
Gate-Body Leakage	$V_{GS(th)}$	$V_{DS} = 0 \text{ V}$ , $V_{GS} = \pm 20 \text{ V}$			$\pm 100$	$\mu\text{A}$
Zero Gate Voltage Drain Current	IDSS	$V_{DS} = 48 \text{ V}$ , $V_{GS} = 0 \text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 48 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $T_J = 55^\circ\text{C}$			25	
On-State Drain Current a	$I_{D(on)}$	$V_{DS} = 5 \text{ V}$ , $V_{GS} = 10 \text{ V}$	4			A
Drain-Source On-Resistance a	$r_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 1.7 \text{ A}$			194	$\text{m}\Omega$
		$V_{GS} = 4.5 \text{ V}$ , $I_D = 1.4 \text{ A}$			273	
Forward Transconductance a	$g_{fs}$	$V_{DS} = 15 \text{ V}$ , $I_D = 1.7 \text{ A}$		18		S
Diode Forward Voltage a	VSD	$I_S = 0.95 \text{ A}$ , $V_{GS} = 0 \text{ V}$		0.74		V
<b>Dynamic b</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 30 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ , $I_D = 1.7 \text{ A}$		3.7		nC
Gate-Source Charge	$Q_{gs}$			0.9		
Gate-Drain Charge	$Q_{gd}$			1.7		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 30 \text{ V}$ , $R_L = 17.7 \Omega$ , $I_D = 1.7 \text{ A}$ , $V_{GEN} = 10 \text{ V}$ , $R_{GEN} = 6 \Omega$		2		nS
Rise Time	$t_r$			6		
Turn-Off Delay Time	$t_{d(off)}^*$			17		
Fall Time	$t_f$			5		
Input Capacitance	$C_{iss}$	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		330		pF
Output Capacitance	$C_{oss}$			30		
Reverse Transfer Capacitance	$C_{rss}$			27		

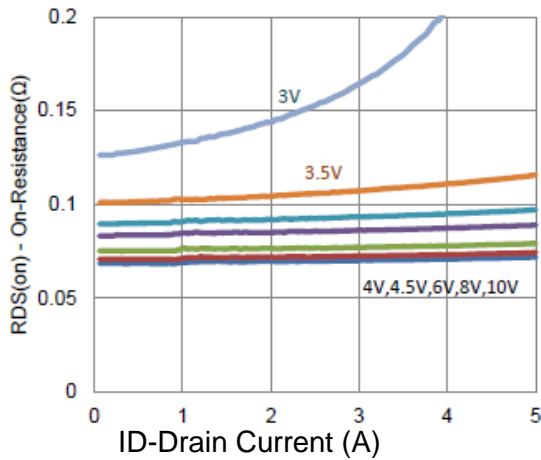
### Notes

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

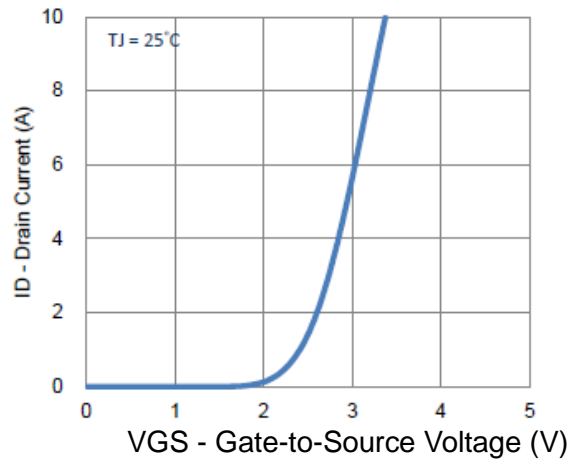


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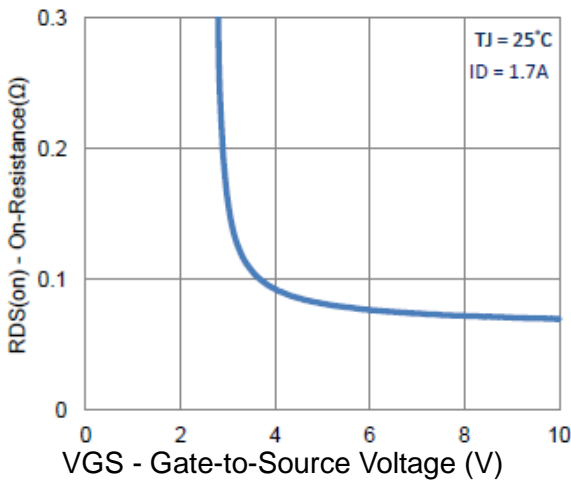
## Typical Performance Characteristics



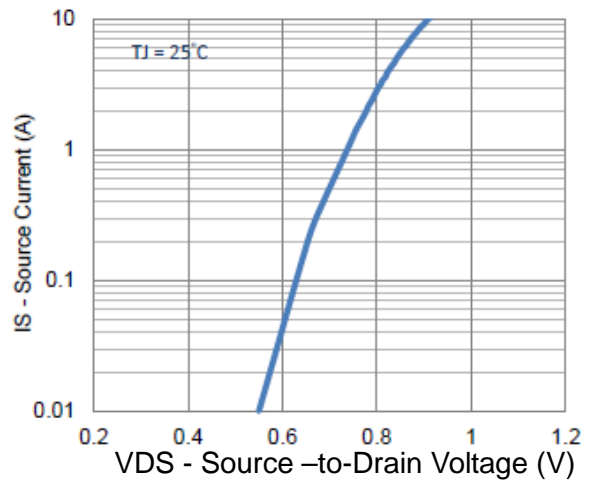
1. On-Resistance vs. Drain Current



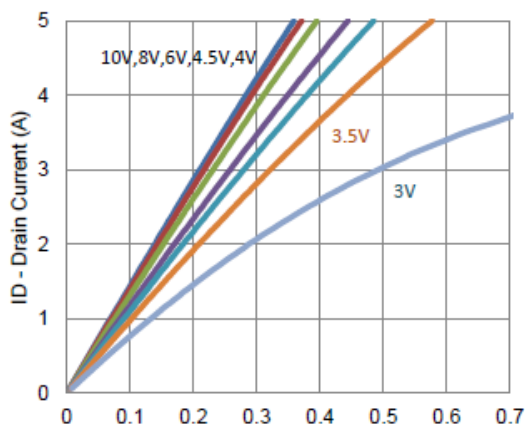
2. Transfer Characteristics



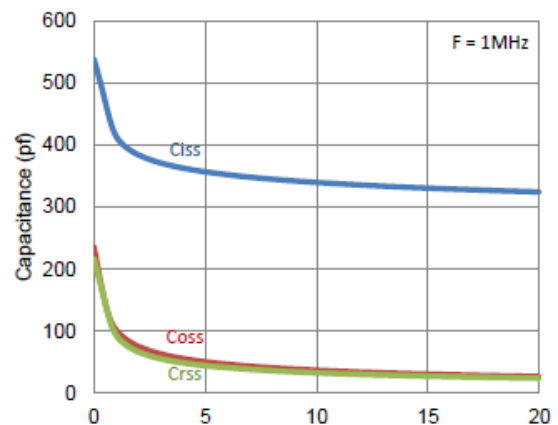
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage



5. Output Characteristics

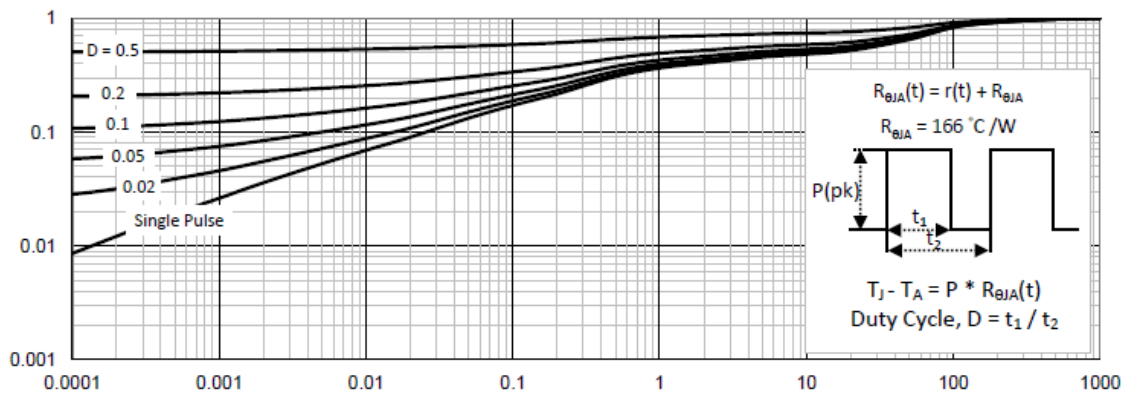
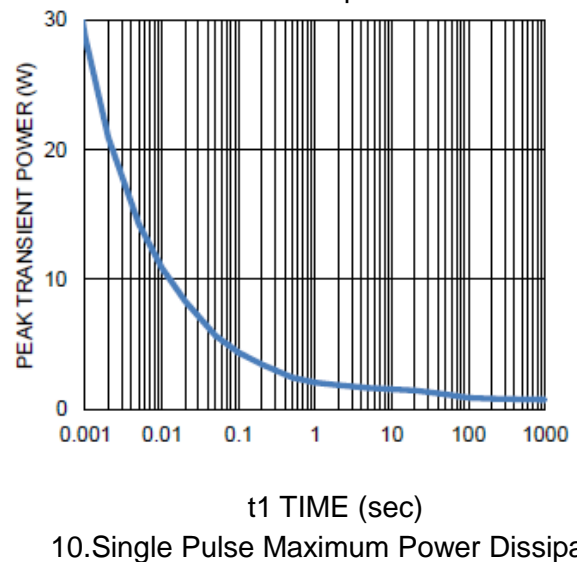
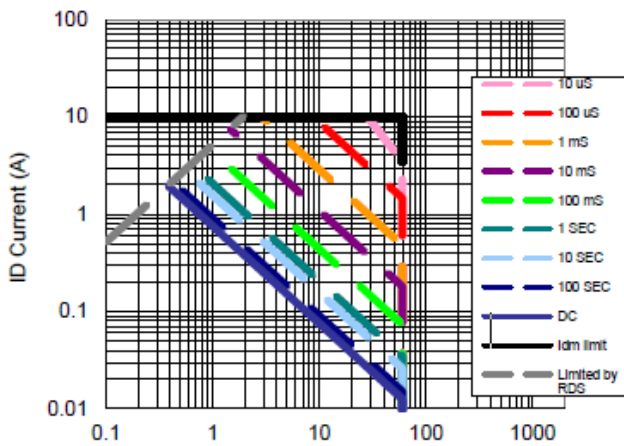
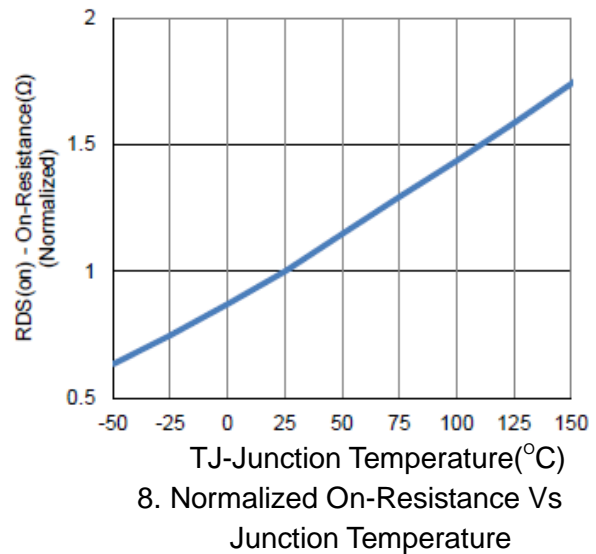
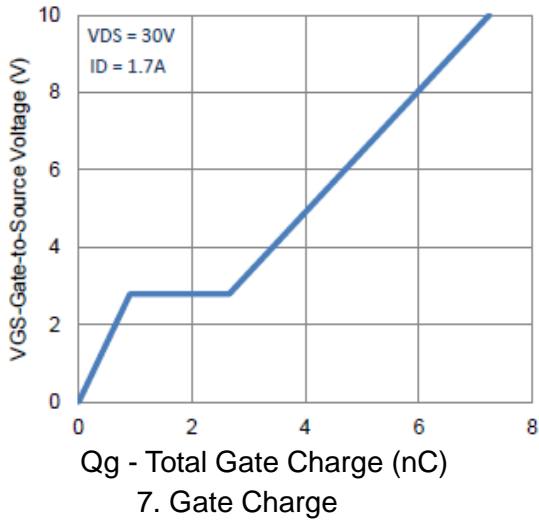


6. Capacitance



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## Typical Performance Characteristics

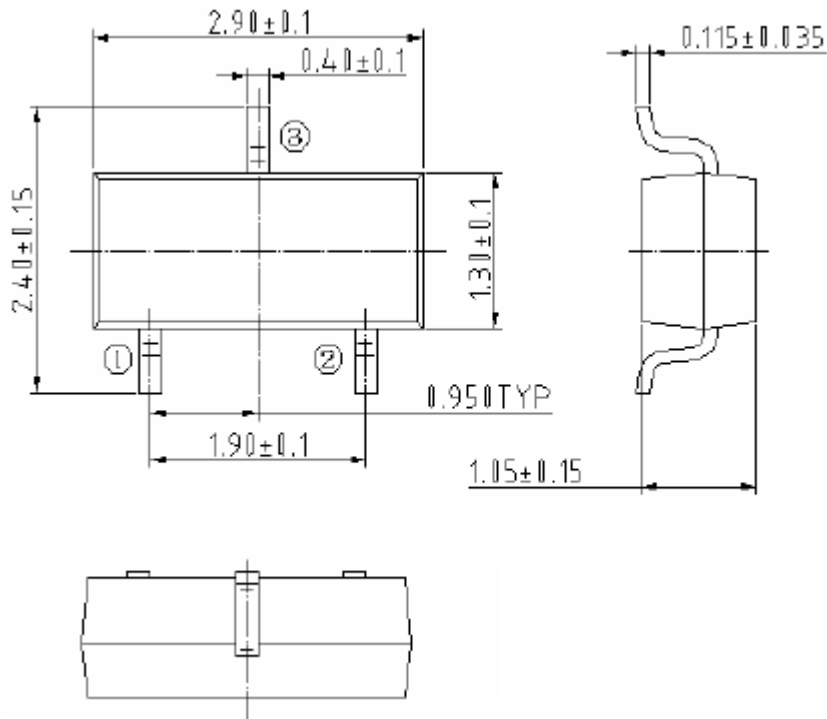




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## Packing Information

### 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°
Θ1	7°NOM		

U

nit: 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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