



ACE2N7002KA

N-Channel Enhancement Mode MOSFET

Description

The ACE2N7002KA is the N-Channel enhancement mode field effect transistors are produced using high cell density DMOS technology. These products have been designed to minimize on-state resistance while provide rugged, reliable, and fast switching performance. They can be used in most applications requiring up to 640mA DC and can deliver pulsed currents up to 950mA. These products are particularly suited for low voltage, low current applications such as small servo motor control, power MOSFET gate drivers, and other switching applications.

Features

- 60V/0.50A , $R_{DS(ON)} = 3.0\Omega @ V_{GS}=10V$
- 60V/0.20A , $R_{DS(ON)} = 3.5\Omega @ V_{GS}=4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- TSOT-23-3 package design

Applications

- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- High saturation current capability. Direct Logic-Level Interface: TTL/CMOS
- Battery Operated Systems
- Solid-State Relays

Absolute Maximum Ratings

($T_A=25^\circ\text{C}$ Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current ($T_J=150^\circ\text{C}$)	$T_A=25^\circ\text{C}$	I_D	0.3	A
Pulsed Drain Current(*)		I_{DM}	0.8	A
Power Dissipation	$T_A=25^\circ\text{C}$	P_D	0.35	A
Operating Junction Temperature		T_J	-55~150	W
Storage Temperature Range		T_{STG}	-55~150	$^\circ\text{C}$
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	350	$^\circ\text{C/W}$

(*) Pulse width limited by safe operating area

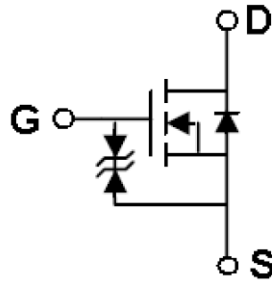
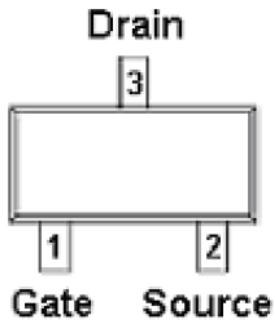


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Packaging Type

TSOT-23-3

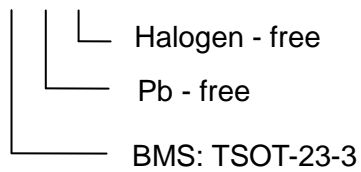


Pin Description

Pin	Symbol	Description
1	G	Gate
2	S	Source
3	D	Drain

Ordering information

ACE2N7002KA XX + H





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Electrical Characteristics

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\ \mu A$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\ \mu A$	1.0	1.7	2.5	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 30	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V, T_J=25^{\circ}\text{C}$			1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=70^{\circ}\text{C}$			100	
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=0.5A$		2.0	3.0	Ω
		$V_{GS}=4.5V, I_D=0.2A$		3.0	3.5	
Forward Trans Conductance	$gfs_{(1)}$	$V_{DS}=10V, I_D=0.6A$	0.08			S
Diode Forward Voltage	$V_{SD(1)}$	$V_{GS}=0V, I_S=-0.5A$			1.3	V
Dynamic						
Total Gate Charge	Q_g	$V_{DD}=50V, V_{GS}=4.5V, I_D=0.6A$		0.6	0.8	nC
Gate-Source Charge	Q_{gs}			0.2		
Gate-Drain Charge	Q_{gd}			0.2		
Input Capacitance	C_{iss}	$V_{DS} = 25\ \text{V}, f = 1\ \text{MHz}, V_{GS} = 0$		30	50	μF
Output Capacitance	C_{oss}			7		
Reverse Transfer Capacitance	C_{rss}			4		
Turn-On Time	$t_{d(on)}$	$V_{DD}=30V, I_D=0.6A, R_G=3.3\Omega,$ $V_{GS}=10V, R_D=52\Omega$		2		ns
	t_r			15		
Turn-Off Time	$t_{d(off)}$			8		
	t_f			11		

(1) Pulsed: Pulse duration = 300 μs , duty cycle 2 %.

(2) Pulse width limited by safe operating area.



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Typical Performance Characteristics

Fig. 1 $I_D - V_{DS}$

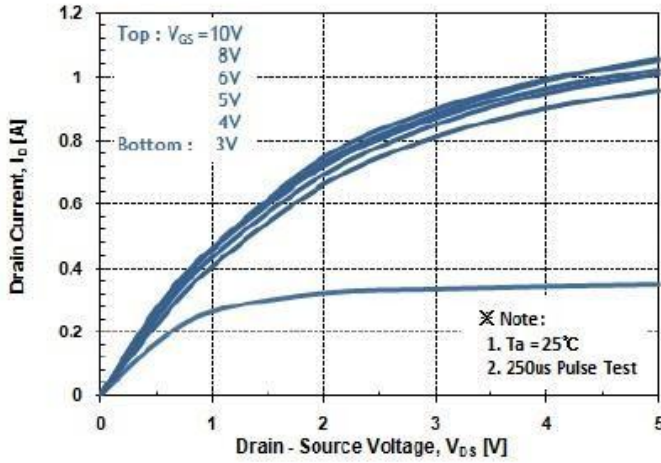


Fig. 2 $I_D - V_{GS}$

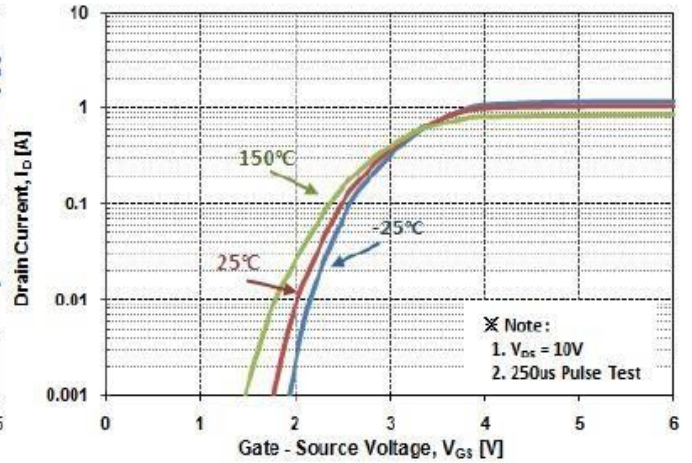


Fig. 3 $R_{DS(ON)} - I_D$

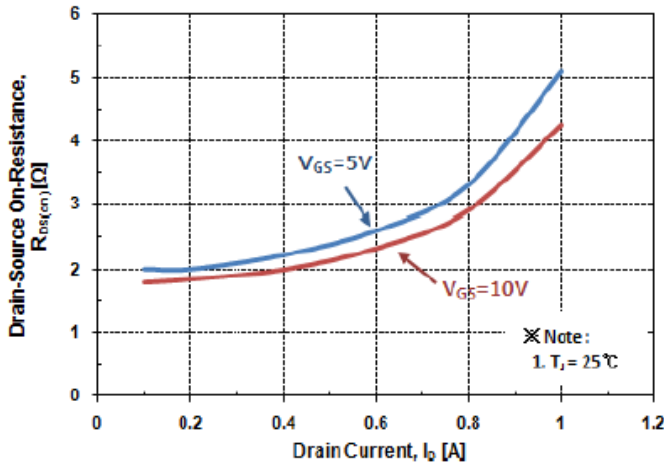


Fig. 4 $I_S - V_{SD}$

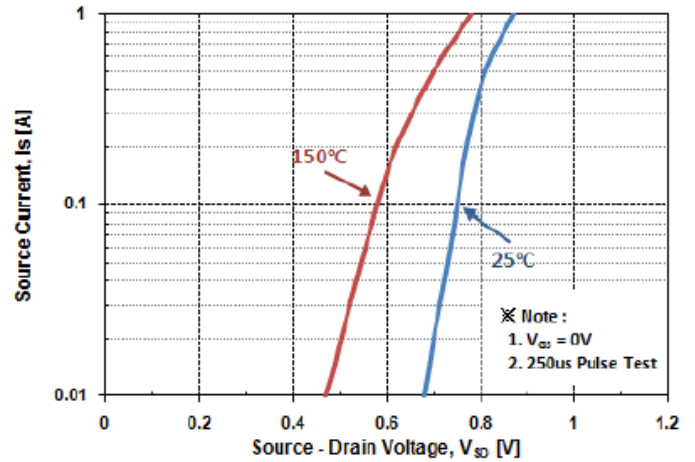


Fig. 5 Capacitance - V_{DS}

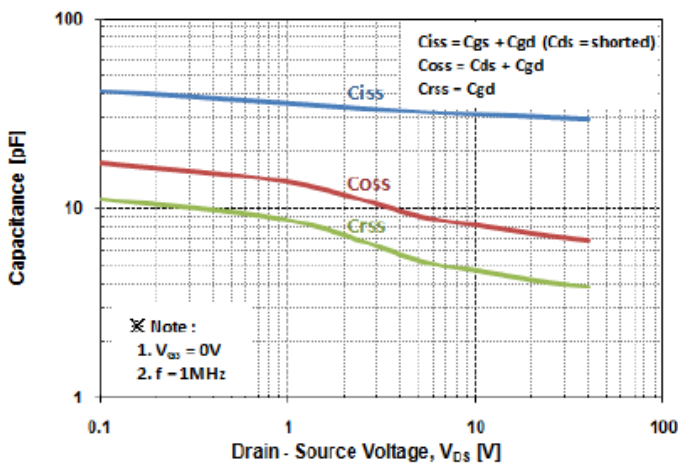
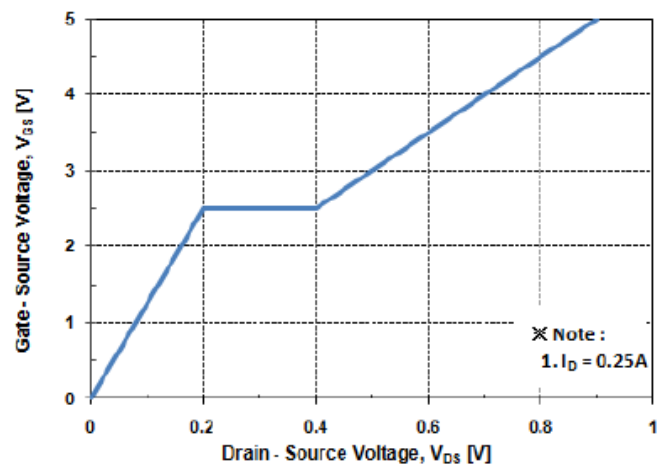


Fig. 6 $V_{GS} - Q_G$





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Fig. 7 $V_{DSS} - T_J$

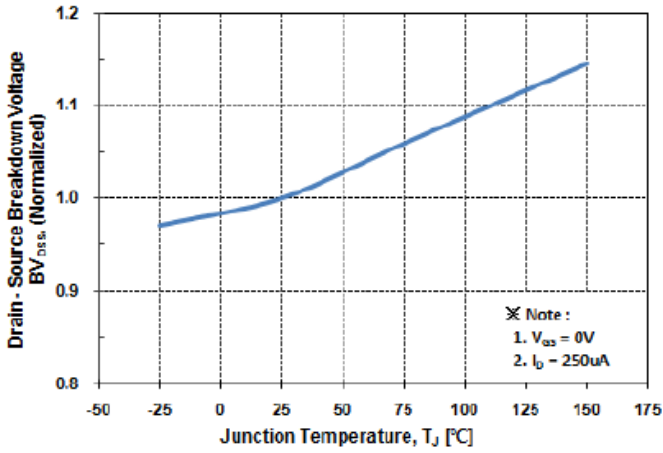


Fig. 8 $R_{DS(on)} - T_J$

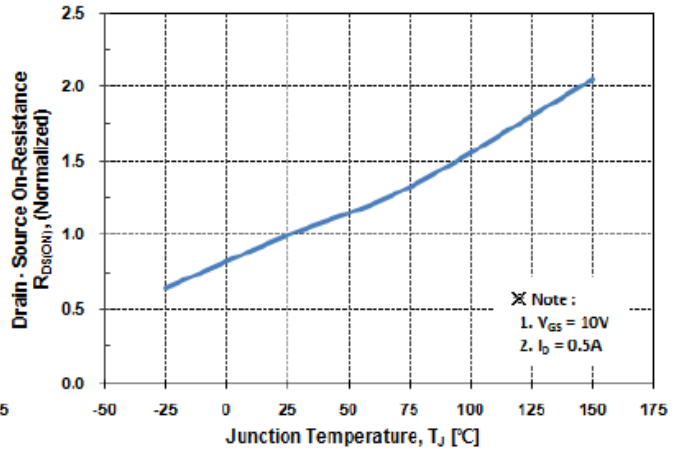


Fig. 9 $I_D - T_C$

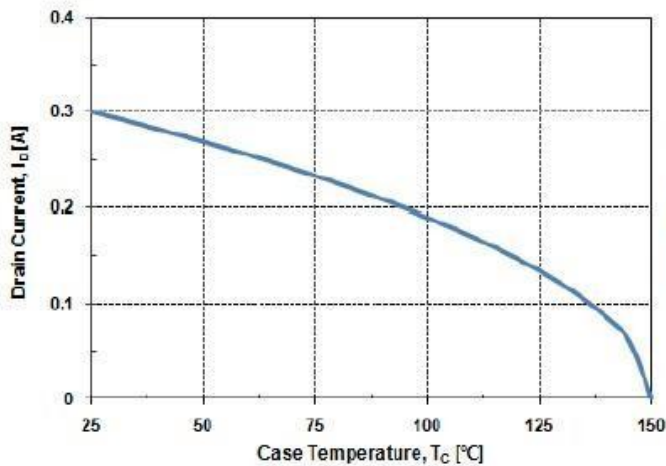


Fig. 10 Safe Operating Area

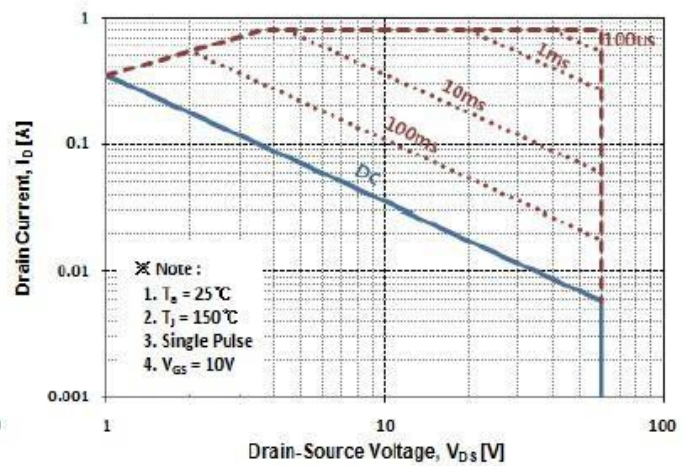
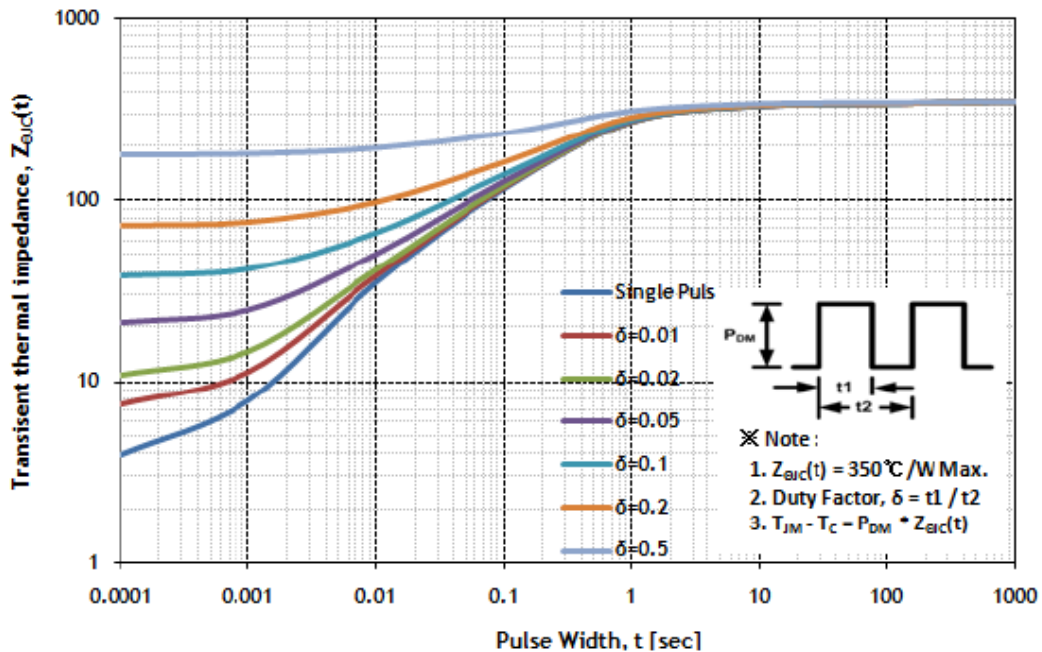


Fig. 11 Transient Thermal Impedance



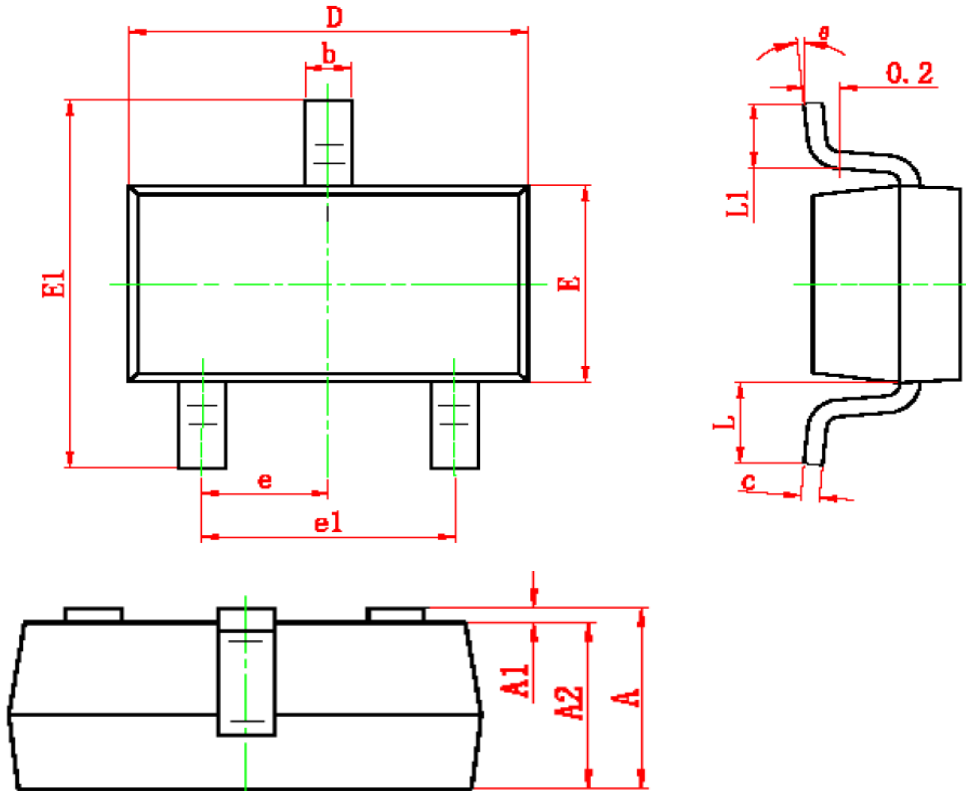


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Packing Information

TSOT-23-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.200	0.0323	0.0430
A1	0.000	0.100	0.0000	0.0040
A2	0.820	1.100	0.0323	0.0390
b	0.300	0.500	0.0120	0.0200
c	0.080	0.150	0.0030	0.0060
D	2.800	3.000	0.1100	0.1180
E	1.200	1.400	0.0470	0.0550
E1	2.200	2.550	0.0866	0.1000
e	0.95 TYP		0.037 TYP	
e1	1.800	2.000	0.0710	0.0790
L	0.529 REF		0.0208 REF	
L1	0.200	0.500	0.0079	0.0200
θ	0°	8°	0°	8°



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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.