



ACE7402A

N-Channel Enhancement Mode MOSFET

Description

The ACE7402A is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology.

This high density process is especially tailored to minimize on-state resistance.

These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching, and low in-line power loss are needed in a very small outline surface mount package.

Features

- 20V/4.0A, $R_{DS(ON)}=65m\Omega@VGS=4.5V$
- 20V/3.4A, $R_{DS(ON)}=80m\Omega @VGS=2.5V$
- 20V/2.8A, $R_{DS(ON)}=95m\Omega @VGS=1.8V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

Application

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter



ACE7402A

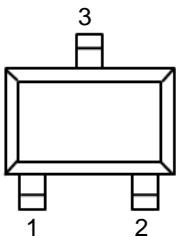
N-Channel Enhancement Mode MOSFET

Absolute Maximum Ratings

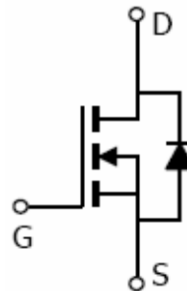
Parameter	Symbol	Max	Unit
Drain-Source Voltage	V_{DSS}	20	V
Gate-Source Voltage	V_{GSS}	± 12	V
Continuous Drain Current ($T_J=150^\circ\text{C}$)	I_D	$T_A=25^\circ\text{C}$	2.4
		$T_A=70^\circ\text{C}$	1.7
Pulsed Drain Current	I_{DM}	6	A
Continuous Source Current (Diode Conduction)	I_S	1.6	A
Power Dissipation	P_D	$T_A=25^\circ\text{C}$	0.33
		$T_A=70^\circ\text{C}$	0.21
Operating Junction Temperature	T_J	-55/150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55/150	$^\circ\text{C}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	105	$^\circ\text{C/W}$

Packaging Type

SOT-323

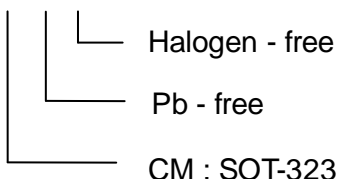


SOT-323	Description
1	Gate
2	Source
3	Drain



Ordering information

ACE7402A CM + 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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.35		0.85	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$			1	uA
		$V_{DS}=20V, V_{GS}=0V, T_J=55^{\circ}\text{C}$			5	
		$V_{DS}\geq 5V, V_{GS}=4.5V$	6			A
Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=4.0A$		0.060	0.065	Ω
		$V_{GS}=2.5V, I_D=3.4A$		0.067	0.080	
		$V_{GS}=1.8V, I_D=2.8A$		0.076	0.095	
Forward Transconductance	G_{fs}	$V_{DS}=5V, I_D=-3.6A$		10		S
Diode Forward Voltage	V_{SD}	$I_S=1.6A, V_{GS}=0V$		0.8	1.2	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=6V, V_{GS}=4.5V, I_D=2.8A$		4.8	8	nC
Gate-Source Charge	Q_{gs}			1.0		
Gate-Drain Charge	Q_{gd}			1.0		
Input Capacitance	C_{iss}	$V_{DS}=6V, V_{GS}=0V, f=1\text{MHz}$		485		pF
Output Capacitance	C_{oss}			85		
Reverse Transfer Capacitance	C_{rss}			40		
Turn-On Time	$t_{d(on)}$	$V_{DD}=6V, R_L=6\Omega, V_{GEN}=4.5V, I_D=1.0A, R_G=6\Omega$		8	14	nS
	t_r			12	18	
Turn-Off Time	$t_{d(off)}$			30	35	
	t_f			12	16	

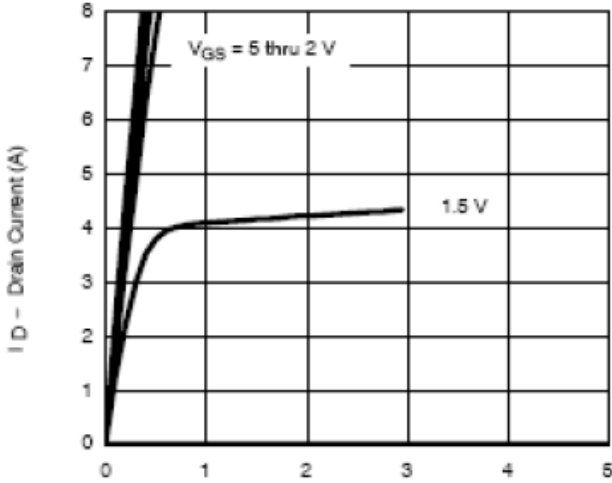


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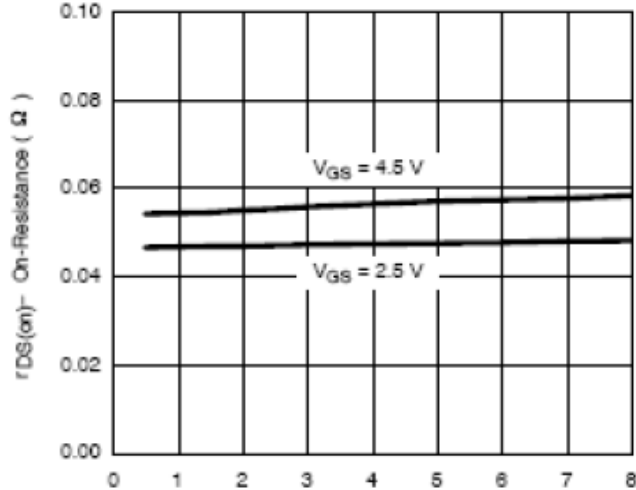
Typical Performance Characteristics

Output Characteristics



V_{GS} = 5 thru 2 V

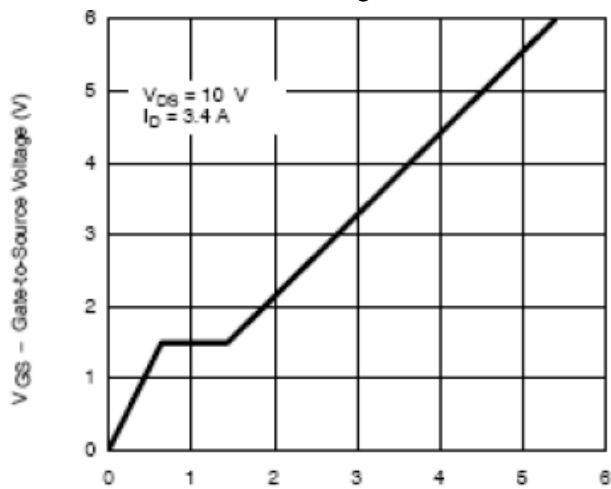
On-Resistance vs. Drain Current



$V_{GS} = 4.5$ V

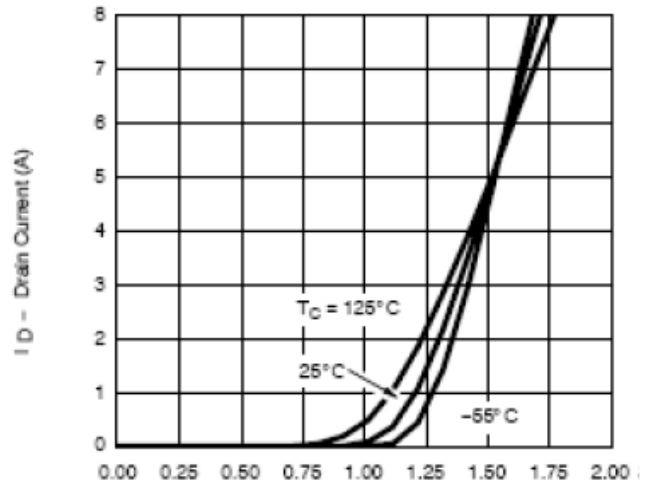
$V_{GS} = 2.5$ V

Gate Charge



$V_{GS} = 10$ V
 $I_D = 3.4$ A

Transfer Characteristics

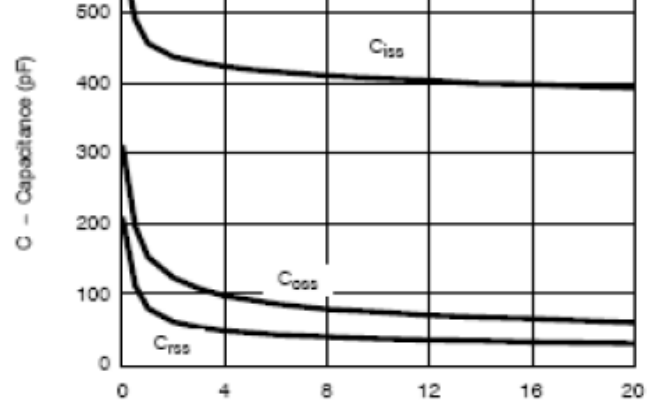


$T_C = 125^\circ\text{C}$

25°C

-55°C

Capacitance

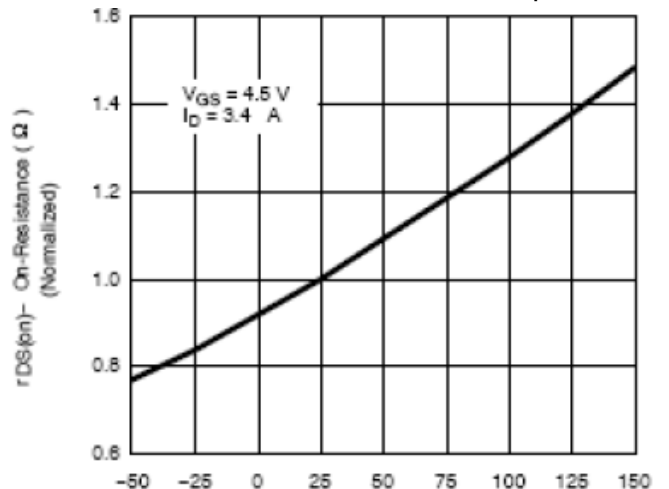


C_{iss}

C_{oss}

C_{rss}

On-Resistance vs. Junction Temperature



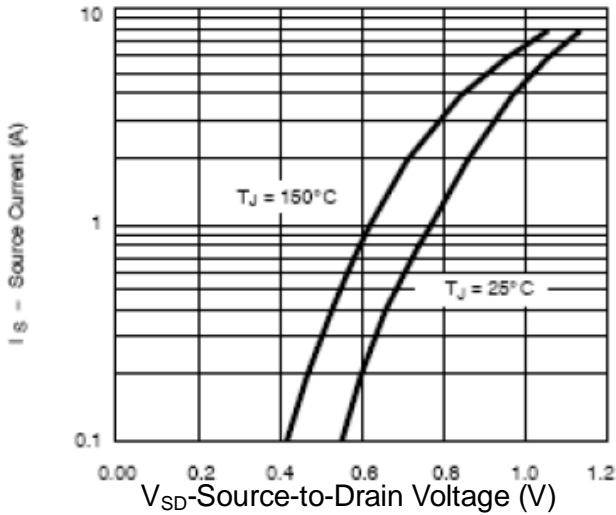
$V_{GS} = 4.5$ V
 $I_D = 3.4$ A



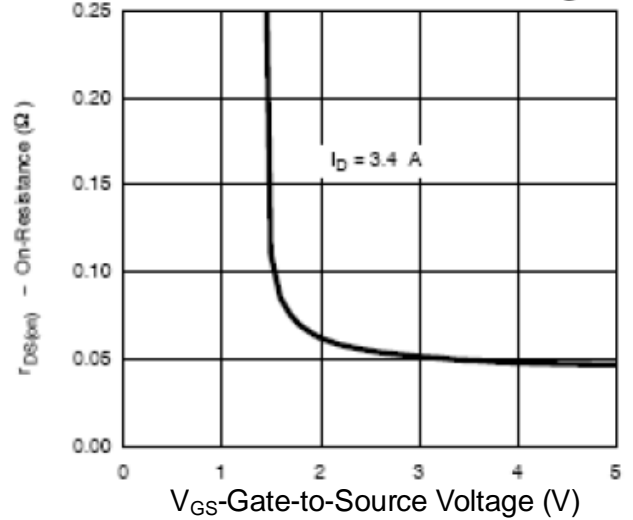
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Typical Performance Characteristics

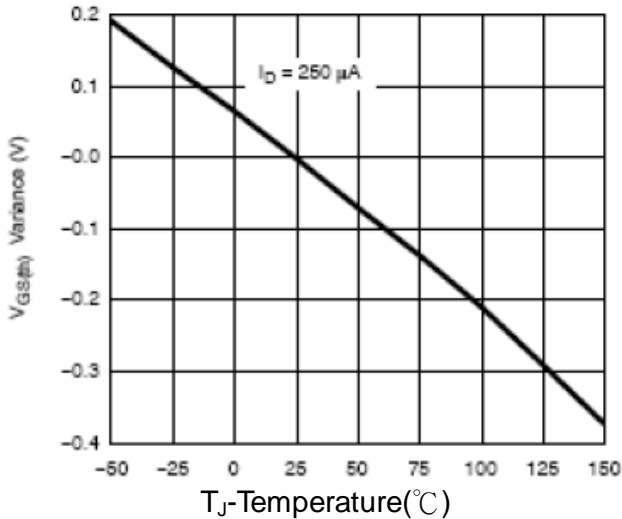
Source-Drain Diode Forward Voltage



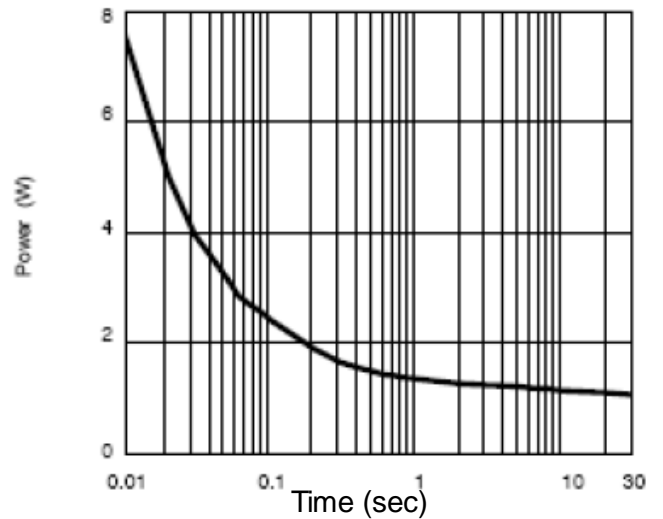
On-Resistance vs. Gate-to-Source Voltage



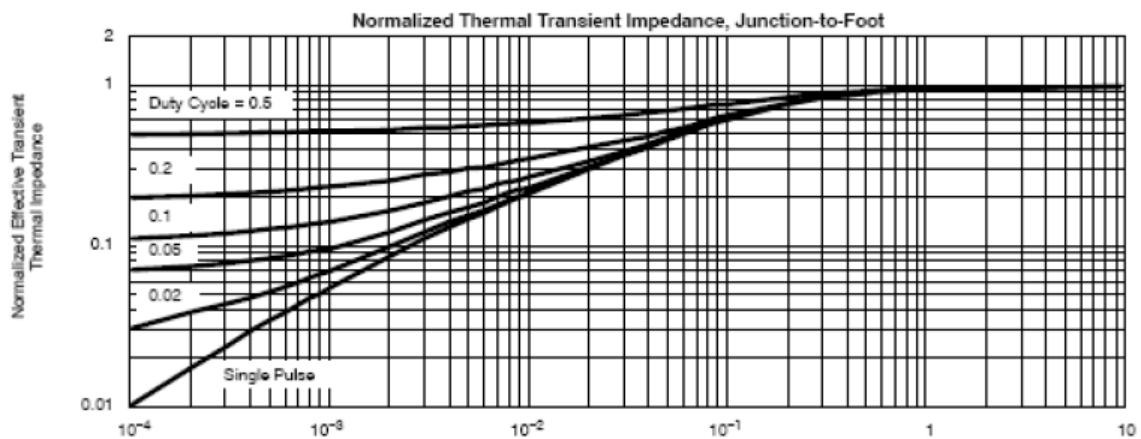
Threshold Voltage



Single Pulse Power (Junction-to-Ambient)



Normalized Thermal Transient Impedance, Junction-to-Foot



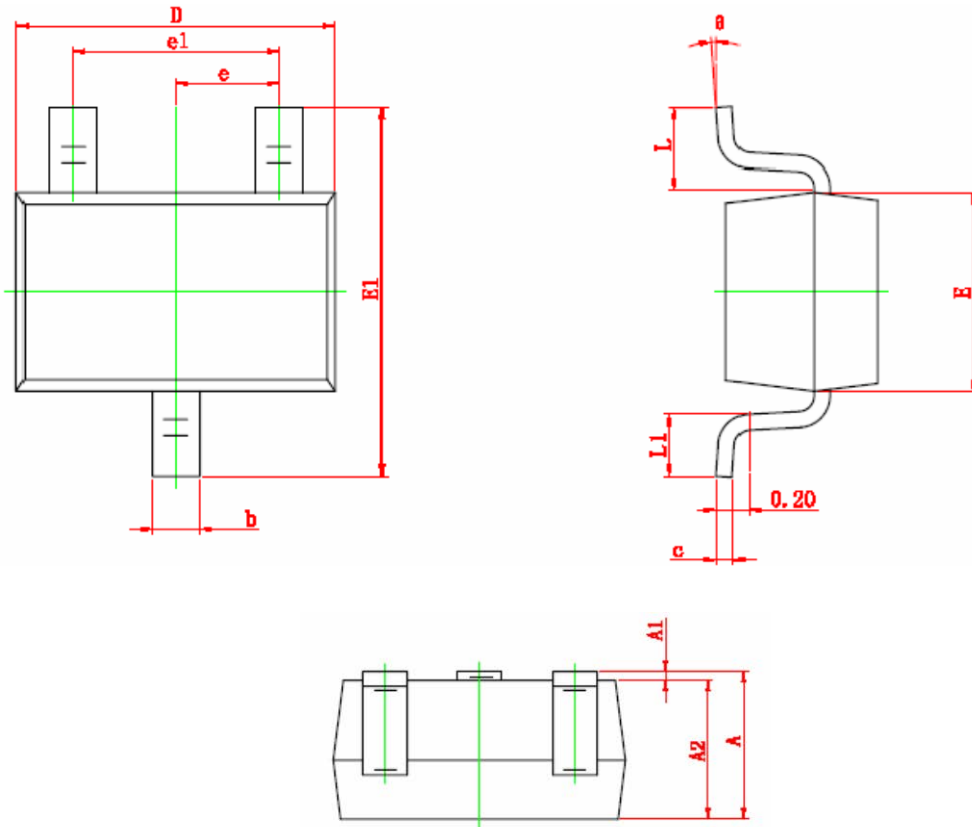
Square Wave Pulse Duration (sec)



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Packing Information

SOT-323



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
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.

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