



# ACE7400

## N-Channel Enhancement Mode MOSFET

### Description

The ACE7400 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 batter powered circuits, and low in-line power loss are needed in a very small outline surface mount package.

### Features

- 30V/2.8A,  $R_{DS(ON)}=77m\Omega@V_{GS}=10V$
- 30V/2.3A,  $R_{DS(ON)}=85m\Omega@V_{GS}=4.5V$
- 30V/1.5A,  $R_{DS(ON)}=110m\Omega@V_{GS}=2.5V$
- 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

### Absolute Maximum Ratings

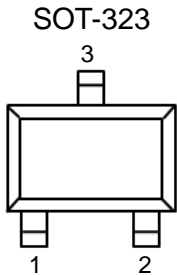
Parameter	Symbol	Max	Unit	
Drain-Source Voltage	$V_{DSS}$	30	V	
Gate-Source Voltage	$V_{GSS}$	$\pm 12$	V	
Continuous Drain Current ( $T_J=150^\circ C$ )	$I_D$	$T_A=25^\circ C$	2.8	A
		$T_A=70^\circ C$	2.3	
Pulsed Drain Current	$I_{DM}$	10	A	
Continuous Source Current (Diode Conduction)	$I_S$	1.25	A	
Power Dissipation	$P_D$	$T_A=25^\circ C$	0.33	W
		$T_A=70^\circ C$	0.21	
Operating Junction Temperature	$T_J$	150	$^\circ C$	
Storage Temperature Range	$T_{STG}$	-55/150	$^\circ C$	
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	100	$^\circ C/W$	



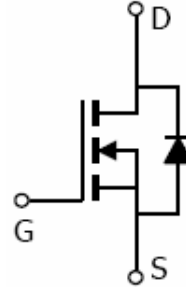
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### Packaging Type

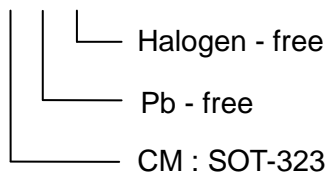


SOT-323	Description
1	Gate
2	Source
3	Drain



### Ordering information

ACE7400 XX + H



### Electrical Characteristics

T<sub>A</sub>=25°C, unless otherwise noted

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	30			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	0.8		1.6	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V			1	uA
		V <sub>DS</sub> =24V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			10	
On-State Drain Current	I <sub>D(ON)</sub>	V <sub>DS</sub> ≥ 4.5V, V <sub>GS</sub> =10V	6			A
		V <sub>DS</sub> ≥ 4.5V, V <sub>GS</sub> =-4.5V	4			
Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =2.8A		0.062	0.077	Ω
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =2.3A		0.070	0.085	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =1.5A		0.095	0.110	
Forward Transconductance	G <sub>fs</sub>	V <sub>DS</sub> =4.5V, I <sub>D</sub> =2.8A		4.6		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =1.25A, V <sub>GS</sub> =0V		0.82	1.2	V
Dynamic						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =-2.0A		4.2	6	nC
Gate-Source Charge	Q <sub>gs</sub>			0.6		
Gate-Drain Charge	Q <sub>gd</sub>			1.5		



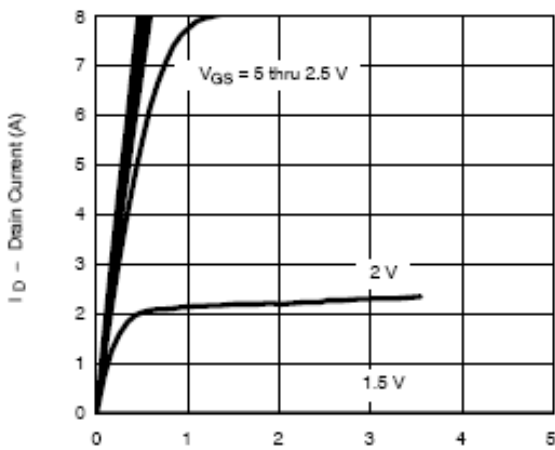
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Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	350	pF
Output Capacitance	C <sub>oss</sub>		55	
Reverse Transfer Capacitance	C <sub>rss</sub>		41	
Turn-On Time	td(on)	V <sub>DD</sub> =15V, R <sub>L</sub> =10Ω, V <sub>GEN</sub> =10V, R <sub>G</sub> =3Ω	2.5	nS
	tr		2.5	
Turn-Off Time	td(off)		20	
	tf		4	

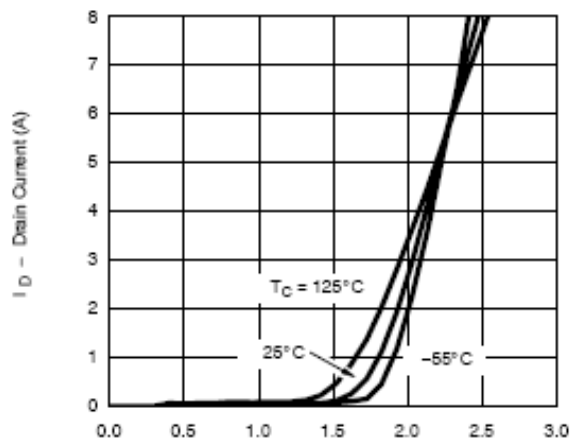
### Typical Performance Characteristics

Output Characteristics



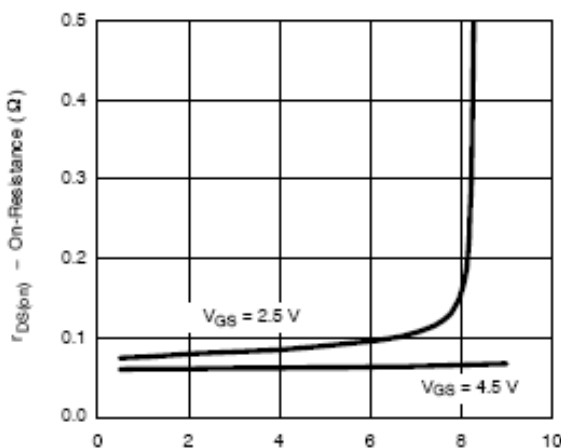
V<sub>DS</sub>-Drain-to-Source Voltage (V)

Transfer Characteristics



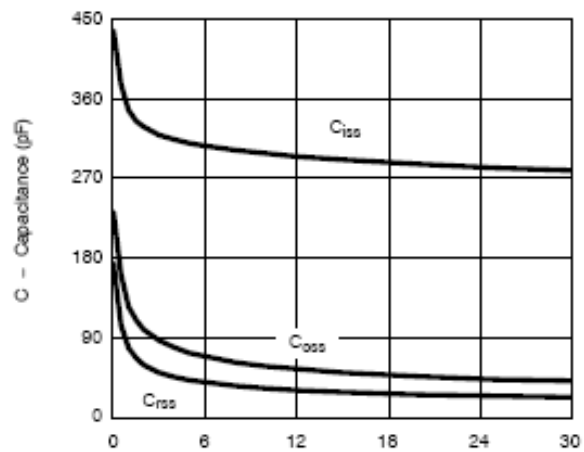
V<sub>GS</sub>-Gate-to-Source Voltage (V)

On-Resistance vs. Drain Current



I<sub>D</sub>-Drain Current (A)

Capacitance

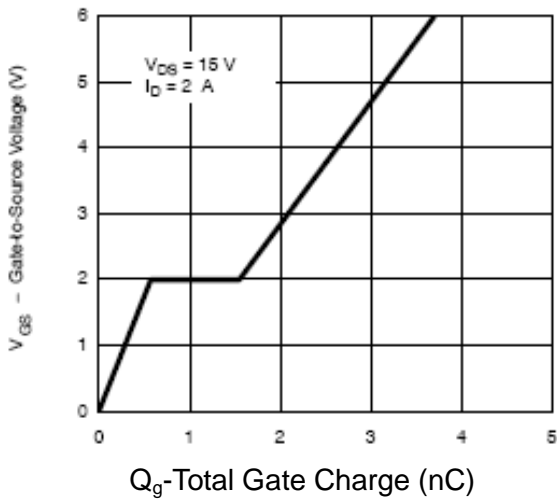


V<sub>DS</sub>-Drain-to-Source Voltage (V)

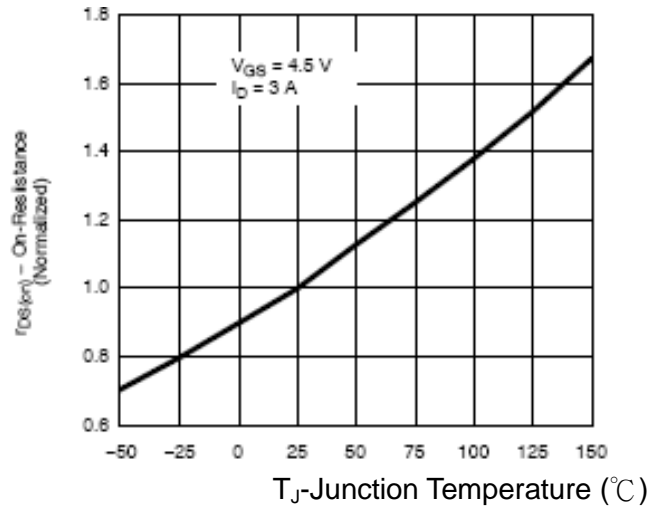


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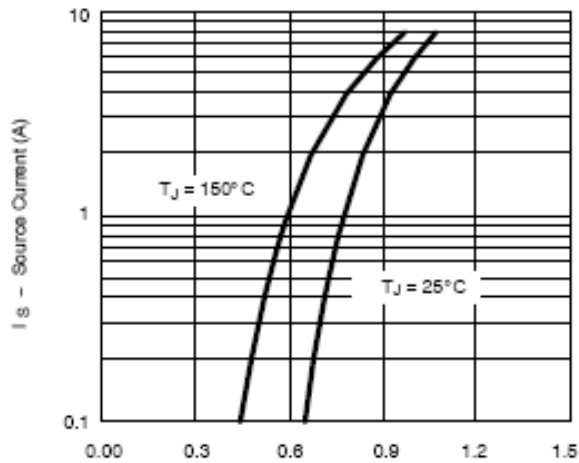
Gate Charge



On-Resistance vs. Junction Temperature

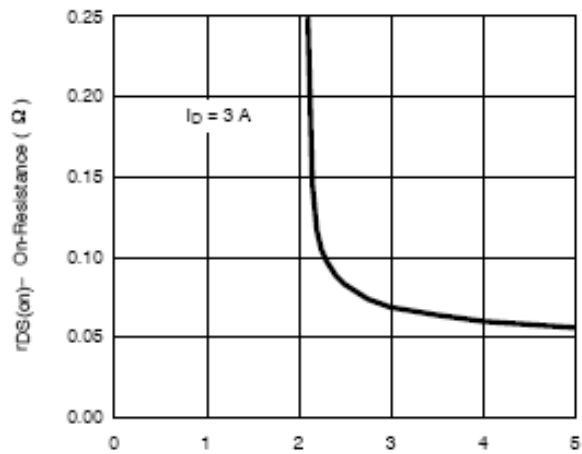


Source-Drain Diode Forward Voltage



$V_{SD}$ -Source-to-Drain Voltage (V)

On-Resistance vs. Gate-to-Source Voltage

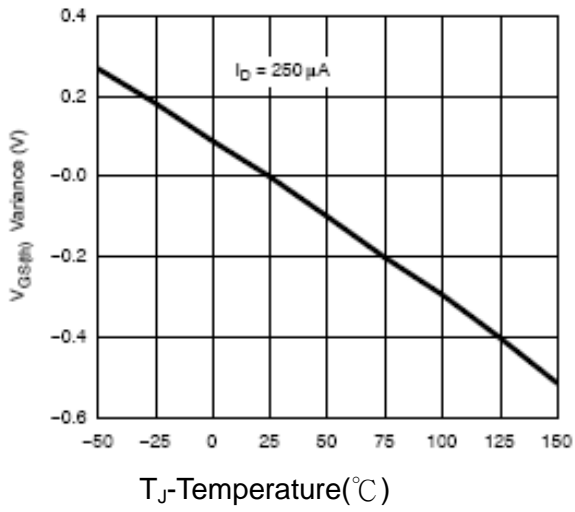


$V_{GS}$ -Gate-to-Source Voltage (V)

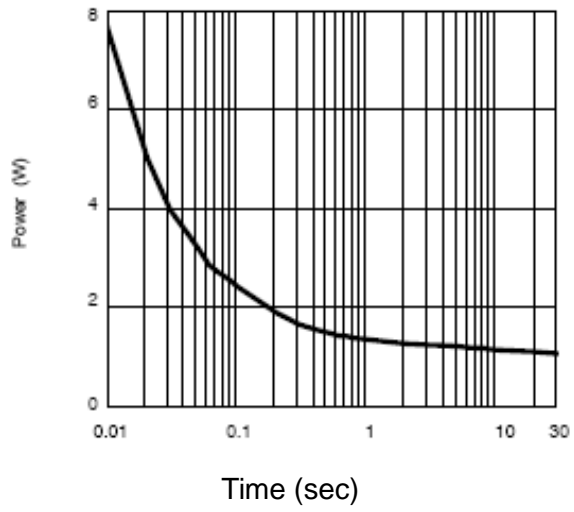


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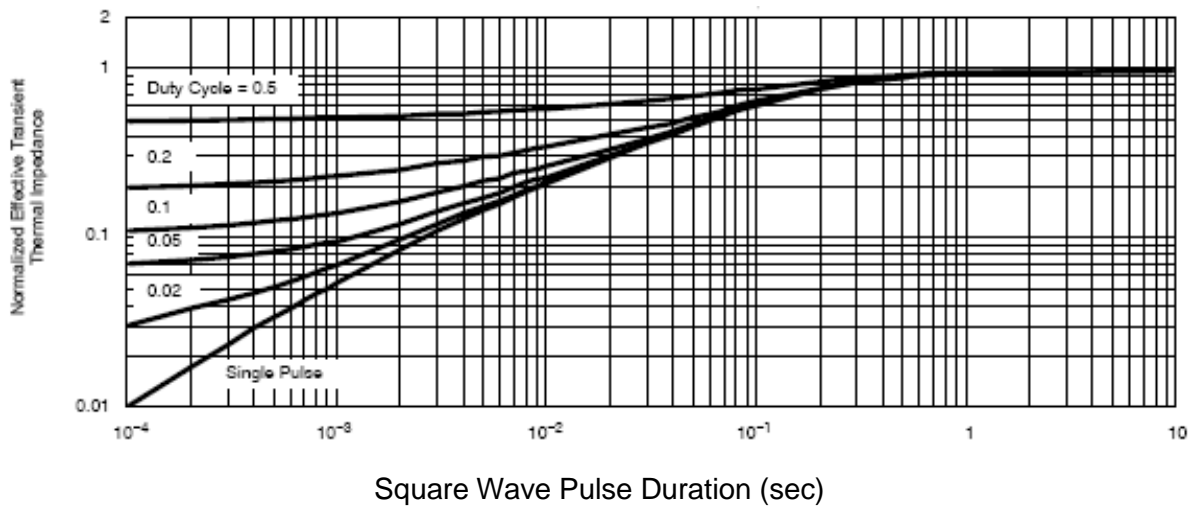
Threshold Voltage



Single Pulse Power



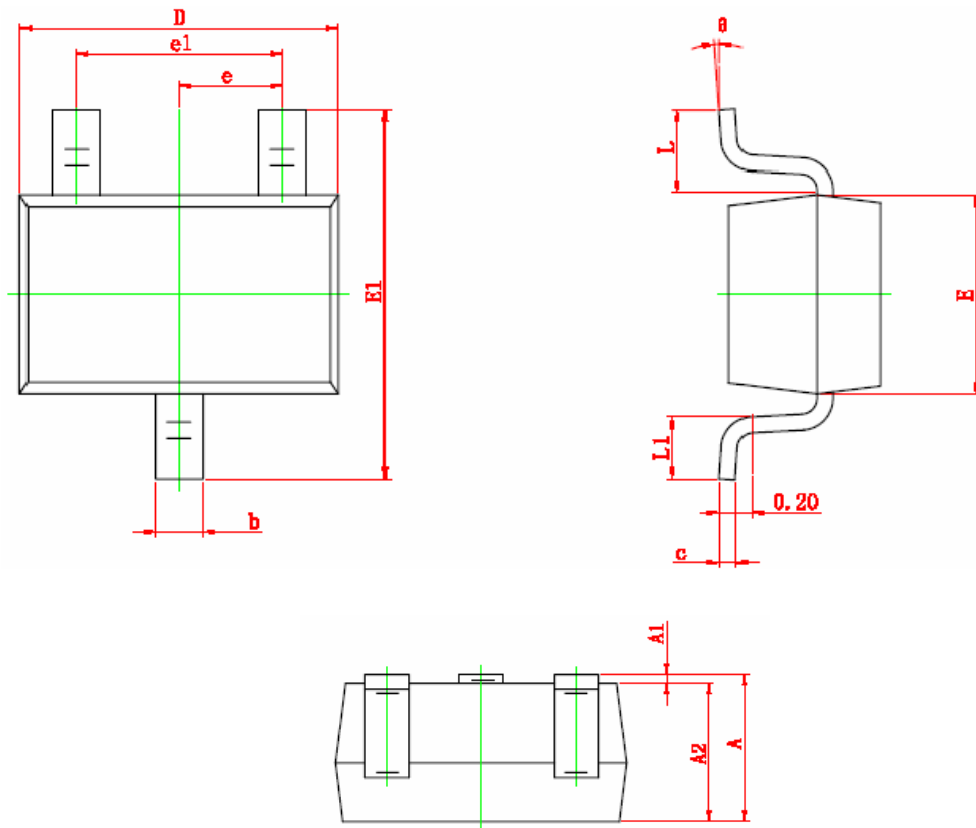
Normalized Thermal Transient Impedance, Junction-to Foot





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

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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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