ACE16904B

N-Channel Enhancement Mode Power MOSFET

Description

ACE16904B uses advanced trench technology and desgin to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

Features

- V_{DS} = 60V , I_D = 50A
- $R_{DS(ON)}$ @V_{GS} = 10V , TYP9.8mΩ
- $R_{DS(ON)}$ @V_{GS} = 4.5V , TYP12mΩ

Absolute Maximum Ratings

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current (Continuous)*AC	T_A=25 °C	I_D	50	A
	T_A=100 °C		31	
Drain Current (Pulse)*B		I_{DM}	200	A
Single Pulse Avalanche Energy2		EAS	61	mJ
Single Pulse Avalanche Current2		IAS	35	A
Power Dissipation	T_A=25 °C	P_D	96	W
	Derate above 25°C		0.77	W/°C
Operating and Storage Temperature Range		T_J,T_{STG}	-55 to 150	°C

A: The value of $R_{θJA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

Thermal Characteristics

Parameter	Symbol	Max	Unit
Maximum Junction-to-Ambient	$R_{θJA}$	62	°C /W
Maximum Junction-to-Case	$R_{θJC}$	1.3	°C /W

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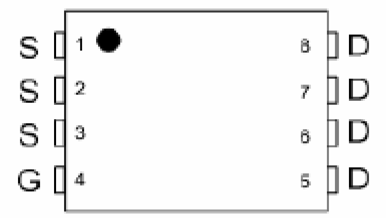
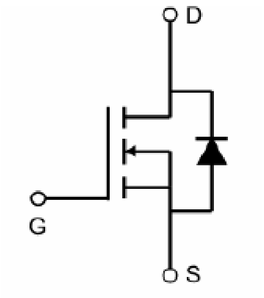
Packaging Type

DFN5*6-8L-EP





Ordering information

ACE16904B XX + H

- Halogen - free
- Pb - free
- PN: DFN5*6-8L-EP

Drain-Source Diode Characteristics

Parameter	Symbol	Test Conditions	Max	Unit
Continuous Source Current	I_S	V_G=V_D=0V , Force Current	55	A
Pulsed Source Current3	I_{SM}		220	A
Diode Forward Voltage3	V_{SD}	V_{GS}=0V , I_S=1A , T_J=25°C	1	V

Electrical Characteristics T_A=25 °C unless otherwise noted

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	60			V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , I_D=1mA		0.03		
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0V, T_J=25°C			1	uA
		V_{DS} = 48 V, V_{GS} = 0V , T_J=125°C			10	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250uA	1.2	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$			4		
Gate Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=10A		9.8	12	mΩ
		V_{GS}=4.5V, I_D=8A		12	15	
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=6A		11.7		S
Diode Forward Voltage	V_{SD}	I_{SD}=1A, V_{GS}=0V			1	V
Diode Forward Current	I_S				55	A
Switching						
Total Gate Charge	Q_g	V_{DS}=30V, I_D=10A V_{GS}=10V		39	59	nC
Gate-Source Charge	Q_{gs}			5.9	9	
Gate-Drain Charge	Q_{gd}			8.9	14	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=15V,I_D=1A V_{GS}=10V, R_{GEN}=6Ω		9.6	18	ns
Turn-On Rise Time	t_f			28.2	54	
Turn-Off Delay Time	$t_{d(off)}$			45.3	86	
Turn-Off Fall Time	t_f			10.9	21	
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V f=1MHz		2100		pF
Output Capacitance	C_{oss}			165		
Reverse Transfer Capacitance	C_{rss}			80		
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz		1.6		Ω

Note:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,IAS=50A.,R_G=25Ω,Starting T_J=25°C.
3. The data tested by pulsed , pulse width ≦300us , duty cycle ≦2%.
4. Essentially independent of operating temperature.

Typical Performance Characteristics

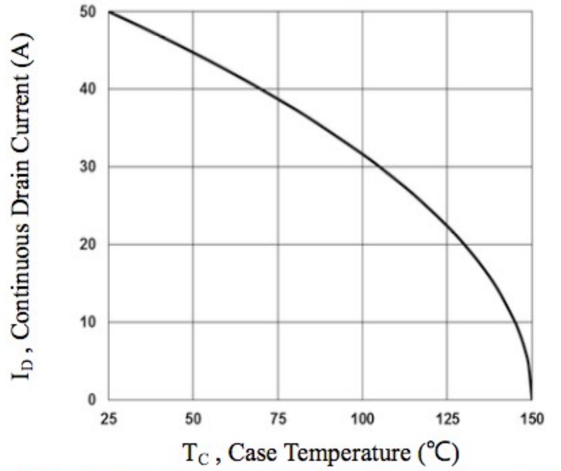


Fig.1 Continuous Drain Current vs. T_C

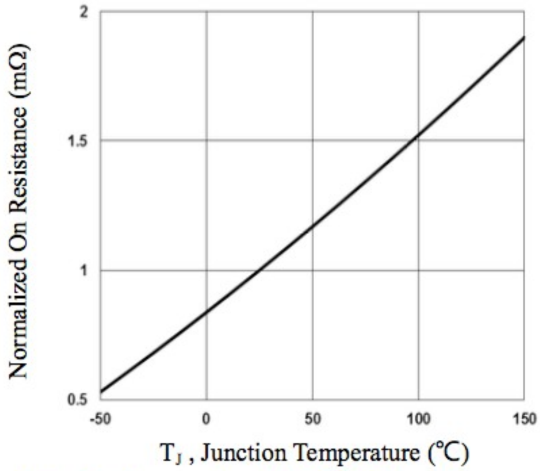


Fig.2 Normalized RDSON vs. T_J

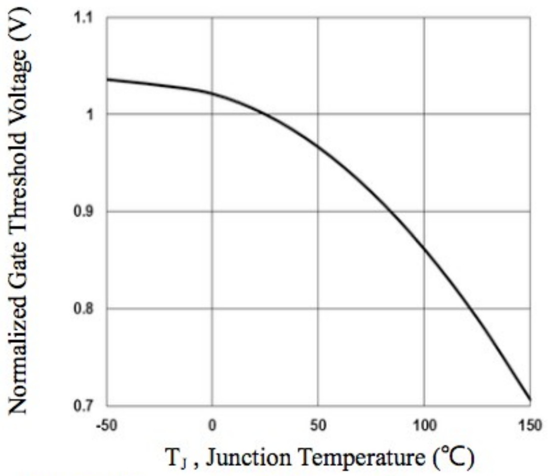


Fig.3 Normalized V_{th} vs. T_J

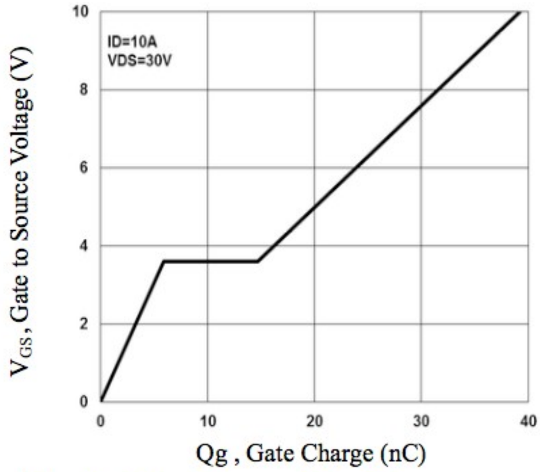


Fig.4 Gate Charge Waveform

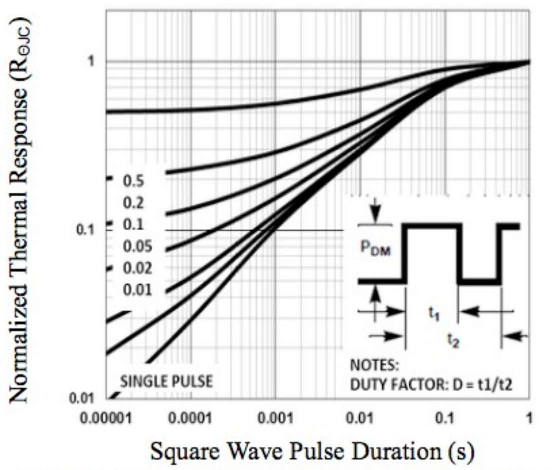


Fig.5 Normalized Transient Response

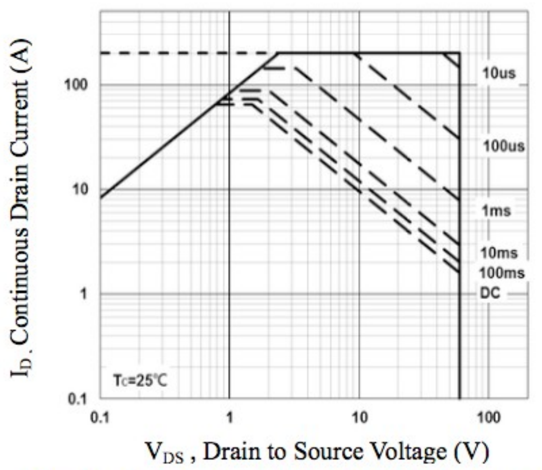


Fig.6 Maximum Safe Operation Area

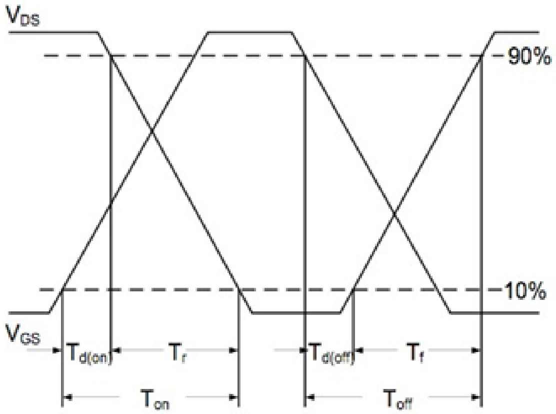


Fig.7 Switching Time Waveform

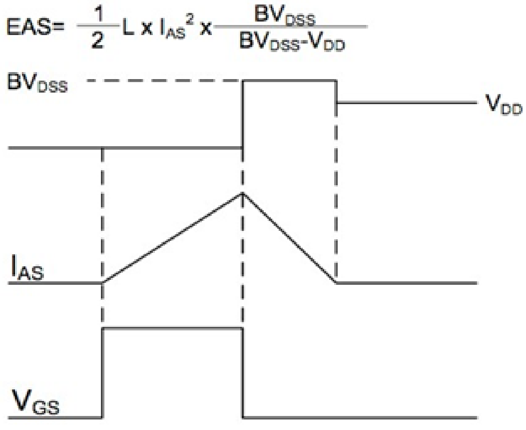
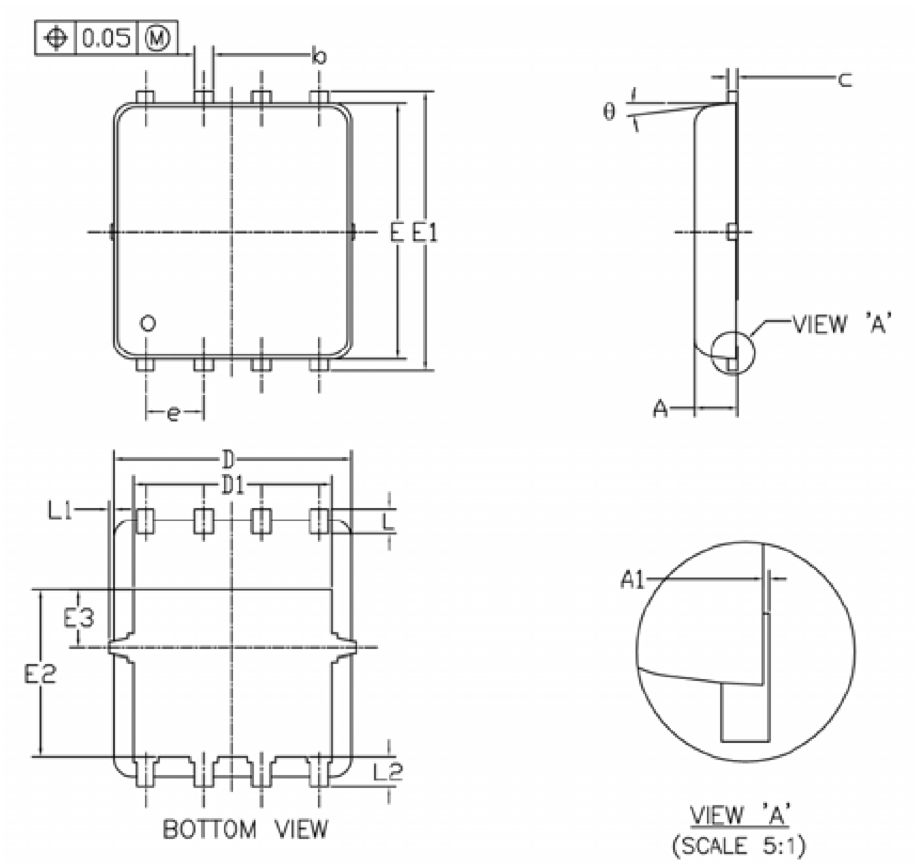


Fig.8 EAS Waveform

Packing Information

DFN5*6-8L-EP



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.95	1.00	0.033	0.037	0.039
A1	0.00	—	0.05	0.000	—	0.002
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.15	0.20	0.25	0.006	0.008	0.010
D	5.20 BSC			0.205 BSC		
D1	4.35 BSC			0.171 BSC		
E	5.55 BSC			0.219 BSC		
E1	6.05 BSC			0.238 BSC		
E2	3.625 BSC			0.143 BSC		
E3	1.275 BSC			0.050 BSC		
e	1.27 BSC			0.050 BSC		
L	0.45	0.55	0.65	0.018	0.022	0.026
L1	0	—	0.15	0	—	0.006
L2	0.68 REF			0.027 REF		
θ	0°	—	10°	0°	—	10°

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 sued 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 shoes 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.