



ACE17446B

N-Channel Enhancement Mode Field Effect Transistor

Description

The ACE17446B uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications. The source leads are separated to allow a kelvin connection to the source, which may be used to bypass the source inductance.

ACE17446BPD and ACE17446BNN are electrically identical.

-RoHS Compliant

-Halogen Free

Features

- $V_{DS} (V) = 30V$
- $V_{GS} (V) = \pm 20V$
- $I_D = 45A (V_{GS} = 10V)$
- $R_{DS(ON)} < 6.5m\Omega (V_{GS} = 10V)$
- $R_{DS(ON)} < 10m\Omega (V_{GS} = 4.5V)$

Absolute Maximum Ratings@ $T_A=25^\circ C$ unless otherwise noted

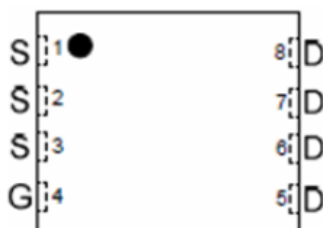
Parameter		Symbol	Max	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current (Continuous)*AC	$T_A=25^\circ C$	I_D	45	A
	$T_A=70^\circ C$		36	
Drain Current (Pulsed)*B		I_{DM}	140	A
Power Dissipation	$T_A=25^\circ C$	P_D	25	W
	$T_A=70^\circ C$		9	
Operating temperature / Storage temperature		T_J/T_{STG}	-55~150	$^\circ C$

Packaging Type

PDFN3*3-8L



DFN3*3-8L





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Ordering information

ACE17446B XX + H

└─ Halogen - free
└─ Pb - free
└─ PD: PDFN3*3-8L
└─ NN: DFN3*3-8L

Electrical Characteristics $T_A=25^{\circ}\text{C}$, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$			1	μA
Gate threshold voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_{DS}=250\mu A$	0.7	1.1	1.6	V
Gate leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			100	μA
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$		5.	6.5	m Ω
		$V_{GS}=4.5V, I_D=20A$		6.5	10	
Forward Trans conductance	g_{FS}	$V_{DS} = 5V, I_D= 20A$		50		S
Diode forward voltage	V_{SD}	$I_{SD}=20A, V_{GS}=0V$		0.78	1.3	V
Maximum body-diode continuous current	I_S				45	A
Switching						
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=15V, I_D=20A$		25.2		nC
Gate-Source Charge	Q_{gs}			13		
Gate-Drain Charge	Q_{gd}			3.6		
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DS}=15V, R_L=0.75\Omega, R_{GEN}=3\Omega$		6.5		ns
Turn-on Rise Time	t_r			2.5		
Turn-off Delay Time	$t_{d(off)}$			17.5		
Turn-off Fall Time	t_f			3.8		
Dynamic						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=15V, f=1MHz$		1230		pF
Output Capacitance	C_{oss}			420		
Reverse Transfer Capacitance	C_{rss}			150		

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. 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 $t \leq 10s$ junction to ambient thermal resistance rating.



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Typical Performance Characteristics

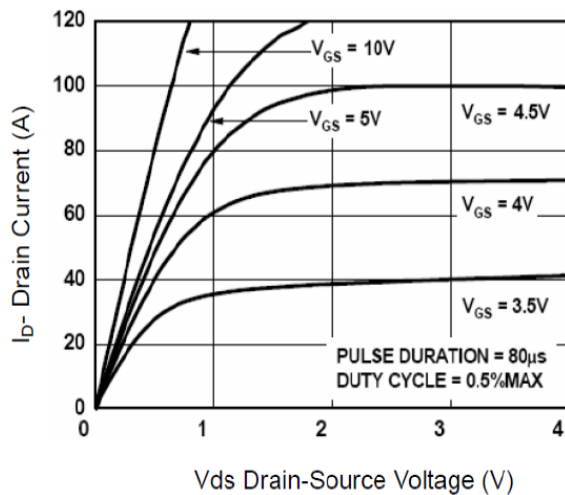


Figure 1 Output Characteristics

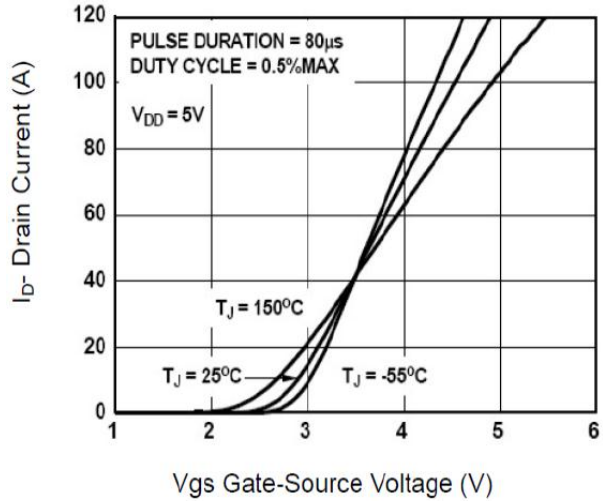


Figure 2 Transfer Characteristics

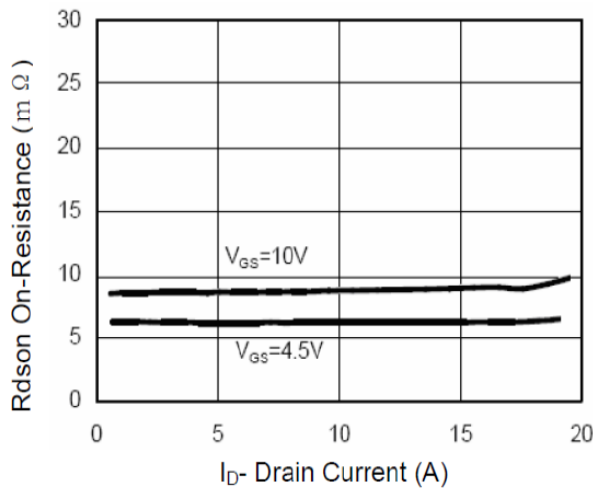


Figure 3 $R_{DS(on)}$ - Drain Current

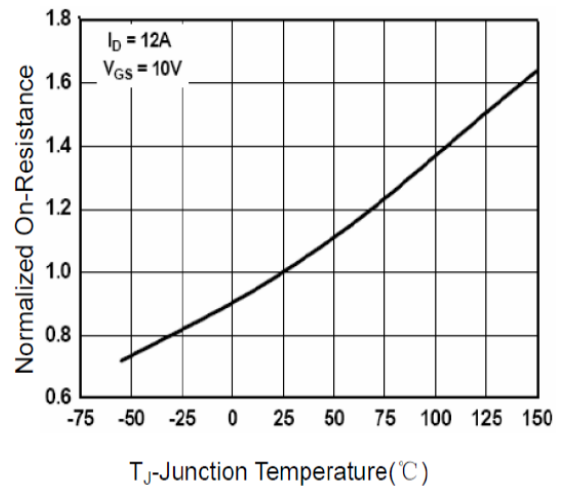


Figure 4 $R_{DS(on)}$ -Junction Temperature

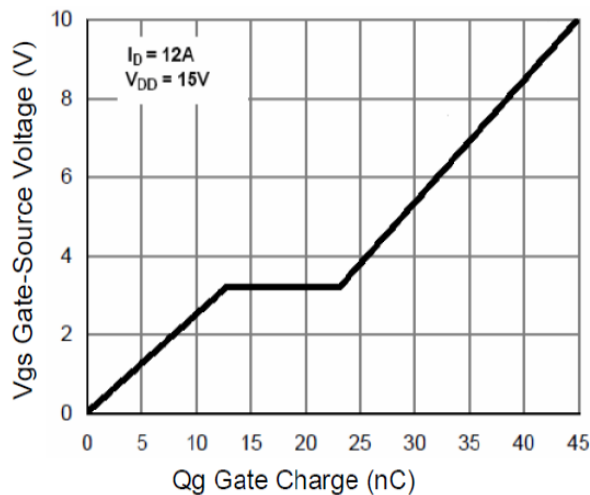


Figure 5 Gate Charge

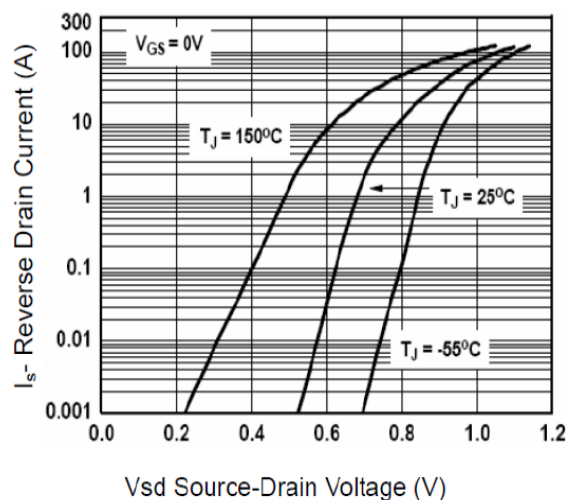


Figure 6 Source- Drain Diode Forward



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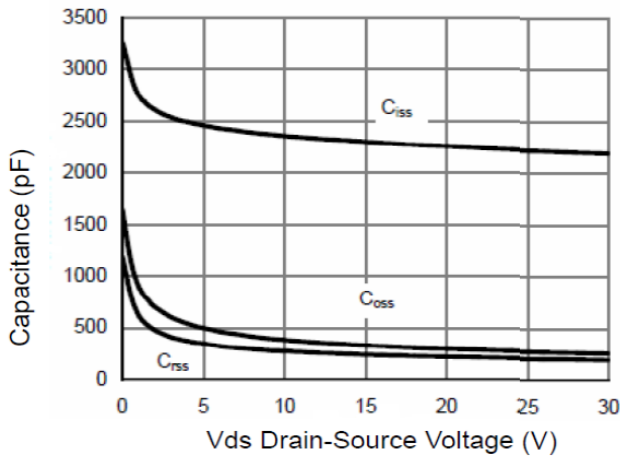


Figure 7 Capacitance vs Vds

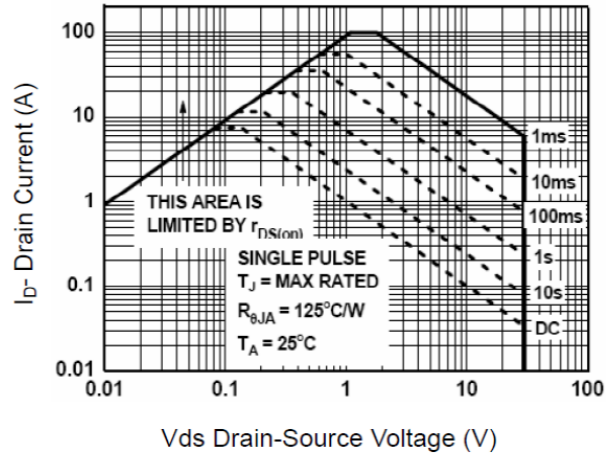


Figure 8 Safe Operation Area

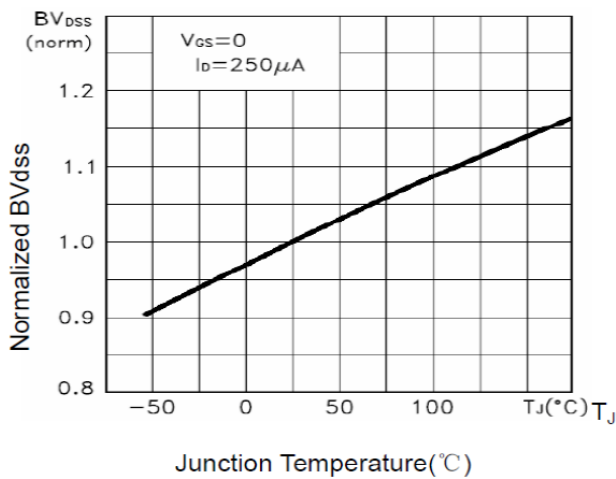


Figure 9 BV_{DSS} vs Junction Temperature

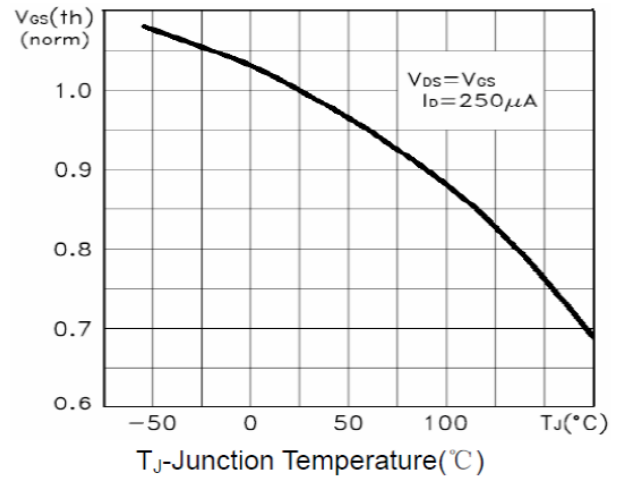


Figure 10 V_{GS(th)} vs Junction Temperature

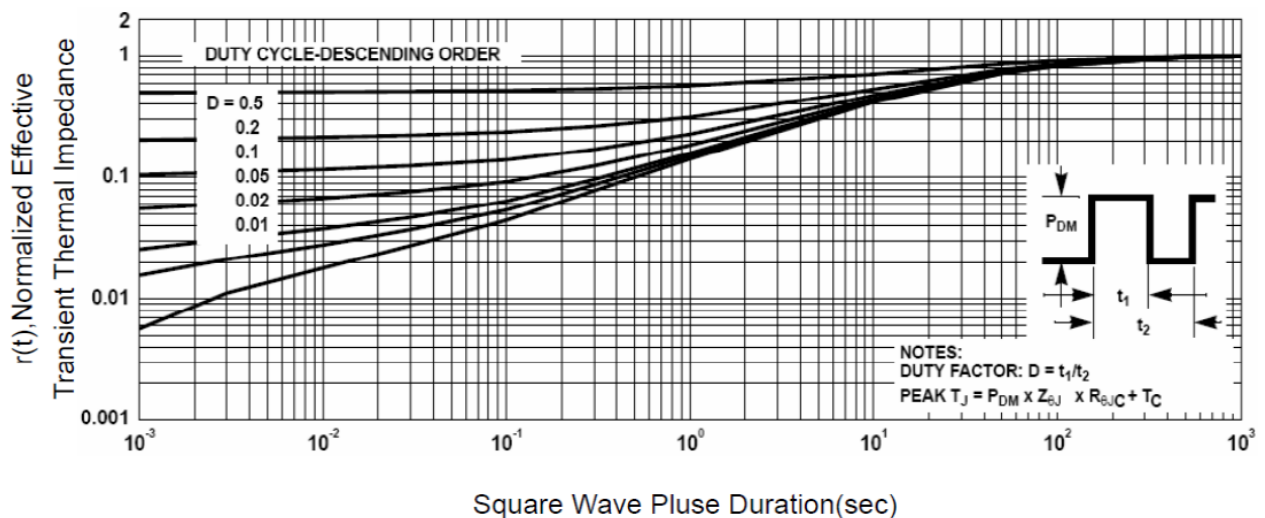


Figure 11 Normalized Maximum Transient Thermal Impedance

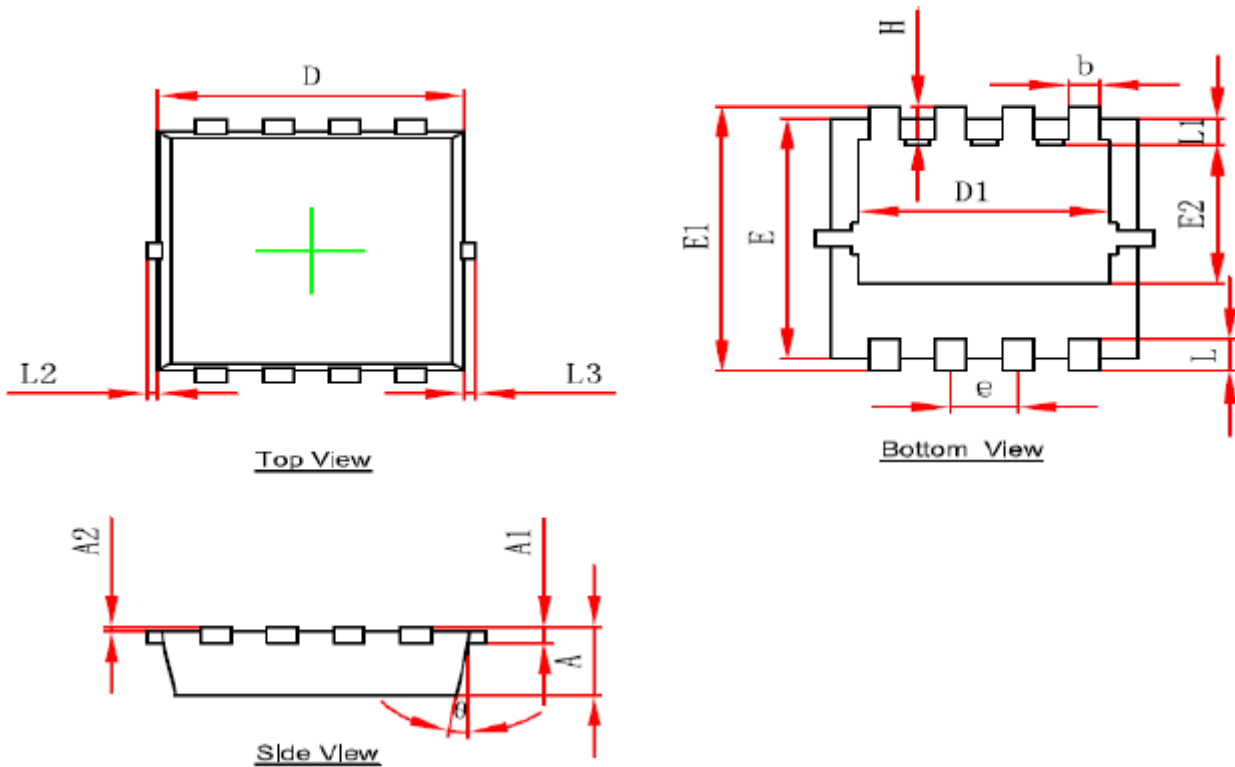


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Packing Information

PDFN3*3-8L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152REF		0.006REF	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315			
θ	9°	13°	9°	13°

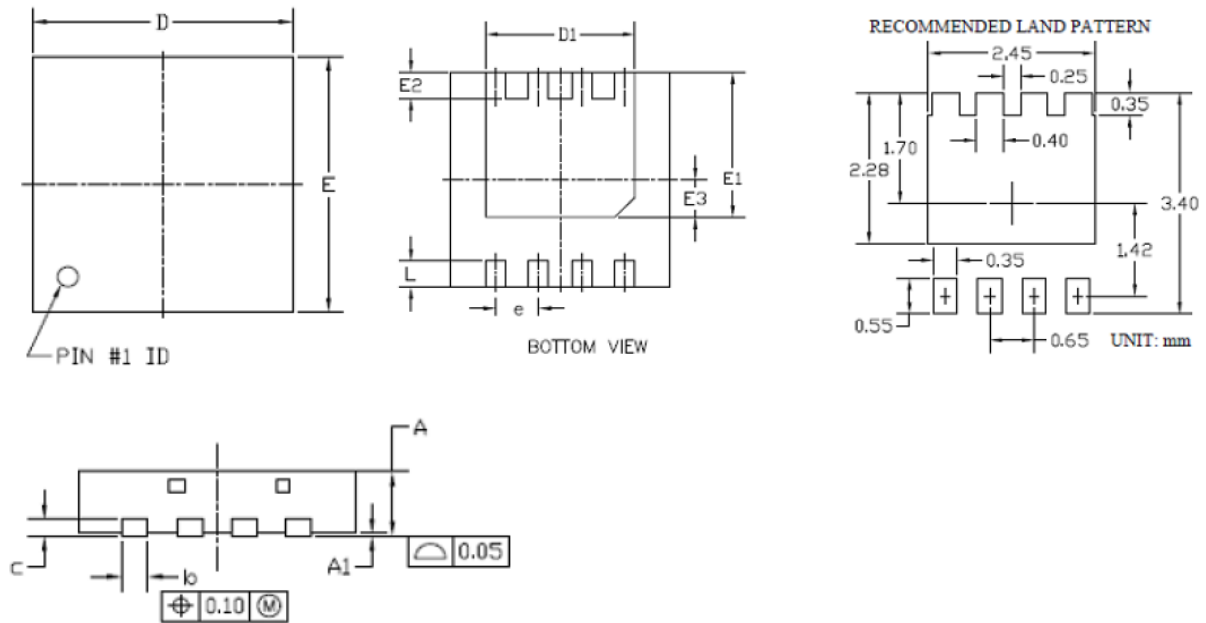


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Packing Information

DFN3*3-8L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	NOM	Max.	Min.	NOM	Max.
A	0.70	0.75	0.80	0.028	0.030	0.031
A1			0.05			0.002
b	0.24	0.30	0.35	0.009	0.012	0.014
c	0.10	0.15	0.25	0.004	0.006	0.010
D	3.20	3.30	3.40	0.126	0.130	0.134
D1	2.15	2.25	2.35	0.085	0.089	0.093
E	3.20	3.30	3.40	0.126	0.130	0.134
E1	2.13	2.23	2.33	0.084	0.088	0.092
E2	0.30	0.40	0.50	0.012	0.016	0.020
E3	0.48	0.58	0.68	0.019	0.023	0.027
e	0.65BSC			0.026BSC		
L	0.30	0.40	0.50	0.012	0.016	0.020



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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 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 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.