ACE12410B

N-Channel Enhancement Mode Field Effect Transistor

Features

- V_{DS} (V) = 20V
- I_D = 8A
- $R_{DS(ON)}$ = 12.5mΩ @V_{GS}=4.5V
- $R_{DS(ON)}$ = 16.5mΩ @V_{GS}=2.5V

General Description

- load switch
- battery protection

Absolute Maximum Ratings

Parameter		Symbol	Max	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±12	V
Drain Current (Continuous) *AC	T_A=25°C	I_D	8	A
	T_A=70°C		6	
Drain Current (Pulse)*B		I_{DM}	32	
Power Dissipation	T_A=25°C	P_D	2.8	W
Operating and Storage Temperature Range		T_J,T_{STG}	-55 to 150	°C

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°C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and duty cycles to keep initial T_J =25°C.

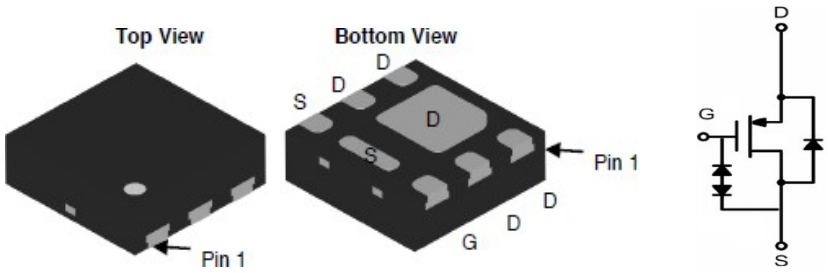
D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to case $R_{\theta JC}$ and case to ambient.

Thermal Resistance Ratings

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient	t ≤10s	RthJA	37	45	°C/W
Maximum Junction-to-Ambient	Steady State		66	80	

Packaging Type

DFN2*2-6L



Ordering information

ACE12410B XX + H

- Halogen - free
- Pb - free
- MN: DFN2*2-6L

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=250uA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	uA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250uA	0.4	0.75	1.5	V
Gate Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V			±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=8A		12.5	15	mΩ
		V_{GS}=2.5V, I_D=4A		16.5	20	
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=8A		50		S
Diode Forward Voltage	V_{SD}	I_{SD}=1A, V_{GS}=0V		0.65	1	V
Diode Forward Current	I_S	TC =25°C			3.5	A
Switching						
Total Gate Charge	Q_g	V_{DS}=10V, I_D=8A V_{GS}=4.5V		7		nC
Gate-Source Charge	Q_{gs}			1		
Gate-Drain Charge	Q_{gd}			2.5		
Turn-On Delay Time	$T_{d(on)}$	V_{GS}=4.5V, V_{DS}=10V R_L=1.25Ω, R_{GEN}=3Ω		3		ns
Turn-On Rise Time	t_f			4.5		
Turn-Off Delay Time	$t_{d(off)}$			28		
Turn-Off Fall Time	t_f			6		
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0V f=1.0MHz		782		pF
Output Capacitance	C_{oss}			158		
Reverse Transfer Capacitance	C_{rss}			98		

Typical Performance Characteristics

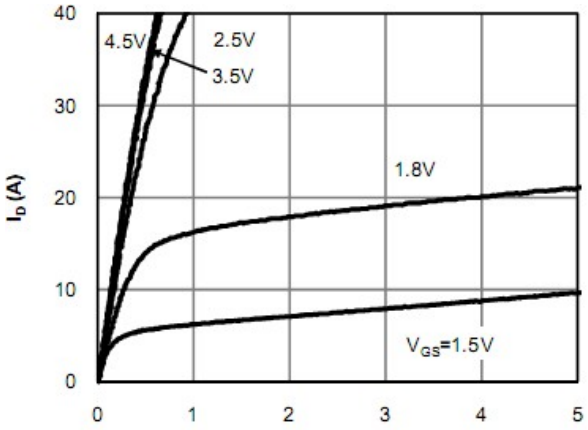


Fig 1: On-Region Characteristics (Note E)

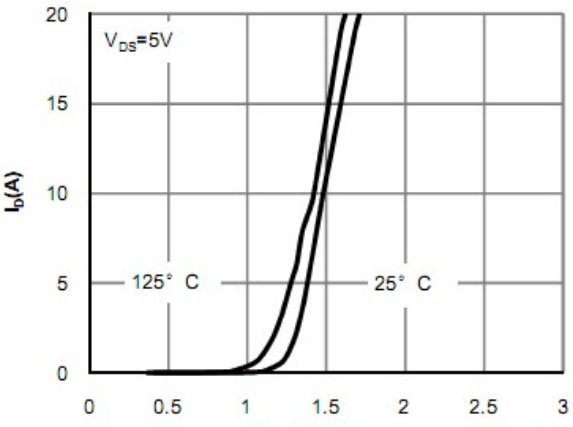


Figure 2: Transfer Characteristics (Note E)

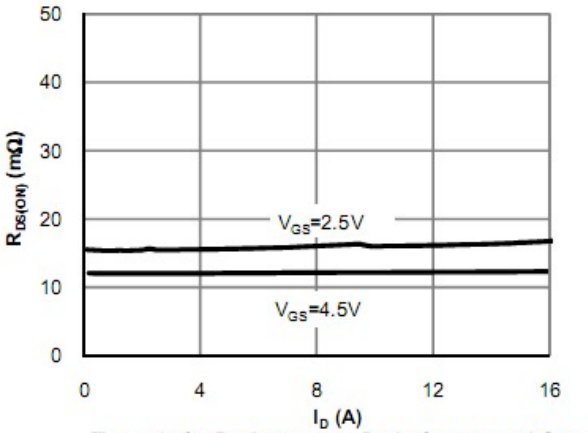


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

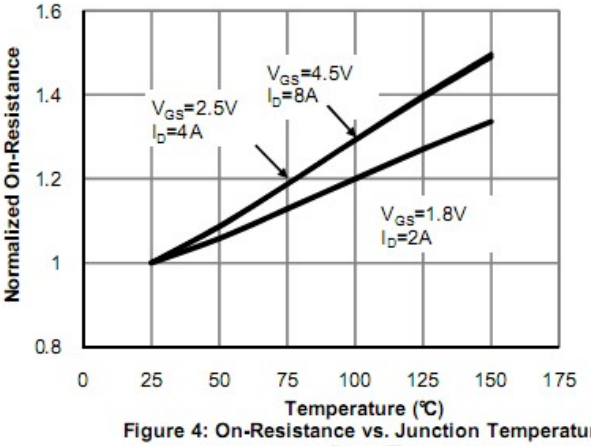


Figure 4: On-Resistance vs. Junction Temperature (Note E)

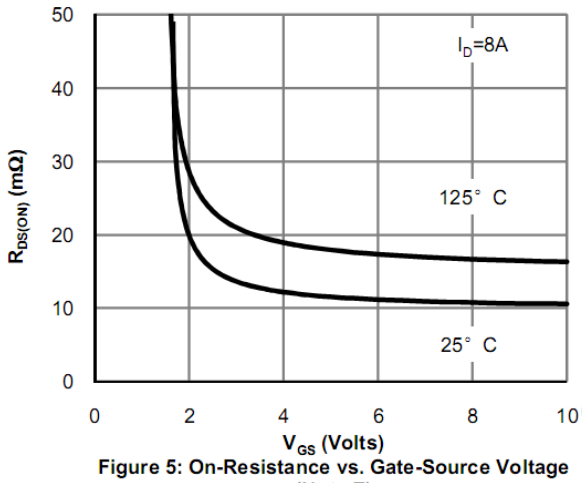


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

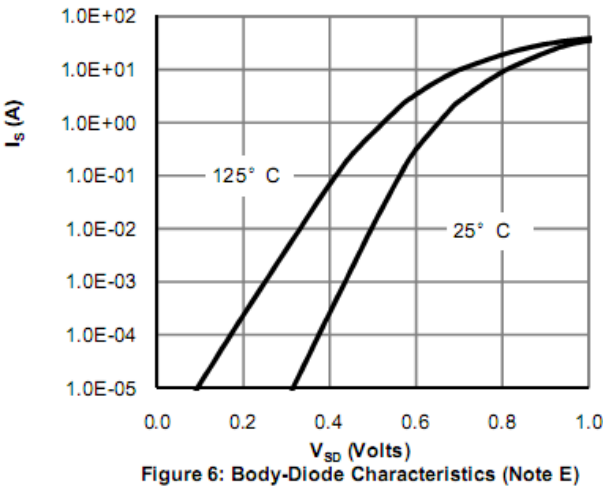


Figure 6: Body-Diode Characteristics (Note E)

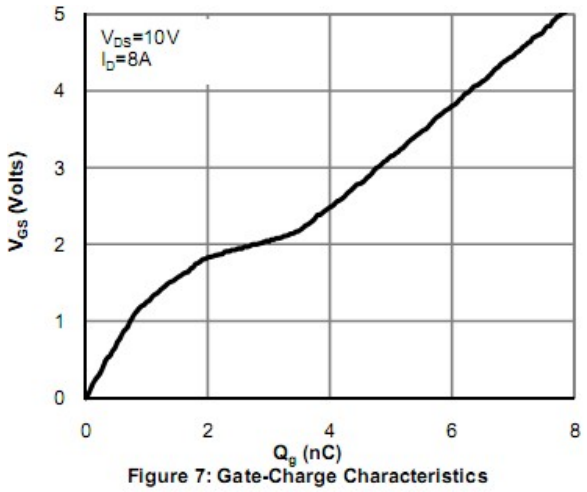


Figure 7: Gate-Charge Characteristics

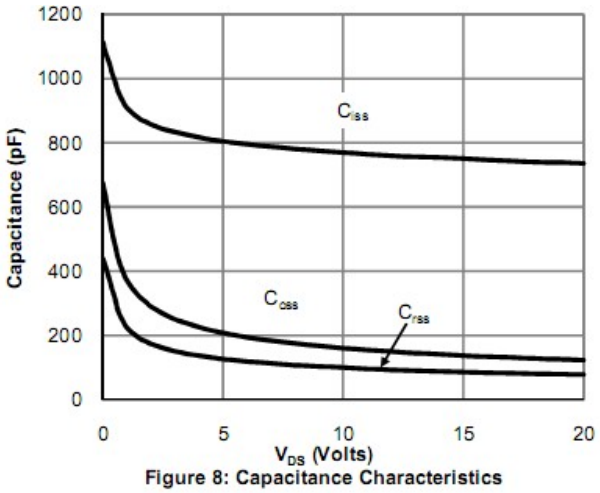


Figure 8: Capacitance Characteristics

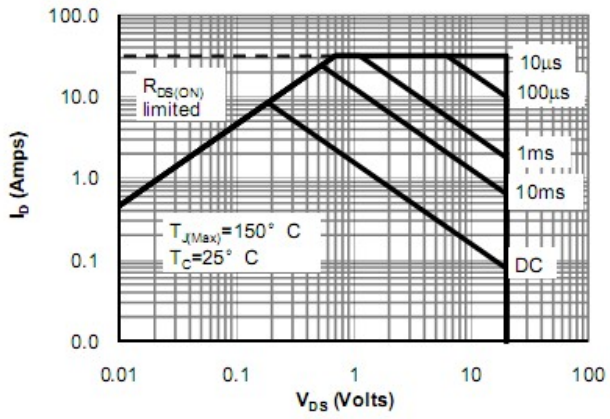


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

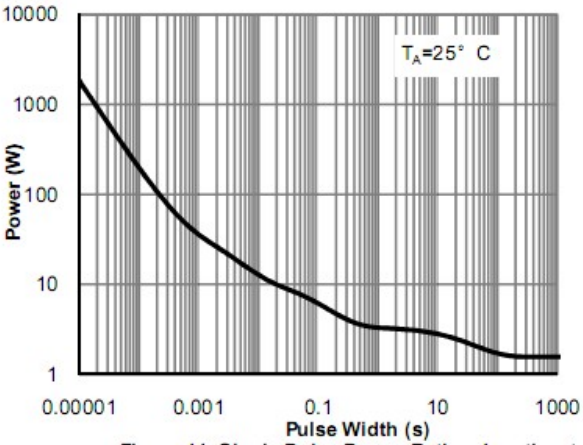


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note H)

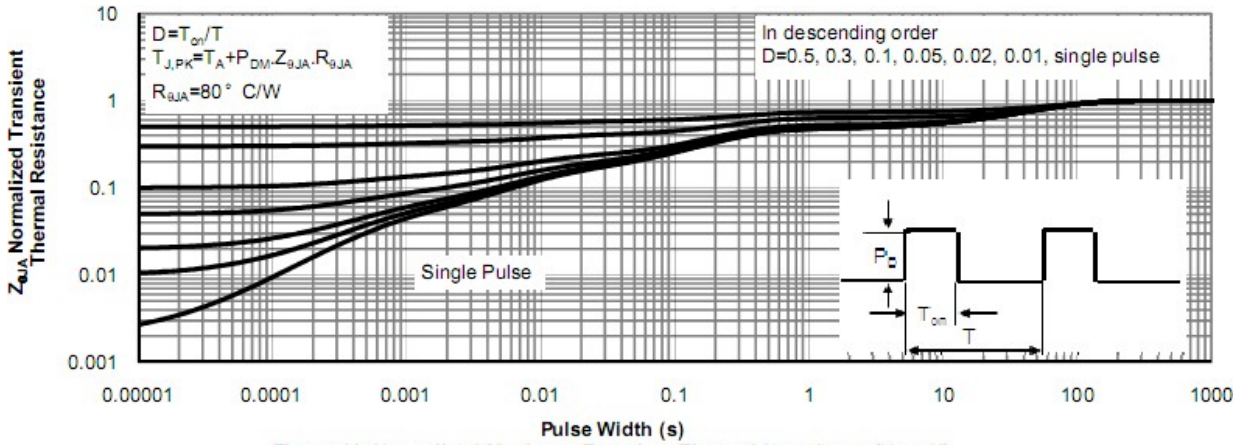
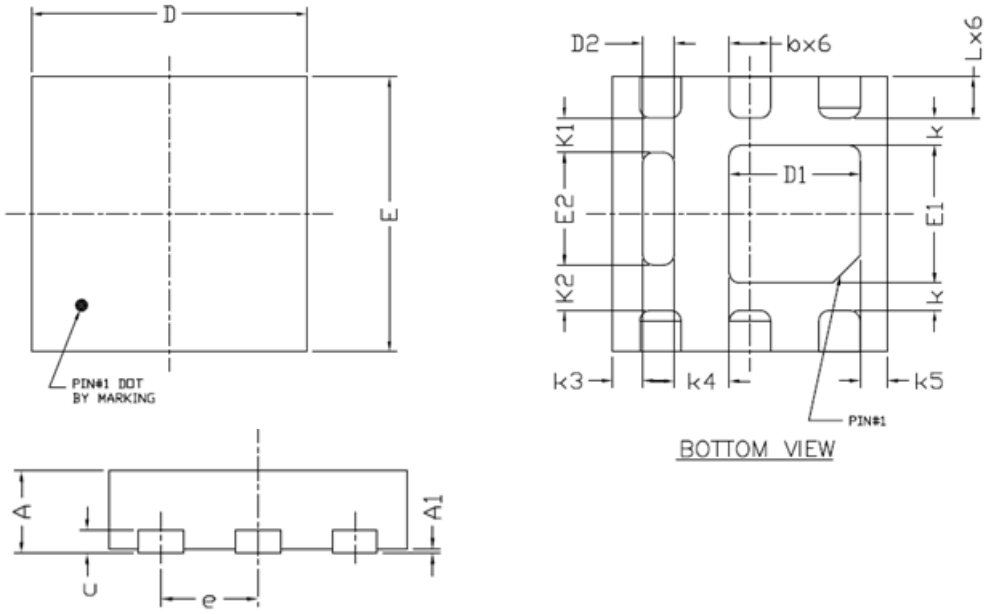


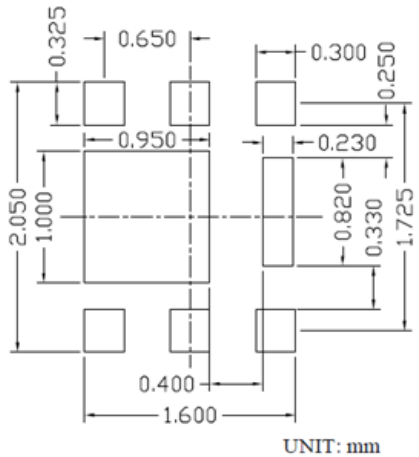
Figure 12: Normalized Maximum Transient Thermal Impedance (Note H)

Packing Information

DFN2*2-6L



RECOMMENDED LAND PATTERN



UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.50	0.55	0.60	0.020	0.022	0.024
A1	0.00	——	0.05	0.000	——	0.002
b	0.25	0.30	0.35	0.010	0.012	0.014
c		0.152 REF			0.006 REF	
D	1.90	2.00	2.10	0.075	0.079	0.083
D1	0.85	0.95	1.05	0.033	0.037	0.041
D2	0.13	0.23	0.33	0.005	0.009	0.013
E	1.90	2.00	2.10	0.075	0.079	0.083
E1	0.90	1.00	1.10	0.035	0.039	0.043
E2	0.72	0.82	0.92	0.028	0.032	0.036
e		0.65 BSC			0.026 BSC	
K	0.10	0.20	0.30	0.004	0.008	0.012
K1	0.15	0.25	0.35	0.006	0.010	0.014
K2	0.23	0.33	0.43	0.009	0.013	0.017
K3	0.12	0.22	0.32	0.005	0.009	0.013
K4	0.30	0.40	0.50	0.012	0.016	0.020
K5	0.10	0.20	0.30	0.004	0.008	0.012
L	0.25	0.30	0.35	0.010	0.012	0.014

NOTE
1. CONTROLLING DIMENSION IS MILLIMETER.
   CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

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.