# ACE17427B

**N-Channel Enhancement Mode Power MOSFET**

## Features

- $V_{DS}$= 40V , $I_D$=90A
- $R_{DS(ON)}$@ $V_{GS}$ = 10V , TYP=4.2mΩ
- $R_{DS(ON)}$@ $V_{GS}$ = 4.5V , TYP=5.4mΩ

## General Description

- load switching
- use in PWM
- general purpose applications

## Absolute Maximum Ratings@$T_A$=25℃ unless otherwise noted

| Parameter | | Symbol | Max | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 40 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±20 | V |
| Drain Current (Continuous)*AC | $T_C$=25℃ | $I_D$ | 90 | A |
| | $T_C$=70℃ | | 62 | |
| Drain Current (Pulsed)*B | | $I_{DM}$ | 360 | A |
| Avalanche energy L= 1 mH | | EAS | 162 | mJ |
| Power Dissipation | $T_A$=25℃ | $P_D$ | 71 | W |
| Operating temperature / Storage temperature | | $T_J$/$T_{STG}$ | -55~150 | ℃ |

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ 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 Resistance Ratings

| Parameter | | Symbol | Maximum | Unit |
|---|---|---|---|---|
| Maximum Junction-to-Ambient | Steady State | $R_{thJA}$ | 62.5 | °C/W |
| Maximum Junction-to-Case (Drain) | Steady State | $R_{thJC}$ | 2.1 | |

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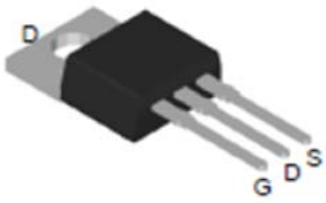
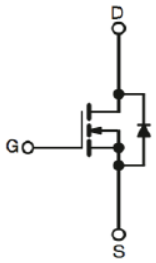
## Packaging Type

TO-220




## Ordering information

ACE17427B XX + H

- Halogen - free
- Pb - free
- ZM: TO-220

## Electrical Characteristics $T_A$=25℃, unless otherwise specified.

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 40 | | | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=30V, $V_{GS}$=0V | | | 1 | μA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{GS}$=$V_{DS}$, $I_{DS}$=250μA | 0.9 | 1.37 | 3 | V |
| Gate leakage current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V | | | ±100 | μA |
| Drain-source on-state resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=20A | | 4.2 | 5.5 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=15A | | 5.4 | 7.5 | |
| Diode forward voltage | $V_{SD}$ | $I_{SD}$=20A, $V_{GS}$=0V | | | 1.5 | V |
| Diode Forward Current | $I_S$ | TC =25°C | | | 90 | A |
| **Switching** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=10V, $V_{DS}$=15V, $I_D$=20A | | 67 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 10 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 12 | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=15V, $I_D$=2A, $V_{GS}$=10V,$R_G$=3Ω | | 19 | | ns |
| Turn-on Rise Time | $t_r$ | | | 10 | | |
| Turn-off Delay Time | $t_{d(off)}$ | | | 84 | | |
| Turn-off Fall Time | $t_f$ | | | 22 | | |
| **Dynamic** | | | | | | |
| Input Capacitance | Ciss | $V_{GS}$=0V, $V_{DS}$=15V, f=1.0MHz | | 3070 | | pF |
| Output Capacitance | Coss | | | 385 | | |
| Reverse Transfer Capacitance | Crss | | | 285 | | |

## Typical Performance Characteristics

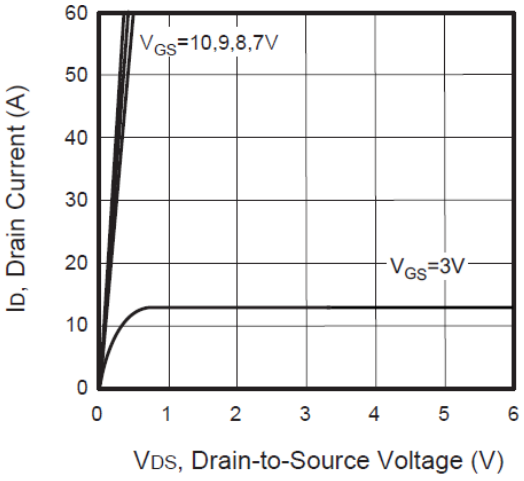



**Figure 1. Output Characteristics**

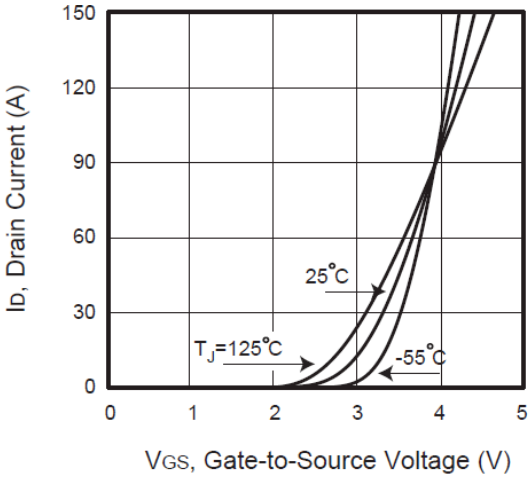



**Figure 2. Transfer Characteristics**

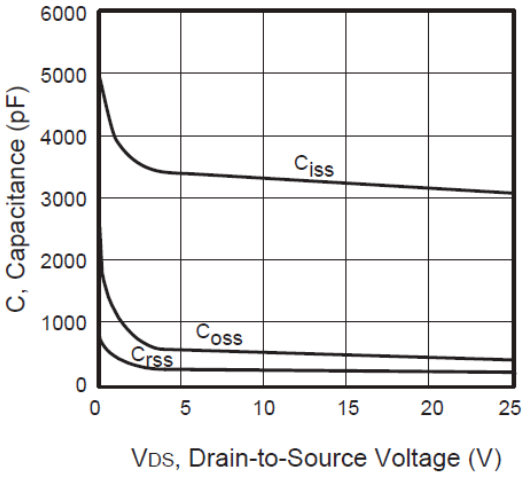



**Figure 3. Capacitance**

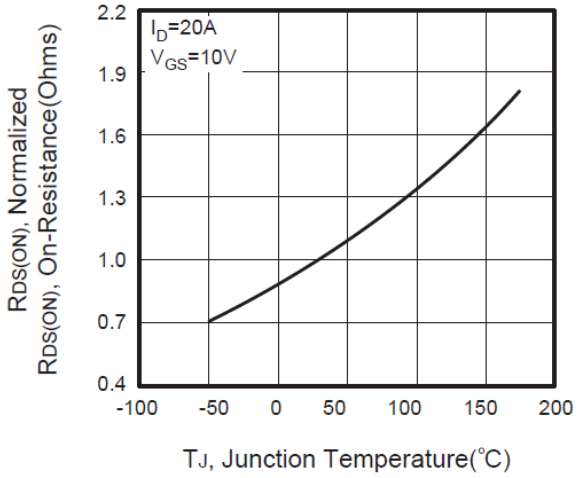



**Figure 4. On-Resistance Variation with Temperature**

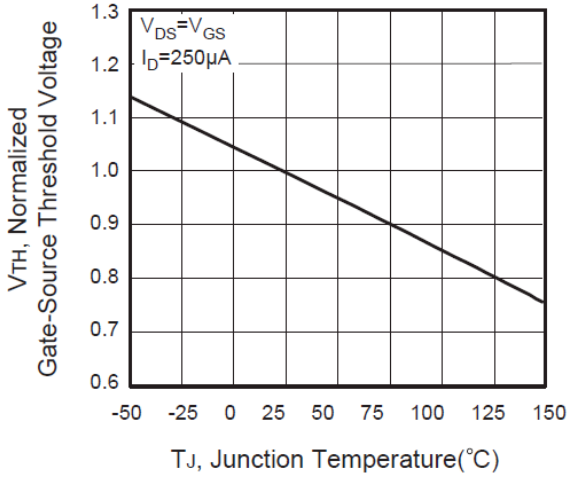



**Figure 5. Gate Threshold Variation with Temperature**

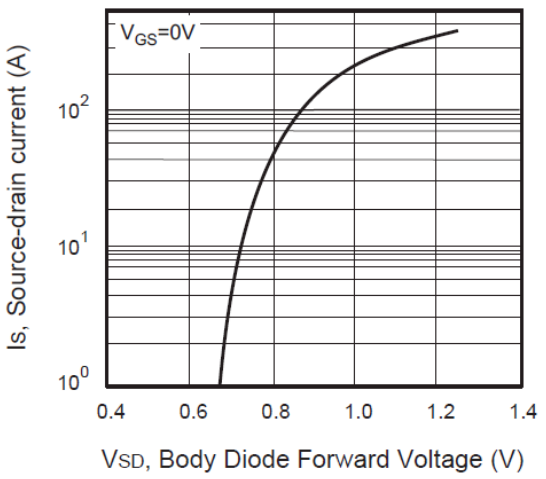



**Figure 6. Body Diode Forward Voltage Variation with Source Current**

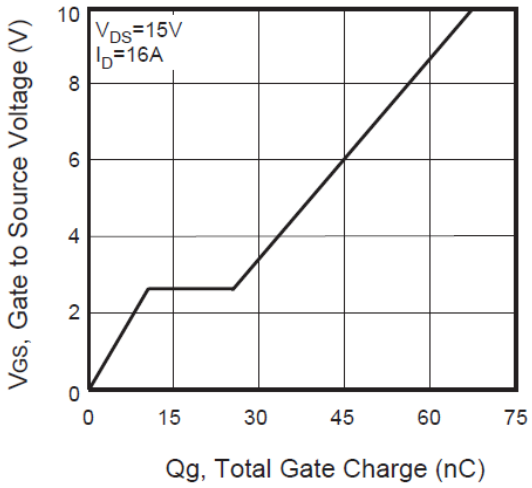



**Figure 7. Gate Charge**

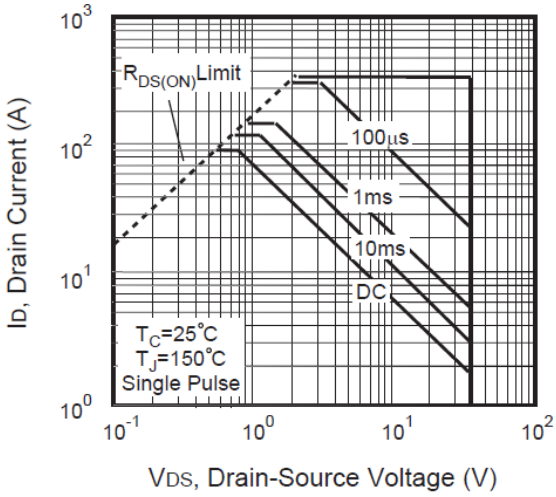



**Figure 8. Maximum Safe Operating Area**

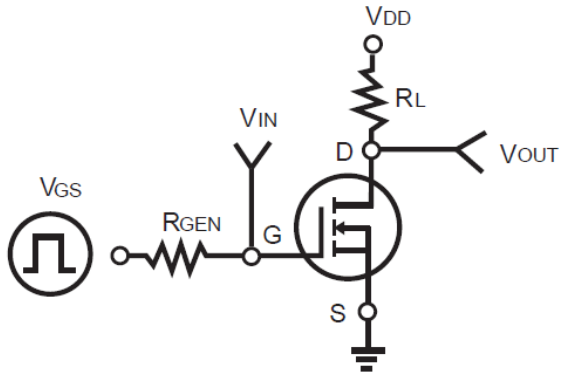



**Figure 9. Switching Test Circuit**

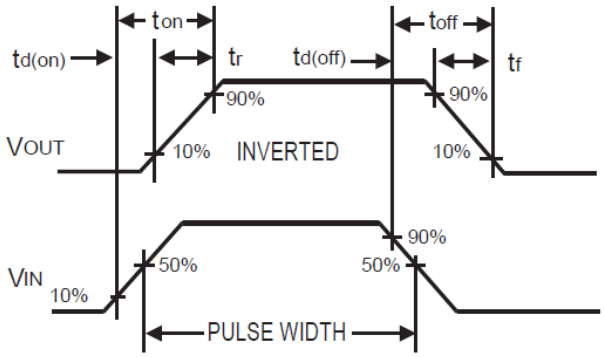



**Figure 10. Switching Waveforms**

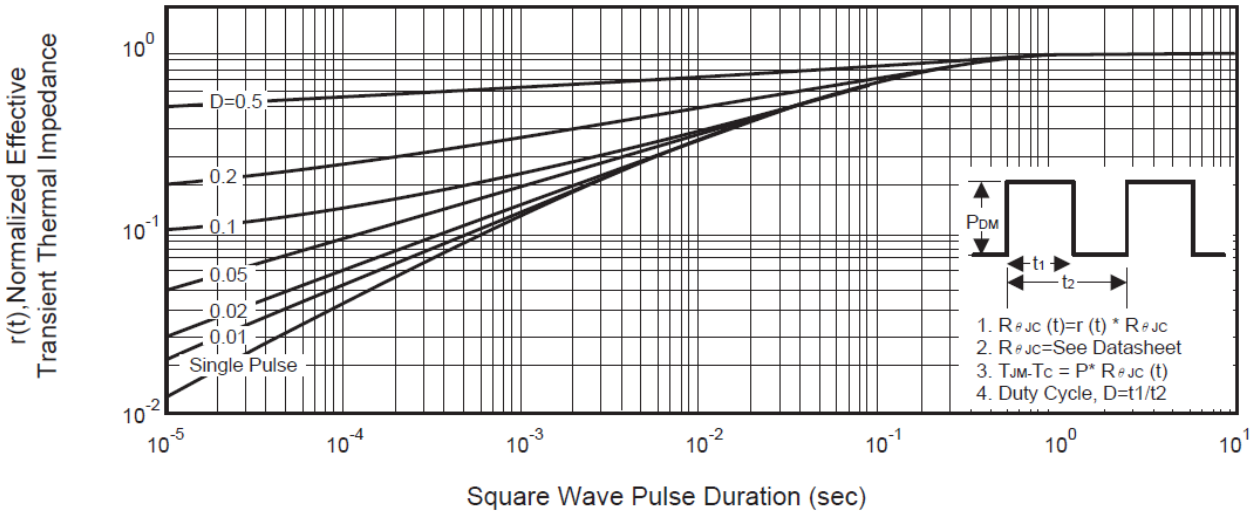
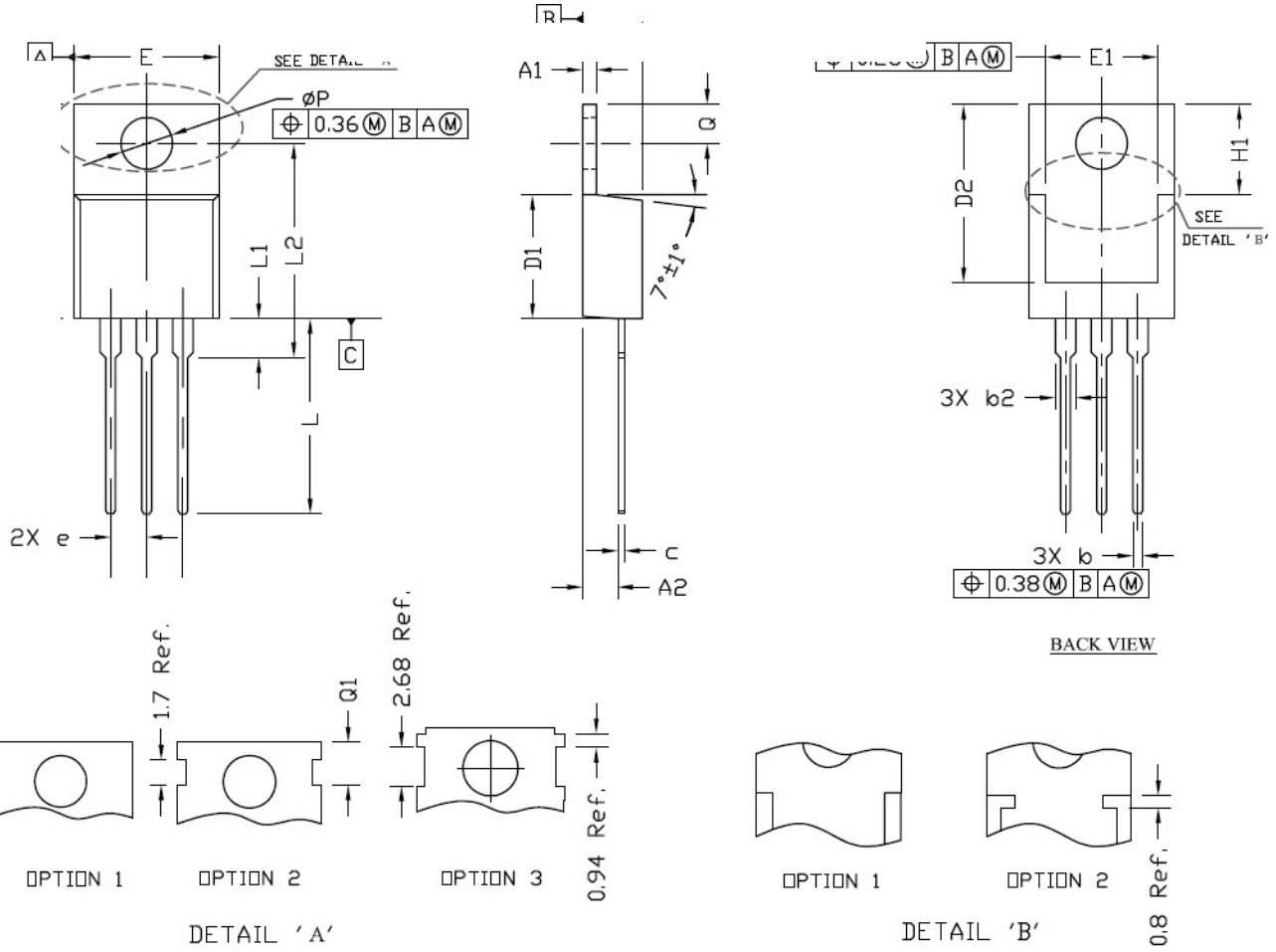


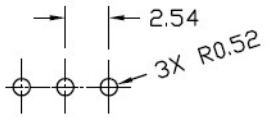

**Figure 11. Normalized Thermal Transient Impedance Curve**

## Packing Information

### TO-220




RECOMMENDATION OF HOLE PATTERN




UNIT: mm

| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 4.30 | 4.45 | 4.72 | 0.169 | 0.175 | 0.186 |
| A1 | 1.15 | 1.27 | 1.40 | 0.045 | 0.050 | 0.055 |
| A2 | 2.20 | 2.67 | 2.90 | 0.087 | 0.105 | 0.114 |
| b | 0.69 | 0.81 | 0.95 | 0.027 | 0.032 | 0.037 |
| b2 | 1.17 | 1.37 | 1.45 | 0.046 | 0.050 | 0.068 |
| c | 0.36 | 0.38 | 0.60 | 0.014 | 0.015 | 0.024 |
| D | 14.50 | 15.44 | 15.80 | 0.571 | 0.608 | 0.622 |
| D1 | 8.59 | 9.14 | 9.65 | 0.338 | 0.360 | 0.380 |
| D2 | 11.43 | 11.73 | 12.48 | 0.450 | 0.462 | 0.491 |
| e | 2.54 BSC | | | 0.100 BSC. | | |
| E | 9.66 | 10.03 | 10.54 | 0.380 | 0.395 | 0.415 |
| E1 | 6.22 | --- | --- | 0.245 | --- | --- |
| H1 | 6.10 | 6.30 | 6.50 | 0.240 | 0.248 | 0.256 |
| L | 12.27 | 12.82 | 14.27 | 0.483 | 0.505 | 0.562 |
| L1 | 2.47 | --- | 3.90 | 0.097 | --- | 0.154 |
| L2 | --- | --- | 16.70 | --- | --- | 0.657 |
| Q | 2.59 | 2.74 | 2.89 | 0.102 | 0.108 | 0.114 |
| øP | 3.50 | 3.84 | 3.89 | 0.138 | 0.151 | 0.153 |
| Q1 | 2.70 | --- | 2.90 | 0.106 | --- | 0.114 |

NOTE
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS. MOLD FLASH SHOULD BE LESS THAN 6 MIL.
2. TOLERANCE 0.100 MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. 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.