



# ACE6010M70N

## N-Channel 100-V MOSFET

### Description

The ACE6010M70N 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.

### Features

- Low  $r_{DS(on)}$  trench technology
- Low thermal impedance
- Fast switching speed

| PRODUCT SUMMARY |                            |                 |
|-----------------|----------------------------|-----------------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ (m $\Omega$ ) | $I_D$ (A)       |
| 100             | 78 @ $V_{GS} = 10V$        | 51 <sup>a</sup> |
|                 | 96 @ $V_{GS} = 5.5V$       |                 |

### Applications

- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

### Absolute Maximum Ratings

| Parameter   | Symbol        | Limit    | Units       |
|---|---------------|----------|-------------|
| Drain-Source Voltage                                      | $V_{DS}$      | 100      | V           |
| Gate-Source Voltage                                       | $V_{GS}$      | $\pm 20$ | V           |
| Continuous Drain Current <sup>a</sup>                     | $I_D$         | 51       | A           |
| Pulsed Drain Current <sup>b</sup>                         | $I_{DM}$      | 240      | A           |
| Continuous Source Current (Diode Conduction) <sup>a</sup> | $I_S$         | 90       | A           |
| Power Dissipation <sup>a</sup>                            | $P_D$         | 300      | W           |
| Operating temperature / storage temperature               | $T_J/T_{STG}$ | -55~150  | $^{\circ}C$ |

### THERMAL RESISTANCE RATINGS

| Parameter                                | Symbol          | Maximum | Units         |
|--|-----------------|---------|---------------|
| Maximum Junction-to-Ambient <sup>a</sup> | $R_{\theta JA}$ | 62.5    | $^{\circ}C/W$ |
|  |                 | 1       |               |

### Notes

- a. Surface Mounted on 1" x 1" FR4 Board.  
 b. Pulse width limited by maximum junction temperature

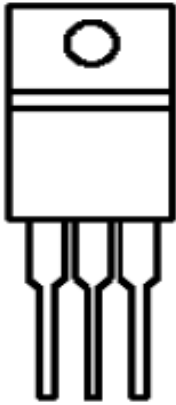


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### Packaging Type

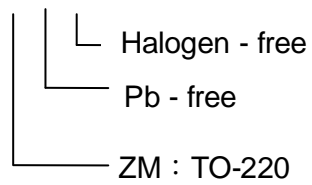
TO-220



G D S

### Ordering information

ACE6010M70N XX + H



Halogen - free

Pb - free

ZM : TO-220



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### Electrical Characteristics

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

| Parameter                       | Symbol       | Test Conditions  | Min | Typ  | Max       | Unit       |
|---------------------------------|--------------|--|-----|------|-----------|------------|
| Static                          |              |  |     |      |           |            |
| Gate-Source Threshold Voltage   | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$   | 1   |      |           | V          |
| Gate-Body Leakage               | $I_{GSS}$    | $V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$  |     |      | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current | $I_{DSS}$    | $V_{DS} = 80 \text{ V}, V_{GS} = 0 \text{ V}$  |     |      | 1         | uA         |
|                                 |              | $V_{DS} = 80 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^{\circ}\text{C}$  |     |      | 25        |            |
| On-State Drain Current          | $I_{D(on)}$  | $V_{DS} = 5 \text{ V}, V_{GS} = 10 \text{ V}$  | 100 |      |           | A          |
| Drain-Source On-Resistance      | $r_{DS(on)}$ | $V_{GS} = 10 \text{ V}, I_D = 20 \text{ A}$  |     |      | 78        | m $\Omega$ |
|                                 |              | $V_{GS} = 5.5 \text{ V}, I_D = 18 \text{ A}$   |     |      | 92        |            |
| Forward Transconductance        | $g_{fs}$     | $V_{DS} = 15 \text{ V}, I_D = 20 \text{ A}$  |     | 25   |           | S          |
| Diode Forward Voltage           | $V_{SD}$     | $I_S = 20 \text{ A}, V_{GS} = 0 \text{ V}$   |     | 0.93 |           | V          |
| Dynamic                         |              |  |     |      |           |            |
| Total Gate Charge               | $Q_g$        | $V_{DS} = 50 \text{ V}, V_{GS} = 5.5 \text{ V}, I_D = 20 \text{ A}$  |     | 13   |           | nC         |
| Gate-Source Charge              | $Q_{gs}$     |  |     | 4.3  |           |            |
| Gate-Drain Charge               | $Q_{gd}$     |  |     | 8.2  |           |            |
| Turn-On Delay Time              | $t_{d(on)}$  | $V_{DS} = 50 \text{ V}, R_L = 2.5 \Omega, I_D = 20 \text{ A},$<br>$V_{GEN} = 10 \text{ V}, R_{GEN} = 6 \Omega$ |     | 9    |           | ns         |
| Rise Time                       | $t_r$        |  |     | 9    |           |            |
| Turn-Off Delay Time             | $t_{d(off)}$ |  |     | 20   |           |            |
| Fall Time                       | $t_f$        |  |     | 11   |           |            |
| Input Capacitance               | $C_{iss}$    | $V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$   |     | 822  |           | pF         |
| Output Capacitance              | $C_{oss}$    |  |     | 83   |           |            |
| Reverse Transfer Capacitance    | $C_{rss}$    |  |     | 72   |           |            |

Note :

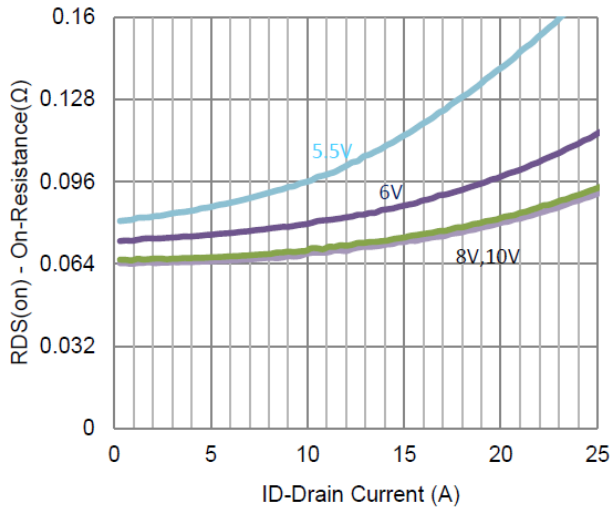
- Pulse test:  $PW \leq 300\mu\text{s}$  duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing



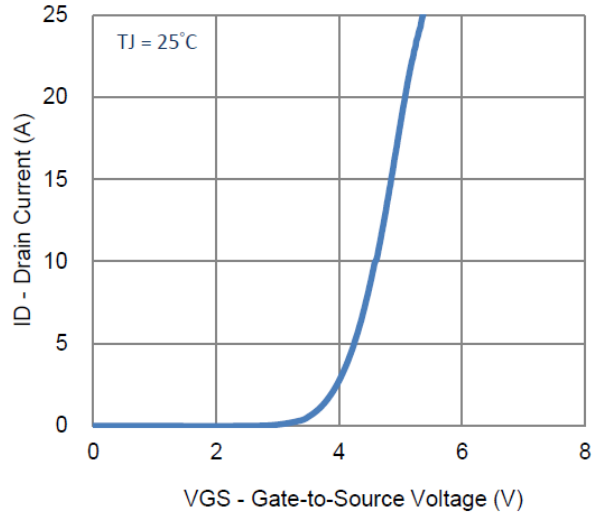
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## N-Channel 100-V MOSFET

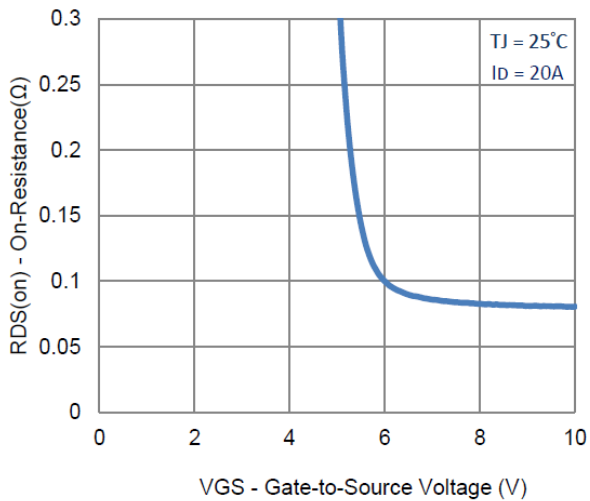
### Typical Performance Characteristics



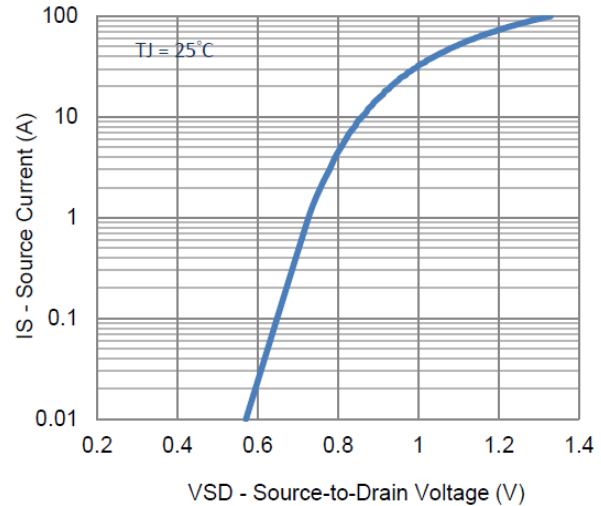
1. On-Resistance vs. Drain Current



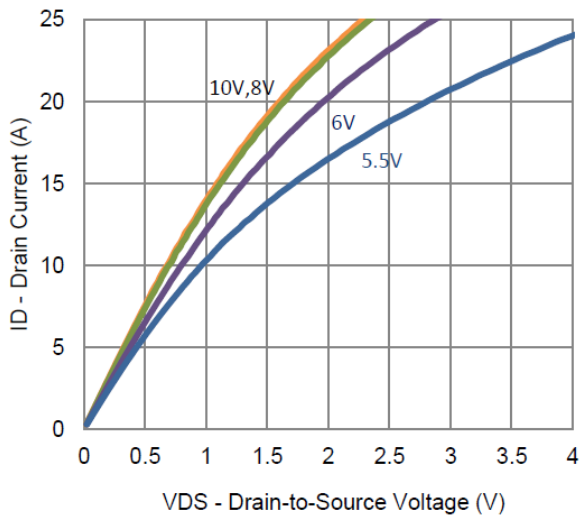
2. Transfer Characteristics



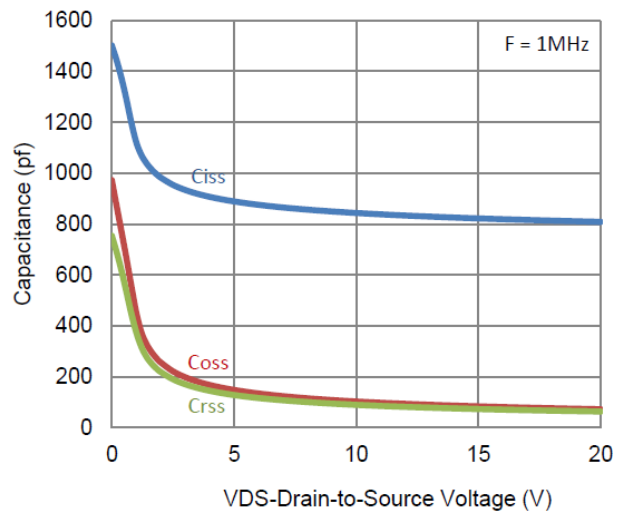
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage



5. Output Characteristics

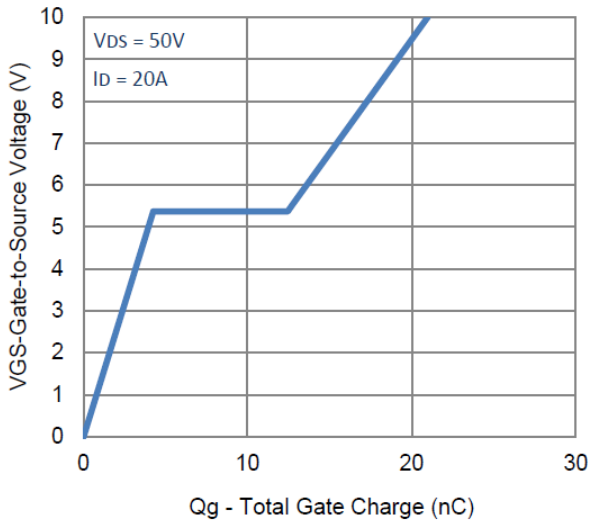


6. Capacitance

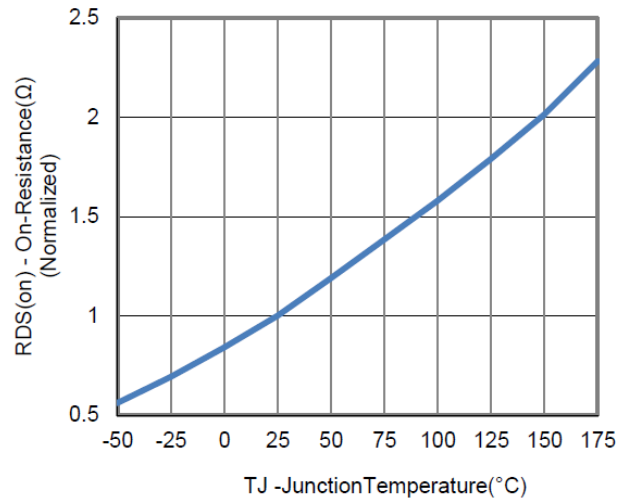


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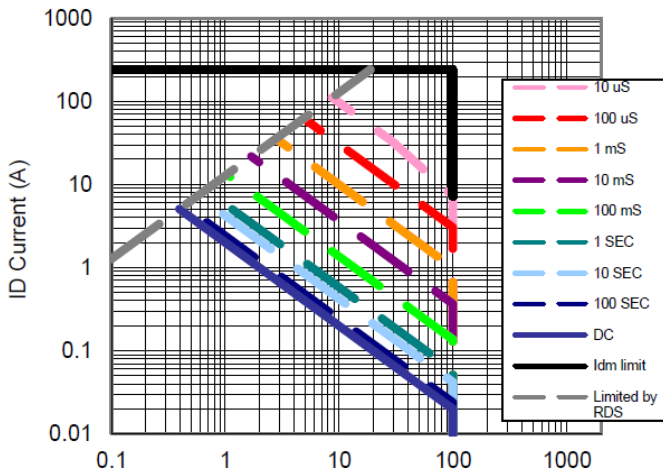
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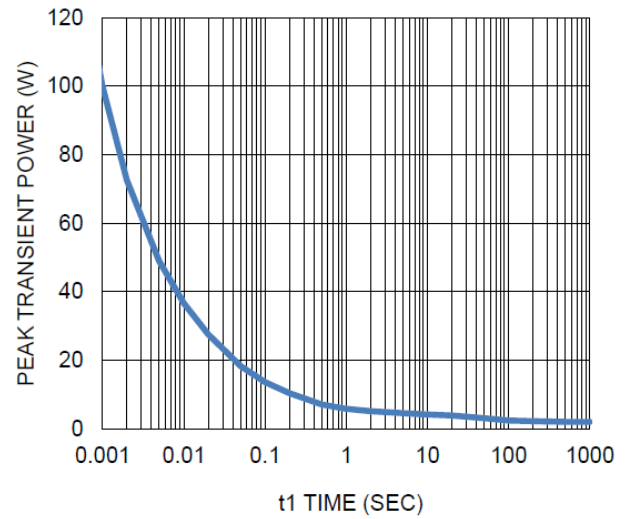
7. Gate Charge



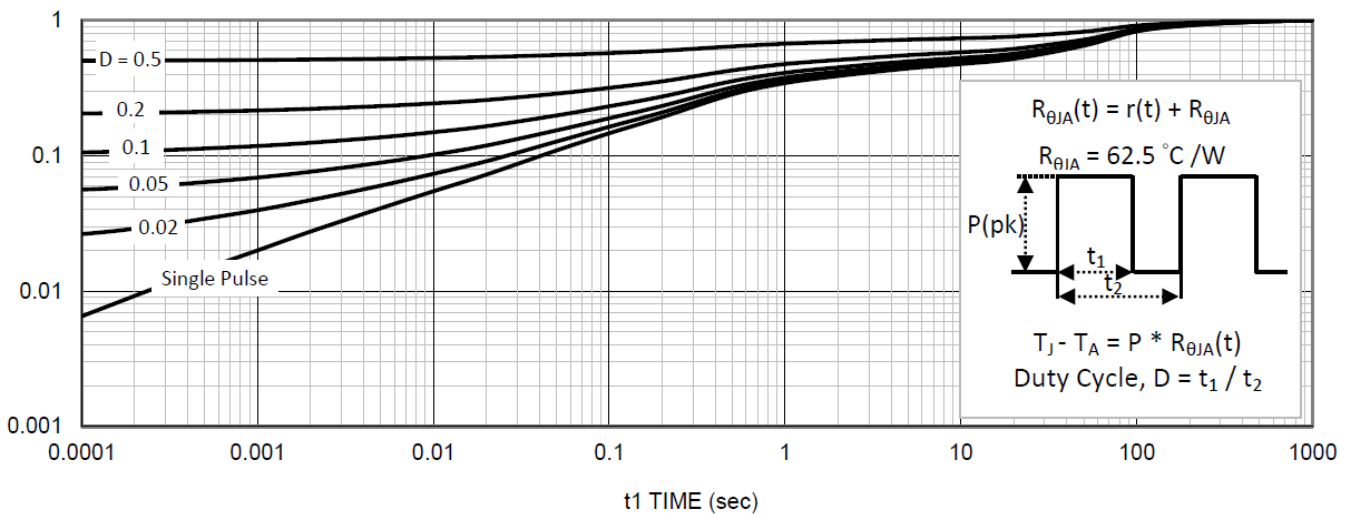
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



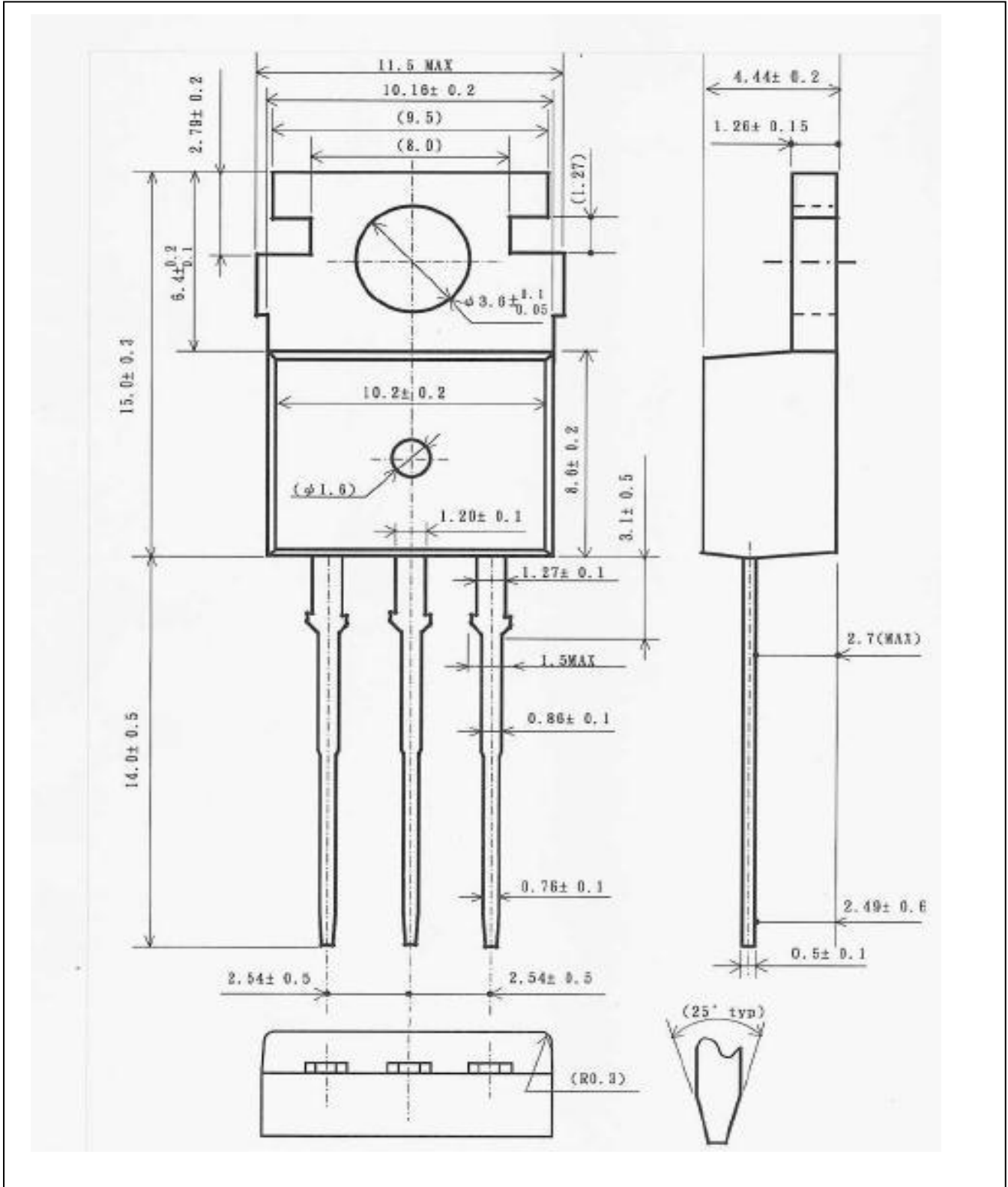
11. Normalized Thermal Transient Junction to Ambient



# ACE6010M70N N-Channel 100-V MOSFET

## Packing Information

TO-220





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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 used 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.

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