

TO-252 Plastic-Encapsulate MOSFETS

Features

- $V_{DS}=-100V$
- $I_D=-30A$
- $R_{DS(on)}@V_{GS}=-10V < 54m\Omega$
- Low Gate Charge and Rdson
- Fast Switching Speedze
- Improved dv/dt capability, high ruggedness

Drain-source Voltage  
-100 V  
Drain Current  
-30 Ampere

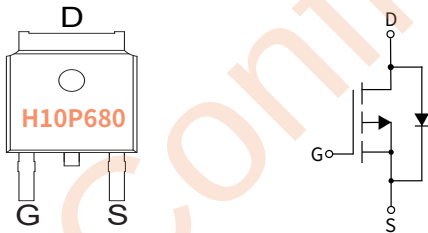
Applications

- Power Switching Application
- Load switch

Mechanical Data

- Case: TO-252  
Molding compound meets UL 94V-0 flammability rating, RoHS-compliant,halogen-free
- Terminals: Solder plated, solderable per MIL-STD-750,Method 2026

Function Diagram



Ordering Information

| PACKAGE | PACKAGE CODE | UNIT WEIGHT(g) | REEL(pcs) | BOX(pcs) | CARTON(pcs) | DELIVERY MODE |
|---------|--------------|----------------|-----------|----------|-------------|---------------|
| TO-252  | R3           | 0.305          | 2500      | 5000     | 30000       | 13"           |

Maximum Ratings (Ta=25°C Unless otherwise specified)

| PARAMETER                                    | SYMBOL          | UNIT   | VALUE     |
|----------------------------------------------|-----------------|--------|-----------|
| Drain-source Voltage                         | $V_{DS}$        | V      | -100      |
| Gate-source Voltage                          | $V_{GS}$        | V      | $\pm 20$  |
| Drain Current                                | $I_D$           | A      | -30       |
| Pulsed Drain Current <sup>(1)</sup>          | $I_{DM}$        | A      | -120      |
| Total Power Dissipation                      | $P_D$           | W      | 125       |
| Single pulse avalanche energy <sup>(2)</sup> | EAS             | mJ     | 103       |
| Junction temperature                         | $T_J$           | °C     | -55 ~+150 |
| Storage temperature                          | $T_{stg}$       | °C     | -55 ~+150 |
| Thermal Resistance Junction-to-Case          | $R_{\theta JC}$ | °C / W | 1.0       |

● Static Parameter Characteristics (Tj=25°C Unless otherwise specified)

| PARAMETER                                        | SYMBOL              | Condition                                                  | UNIT | Min  | Typ  | Max  |
|--------------------------------------------------|---------------------|------------------------------------------------------------|------|------|------|------|
| Drain-Source Breakdown Voltage                   | BV <sub>DSS</sub>   | V <sub>GS</sub> = 0V, I <sub>D</sub> =-250μA               | V    | -100 | —    | —    |
| Zero Gate Voltage Drain Current                  | I <sub>DSS</sub>    | V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V                | μA   | —    | —    | -1.0 |
| Gate-Body Leakage Current                        | I <sub>GSS</sub>    | V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V                | nA   | —    | —    | ±100 |
| Gate Threshold Voltage                           | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250μA | V    | -1.0 | -2.1 | -3.0 |
| Static Drain-Source On-Resistance <sup>(3)</sup> | R <sub>DS(ON)</sub> | V <sub>GS</sub> = -10V, I <sub>D</sub> =-15A               | mΩ   | —    | 38   | 54   |

● Dynamic Parameters

| PARAMETER                    | SYMBOL           | Condition                                         | UNIT | Min | Typ  | Max |
|------------------------------|------------------|---------------------------------------------------|------|-----|------|-----|
| Input Capacitance            | C <sub>iss</sub> | V <sub>DS</sub> =-45, V <sub>GS</sub> =0V, f=1MHZ | pF   | —   | 6303 | —   |
| Output Capacitance           | C <sub>oss</sub> |                                                   |      | —   | 196  | —   |
| Reverse Transfer Capacitance | C <sub>rss</sub> |                                                   |      | —   | 183  | —   |

● Switching Parameters

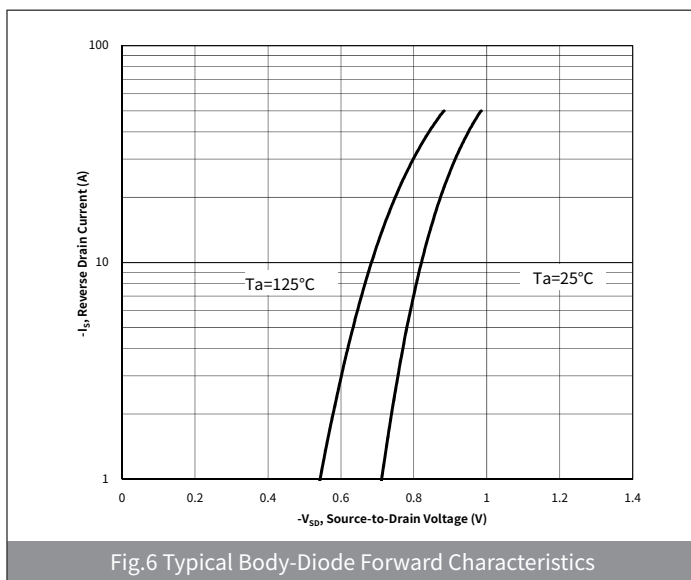
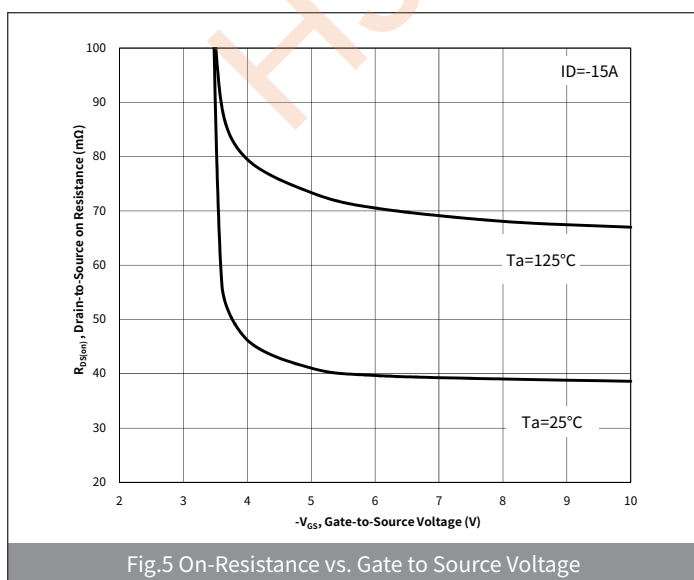
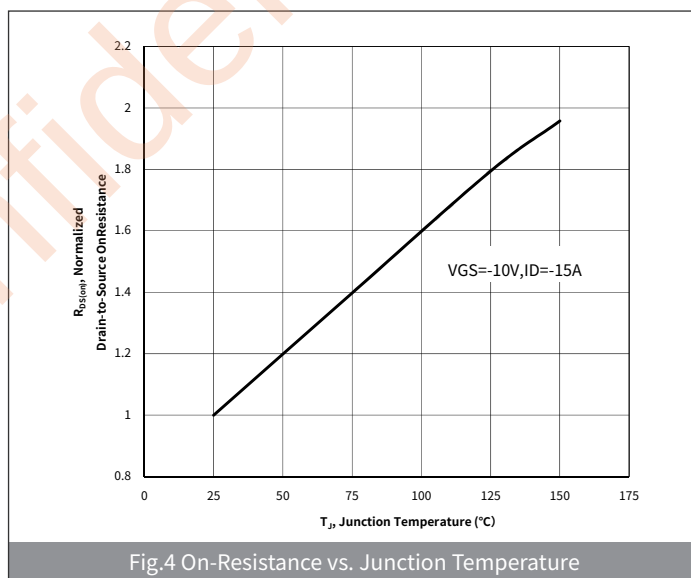
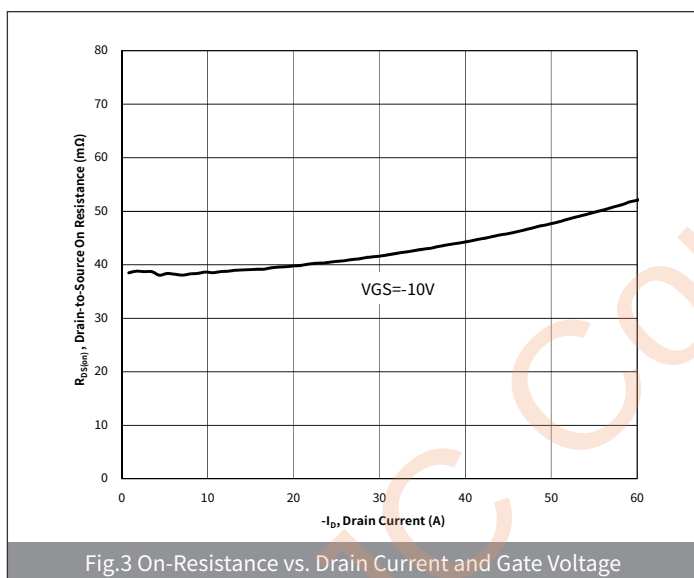
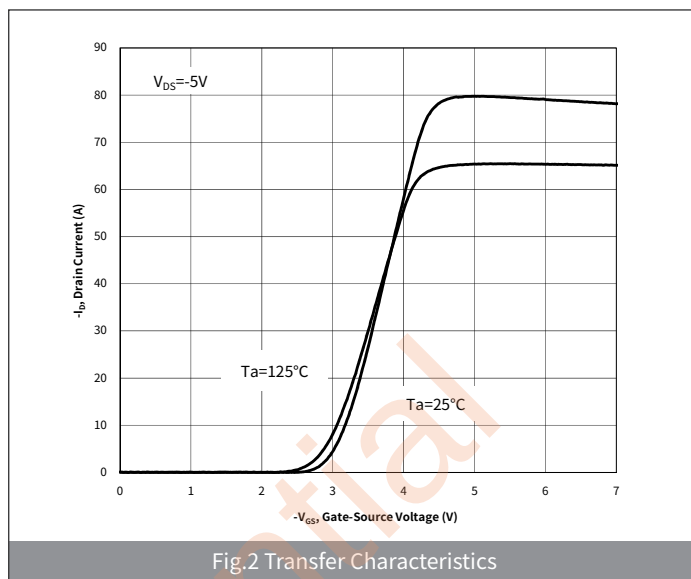
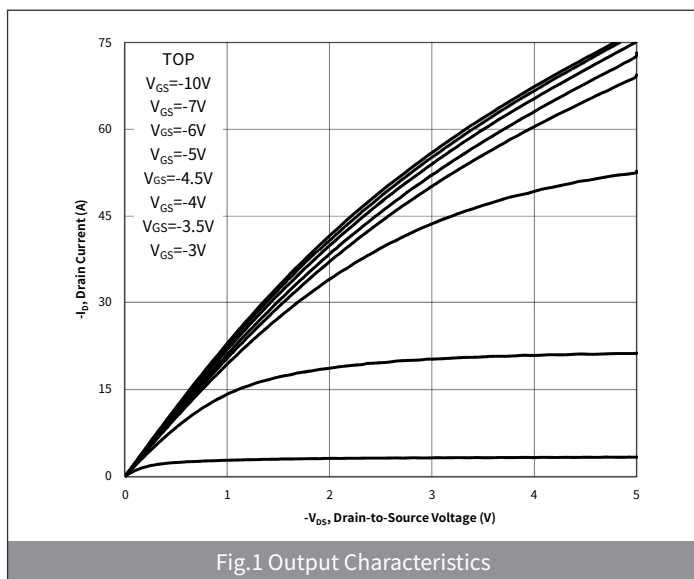
| PARAMETER           | SYMBOL              | Condition                                                                                     | UNIT | Min | Typ   | Max |
|---------------------|---------------------|-----------------------------------------------------------------------------------------------|------|-----|-------|-----|
| Turn-on Delay Time  | t <sub>D(on)</sub>  | V <sub>GS</sub> =-10V, V <sub>DD</sub> =-50V,<br>I <sub>D</sub> =-14A ,R <sub>GEN</sub> =3.3Ω | nS   | —   | 23    | —   |
| Turn-on Rise Time   | t <sub>r</sub>      |                                                                                               | nS   | —   | 34    | —   |
| Turn-off Delay Time | t <sub>D(off)</sub> |                                                                                               | nS   | —   | 125   | —   |
| Turn-off fall Time  | t <sub>f</sub>      |                                                                                               | nS   | —   | 65    | —   |
| Total Gate Charge   | Q <sub>g</sub>      | V <sub>DS</sub> =-50V, I <sub>D</sub> =-6A<br>V <sub>GS</sub> =-10V                           | nC   | —   | 116.8 | —   |
| Gate-Source Charge  | Q <sub>gs</sub>     |                                                                                               | nC   | —   | 27.7  | —   |
| Gate-Drain Charge   | Q <sub>gd</sub>     |                                                                                               | nC   | —   | 17.9  | —   |

● Drian-Source Diode Characteristics

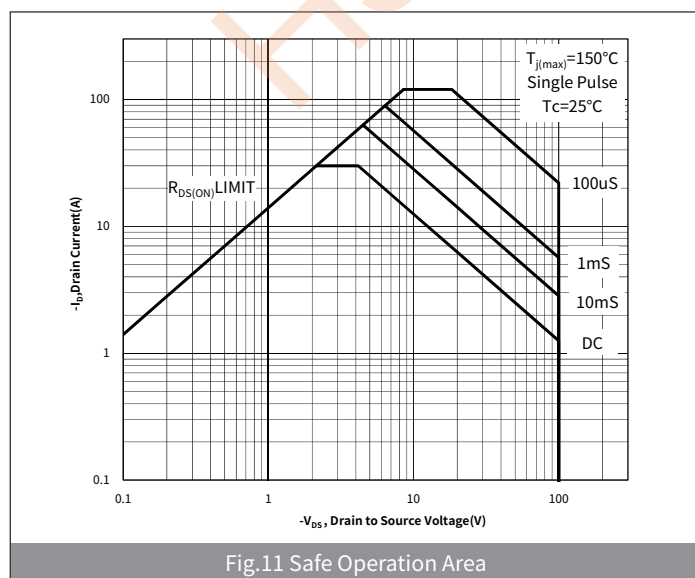
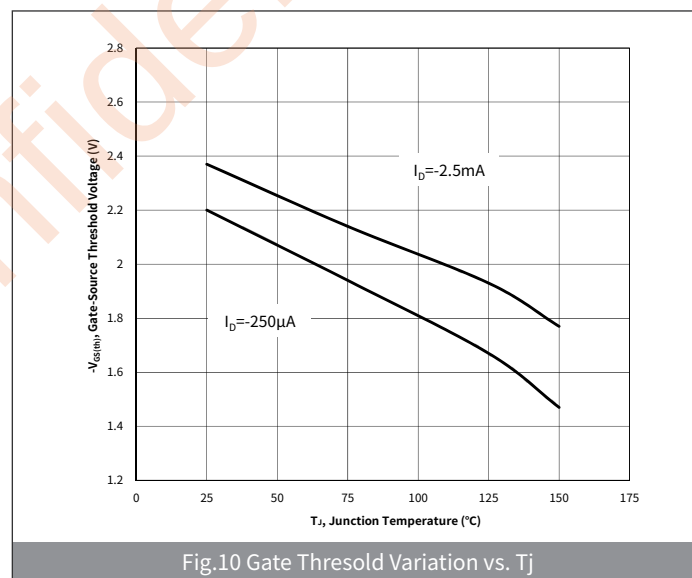
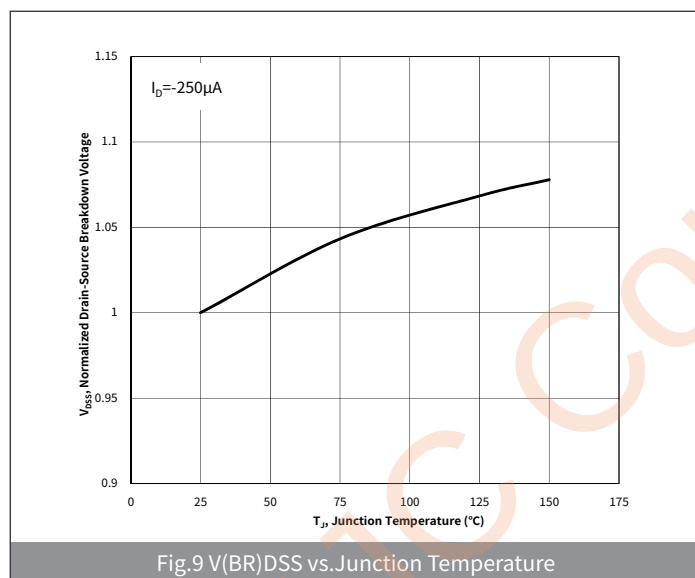
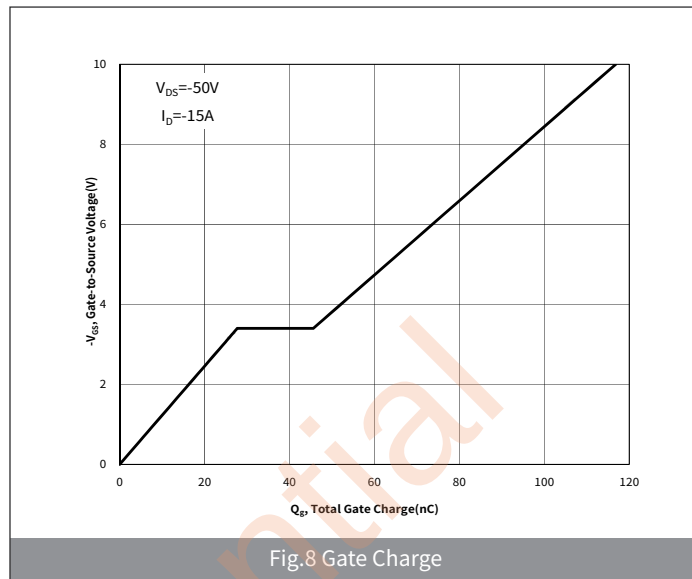
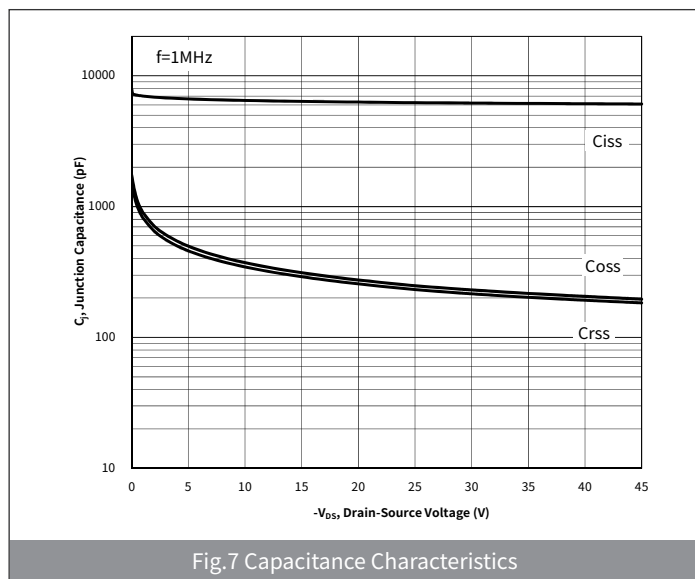
| PARAMETER                             | SYMBOL          | Condition                                 | UNIT | Min | Typ | Max  |
|---------------------------------------|-----------------|-------------------------------------------|------|-----|-----|------|
| Diode Forward Voltage                 | V <sub>SD</sub> | I <sub>S</sub> =-10A, V <sub>GS</sub> =0V | V    | —   | —   | -1.2 |
| Maximum Body-Diode Continuous Current | I <sub>S</sub>  | —                                         | A    | —   | —   | -30  |

Note :  
(1)Repetitive Rating: Pulse width limited by maximum junction temperature.  
(2)EAS condition : Tj=25°C ,VDD=-50V,VG=-10V,L=0.5mH,IAS=-20.3A,Rg=25Ω.  
(3)Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

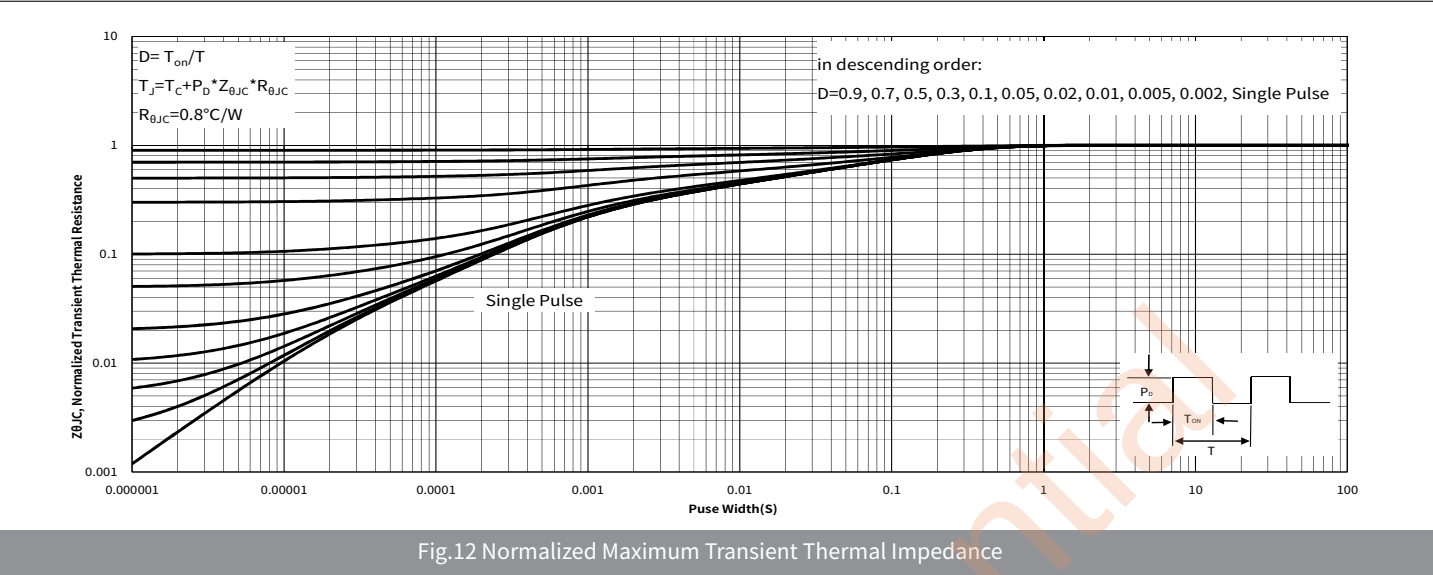
● Ratings And Characteristics Curves ( $T_a=25^\circ\text{C}$  Unless otherwise specified)



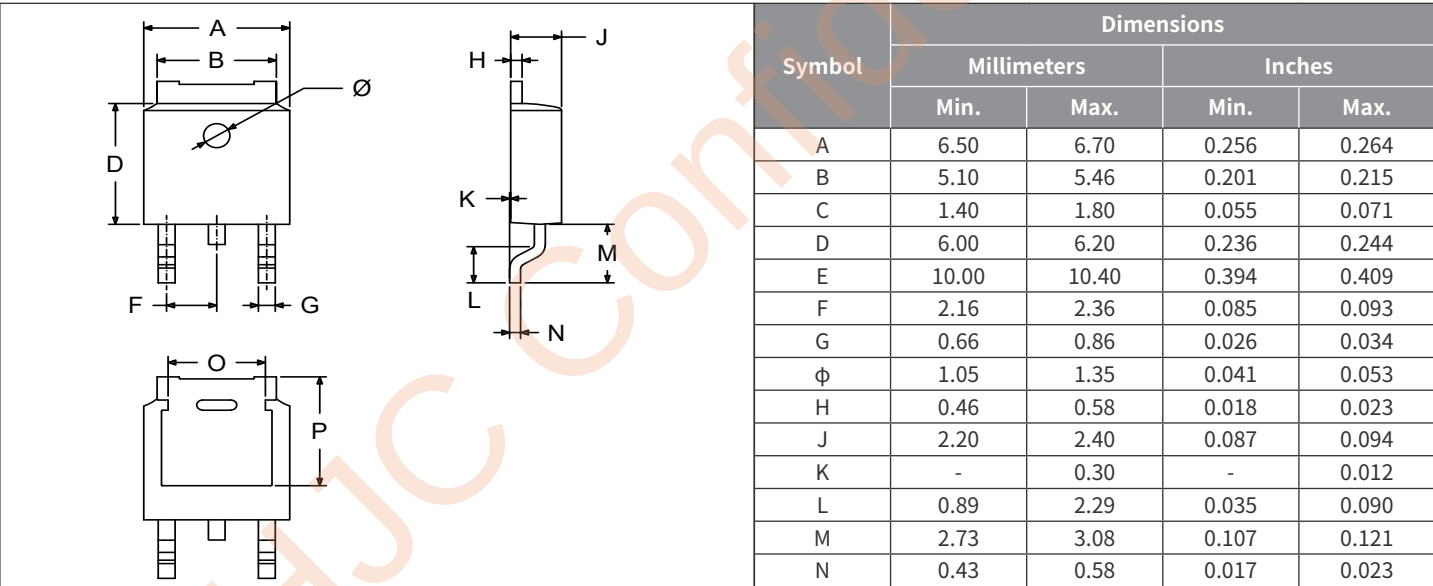
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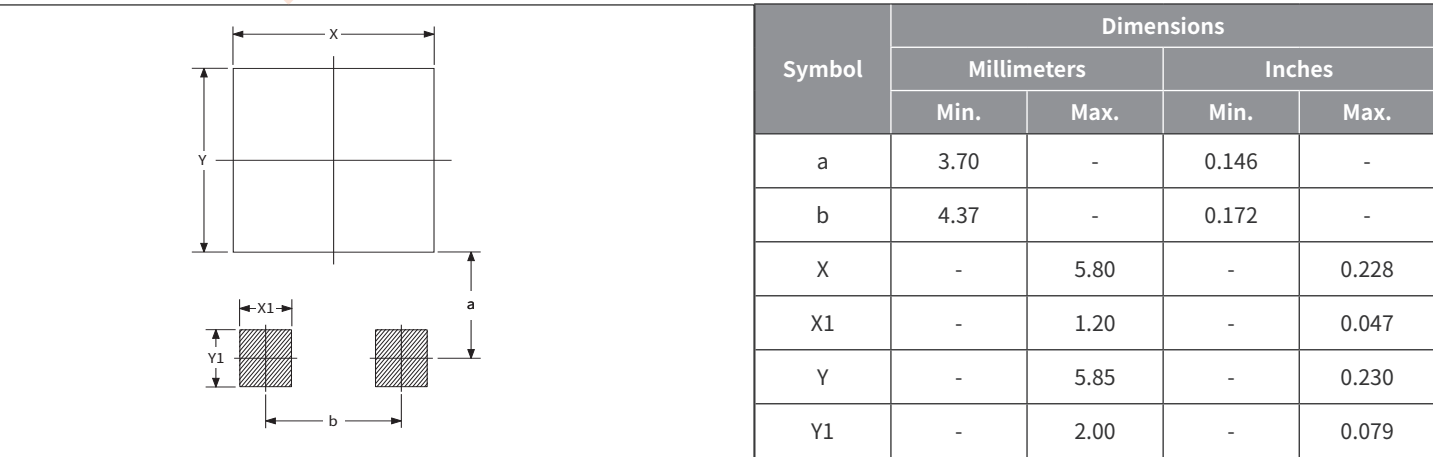
● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



● Package Outline Dimensions (TO-252)



● Suggested Pad Layout



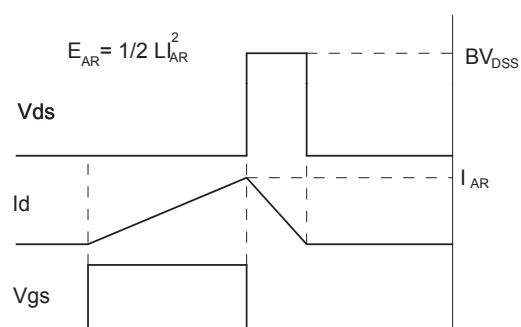
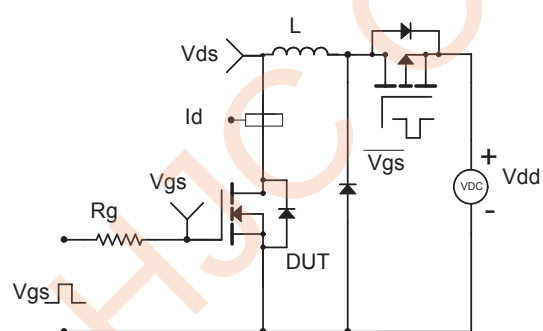
## 1. Gate Charge Test Circuit & Waveforms



## 2. Resistive Switching Test Circuit & Waveforms



## 3. Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



## 4. Diode Recovery Test Circuit & Waveforms

