

### Features

- High Reliability Capability
- Extremely low on-resistance  $R_{DS(on)}$
- Excellent gate charge x  $R_{DS(on)}$  product(FOM)

| Product Summary |                                |           |             |
|-----------------|--------------------------------|-----------|-------------|
| $V_{DS}$        | $R_{DS(on)}$ (m $\Omega$ ) Typ | $I_D$ (A) | $Q_g$ (Typ) |
| -30V            | 16 @ -10V -15A                 | -30       | 22nc        |

### Mechanical Data

- Case:TO-252 Package

TO-252  
D30P03M



### Application

- Charger
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

### Ordering Information

| Part No. | Marking. | Package Type | Package     | Quality(box) |
|----------|----------|--------------|-------------|--------------|
| D30P03M  | D30P03M  | TO-252       | Tape & Reel | 2500         |

Pin Definition:

1. Gate
2. Drain
3. Source

### Block Diagram

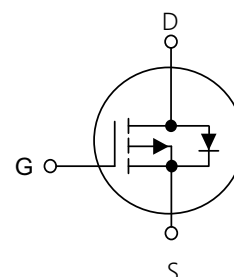


Table1 Absolute Maximum Ratings ( $T_c=25^\circ\text{C}$ , unless otherwise specified)

| Parameter                                  | Symbol        | Value                   | Unit             |
|--------------------------------------------|---------------|-------------------------|------------------|
| Drain-Source Voltage                       | $V_{DS}$      | -30                     | V                |
| Gate-Source Voltage                        | $V_{GS}$      | $\pm 20$                | V                |
| Continuous Drain Current                   | $I_D$         | $T_c=25^\circ\text{C}$  | A                |
|                                            |               | $T_c=100^\circ\text{C}$ |                  |
| Pulsed Drain Current (Note 1)              | $I_{DM}$      | -125                    | A                |
| Single Pulse Avalanche Energy(Note 2)      | $E_{AS}$      | 100                     | mJ               |
| Power Dissipation $T_c=25^\circ\text{C}$   | $P_D$         | 28                      | W                |
| Operating Junction and Storage Temperature | $T_J/T_{STG}$ | -55~+150                | $^\circ\text{C}$ |

Table 2. Thermal Characteristics

| Parameter                                  | Symbol          | Value | Unit                 |
|--------------------------------------------|-----------------|-------|----------------------|
| Thermal resistance Junction to Ambient,Max | $R_{\theta JA}$ | 75    | $^{\circ}\text{C/W}$ |
| Thermal resistance Junction to Case,Max    | $R_{\theta JC}$ | 4.5   | $^{\circ}\text{C/W}$ |

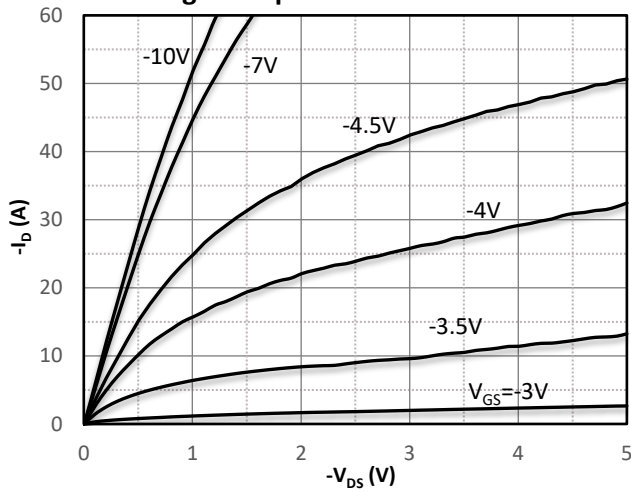
Table 3. Electrical Characteristics ( $T_J=25^{\circ}\text{C}$ , unless otherwise specified)

| Parameter                                              |         | Symbol              | Test Conditions                                                                             | Min  | Typ  | Max  | Unit |
|--------------------------------------------------------|---------|---------------------|---------------------------------------------------------------------------------------------|------|------|------|------|
| Off Characteristics                                    |         |                     |                                                                                             |      |      |      |      |
| Drain-Source Breakdown Voltage                         |         | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V,I <sub>D</sub> = -250μA                                                 | -30  | -    | -    | V    |
| Drain-Source Leakage Current                           |         | I <sub>DSS</sub>    | V <sub>DS</sub> = -30V,V <sub>GS</sub> =0V                                                  | -    | -    | 1    | μA   |
| Gate- Source Leakage Current                           | Forward | I <sub>GSS</sub>    | V <sub>GS</sub> =20V,V <sub>DS</sub> =0V                                                    | -    | -    | 100  | nA   |
|                                                        | Reverse |                     | V <sub>GS</sub> = -20V,V <sub>DS</sub> =0V                                                  | -    | -    | -100 | nA   |
| On Characteristics(Note 3)                             |         |                     |                                                                                             |      |      |      |      |
| Gate Threshold Voltage                                 |         | V <sub>GS(TH)</sub> | V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> = -250μA                                   | -1.3 | -    | -2.5 | V    |
| Static Drain-Source On-State Resistance                |         | R <sub>DS(ON)</sub> | V <sub>GS</sub> = -10V,I <sub>D</sub> = -15A                                                | -    | 16   | 20   | mΩ   |
|                                                        |         |                     | V <sub>GS</sub> = -4.5V,I <sub>D</sub> = -15A                                               | -    | 33   | 45   |      |
| Dynamic Characteristics(Note 4)                        |         |                     |                                                                                             |      |      |      |      |
| Input Capacitance                                      |         | C <sub>ISS</sub>    | V <sub>DS</sub> = -15V,V <sub>GS</sub> =0V,f=1MHz                                           | -    | 1233 | -    | pF   |
| Output Capacitance                                     |         | C <sub>OSS</sub>    |                                                                                             | -    | 172  | -    | pF   |
| Reverse Transfer Capacitance                           |         | C <sub>RSS</sub>    |                                                                                             | -    | 149  | -    | pF   |
| Switching Characteristics (Note 4)                     |         |                     |                                                                                             |      |      |      |      |
| Turn-On Delay Time                                     |         | td(on)              | V <sub>DS</sub> = -15V,I <sub>D</sub> = -15A,<br>V <sub>GS</sub> = -10V,R <sub>L</sub> =3Ω, | -    | 7    | -    | ns   |
| Turn-On Rise Time                                      |         | t <sub>R</sub>      |                                                                                             | -    | 52   | -    | ns   |
| Turn-Off Delay Time                                    |         | td(off)             |                                                                                             | -    | 28   | -    | ns   |
| Turn-Off Fall Time                                     |         | t <sub>f</sub>      |                                                                                             | -    | 12   | -    | ns   |
| Total Gate Charge                                      |         | Q <sub>G</sub>      | V <sub>DS</sub> = -15V,I <sub>D</sub> = -15A,<br>V <sub>GS</sub> = -10V                     | -    | 22   | -    | nC   |
| Gate-Source Charge                                     |         | Q <sub>GS</sub>     |                                                                                             | -    | 6    | -    | nC   |
| Gate-Drain Charge                                      |         | Q <sub>GD</sub>     |                                                                                             | -    | 3    | -    | nC   |
| Drain-Source Diode Characteristics and Maximum Ratings |         |                     |                                                                                             |      |      |      |      |
| Diode Max Current                                      |         | I <sub>S</sub>      |                                                                                             | -    | -    | -30  | V    |
| Drain-Source Diode Forward Voltage                     |         | V <sub>SD</sub>     | V <sub>GS</sub> =0V,I <sub>S</sub> = -15A                                                   | -    | -    | -1.2 | V    |

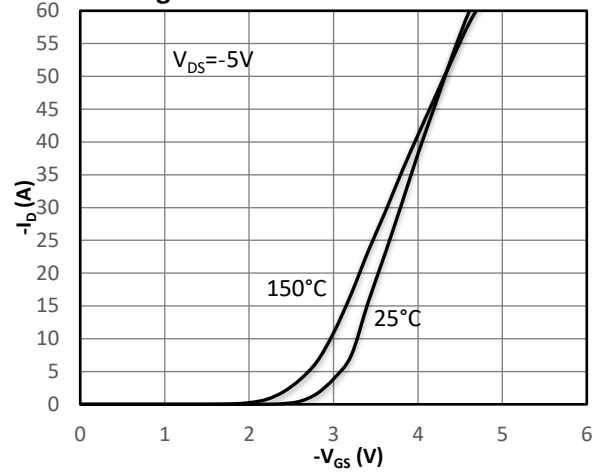
Notes: 1 Repetitive Rating:Pulse width limited by maximum junction temperature  
2  $L=0.5\text{mH}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^{\circ}\text{C}$   
3 Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$   
4 Guaranteed by design, not subject to production

## Typical Characteristics Diagrams

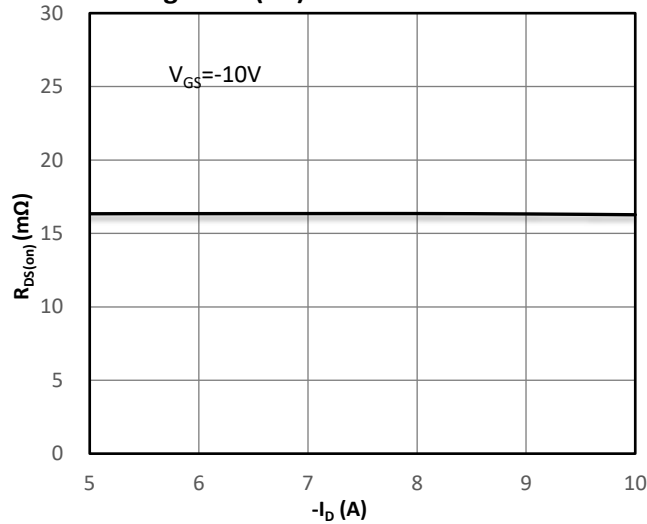
**Fig1. Output Characteristics**



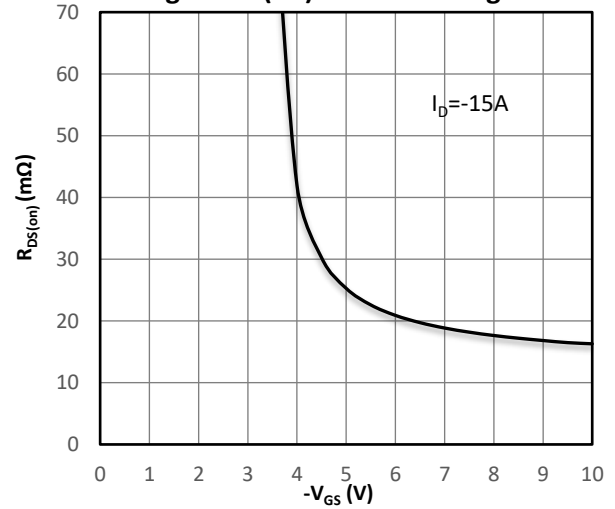
**Fig2. Transfer Characteristics**



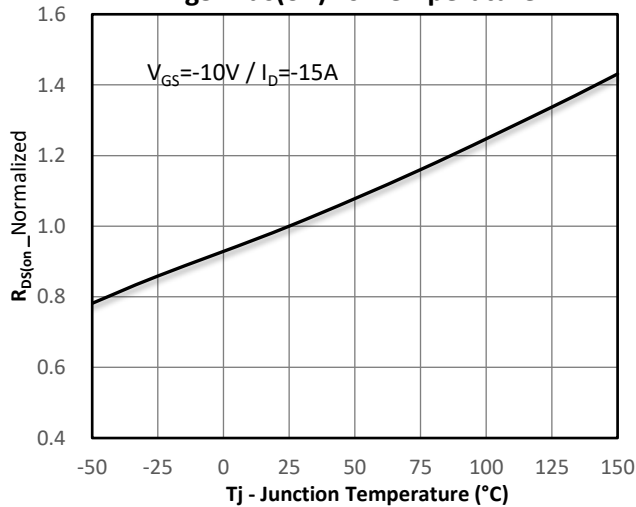
**Fig3. R\_DS(on) vs Drain Current**



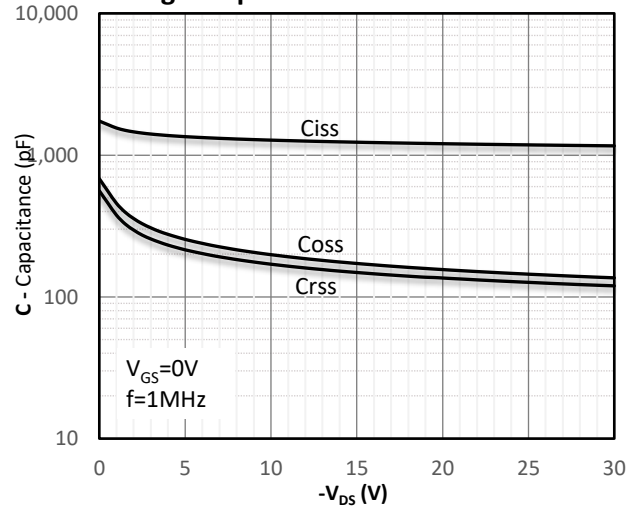
**Fig 4. R\_DS(on) vs Gate Voltage**



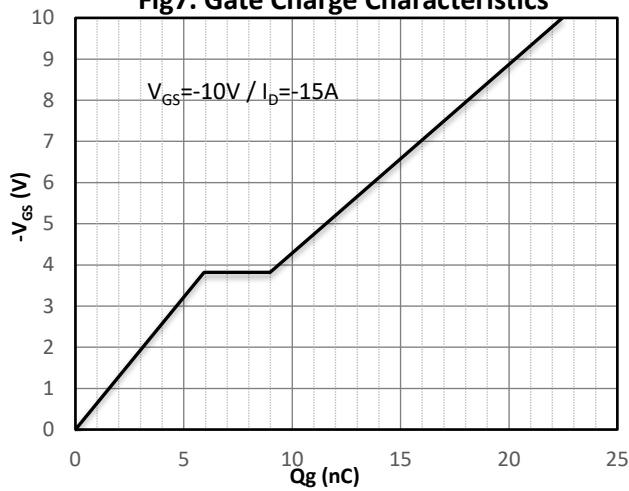
**Fig5. R\_DS(on) vs. Temperature**



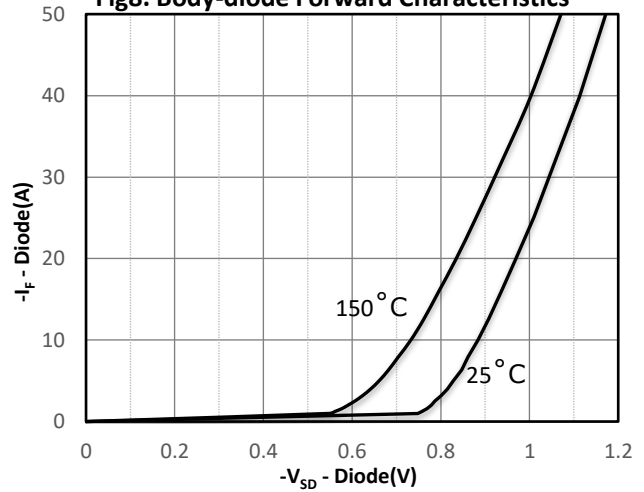
**Fig6. Capacitance Characteristics**



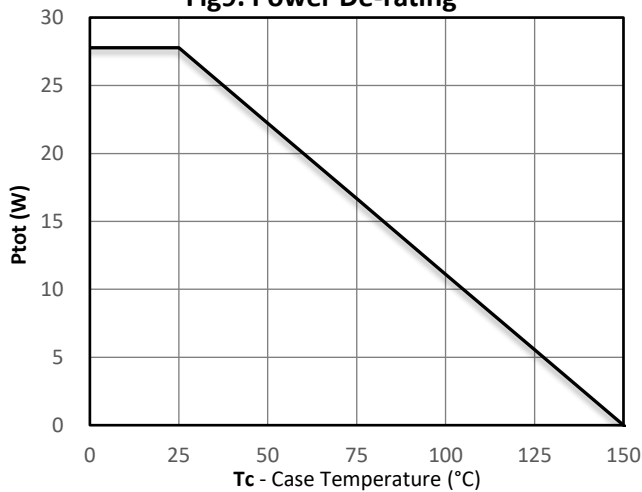
**Fig7. Gate Charge Characteristics**



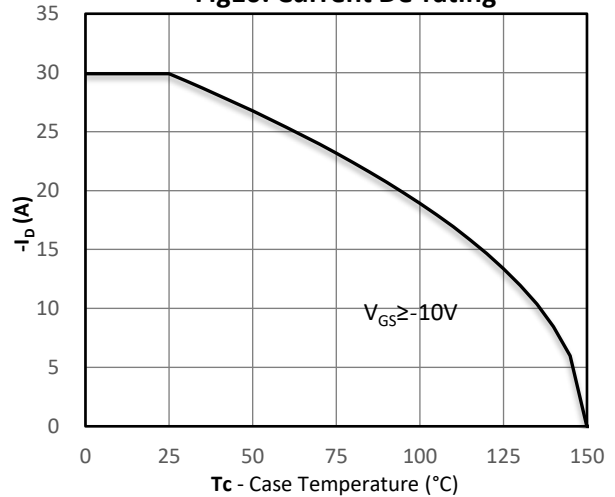
**Fig8. Body-diode Forward Characteristics**



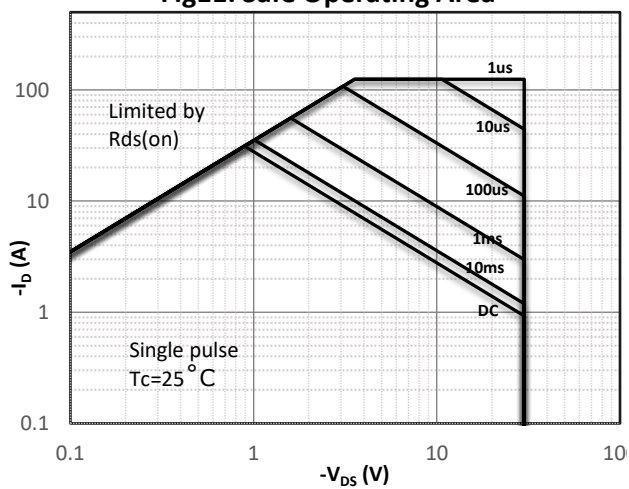
**Fig9. Power De-rating**



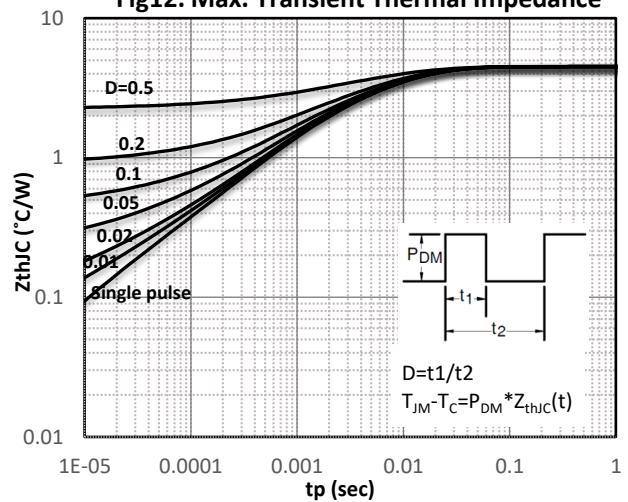
**Fig10. Current De-rating**



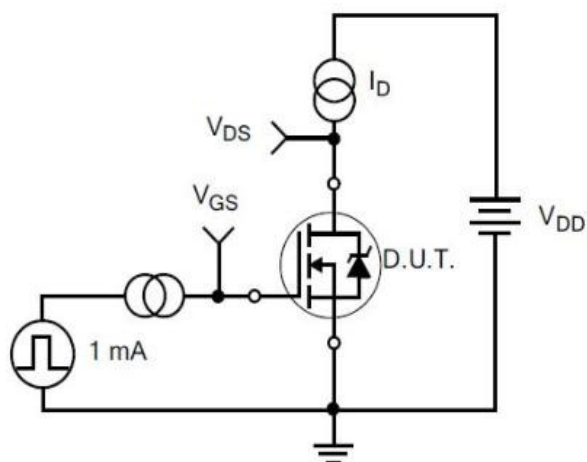
**Fig11. Safe Operating Area**



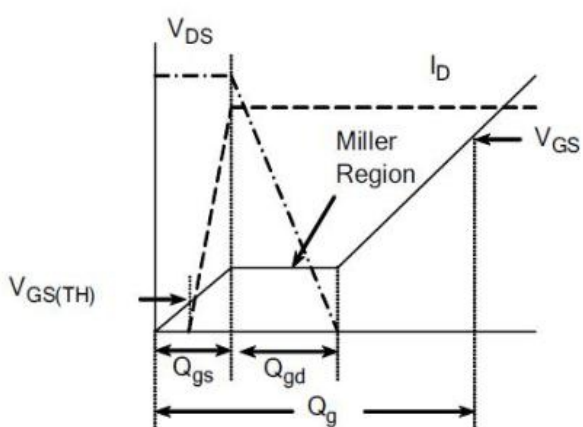
**Fig12. Max. Transient Thermal Impedance**



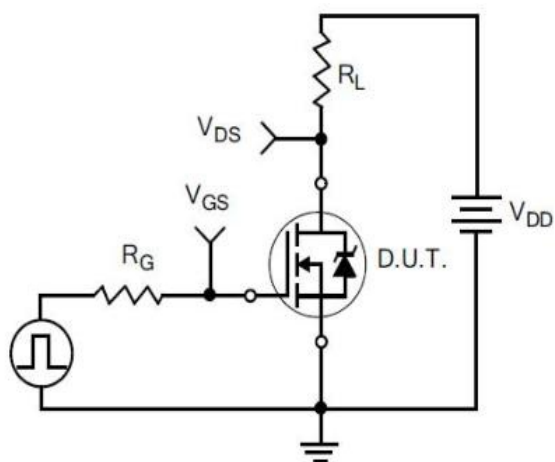
## Typical Test Circuit



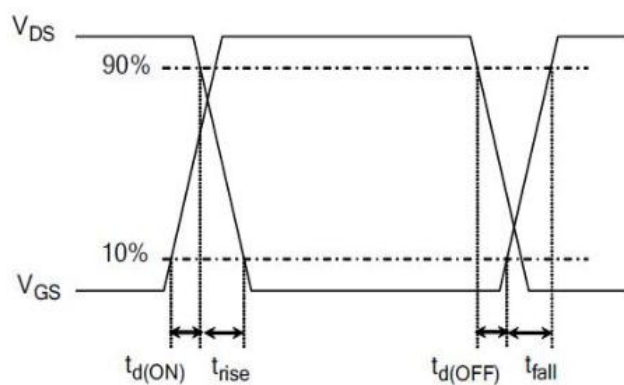
1) Gate Charge Test Circuit



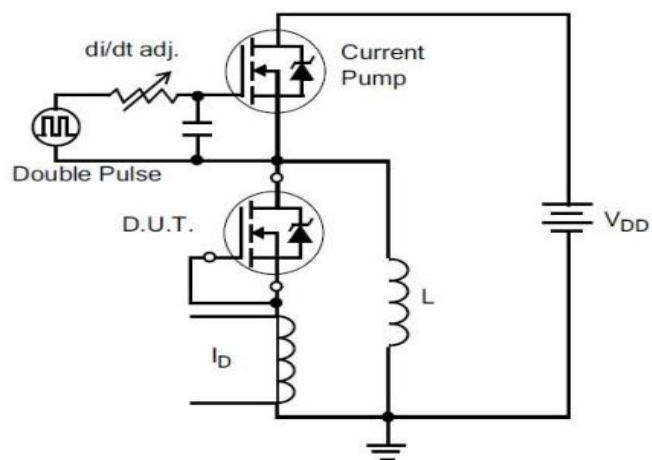
2) . Gate Charge Waveform



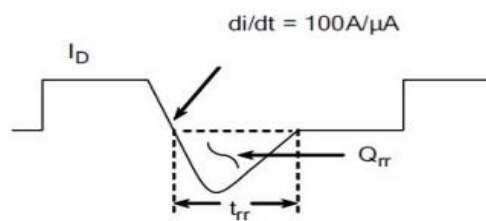
3) Resistive Switching Test Circuit



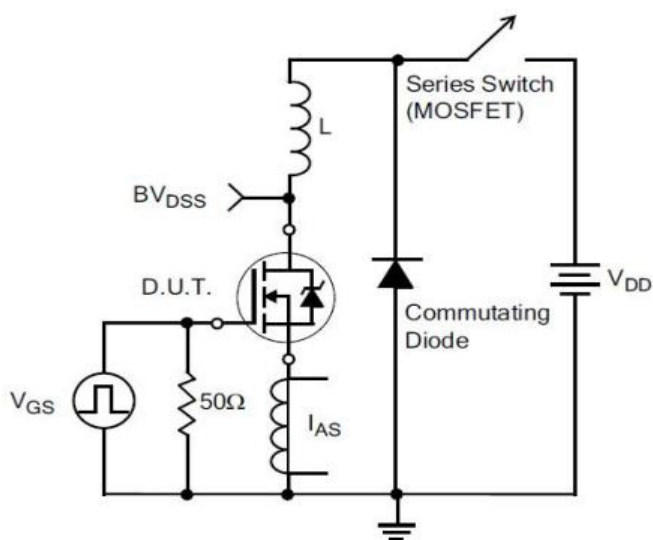
4) Resistive Switching Waveforms



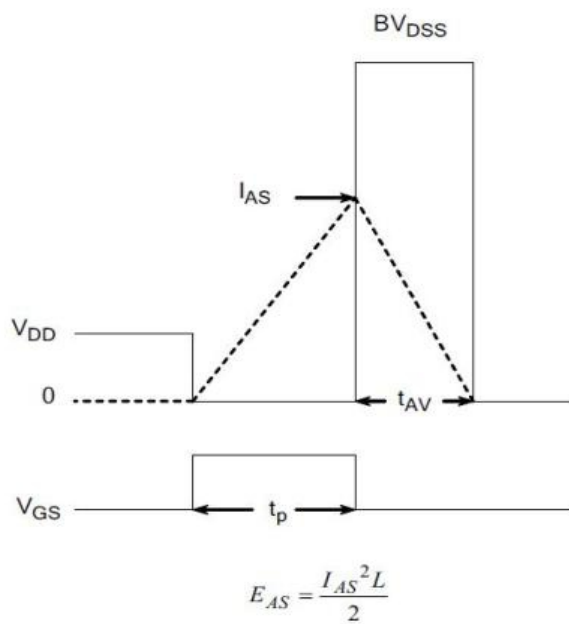
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

## Product Names Rules

X X X X N E X X X

Process Type:  
VDMOS:default  
Super junction:SJ  
Low Voltage trench:D

Rated Current Code  
With 2-3 Digital,  
For Example:  
10A:10,  
0.8A:08,

Channel Code  
N channel:N  
P channel:P

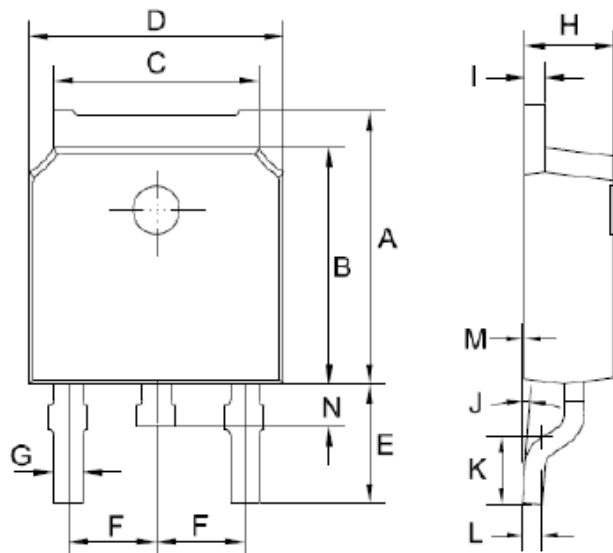
Package Code  
TO-220:Default  
ITO-220:F  
TO-262:E  
TO-263:D  
TO-252:M  
TO-251:N  
TO-263-7L:D7  
TOLL:T  
DFN5×6:G

Rated Voltage Code  
With 2 Digital,For Example:  
600V:60  
60V:06

Special Function Code  
G-S ESD Protection:E  
No Protection:Default

# Dimensions

## TO-252 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters |      | Dimensions In Inches |       |
|--------|---------------------------|------|----------------------|-------|
|        | MIN                       | MAX  | MIN                  | MAX   |
| A      | 6.85                      | 7.25 | 0.270                | 0.285 |
| B      | 5.8                       | 6.3  | 0.228                | 0.248 |
| C      | 5                         | 5.53 | 0.197                | 0.218 |
| D      | 6.3                       | 6.8  | 0.248                | 0.268 |
| E      | 2.6                       | 3.3  | 0.102                | 0.130 |
| F      | 2.19                      | 2.39 | 0.086                | 0.094 |
| G      | 0.45                      | 0.85 | 0.018                | 0.033 |
| H      | 2.2                       | 2.4  | 0.087                | 0.094 |
| I      | 0.41                      | 0.61 | 0.016                | 0.024 |
| J      | 0°                        | 8°   | 0°                   | 8°    |
| K      | 1.45                      | 1.85 | 0.057                | 0.073 |
| L      | 0.41                      | 0.61 | 0.016                | 0.024 |
| M      | 0                         | 0.12 | 0.000                | 0.005 |
| P      | 0.6                       | 1    | 0.024                | 0.039 |



## Friendship Reminder

■ JiNan JingHeng (hereinafter referred to as JH) reserves the right to make changes to this document and its products and specifications at anytime without notice.

■ Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.

■ JH makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does JH assume any liability for application assistance or customer product design.

■ JH does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.

■ No license is granted by implication or otherwise under any intellectual property rights of JH.

■ JH's products are not authorized for use as critical components in life support devices or systems without express written approval of JH.