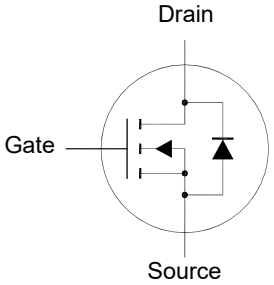
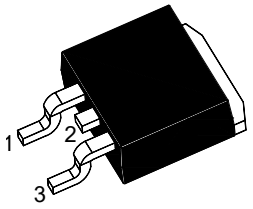
# WTV06N028S-AH

## N-Channel Enhancement Mode MOSFET

### Features

- AEC-Q101 Qualified
- Advanced trench cell design
- High speed switch
- Halogen and Antimony Free(HAF), RoHS compliant




1.Gate 2.Drain 3.Source
TO-263 Plastic Package

### Applications

- Portable appliances
- Power management

### Key Parameters

| Parameter | Value | Unit |
|---|---|---|
| $BV_{DSS}$ | 60 | V |
| $R_{DS(ON)}$ Max | 3.2 @ $V_{GS}$ = 10 V | mΩ |
| $V_{GS(th)}$ typ | 3.0 | V |
| Qg typ | 75 @ $V_{GS}$ = 10 V | nC |

### Absolute Maximum Ratings (at $T_a$ = 25℃ unless otherwise specified)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 60 | V |
| Drain-Gate Voltage | | $V_{GS}$ | ± 20 | V |
| Drain Current - Continuous | $T_c$ = 25℃<br>$T_c$ = 100℃ | $I_D$ | 120<br>77 | A |
| Drain Current - Pulsed [1] | | $I_{DM}$ | 480 | A |
| Avalanche Current, Single Pulse | | $I_{AS}$ | 44.8 | A |
| Avalanche Energy, Single Pulse [2] | | $E_{AS}$ | 100.3 | mJ |
| Power Dissipation | $T_c$ = 25℃ | $P_D$ | 62.5 | W |
| Operating Junction and Storage Temperature Range | | $T_j$,$T_{stg}$ | - 55 to + 150 | ℃ |

### Thermal Characteristics

| Parameter | Symbol | Max. | Unit |
|---|---|---|---|
| Thermal Resistance from Junction to Case | $R_{\theta JC}$ | 2 | ℃/W |
| Thermal Resistance from Junction to Ambient [3] | $R_{\theta JA}$ | 40 | ℃/W |

[1] Pulse Test: Pulse Width ≤ 100 μs, Duty Cycle ≤ 2%, Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$ = 150°C.

[2] Limited by $T_{J(MAX)}$, starting $T_J$ = 25 °C, L = 0.1 mH, $R_g$ = 25 Ω, $I_D$ = 44.8 A, $V_{GS}$ = 10 V.

[3] Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.



Dated: 12/04/2021 IM3E Rev: 02

**Characteristics at $T_a$ = 25℃ unless otherwise specified**

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| **STATIC PARAMETERS** | | | | | |
| Drain-Source Breakdown Voltage at $I_D$ = 1 mA | $BV_{DSS}$ | 60 | - | - | V |
| Drain-Source Leakage Current at $V_{DS}$ = 60 V | $I_{DSS}$ | - | - | 1 | μA |
| Gate-Source Leakage Current at $V_{GS}$ = ± 20 V | $I_{GSS}$ | - | - | ± 100 | nA |
| Gate-Source Threshold Voltage at $V_{DS}$ = $V_{GS}$, $I_D$ = 120 μA | $V_{GSth}$ | 2 | - | 4 | V |
| Drain-Source On-State Resistance at $V_{GS}$ = 10 V, $I_D$ = 100 A | $R_{DS(on)}$ | - | 2.8 | 3.2 | mΩ |
| **DYNAMIC PARAMETERS** | | | | | |
| Gate resistance at $V_{DS}$ = 0 V, f = 1 MHz | $R_g$ | - | 1.1 | - | Ω |
| Input Capacitance at $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz | $C_{iss}$ | - | 4597 | - | pF |
| Output Capacitance at $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz | $C_{oss}$ | - | 2133 | - | pF |
| Reverse Transfer Capacitance at $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz | $C_{rss}$ | - | 110 | - | pF |
| Total Gate Charge at $V_{DS}$ = 30 V, $I_D$ = 25 A, $V_{GS}$ = 10 V | $Q_g$ | - | 75 | - | nC |
| Gate Source Charge at $V_{DS}$ = 30 V, $I_D$ = 25 A, $V_{GS}$ = 10 V | $Q_{gs}$ | - | 23 | - | nC |
| Gate Drain Charge at $V_{DS}$ = 30 V, $I_D$ = 25 A, $V_{GS}$ = 10 V | $Q_{gd}$ | - | 22 | - | nC |
| Turn-On Delay Time at $V_{DS}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 25 A , $R_g$ = 4.7 Ω , $R_L$ = 1.2 Ω | $t_{d(on)}$ | - | 39 | - | nS |
| Turn-On Rise Time at $V_{DS}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 25 A , $R_g$ = 4.7 Ω , $R_L$ = 1.2 Ω | $t_r$ | - | 69 | - | nS |
| Turn-Off Delay Time at $V_{DS}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 25 A , $R_g$ = 4.7 Ω , $R_L$ = 1.2 Ω | $T_{d(off)}$ | - | 27 | - | nS |
| Turn-Off Fall Time at $V_{DS}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 25 A , $R_g$ = 4.7 Ω , $R_L$ = 1.2 Ω | $t_f$ | - | 9 | - | nS |
| **Body-Diode PARAMETERS** | | | | | |
| Drain-Source Diode Forward Voltage at $I_S$ = 100 A, $V_{GS}$ = 0 V | $V_{SD}$ | - | - | 1.3 | V |
| Body-Diode Continuous Current | $I_S$ | - | - | 120 | A |
| Body-Diode Continuous Current, Pulsed | $I_{SM}$ | - | - | 480 | A |
| Body Diode Reverse Recovery Time at $I_S$ = 25 A, di/dt = 100 A / μs | $t_{rr}$ | - | 44 | - | nS |
| Body Diode Reverse Recovery Charge at $I_S$ = 25 A, di/dt = 100 A / μs | $Q_{rr}$ | - | 40 | - | nC |

## Electrical Characteristics Curves

Fig. 1 Typical Output Characteristic

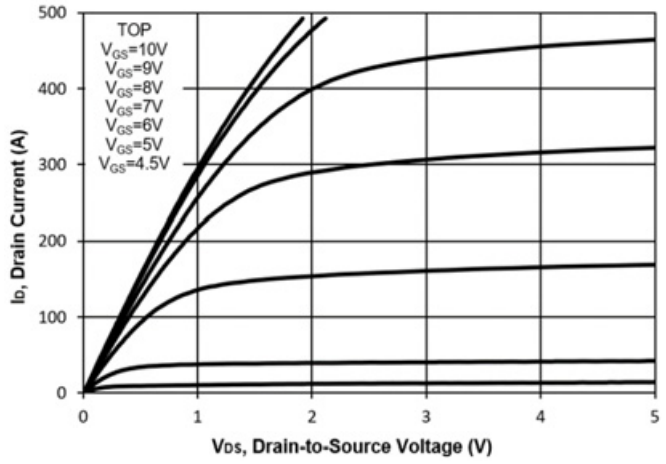



Fig. 2 Typical Transfer Characteristic

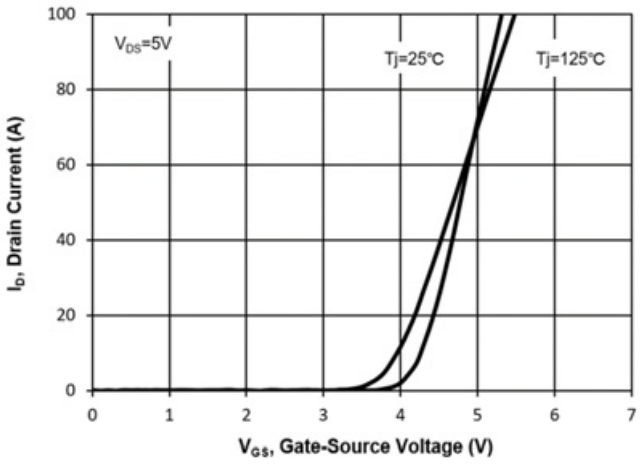



Fig. 3 on-Resistance vs. Drain Current

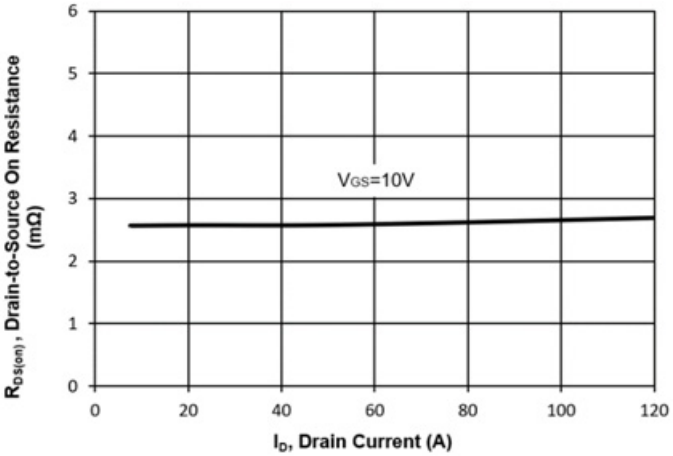



Fig. 4 on-Resistance vs. Gate Voltage

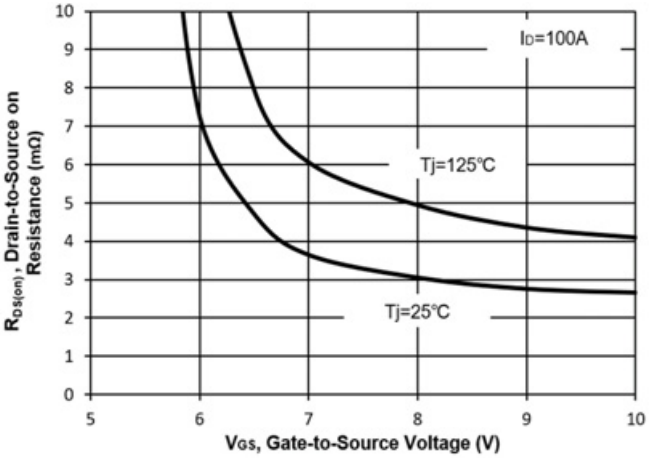



Fig. 5 on-Resistance vs.$T_j$

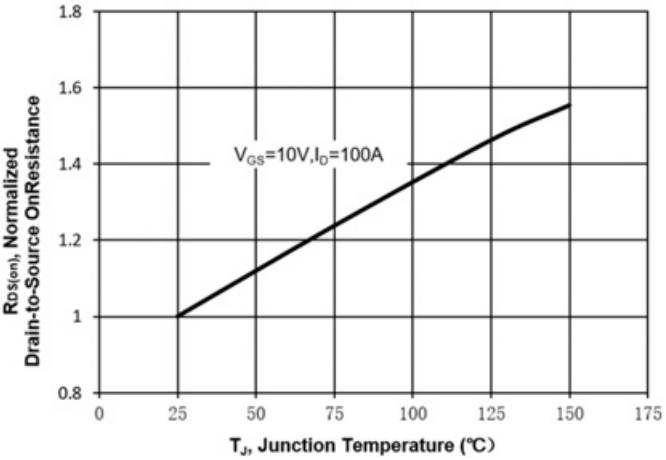
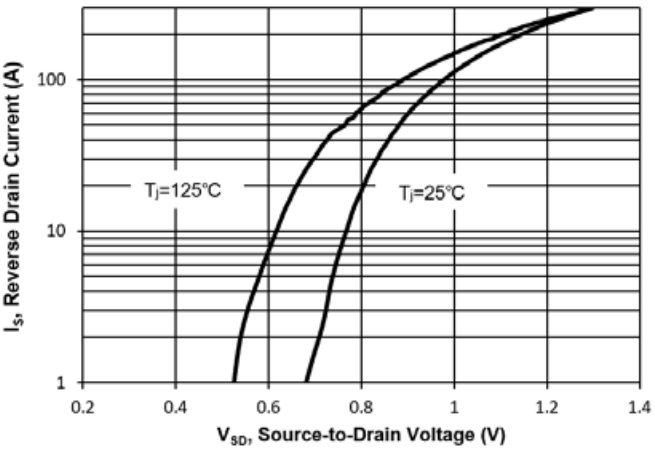



Fig. 6 Typical Body-Diode Forward Characteristic



## Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

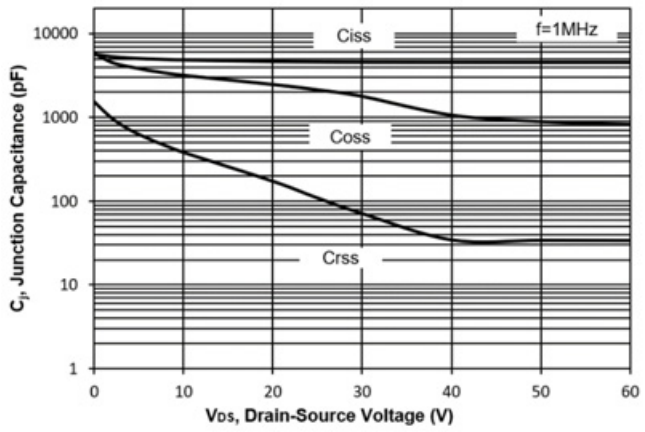



Fig. 8 Drain-Source Leakage Current vs. $T_j$

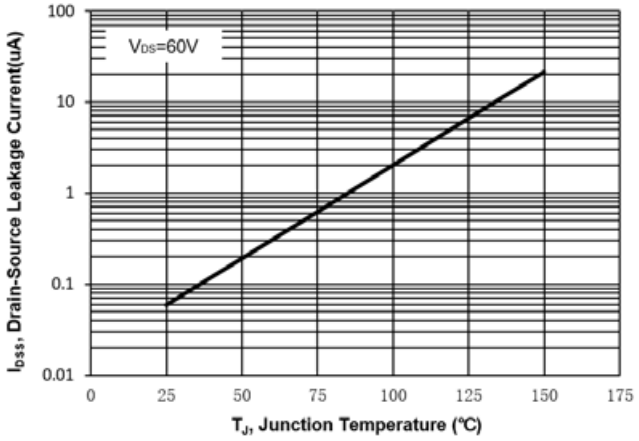



Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

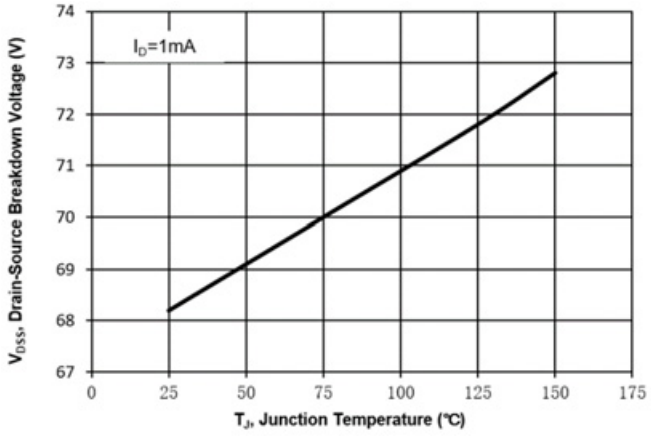



Fig. 10 Gate Threshold Variation vs. $T_j$

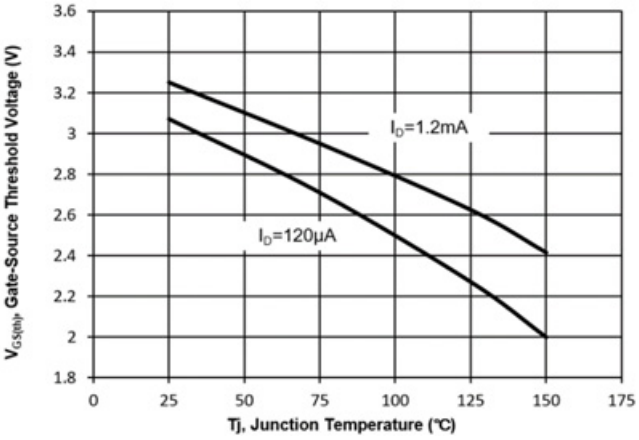



Fig. 11 Gate Charge

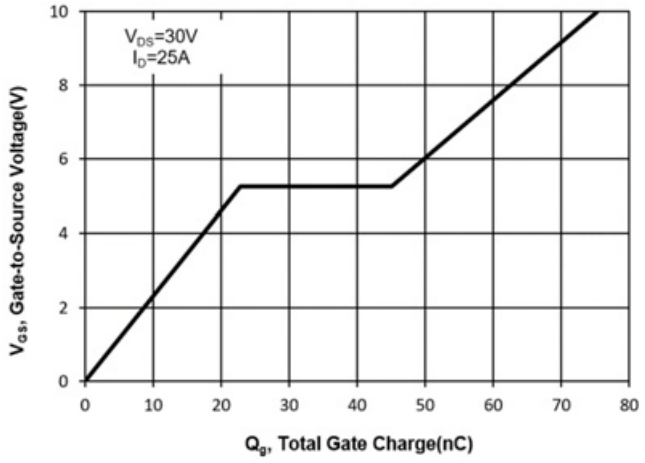
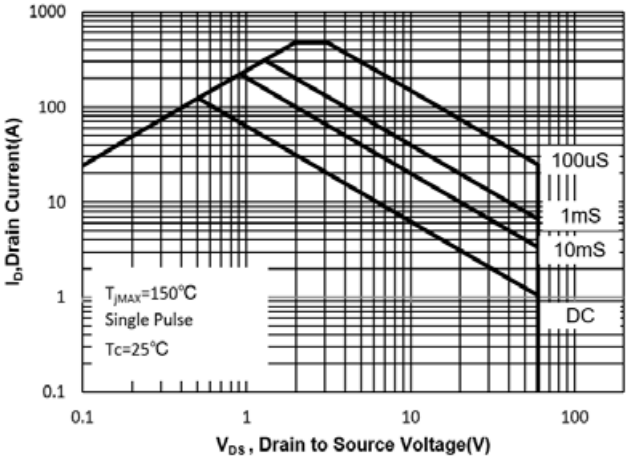



Fig. 12 Safe Operation Area



## Electrical Characteristics Curves

Fig. 13 Normalized Maximum Transient Thermal Impedance($z_{\Theta JC}$)

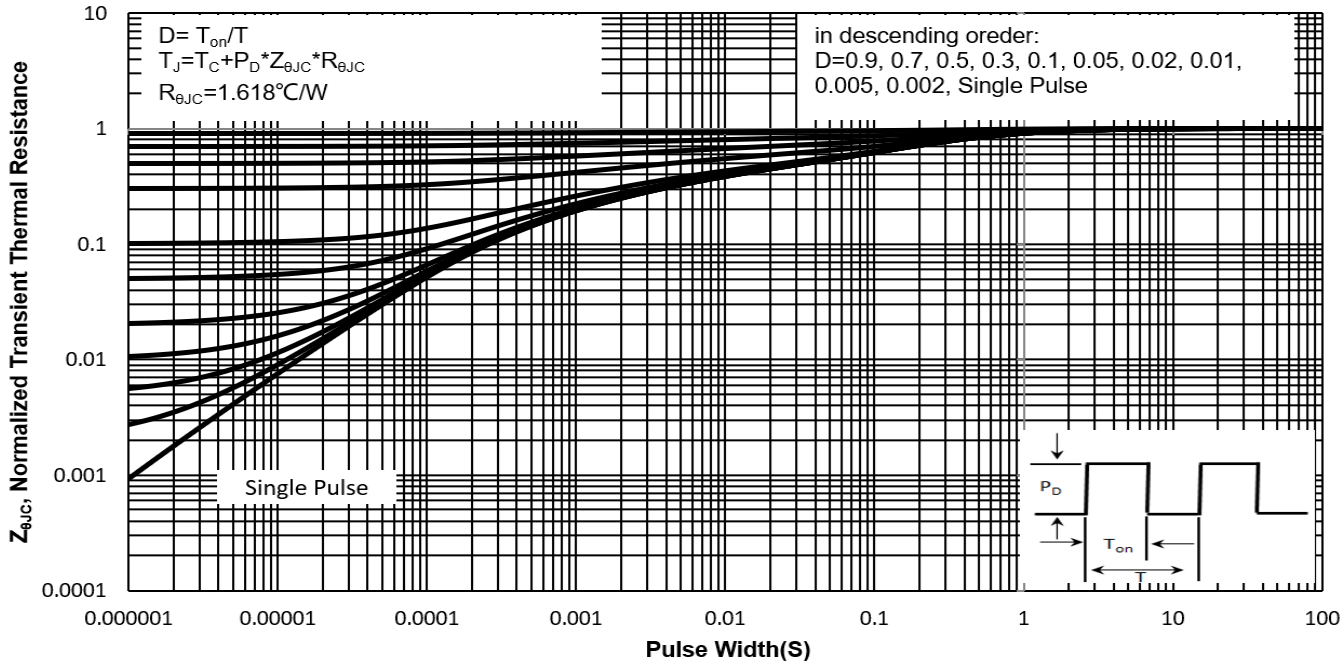
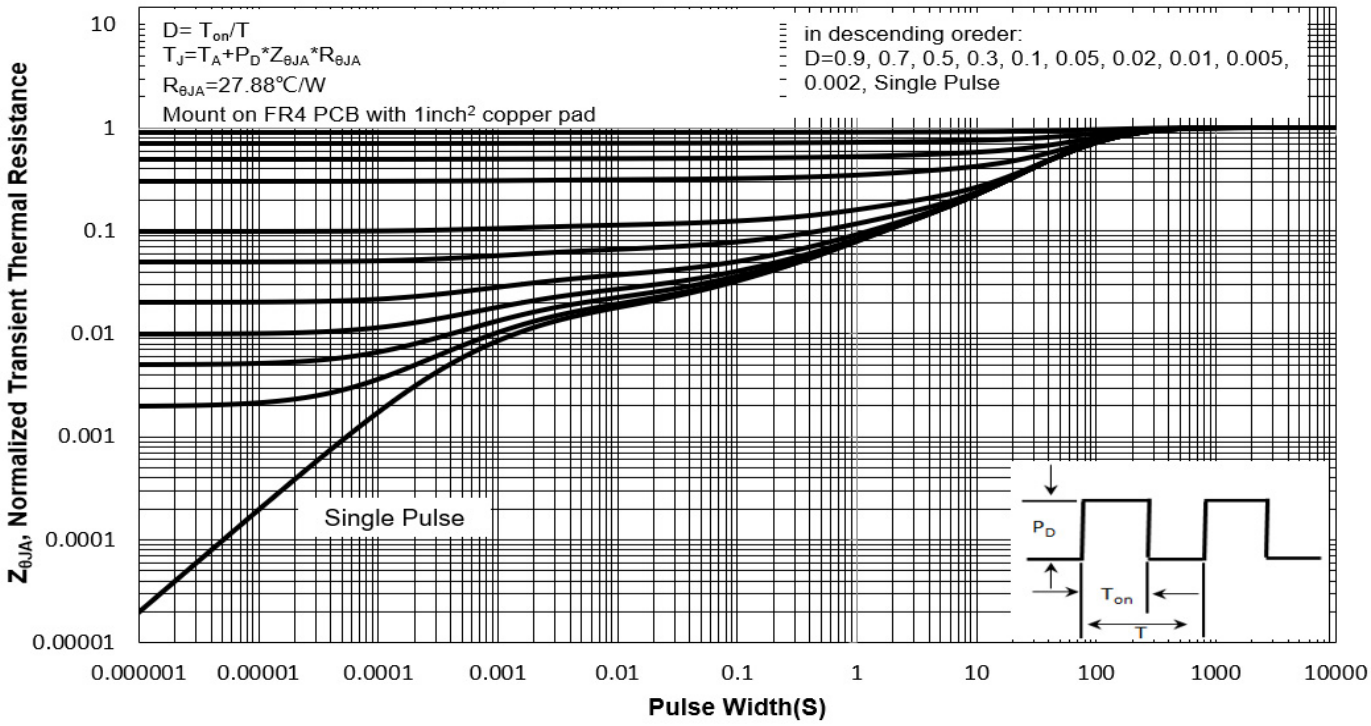



Fig. 14 Normalized Maximum Transient Thermal Impedance($z_{\Theta JA}$)



**Test Circuits**

Fig.1-1 Switching times test circuit

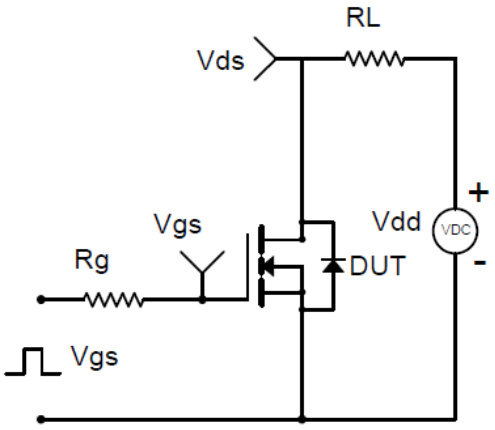



Fig.1-2 Switching Waveform

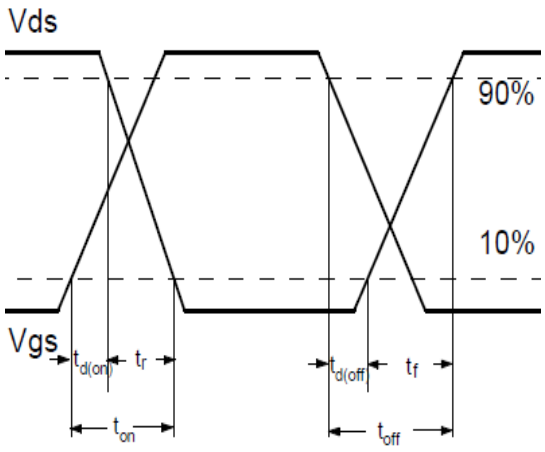



Fig.2-1 Gate charge test circuit

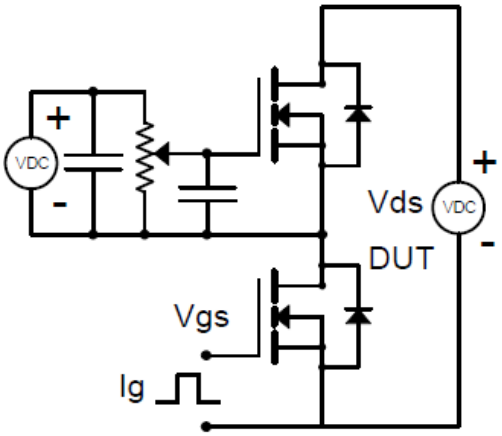



Fig.2-2 Gate charge waveform

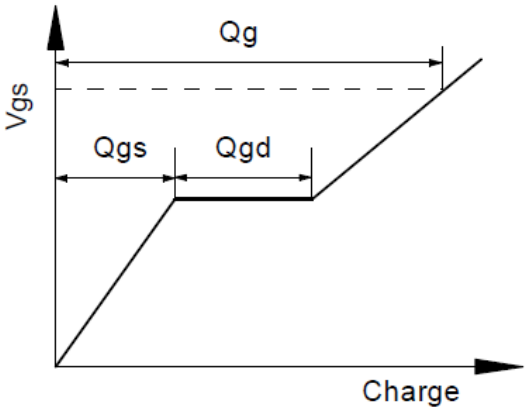



Fig.3-1 Avalanche test circuit

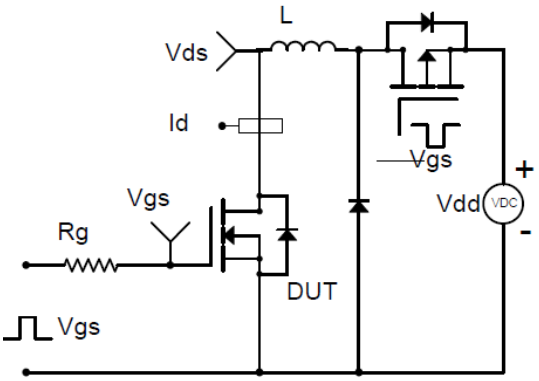
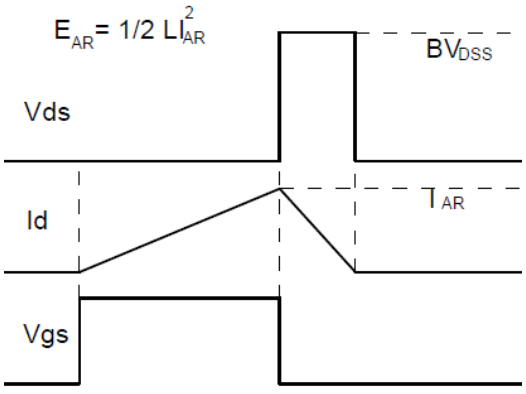
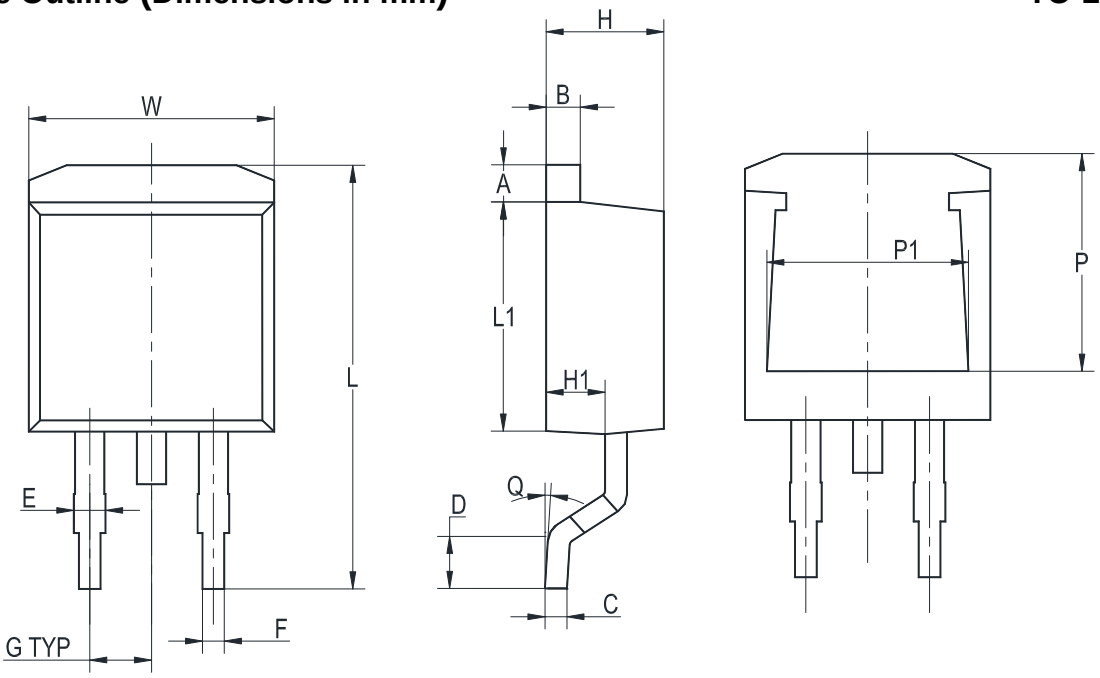



Fig.3-2 Avalanche waveform

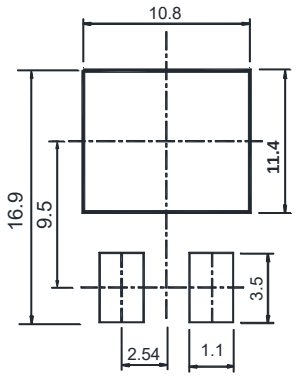


## Package Outline (Dimensions in mm) TO-263




| UNIT | A | B | C | D | E | F | G | W | H | H1 | L | L1 | Q | P | P1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.5 | 1.5 | 0.5 | 2.60 | 1.6 | 0.94 | 2.54 TYP | 10.5 | 4.8 | 2.9 | 16.5 | 8.7 | 8° MAX | 7.6 | 8.2 |
| | 1.1 | 1.1 | 0.3 | 2.15 | 1.1 | 0.68 | | 9.6 | 4.4 | 2.5 | 14.5 | 8.2 | | 7.1 | 7.4 |

## Recommended Soldering Footprint




### Packing information

| Package | Carton Quantity | Box Quantity | Base Quantity | Delivery Mode |
|---|---|---|---|---|
| TO-263 | 5 K / Carton | 1 K / Box | 50 pcs / Tube | Tube |

### Marking information

" TV06N028S" = Part No.
" ****** " = Date Code Marking
Font type: Arial

## IMPORTANT NOTICE

Our company and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes to improve product design, functions and reliability without further notice to this document and any product described herein.

Statements described herein regarding the reliability and suitability of products is for illustrative purposes only. Products specifically described herein are not authorized for use as critical components in life support devices, automobile, military, aviation or aerospace only with the written approval of our company.

The information contained herein is presented only as guidance for product use. No license to any intellectual property rights is granted under this document. No responsibility is assumed by our company for any infringement of patents or any other intellectual property rights of third party that may result from the use of the product.