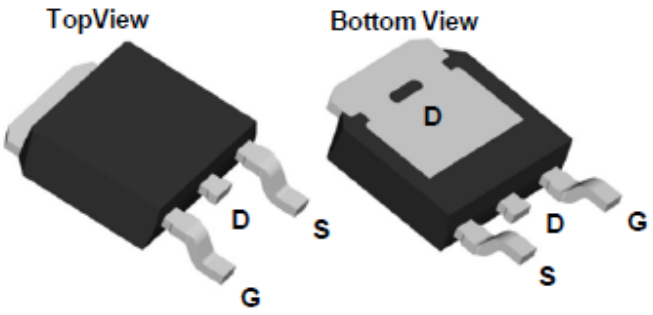
## Features

The TW50N03D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

## Product Summary

| | |
|---|---|
| $V_{DS}$ | 30V |
| $I_D$ | 50A |
| $R_{DS(ON)}$ (at $V_{GS}$=10V) | < 12mR |
| $R_{DS(ON)}$ (at $V_{GS}$ =4.5V) | < 18mΩ |

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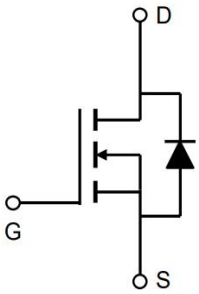



## Maximum Ratings(Ta=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | VDS | 30 | V |
| Gate-Source Voltage | VGS | ±20 | |
| Continuous Drain Current | ID | 50 | A |
| Pulsed Drain Current ① | IDM | 170 | |
| Continuous Source-Drain Current(Diode Conduction) | IS | 30 | |
| Power Dissipation ② | PD | 50 | W |
| Thermal Resistance from Junction to Ambient (t≤5s) | RθJA | 100 | ℃/W |
| Operating Junction | TJ | 150 | ℃ |
| Storage Temperature | TSTG | -55~+150 | ℃ |

## Electrical Characteristics(TJ=25°C unless otherwise noted)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Parameters** | | | | | | |
| Drain-Source Breakdown Voltage | BVDSS | VGS = 0V, ID = 250μA | 30 | | | V |
| Gate Threshold Voltage | VGS(th) | VDS =VGS, ID = 250μA | 1 | | 2.5 | V |
| Gate-Body leakage Current | IGSS | VDS =0V, VGS = ±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | IDSS | VDS = 30V, VGS =0V | | | 1 | μA |
| Static Drain-Source On-Resistance | RDS(on) | VGS = 10V, ID = 25A | | 7.3 | 12 | mΩ |
| | RDS(on) | VGS = 4.5V, ID = 20A | | 9.3 | 18 | mΩ |
| Forward Transconductance | gfs | VDS = 25V, ID = 15A | | 28 | | S |
| Diode Forward Voltage | VSD | IS= 15A, VGS=0V | | 0.85 | 1.4 | V |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | Ciss | VDS = 15V,VGS =0V, f=1MHz | | 610 | | pF |
| Output Capacitance | Coss | | | 300 | | pF |
| Reverse Transfer Capacitance | Crss | | | 125 | | pF |
| Total Gate Charge | Qg | VDS = 15V,VGS = 10V, ID = 30A | | 15 | | nC |
| Gate Source Charge | Qgs | | | 1.9 | | nC |
| Gate Drain Charge | Qgd | | | 3.9 | | nC |
| **Switching Parameters** | | | | | | |
| Turn-On DelayTime | td(on) | VDS= 15V RL= 6Ω, ID = 20A, VGEN= 10V,Rg= 3Ω | | 8 | | ns |
| Turn-On Rise Time | tr | | | 84 | | ns |
| Turn-Off DelayTime | td(off) | | | 15 | | ns |
| Turn-Off Fall Time | tf | | | 10 | | ns |

**Note :**

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 5 sec.
3. Pulse Test : Pulse Width≤300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

## Typical Electrical and Thermal Characteristics

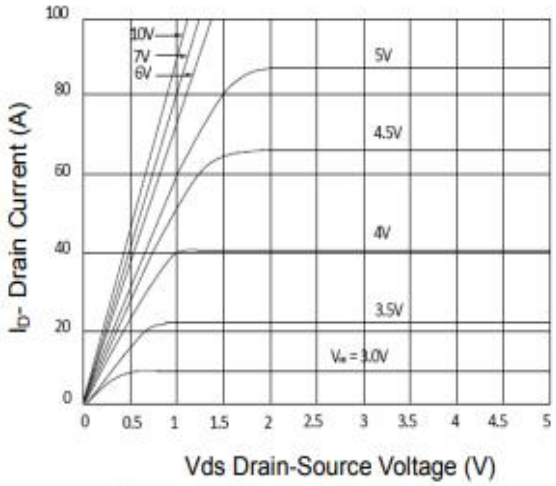



**Figure 1 Output Characteristics**

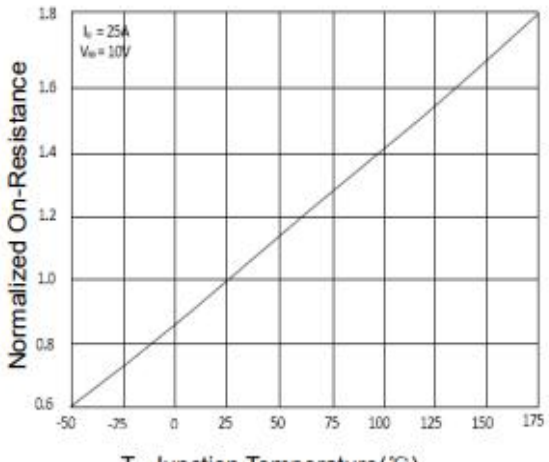



**Figure 4 Rdson-JunctionTemperature**

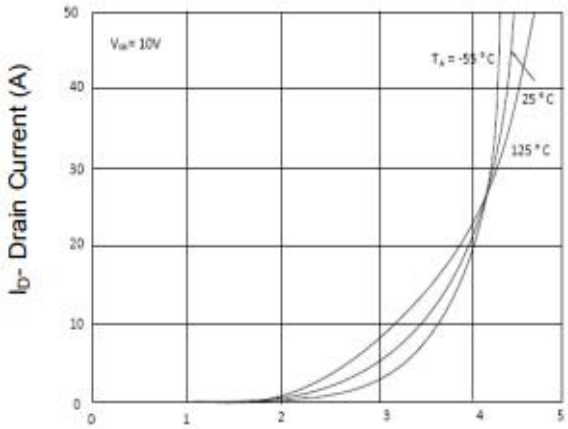



**Figure 2 Transfer Characteristics**

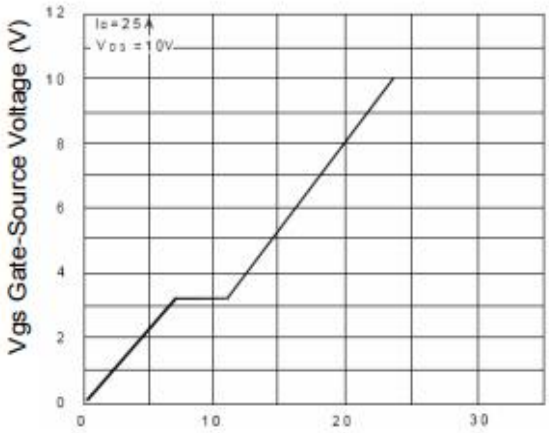



**Figure 5 Gate Charge**

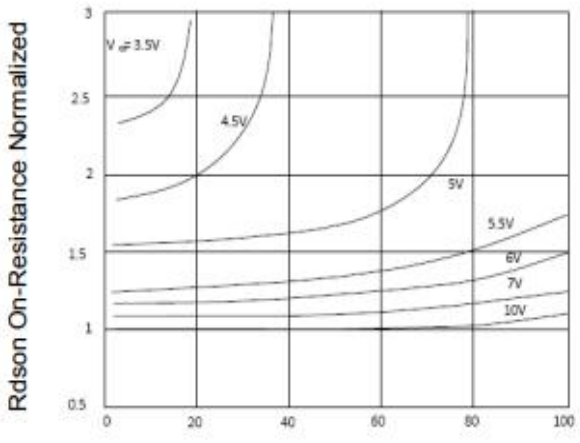



**Figure 3 Rdson- Drain Current**

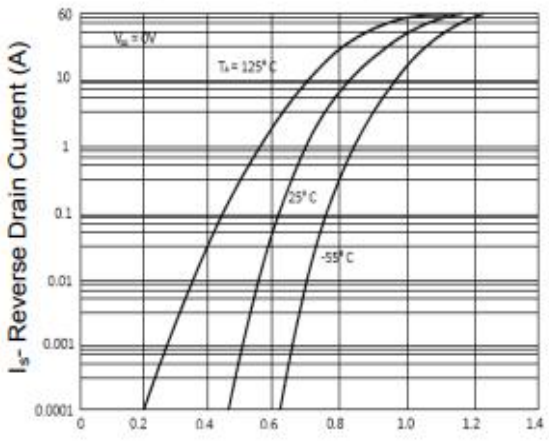



**Figure 6 Source- Drain Diode Forward**

## Typical Electrical and Thermal Characteristics

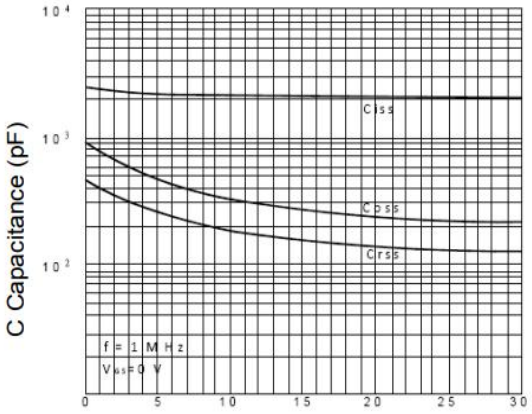



**Figure 7 Capacitance vs Vds**

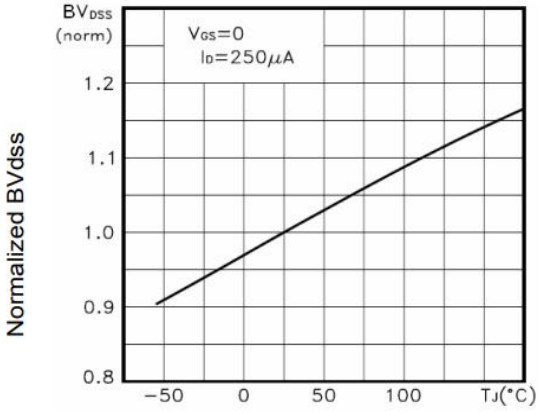



**Figure 9 $BV_{DSS}$ vs Junction Temperature**

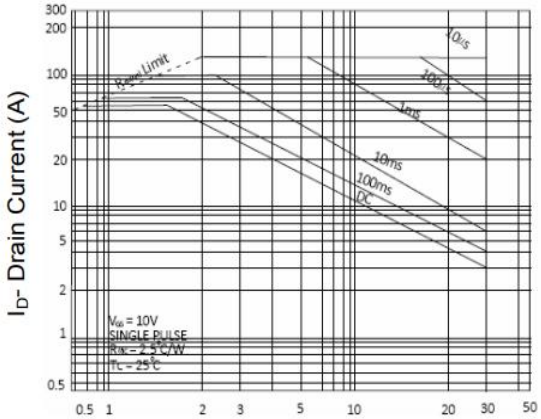



**Figure 8 Safe Operation Area**

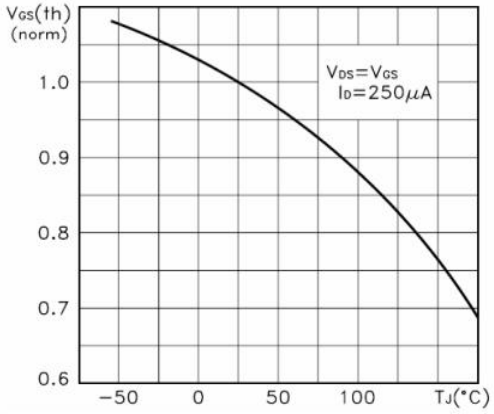



**Figure 10 $V_{GS(th)}$ vs Junction Temperatur**

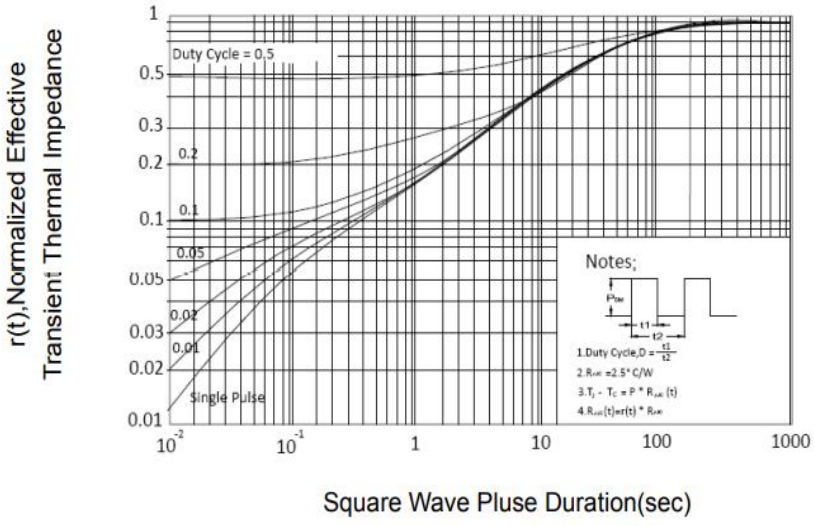
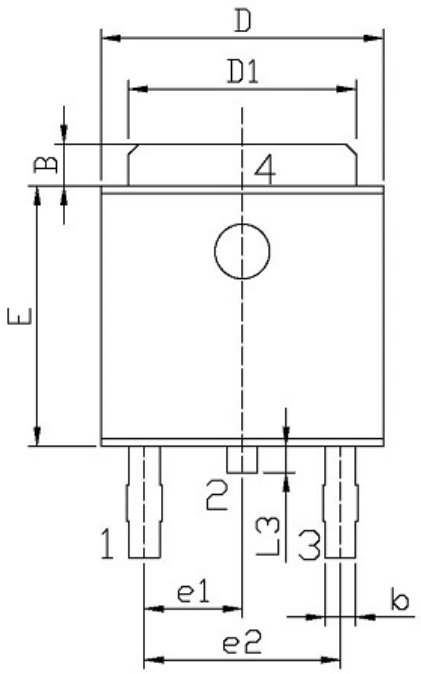


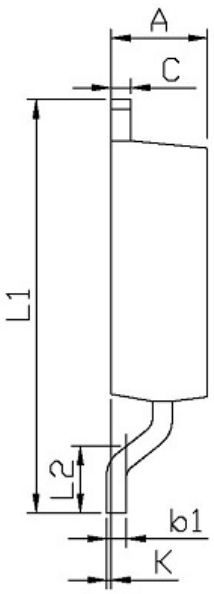

**Figure 11 Normalized Maximum Transient Thermal Impedance**

Package Mechanical Data

**Unit ： mm**

TO-252(DPAK)




单位：mm

| Symbol | Dimensions In Millimeters | | Symbol | Dimensions In Millimeters | |
|---|---|---|---|---|---|
| | Min | Max | | Min | Max |
| A | 2.20 | 2.40 | E | 5.95 | 6.25 |
| B | 0.95 | 1.25 | e1 | 2.24 | 2.34 |
| b | 0.50 | 0.70 | e2 | 4.43 | 4.73 |
| b1 | 0.45 | 0.55 | L1 | 9.45 | 9.95 |
| C | 0.45 | 0.55 | L2 | 1.25 | 1.75 |
| D | 6.45 | 6.75 | L3 | 0.60 | 0.90 |
| D1 | 5.10 | 5.50 | K | 0.00 | 0.10 |