

## Product Summary

- $V_{DS}$  100V
- $I_D$  80A
- $R_{DS(ON)}$  (at  $V_{GS}=10V$ )  $<8.0m\Omega$
- 100% EAS Tested
- 100%  $\nabla V_{DS}$  Tested

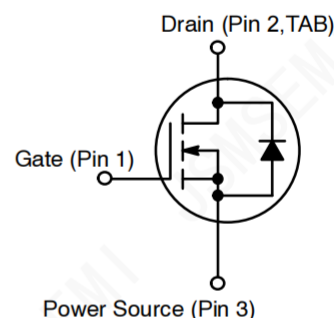


## General Description

- Split gate trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

## Applications

- Power switching application
- Uninterruptible power supply
- DC-DC convertor
- Motor drivers



## Absolute Maximum Ratings ( $T_A=25^\circ C$ , unless otherwise specified)

| Parameter                                       |                                   | Symbol         | Rating     | Unit       |
|-------------------------------------------------|-----------------------------------|----------------|------------|------------|
| Drain-Source Voltage                            |                                   | $V_{DS}$       | 100        | V          |
| Gate-Source Voltage                             |                                   | $V_{GS}$       | $\pm 20$   | V          |
| Continuous Drain Current                        | $T_C=25^\circ C$ <sup>Note1</sup> | $I_D$          | 80         | A          |
|                                                 | $T_C=100^\circ C$                 |                | 60         | A          |
|                                                 | $T_A=25^\circ C$ <sup>Note4</sup> |                | 17         | A          |
| Pulsed Drain Current <sup>Note2</sup>           |                                   | $I_{D,pulse}$  | 600        | A          |
| Avalanche energy, single pulse <sup>Note3</sup> |                                   | EAS            | 110        | mJ         |
| Power Dissipation                               | $T_C=25^\circ C$                  | PD             | 256        | W          |
|                                                 | $T_A=25^\circ C$ <sup>Note4</sup> |                | 3.1        | W          |
| Operating and Storage Temperature Range         |                                   | $T_J, T_{SGT}$ | -55 to 150 | $^\circ C$ |

## Thermal Resistance

| Parameter                                                | Symbol          | Min | Typ | Max | Unit         |
|----------------------------------------------------------|-----------------|-----|-----|-----|--------------|
| Thermal Resistance, Junction-to-Case                     | $R_{\theta JC}$ | -   | -   | 0.8 | $^\circ C/W$ |
| Thermal Resistance, Junction-to-Ambient <sup>Note4</sup> | $R_{\theta JA}$ | -   | -   | 40  | $^\circ C/W$ |

## Ordering Information

| Order number           | Package  | Marking   | Operation Temperature Range | MSL Grade | Ship, Quantity | Green |
|------------------------|----------|-----------|-----------------------------|-----------|----------------|-------|
| IPP082N10NF2SAKMA1-JSM | TO-220-3 | 053N10CGH | -55 to 150 $^\circ C$       | 1         | TUBE, 1000     | Rohs  |

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

| Parameter                                      | Symbol  | TestConditions                  | Min | Typ  | Max  | Unit |
|------------------------------------------------|---------|---------------------------------|-----|------|------|------|
| Statistic Characteristics                      |         |                                 |     |      |      |      |
| Drain-Source Breakdown Voltage                 | BVDSS   | VGS=0V,ID=250uA                 | 100 | -    | -    | V    |
| Gate-Body Leakage Current                      | IGSS    | VGS=±20V,VDS=0V                 | -   | -    | ±100 | nA   |
| ZeroGate Voltage Drain Current                 | IDSS    | VDS=100V,VGS=0V                 | -   | -    | 1    | uA   |
| Gate Threshold Voltage                         | VGS(th) | VDS=VGS,ID=250uA                | 2.2 | 3.0  | 3.8  | V    |
| Static Drain-Source On-Resistance              | RDS(ON) | VGS=10V,ID=50A                  | -   | 7.0  | 8.0  | mΩ   |
| Gate Resistance                                | Rg      | f=1MHz                          | -   | 1.5  | -    | Ω    |
| Forward Transconductance <sup>Note5</sup>      | gfs     | VDS=5V,ID=50A                   | -   | 90   | -    | S    |
| Dynamic Characteristics <sup>Note5</sup>       |         |                                 |     |      |      |      |
| Input Capacitance                              | Ciss    | VGS=0V VDS=50V f=1MHz           | -   | 4646 | -    | pF   |
| Output Capacitance                             | Coss    |                                 | -   | 580  | -    | pF   |
| Reverse Transfer Capacitance                   | Crss    |                                 | -   | 30   | -    | pF   |
| Turn-on Delay Time                             | td(on)  | VDS=50V ID=50A<br>VGS=10V RG=6Ω | -   | 53   | -    | ns   |
| Rise Time                                      | tr      |                                 | -   | 88   | -    | ns   |
| Turn-off Delay Time                            | td(off) |                                 | -   | 85   | -    | ns   |
| Fall Time                                      | tf      |                                 | -   | 22   | -    | ns   |
| Gate Charge Characteristics                    |         |                                 |     |      |      |      |
| Total Gate Charge                              | Qg      | VDS=50V VGS=10V ID=50A          | -   | 69   | -    | nC   |
| Gate to Source Charge                          | Qgs     |                                 | -   | 22   | -    | nC   |
| Gate to Drain Charge                           | Qgd     |                                 | -   | 17   | -    | nC   |
| Reverse Diode Characteristics <sup>Note5</sup> |         |                                 |     |      |      |      |
| Drain-Source Diode Forward Voltage             | VSD     | VGS=0V,IF=50A                   | -   | 0.92 | 1.2  | V    |
| Reverse recovery time                          | trr     | IF=50A,VDS=50V                  | -   | 72   | -    | ns   |
| Reverse recovery charge                        | Qrr     | di/dt=100A/μs                   | -   | 138  | -    | nC   |

Notes:

- 1.Package limited
- 2.Pulse width limited by maximum junction temperature
3. $V_{DS}=50V, V_{GS}=10V, L=0.1mH$
4. $R_{\theta JA}$  is determined with the device mounted on a 1 in<sup>2</sup> pad 2 oz copper pad on a 1.5x1.5 in. board of FR-4 material
- 5.Guaranteed by design, not subject to production testing

## Electrical Characteristics Diagrams

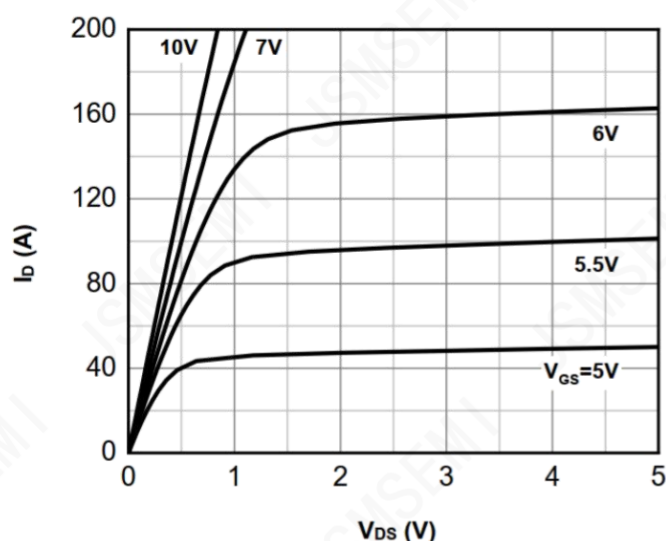


Figure 1: Typ. Output Characteristics

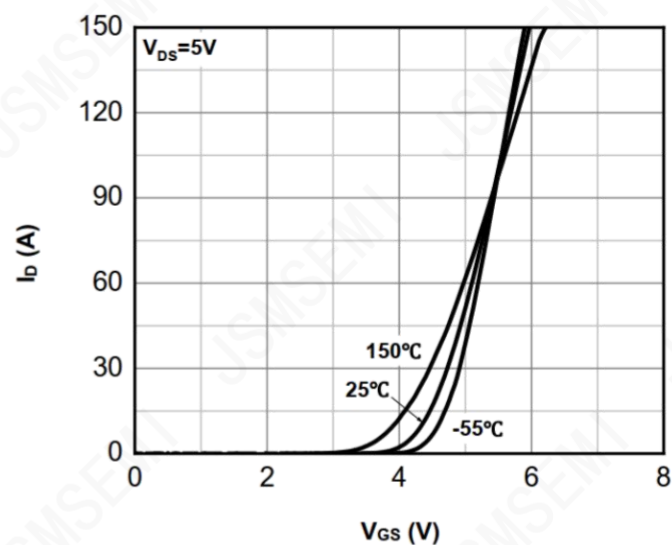


Figure 2: Typ. Transfer Characteristics

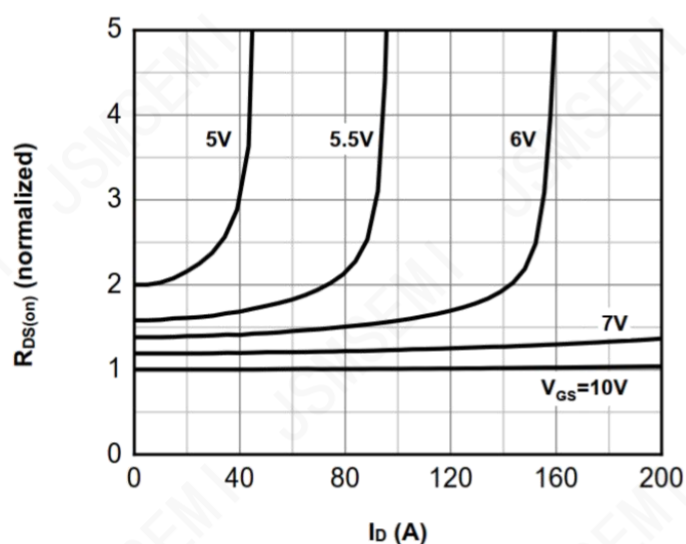


Figure 3: Normalized On-Resistance vs. Drain Current

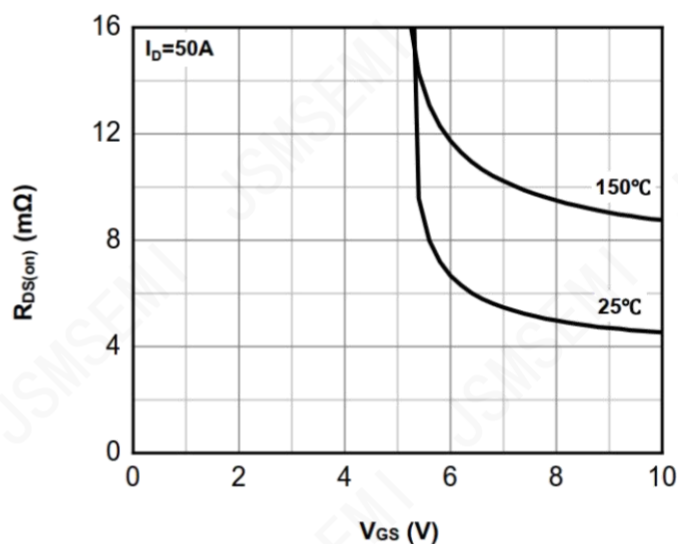


Figure 4: Typ. On-Resistance vs. Gate-source Voltage

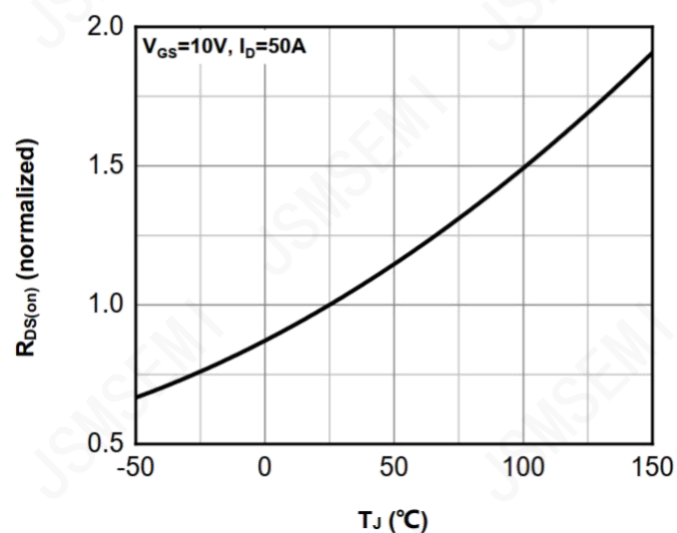


Figure 5: Normalized On-Resistance vs. Junction Temperature

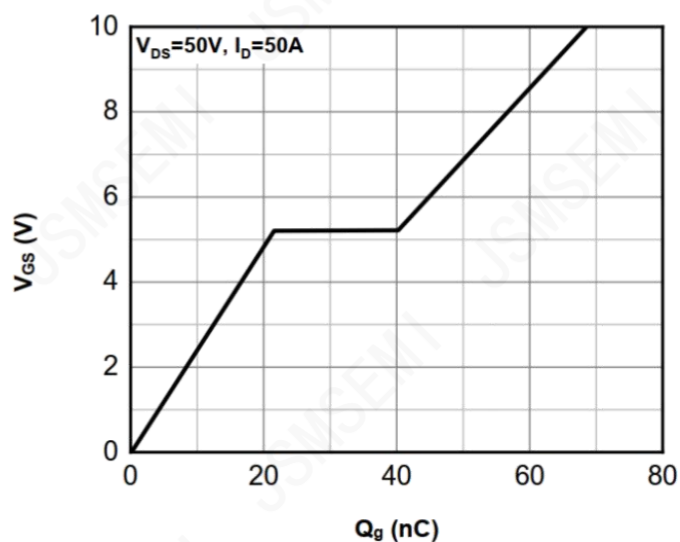


Figure 6: Typ. Gate Charge

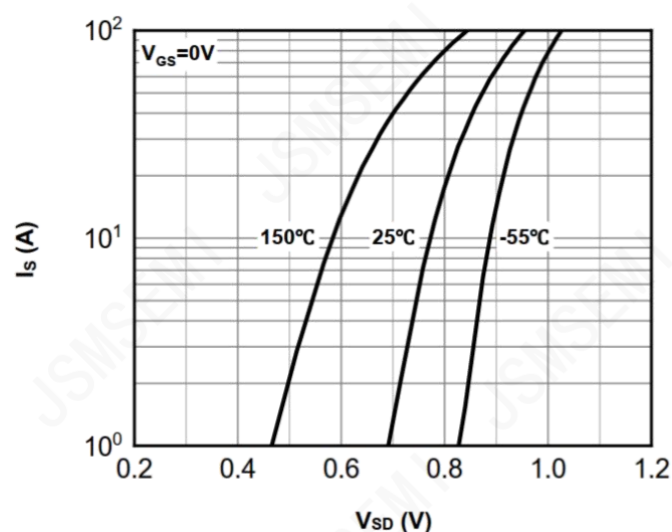


Figure 7: Typ. Forward Characteristics of Body Diode

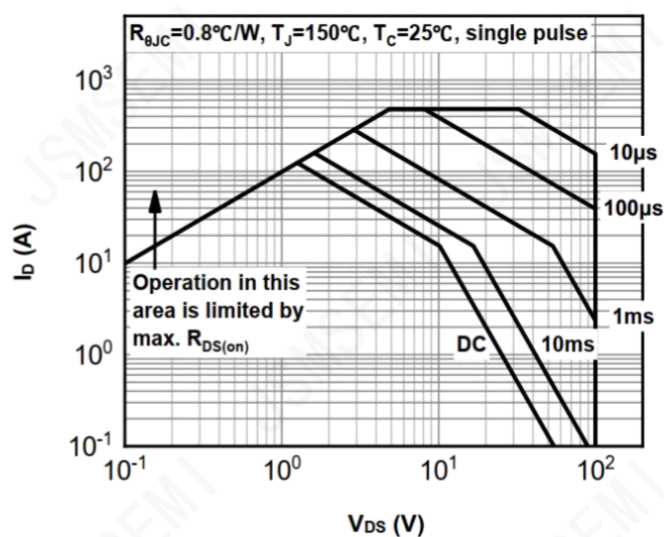


Figure 8: Safe Operating Area

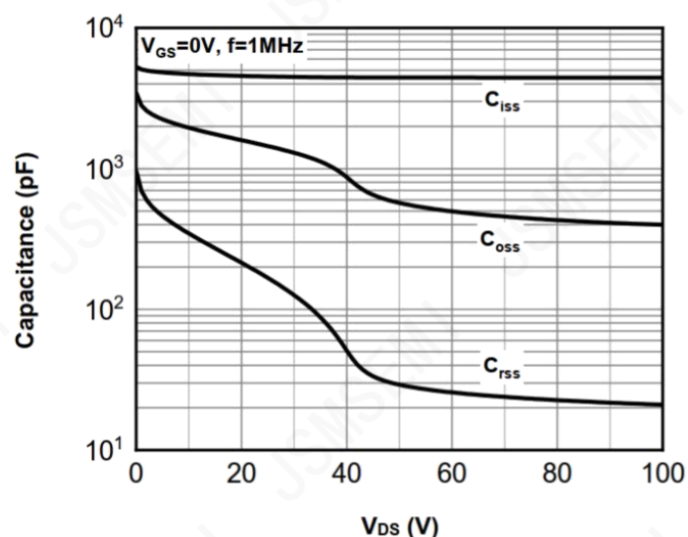


Figure 9: Typ. Capacitances

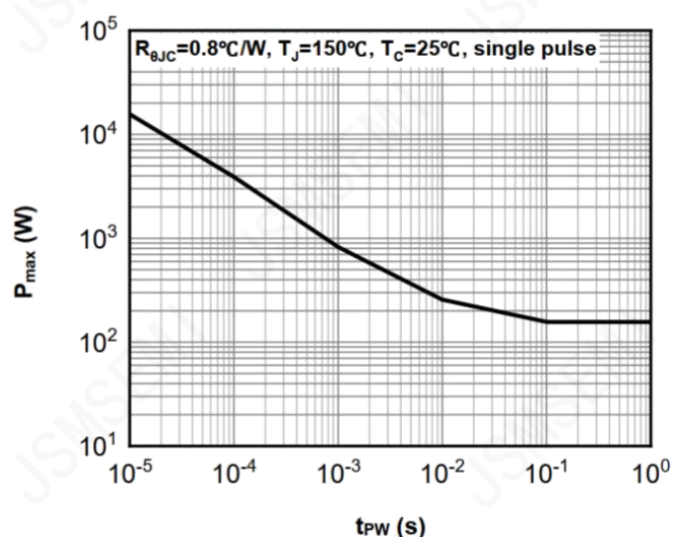


Figure 10: Single Pulse Maximum Power Dissipation

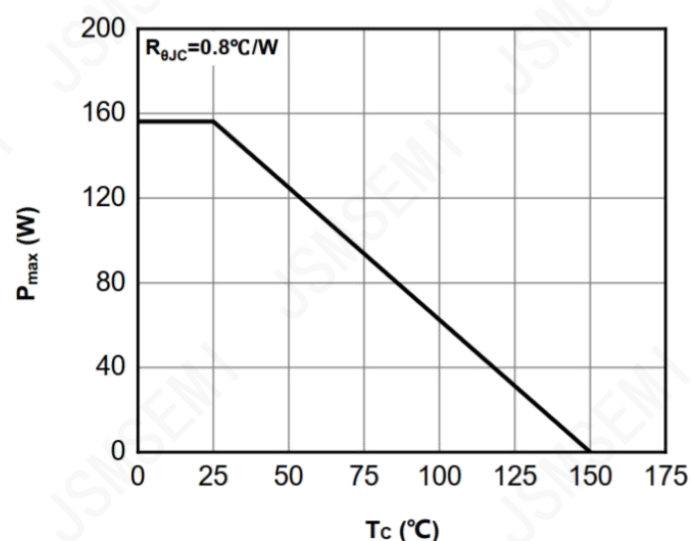


Figure 11: Max. Power Dissipation vs. Case Temperature

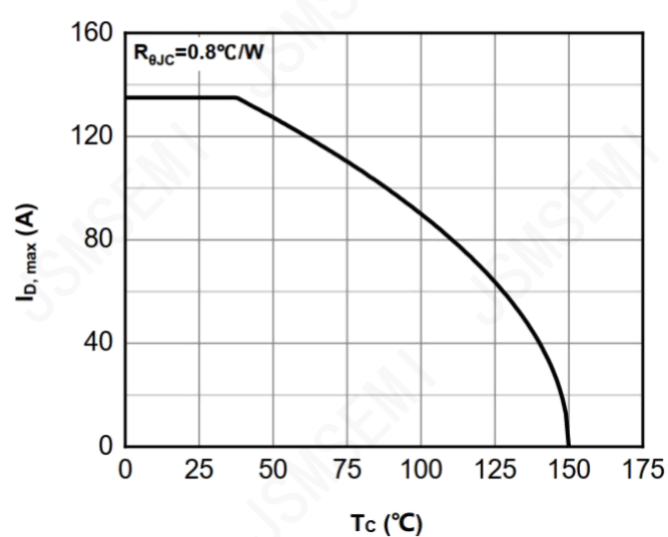


Figure 12: Max. Continuous Drain Current vs. Case Temperature



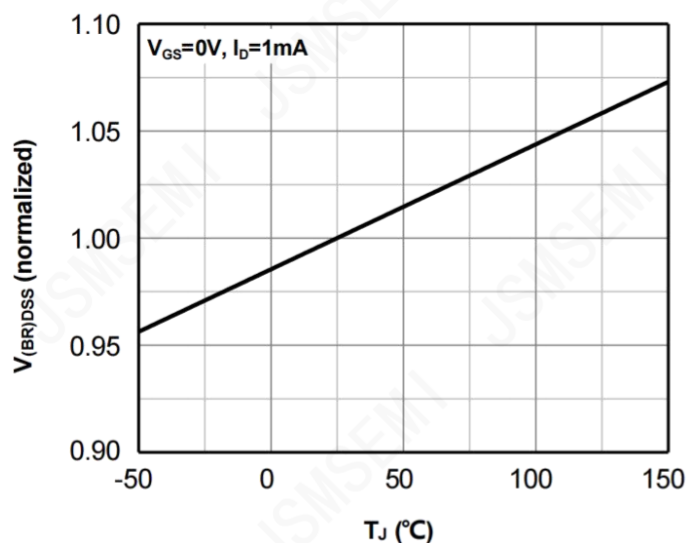


Figure 13: Normalized  $V_{(BR)DSS}$  vs. Junction Temperature

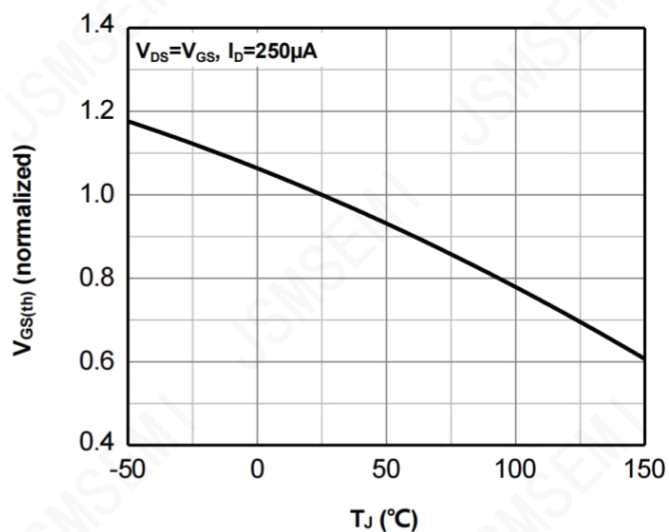


Figure 14: Normalized  $V_{GS(th)}$  vs. Junction Temperature

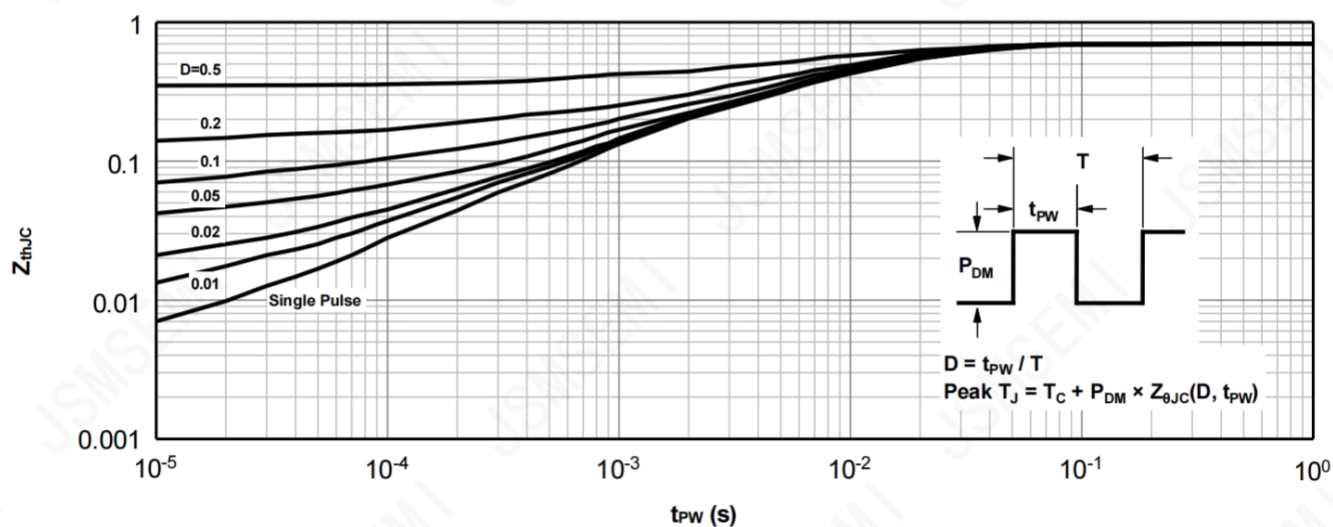
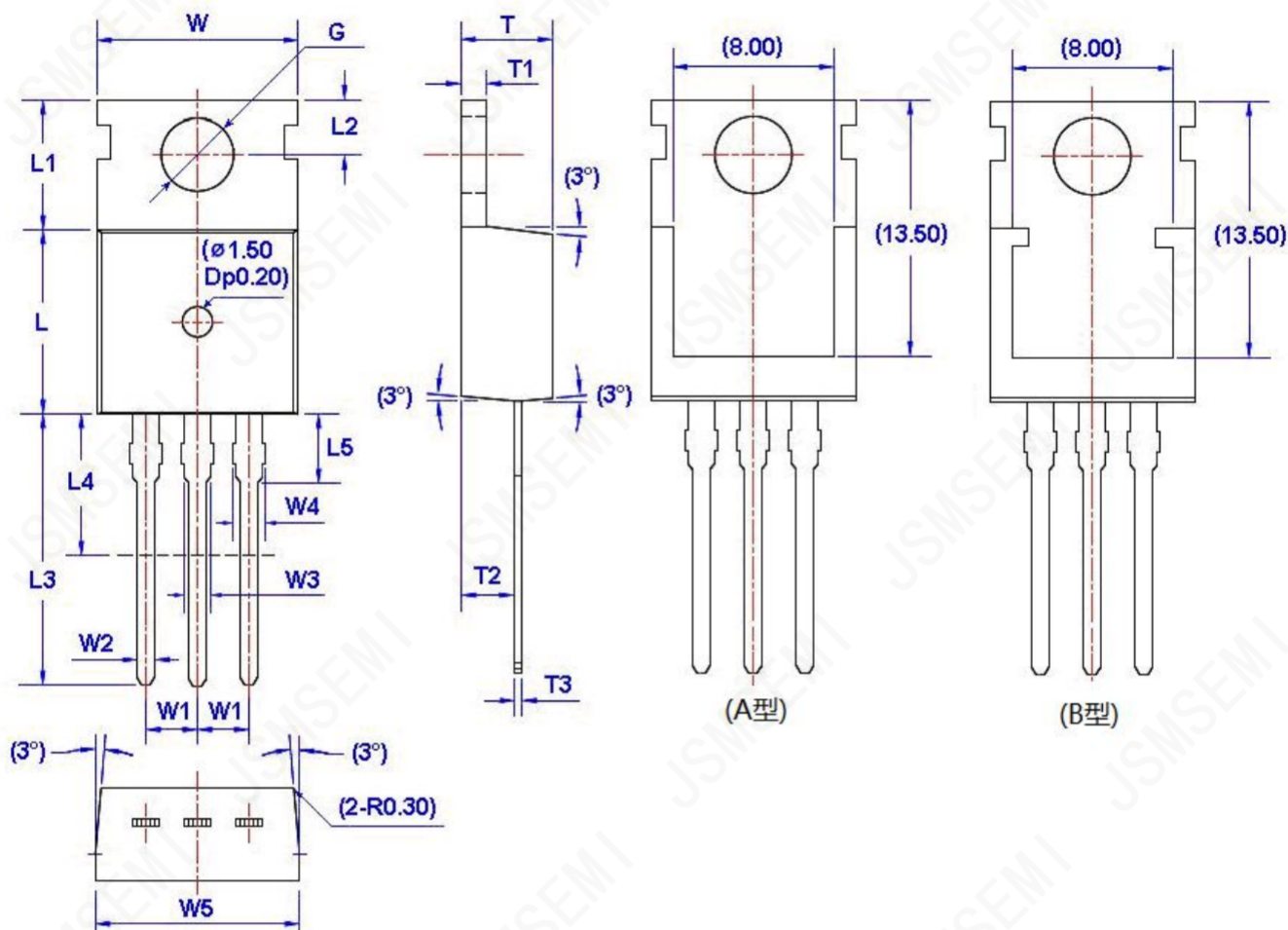


Figure 15: Normalized Transient Thermal Impedance Form Junction To Case

## Package Information

TO-220-3

Unit: mm



| Symbol | Size       |       | Symbol | Size  |       | Symbol | Size |      | Symbol | Size |      |
|--------|------------|-------|--------|-------|-------|--------|------|------|--------|------|------|
|        | Min        | Max   |        | Min   | Max   |        | Min  | Max  |        | Min  | Max  |
| W      | 9.66       | 10.28 | W5     | 9.80  | 10.20 | L4**   | 6.20 | 6.60 | T3     | 0.45 | 0.60 |
| W1     | 2.54 (TYP) |       | L      | 9.00  | 9.40  | L5     | 2.79 | 3.30 | G(Φ)   | 3.50 | 3.70 |
| W2     | 0.70       | 0.95  | L1     | 6.40  | 6.80  | T      | 4.30 | 4.70 |        |      |      |
| W3     | 1.17       | 1.37  | L2     | 2.70  | 2.90  | T1     | 1.15 | 1.40 |        |      |      |
| W4*    | 1.32       | 1.72  | L3     | 12.70 | 14.27 | T2     | 2.20 | 2.60 |        |      |      |

## Revision History

| Rev. | Change          | Date      |
|------|-----------------|-----------|
| V1.0 | Initial version | 6/27/2021 |
|      |                 |           |

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