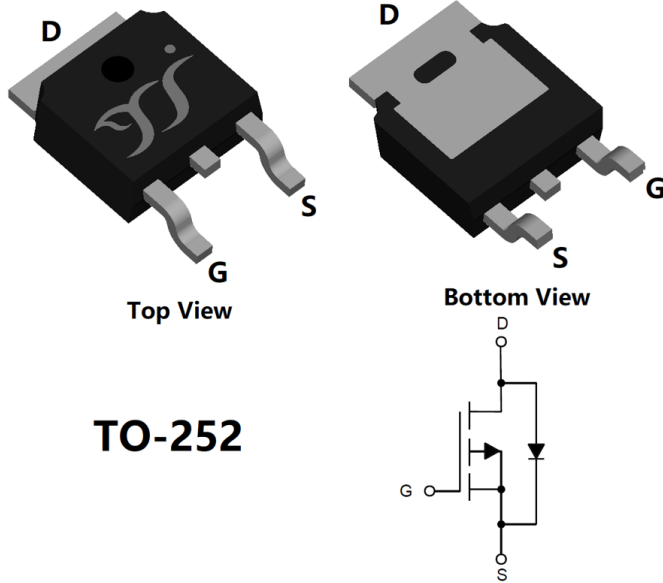


P-Channel Enhancement Mode Field Effect Transistor



TO-252

Product Summary

| | |
|------------------------------------|-------|
| V_{DS} | -60 V |
| I_D | -50 A |
| $R_{DS(ON)}$ (at $V_{GS}=-10V$) | <12 m |
| $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) | <15 m |
| 100% EAS Tested | |
| 100% ∇V_{DS} Tested | |

General Description

Split gate trench MOSFET technology
 Low $R_{DS(on)}$ & FOM
 Extremely low switching loss
 Excellent stability and uniformity
 Moisture Sensitivity Level 1
 Epoxy Meets UL 94 V-0 Flammability Rating
 Halogen Free

Applications

= R ZN NTRZR a
 = aNORR VZR a

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | | Symbol | Limit | Unit |
|--|-------------------------|----------------|----------|------------------|
| Drain-source Voltage | | V_{DS} | -60 | V |
| Gate-source Voltage | | V_{GS} | ± 20 | V |
| Drain Current | $T_A=25^\circ\text{C}$ | I_D | -8 | A |
| | $T_A=100^\circ\text{C}$ | | -5 | |
| | $T_C=25^\circ\text{C}$ | | -50 | |
| | $T_C=100^\circ\text{C}$ | | -31 | |
| Pulsed Drain Current ^A | | I_{DM} | -200 | A |
| Avalanche energy ^B | | EAS | 169 | mJ |
| Total Power Dissipation ^C | $T_A=25^\circ\text{C}$ | P_D | 2 | W |
| | $T_A=100^\circ\text{C}$ | | 0.8 | |
| | $T_C=25^\circ\text{C}$ | | 89 | |
| | $T_C=100^\circ\text{C}$ | | 35 | |
| Junction and Storage Temperature Range | | T_J, T_{STG} | -55~+150 | $^\circ\text{C}$ |

Thermal resistance

| Parameter | | Symbol | Typ | Max | Units |
|---|--------------|-----------------|-----|-----|--------------------|
| Thermal Resistance Junction-to-Ambient ^D | Steady-State | $R_{\theta J}$ | 50 | 60 | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-to-Case | Steady-State | $R_{\theta JC}$ | 1.2 | 1.4 | |

Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|------------|----------------------|-------------------------|----------------------------|---------------|
| YJD50GP06A | F1/F2 | YJD50GP06A | 2500 | / | 25000 | 13 reel |



YJD50GP06A

Electrical Characteristics (T_J=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------------|---------------------|---|-----|------|------|-------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} = 0V, I _D =- | -60 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =-60V, V _{GS} =0V | - | - | -1 | - |
| | | V _{DS} =-60V, V _{GS} =0V, T _J =150°C | - | - | -100 | |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} = ±20V, V _{DS} =0V | - | - | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D =- | -1 | -2 | -3 | V |
| Static Drain-Source On-Resistance | R _{DS(on)} | V _{GS} =-10V, I _D =-25A | - | 9 | 12 | Z |
| | | V _{GS} =-10V, I _D =-20A | - | 9 | 12 | |
| | | V _{GS} =-4.5V, I _D =-20A | - | 11 | 15 | |
| Diode Forward Voltage | V _{SD} | I _S =-25A, V _{GS} =0V | - | -0.9 | -1.2 | V |
| Gate resistance | R _G | f=1MHz, Open drain | - | 8.5 | - | |
| Maximum Body-Diode Continuous Current | I _S | | - | - | -50 | A |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C _{ISS} | V _{DS} =-30V, V _{GS} =0V, f=1MHz | - | 4260 | - | pF |
| Output Capacitance | C _{OSS} | | - | 690 | - | |
| Reverse Transfer Capacitance | C _{RSS} | | - | 145 | - | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q _g | V _{GS} =-10V, V _{DS} =-30V, I _D =-25A | - | 79 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 18 | - | |
| Gate-Drain Charge | Q _{gd} | | - | 18 | - | |
| Reverse Recovery Charge | Q _{rr} | I _F =-25A, di/dt=100A/us | - | 96 | - | nC |
| Reverse Recovery Time | t _{rr} | | - | 52 | - | ns |
| Turn-on Delay Time | t _{D(on)} | V _{GS} =-10V, V _{DD} =-30V, I _D =-25A R _{GEN} =3 | - | 17 | - | ns |
| Turn-on Rise Time | t _r | | - | 88 | - | |
| Turn-off Delay Time | t _{D(off)} | | - | 120 | - | |
| Turn-off fall Time | t _f | | - | 110 | - | |

A. Repetitive rating; pulse width limited by max. junction temperature.

B. T_J=25°C, V_{DD}=-50V, V_G=-10V, R_G 9 0.5mH, I_{AS}=-26A.

C. P_d is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.

D. AUR NYR S 7. V ZRN RQ WJURCR PRZ RQ dLRZ VV Z RP ZZR Q NQ VR V dLR dMNR V ZR a WJA =25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.



Typical Electrical and Thermal Characteristics Diagrams

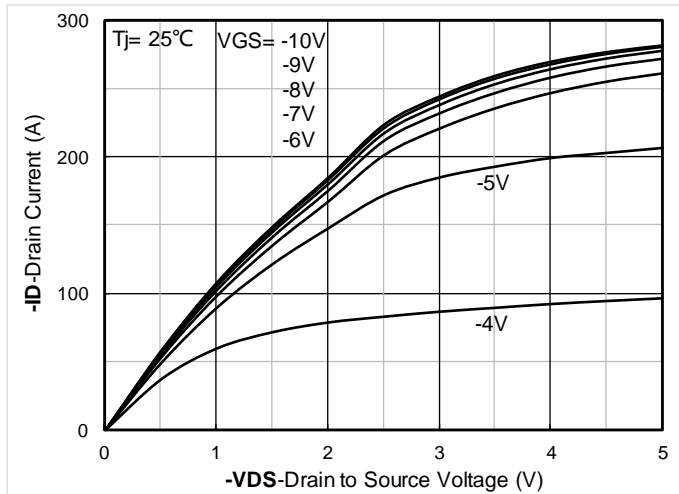


Figure 1. Output Characteristics

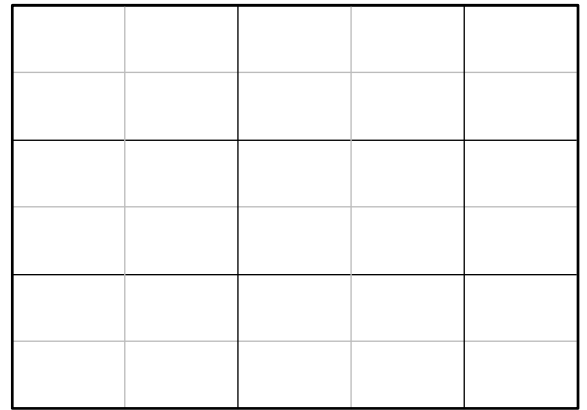


Figure 2. Transfer Characteristics

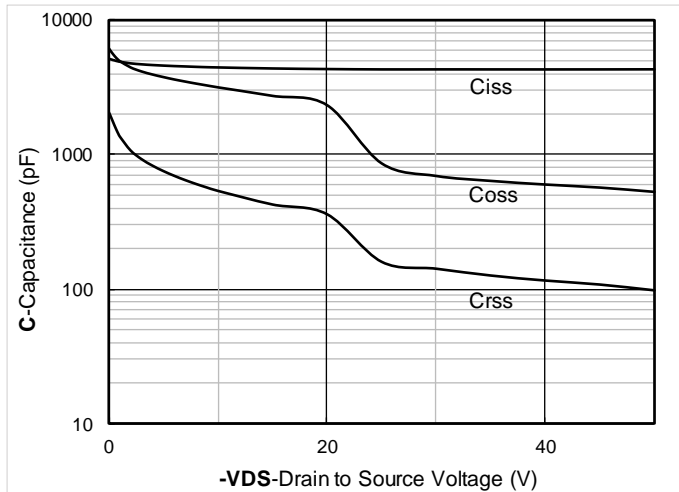


Figure 3. Capacitance Characteristics

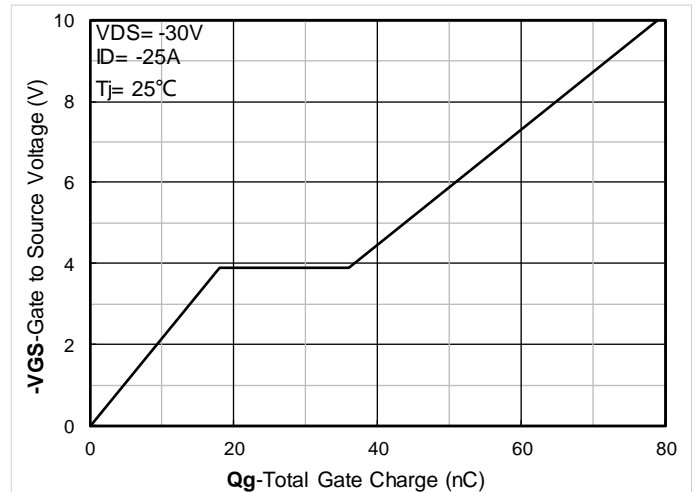


Figure 4. Gate Charge

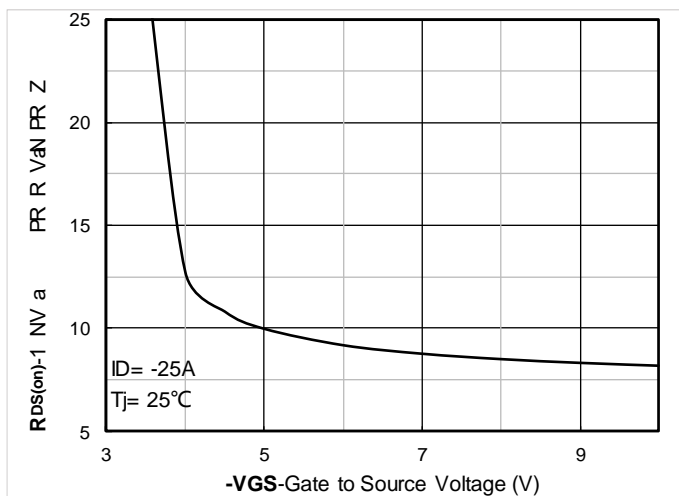


Figure 5. On-Resistance vs Gate to Source Voltage

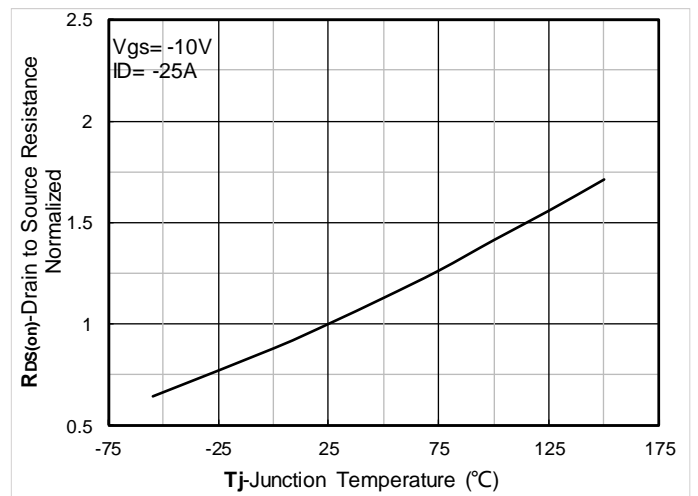


Figure 6. Normalized On-Resistance



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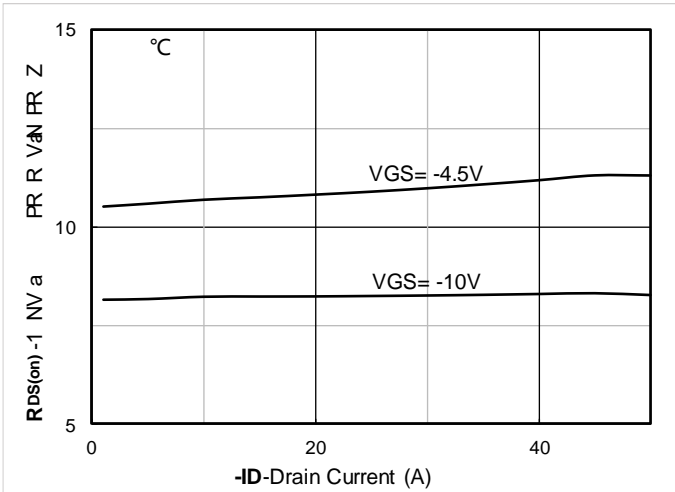


Figure 7. RDS(on) VS Drain Current

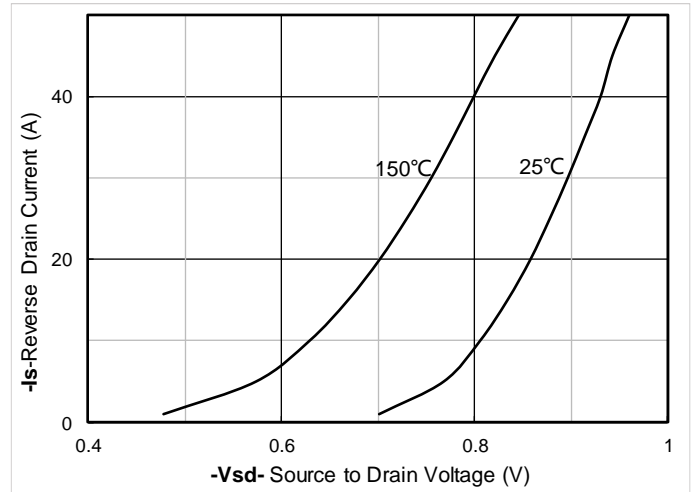


Figure 8. Forward characteristics of reverse diode

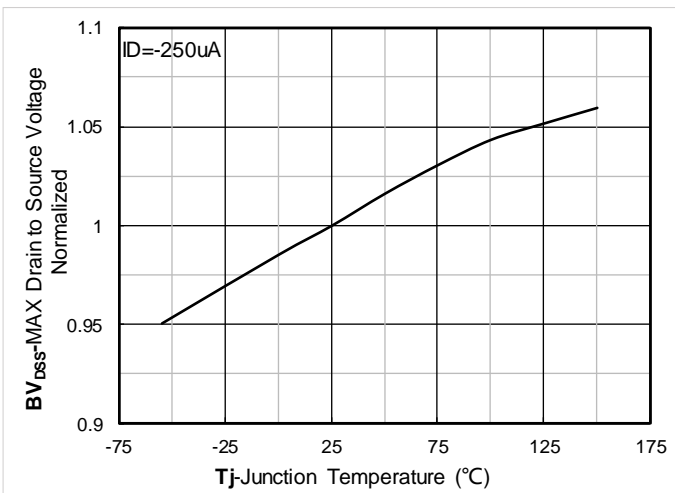


Figure 9. Normalized breakdown voltage

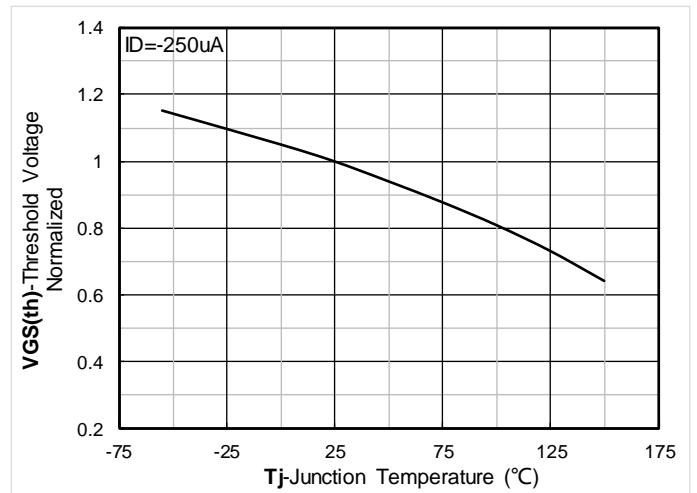


Figure 10. Normalized Threshold voltage

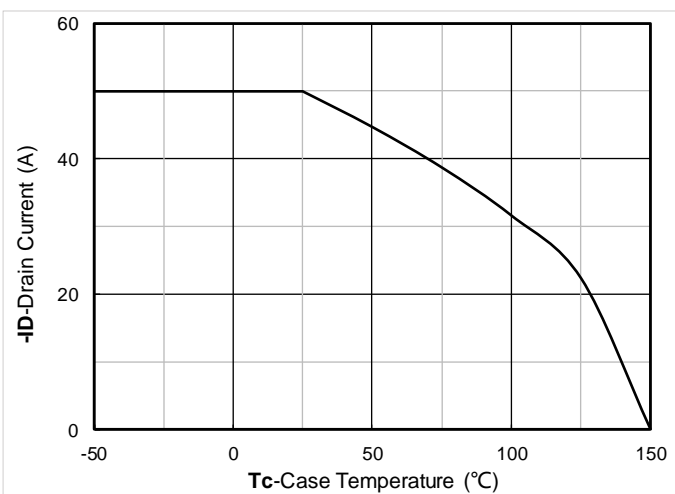


Figure 11. Current dissipation

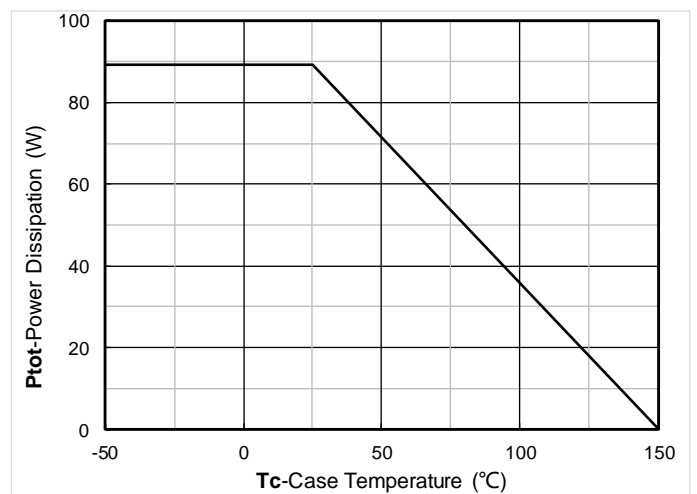


Figure 12. Power dissipation

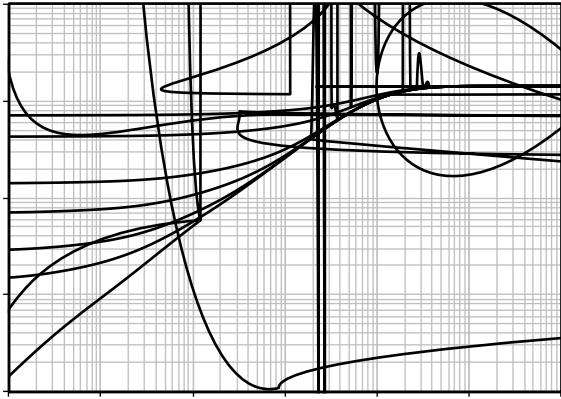


Figure 13. Maximum Transient Thermal Impedance

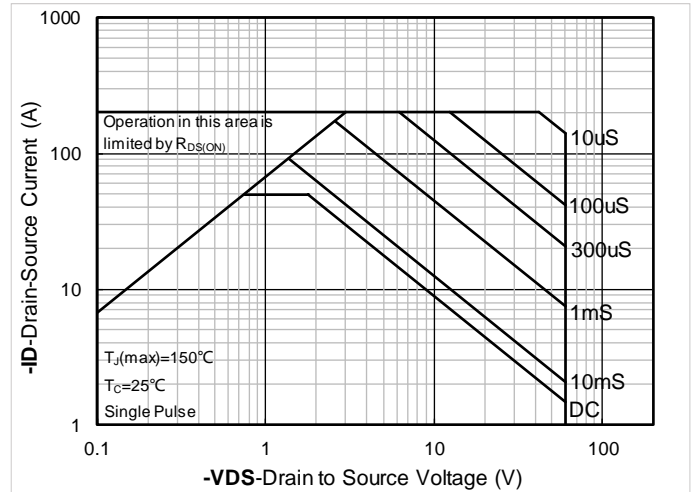
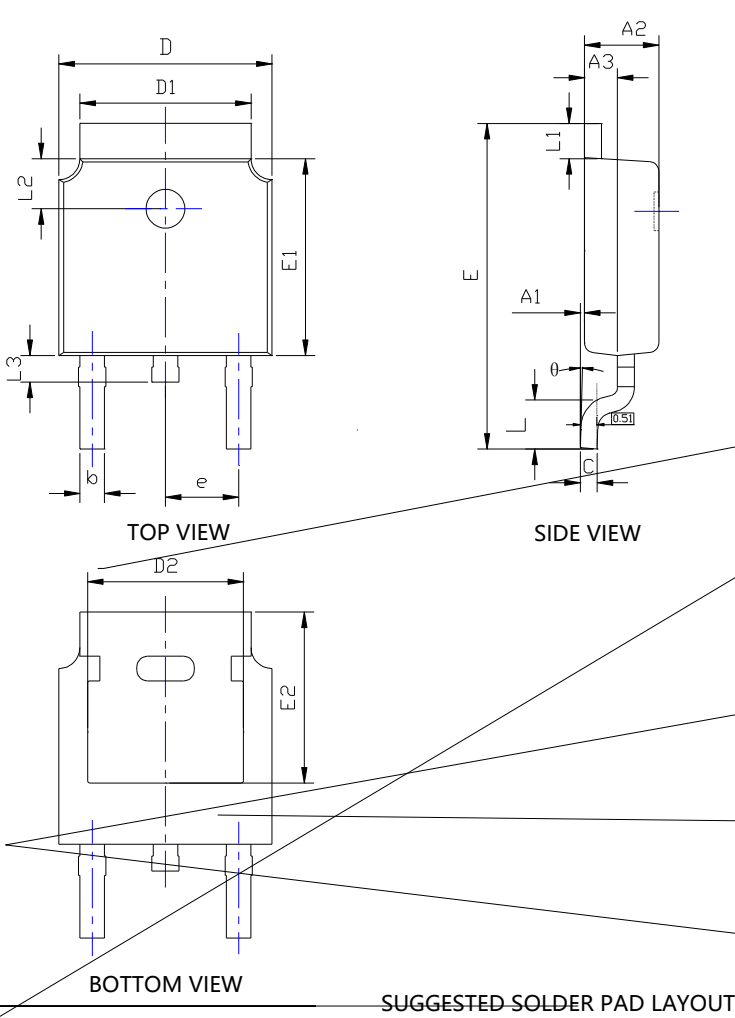


Figure 14. Safe Operation Area



YJD50GP06A

TO-252-B Package information



| SYMBOL | DIMENSIONS | | | | | |
|----------|------------|----------|-------|------------|-------|--------|
| | INCHES | | | Millimeter | | |
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A1 | 0.000 | --- | 0.008 | 0.000 | --- | 0.200 |
| A2 | 0.087 | 0.091 | 0.094 | 2.200 | 2.300 | 2.400 |
| A3 | 0.035 | 0.039 | 0.043 | 0.900 | 1.000 | 1.100 |
| b | 0.026 | 0.030 | 0.034 | 0.660 | 0.760 | 0.860 |
| c | 0.018 | 0.020 | 0.023 | 0.460 | 0.520 | 0.580 |
| D | 0.256 | 0.260 | 0.264 | 6.500 | 6.600 | 6.700 |
| D1 | 0.203 | 0.209 | 0.215 | 5.150 | --- | 5.450 |
| D2 | 0.181 | 0.189 | 0.195 | 4.600 | --- | 4.950 |
| E | 0.390 | 0.398 | 0.406 | 9.900 | --- | 10.300 |
| E1 | 0.236 | 0.240 | 0.244 | 6.000 | --- | 6.200 |
| E2 | | | | | | |
| e | 0.090BSC | | | 2.286BSC | | |
| L | 0.049 | 0.059 | 0.069 | 1.250 | --- | 1.750 |
| L1 | | | | | | |
| L2 | 0.055 | | 0.075 | 1.400 | --- | 1.900 |
| L3 | 0.240 | 0.310 | 0.039 | 0.600 | --- | 1.000 |
| L4 | | 0.114REF | | | | |
| θ | 0° | | 10° | 0° | | 10° |

NOTE:
 1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
 2. TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
 3. THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.



YJD50GP06A

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