

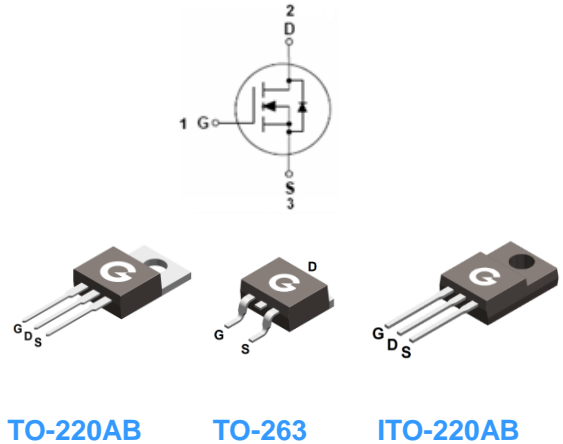
Features

- Low $R_{DS(ON)}$
- Fast switching
- Low gate charge
- Low Reverse transfer capacitances

HF

Mechanical Data

- Case: TO-220AB, TO-263, ITO-220AB
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matted-Tin plated; Solderable Per MIL-STD-202, Method 208



TO-220AB

TO-263

ITO-220AB

Ordering Information

| Part Number | Package | Shipping Quantity | Marking Code |
|-------------|-----------|--|--------------|
| BL10N40 | TO-220AB | 50 pcs / Tube | 10N40 |
| BL10N40B | TO-263 | 50 pcs / Tube or 800 pcs / Tape & Reel | 10N40B |
| BL10N40F | ITO-220AB | 50 pcs / Tube | 10N40F |

Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|---|-----------|-----------------|------------------|
| Drain-to-Source Voltage | V_{DSS} | 400 | V |
| Gate-to-Source Voltage | V_{GSS} | ± 30 | V |
| Continuous Drain Current ($T_C = 25^\circ\text{C}$) | I_D | 10 | A |
| Continuous Drain Current ($T_C = 100^\circ\text{C}$) | | 6.3 | A |
| Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$) | I_{DM} | 40 | A |
| Single Pulse Avalanche Energy ² | E_{AS} | 300 | mJ |
| Power Dissipation (TO-220AB, $T_C = 25^\circ\text{C}$) | P_D | 100 | W |
| Power Dissipation (TO-263, $T_C = 25^\circ\text{C}$) | | 100 | W |
| Power Dissipation (ITO-220AB, $T_C = 25^\circ\text{C}$) | | 35 | W |
| Operating Junction Temperature Range | T_J | $-55 \sim +150$ | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | $-55 \sim +150$ | $^\circ\text{C}$ |

Thermal Characteristics

| Parameter | Symbol | TO-220AB/TO-263 | ITO-220AB | Unit |
|-------------------------------------|-----------------|-----------------|-----------|--------------------|
| Thermal Resistance Junction-to-Case | $R_{\theta JC}$ | 1.25 | 3.6 | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-to-Air | $R_{\theta JA}$ | 50 | 62.5 | $^\circ\text{C/W}$ |

Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
|---|--|--|------|------|-----------|----------|
| Static Characteristics | | | | | | |
| V_{DSS} | Drain-Source Breakdown Voltage | $V_{GS} = 0V, I_D = 250\mu A$ | 400 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 400V, V_{GS} = 0V$ | - | - | 1 | μA |
| I_{GSS} | Gate-Body Leakage Current | $V_{GS} = \pm 30V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $R_{DS(ON)}$ | Drain-Source On-resistance ^{*1} | $V_{GS} = 10V, I_D = 5A$ | - | - | 0.55 | Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2 | - | 4 | V |
| Dynamic Characteristics | | | | | | |
| C_{ISS} | Input Capacitance | $V_{GS} = 0V$ | - | 1126 | - | pF |
| C_{OSS} | Output Capacitance | $V_{DS} = 25V$ | - | 124 | - | |
| C_{RSS} | Reverse Transfer Capacitance | $f = 1\text{MHz}$ | - | 8 | - | |
| Switching Characteristics | | | | | | |
| $t_{d(ON)}$ | Turn-on Delay Time ^{*3} | $V_{DD} = 200V$ $I_D = 10A$ $R_G = 10\Omega$ | - | 18 | - | ns |
| t_r | Turn-on Rise Time ^{*3} | | - | 23 | - | |
| $t_{d(OFF)}$ | Turn-Off Delay Time ^{*3} | | - | 41 | - | |
| t_f | Turn-Off Fall Time ^{*3} | | - | 19 | - | |
| Q_G | Total Gate-Charge | $V_{DD} = 320V$ | - | 23 | - | nC |
| Q_{GS} | Gate to Source Charge | $V_{GS} = 10V$ | - | 5.2 | - | |
| Q_{GD} | Gate to Drain (Miller) Charge | $I_D = 10A$ | - | 8.5 | - | |
| Source-Drain Diode Characteristics | | | | | | |
| V_{SD} | Diode Forward Voltage ^{*1} | $I_{SD} = 10A, V_{GS} = 0V$ | - | - | 1.5 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD} = 10A, V_{GS} = 0V$ | - | 376 | - | ns |
| Q_{rr} | Reverse Recovery Charge | $dI/dt = 100A/\mu s$ | - | 2.56 | - | μC |

Notes:

1. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
2. The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 100V, V_{GS} = 15V, L = 10mH$
3. Guaranteed by design, not subject to production

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

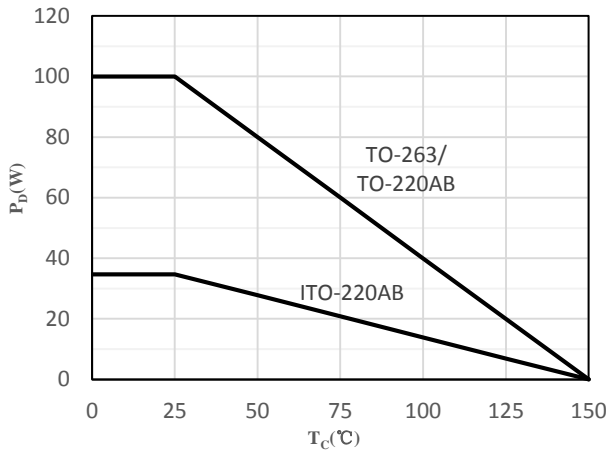


Fig 1 Power Dissipation

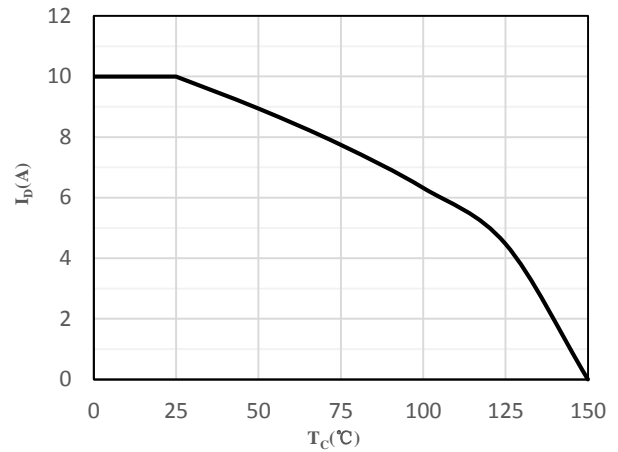


Fig 2 Drain Current

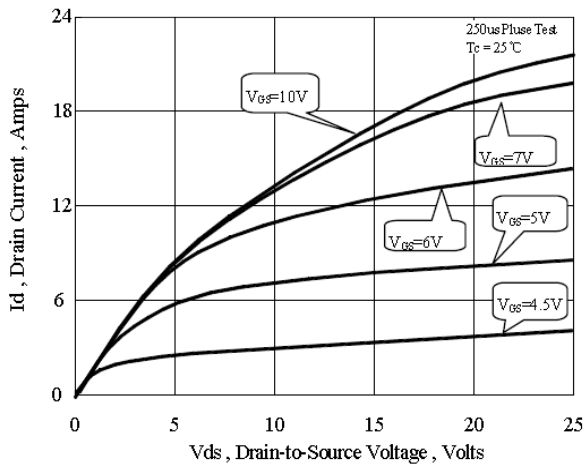


Fig 3 Typical Output Characteristics

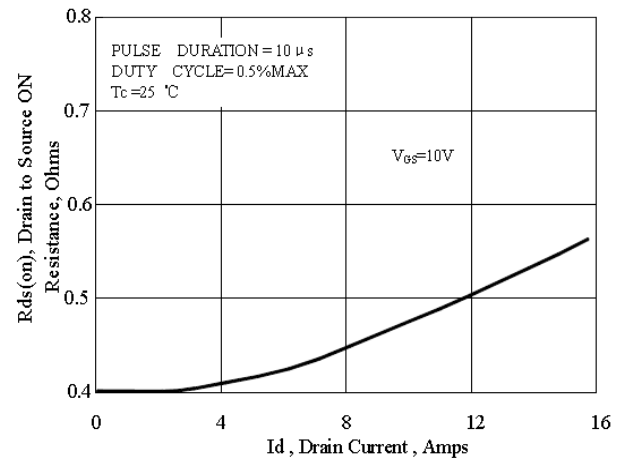


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

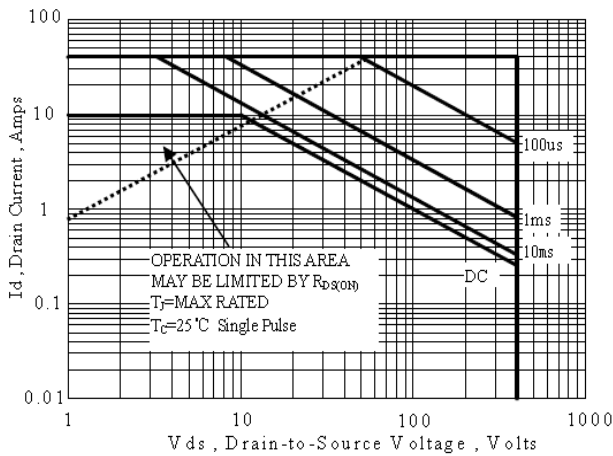


Fig 5 Safe Operation Area

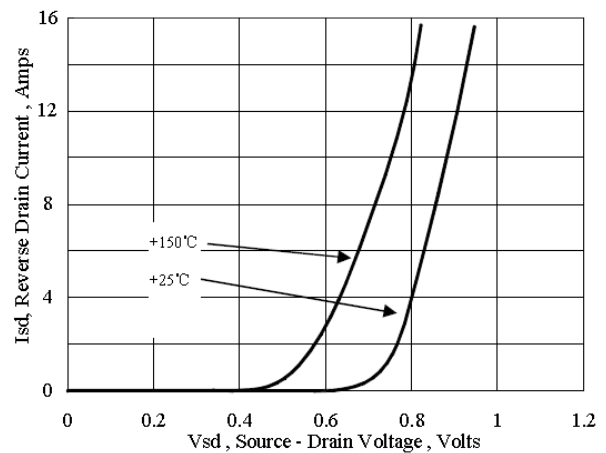


Fig 6 Body-Diode Characteristics

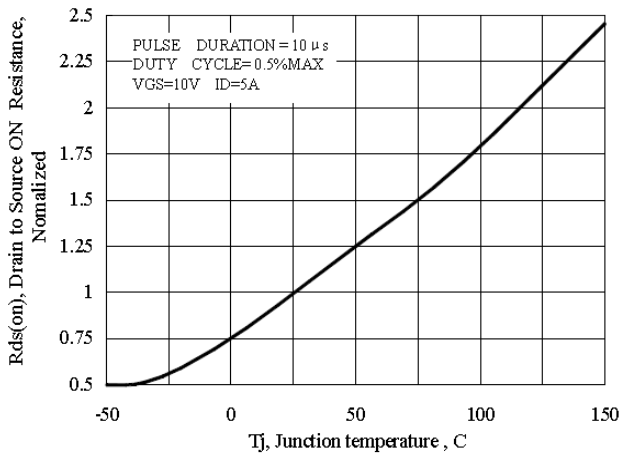


Fig 7 Normalized On-Resistance vs. Junction Temperature

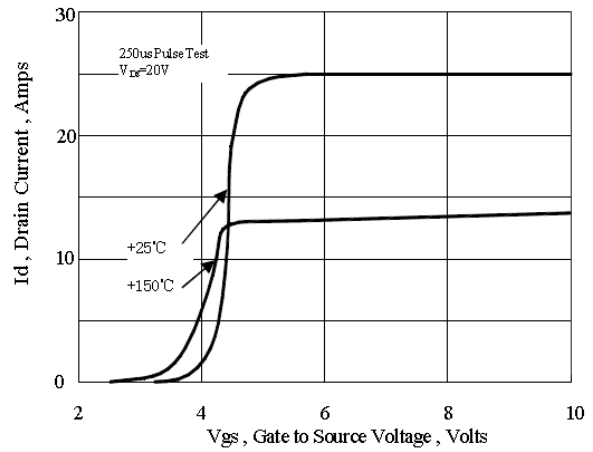


Fig 8 Transfer Characteristics

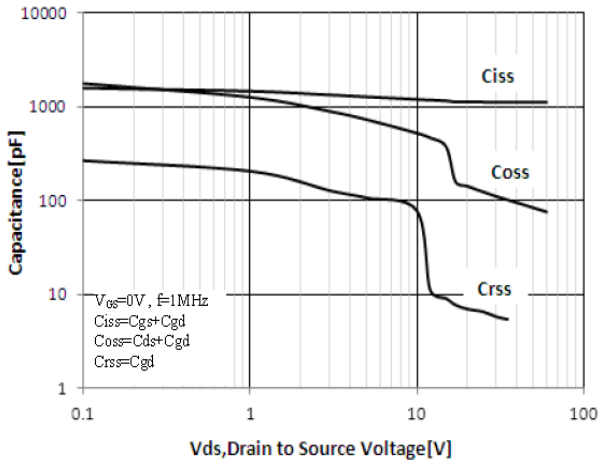


Fig 9 Capacitance Characteristics

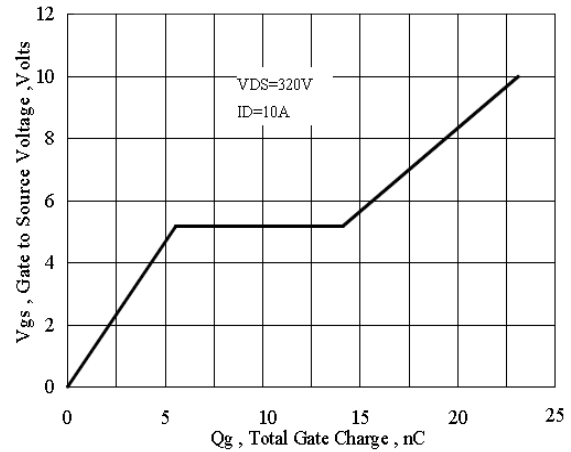


Fig 10 Gate-Charge Characteristics

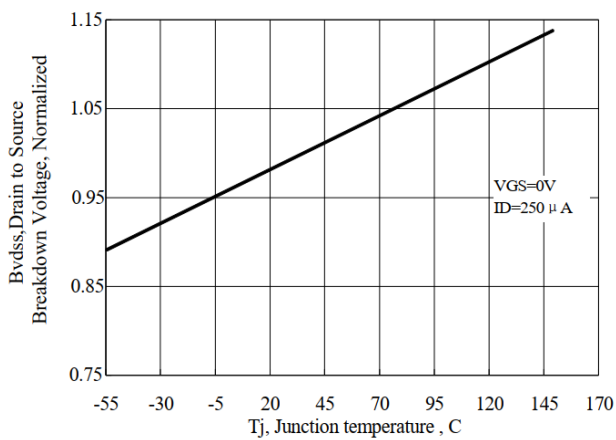


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

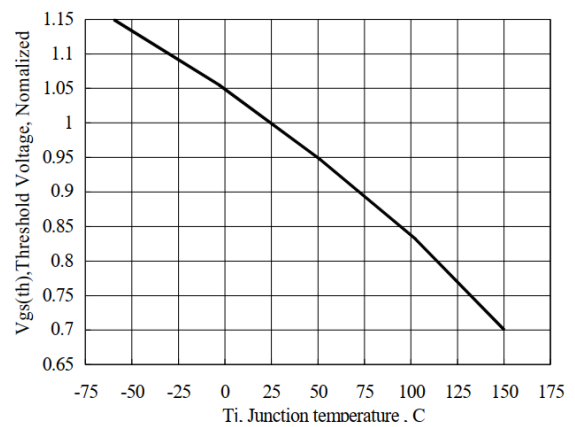
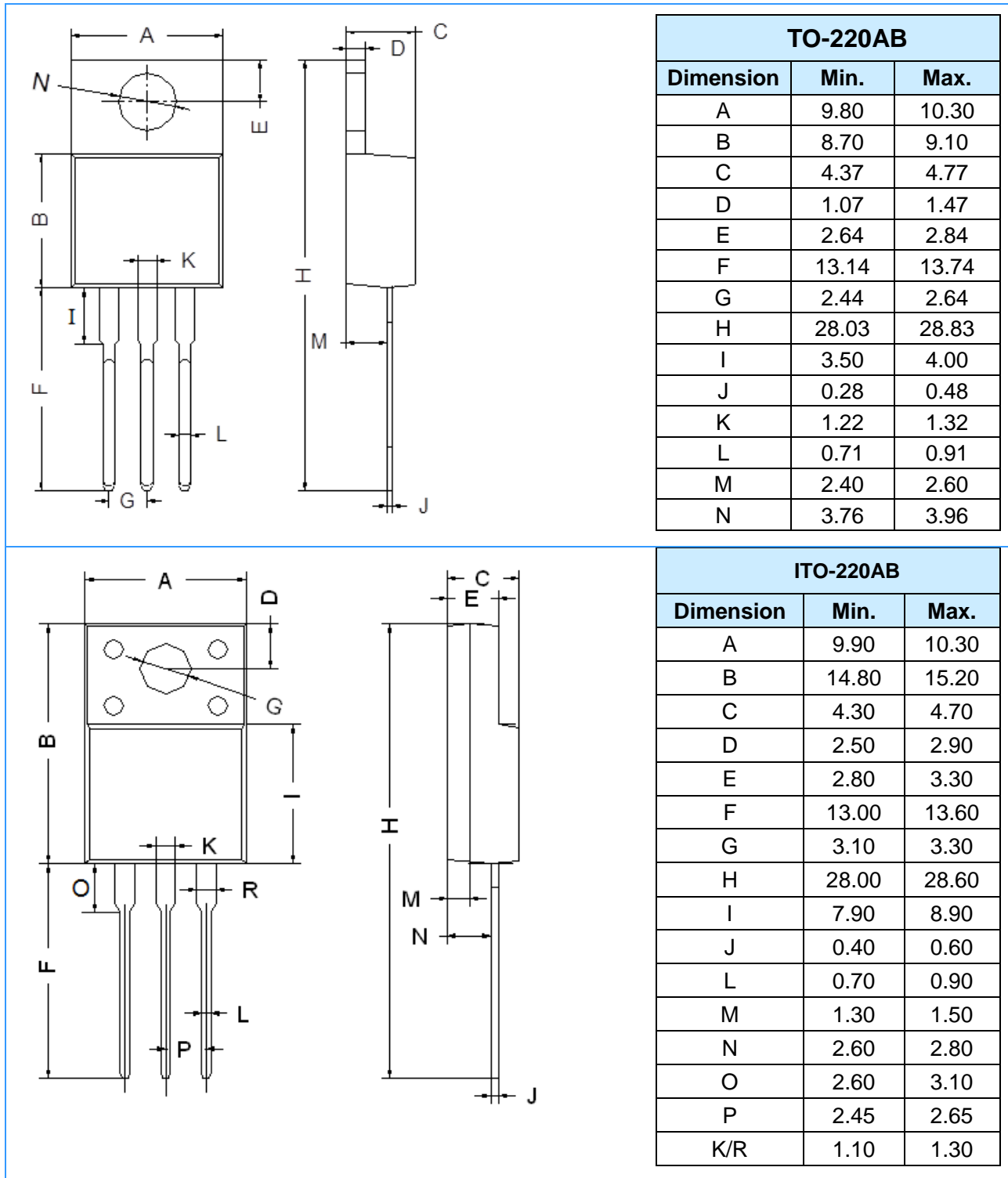
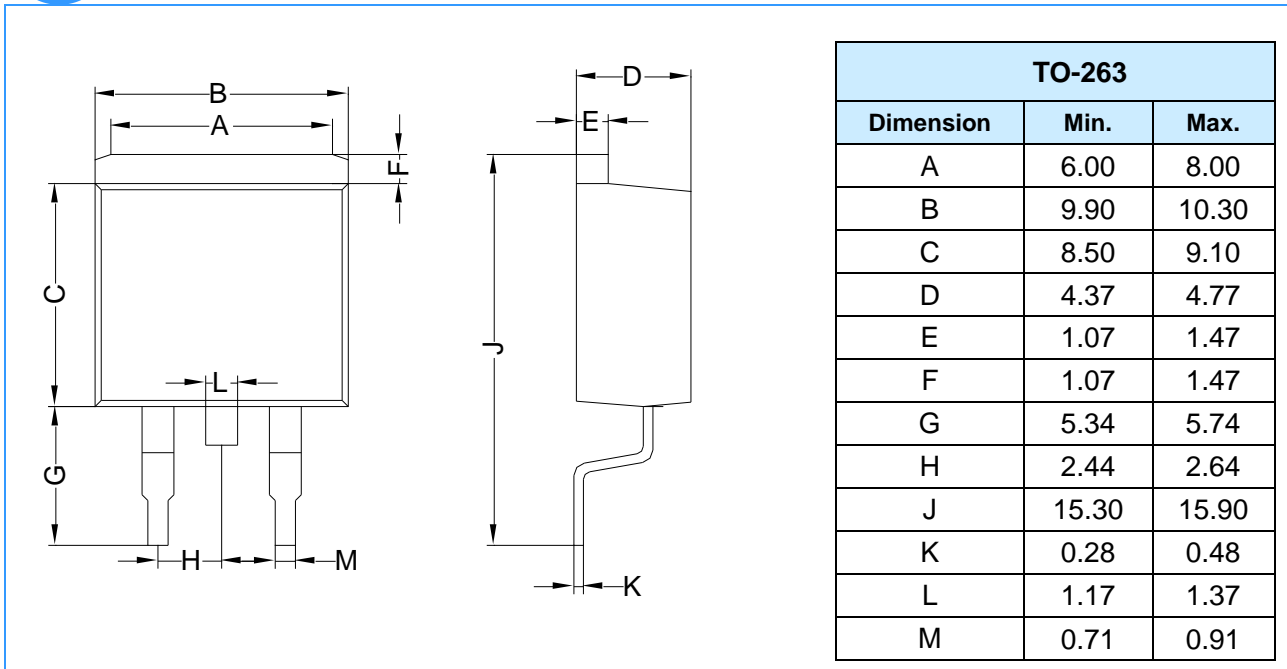


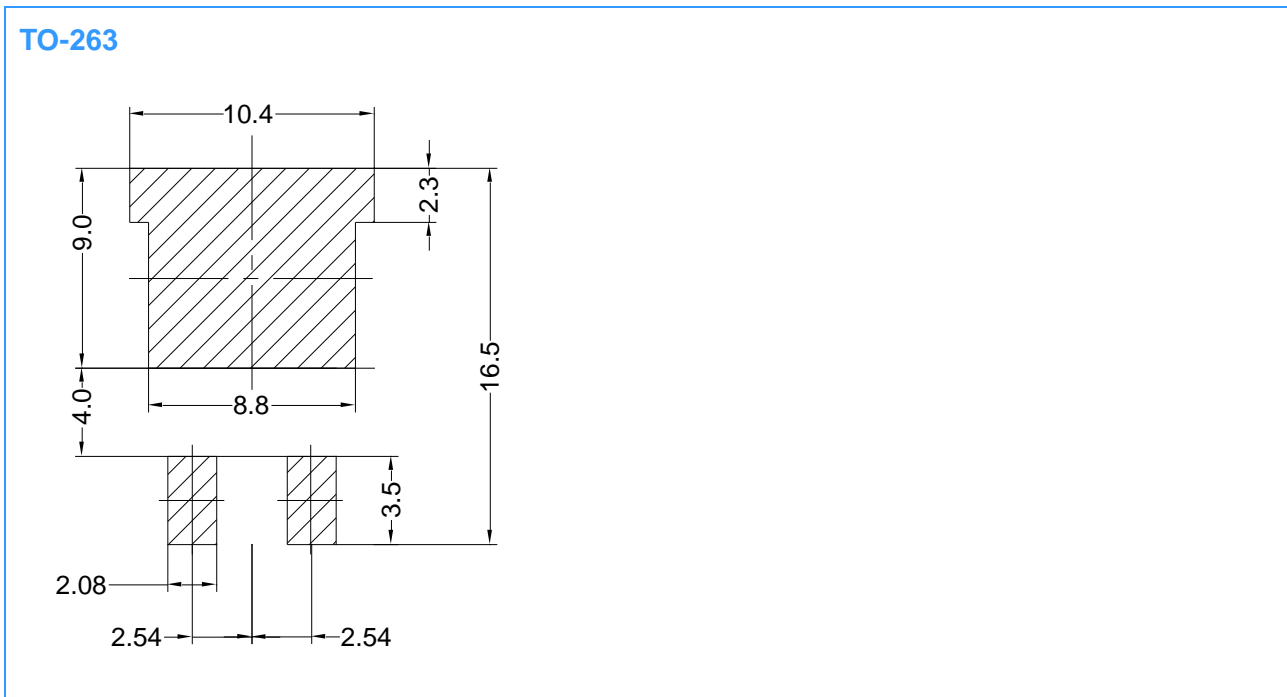
Fig 12 Normalized VGS(th) vs. Junction Temperature

Package Outline Dimensions (Unit: mm)





Mounting Pad Layout (Unit: mm)



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