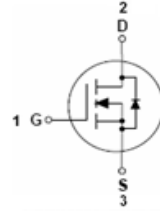


Features

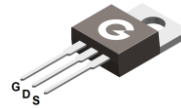
- Low $R_{DS(ON)}$
- Fast switching
- Low gate charge
- Low Reverse transfer capacitances
- HBM: JESD22-A114-B: 1B

HF

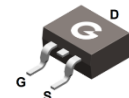


Mechanical Data

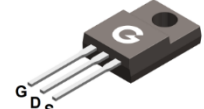
- Case: TO-220AB, TO-263, ITO-220AB
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matted-Tin plated; Solderable Per MIL-STD-202, Method 208



TO-220AB



TO-263



ITO-220AB

Ordering Information

| Part Number | Package | Shipping Quantity | Marking Code |
|-------------|-----------|--|--------------|
| BL8N50 | TO-220AB | 50 pcs / Tube | 8N50 |
| BL8N50B | TO-263 | 50 pcs / Tube or 800 pcs / Tape & Reel | 8N50B |
| BL8N50F | ITO-220AB | 50 pcs / Tube | 8N50F |

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

| Parameter | Symbol | Value | Unit |
|---|-----------|-----------------|------------------|
| Drain-to-Source Voltage | V_{DS} | 500 | V |
| Gate-to-Source Voltage | V_{GS} | ± 30 | V |
| Continuous Drain Current ($T_C = 25^\circ\text{C}$) | I_D | 8 | A |
| Continuous Drain Current ($T_C = 100^\circ\text{C}$) | | 5 | A |
| Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$) | I_{DM} | 32 | A |
| Single Pulse Avalanche Energy ² | E_{AS} | 400 | 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 | Min. | Typ. | Max. | Unit |
|--|------------------|------|------|------|------|
| Thermal Resistance Junction-to-Case (TO-220AB, TO-263) | R _{θJC} | - | 0.9 | 1.25 | °C/W |
| Thermal Resistance Junction-to-Case (ITO-220AB) | | - | - | 3.6 | °C/W |
| Thermal Resistance Junction-to-Air (TO-220AB, TO-263) | R _{θJA} | - | - | 50 | °C/W |
| Thermal Resistance Junction-to-Air (ITO-220AB) | | - | - | 62.5 | °C/W |

Electrical Characteristics (@ T_A = 25°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 = 250μA | 500 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} = 500V, V _{GS} = 0V | - | - | 1 | μA |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} = ±30V, V _{DS} = 0V | - | - | ±100 | nA |
| On Characteristics | | | | | | |
| R _{DS(ON)} | Drain-Source On-resistance *1 | V _{GS} = 10V, I _D = 4A | - | 0.67 | 0.9 | Ω |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} = V _{GS} , I _D = 250μA | 2 | 3 | 4 | V |
| R _G | Gate Resistance | V _{GS} = 0V, f = 1MHz | - | 3.3 | - | Ω |
| Dynamic Characteristics | | | | | | |
| C _{ISS} | Input Capacitance | V _{GS} = 0V V _{DS} = 25V f = 1MHz | - | 1027 | - | pF |
| C _{OSS} | Output Capacitance | | - | 111 | - | |
| C _{RSS} | Reverse Transfer Capacitance | | - | 6 | - | |
| Switching Characteristics | | | | | | |
| t _{d(ON)} | Turn-on Delay Time *3 | V _{DD} = 250V I _D = 8A R _G = 10Ω | - | 18 | - | ns |
| t _r | Turn-on Rise Time *3 | | - | 20 | - | |
| t _{d(OFF)} | Turn-Off Delay Time *3 | | - | 44 | - | |
| t _f | Turn-Off Fall Time *3 | | - | 15 | - | |
| Q _G | Total Gate-Charge | V _{DD} = 400V V _{GS} = 10V I _D = 8A | - | 23 | - | nC |
| Q _{GS} | Gate to Source Charge | | - | 5 | - | |
| Q _{GD} | Gate to Drain (Miller) Charge | | - | 10 | - | |
| Source-Drain Diode Characteristics | | | | | | |
| V _{SD} | Diode Forward Voltage *1 | I _{SD} = 8A, V _{GS} = 0V | - | 0.8 | 1.5 | V |
| t _{rr} | Reverse Recovery Time | I _{SD} = 8A, V _R = 400V | - | 290 | - | ns |
| Q _{rr} | Reverse Recovery Charge | di/dt = 100A/μs | - | 2.4 | - | μC |

Notes:

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

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

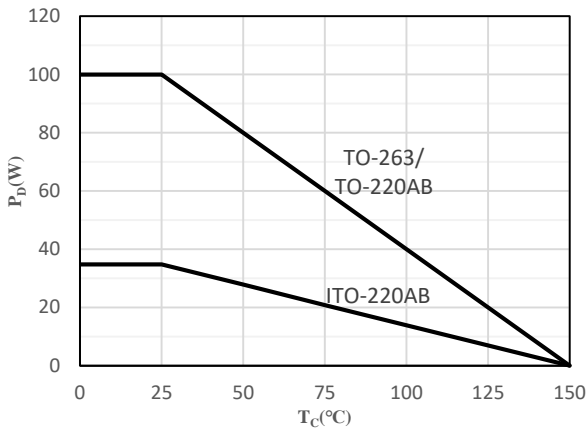


Fig 1 Power Dissipation

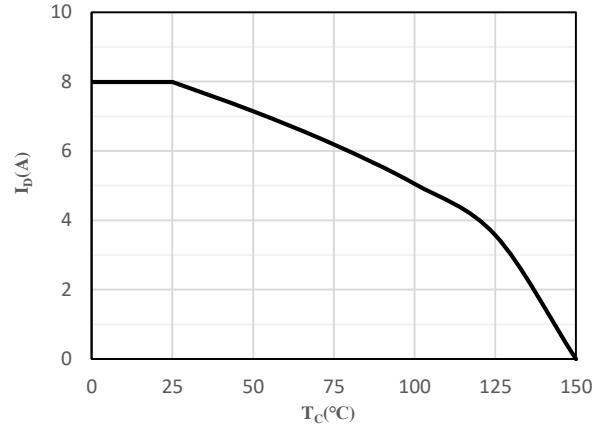


Fig 2 Drain Current

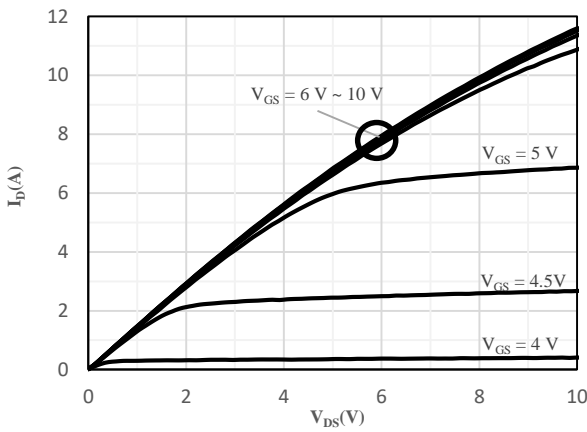


Fig 3 Typical Output Characteristics

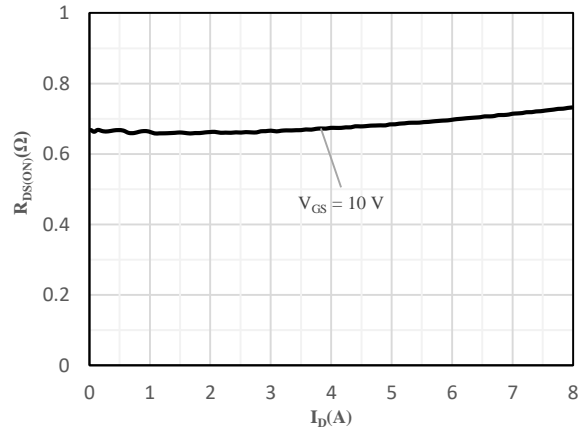


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

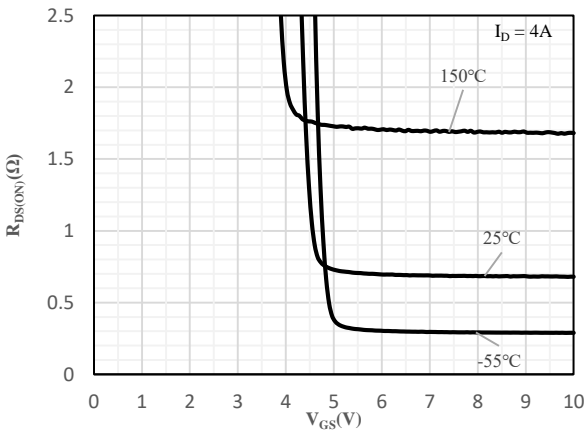


Fig 5 On-Resistance vs. Gate-Source Voltage

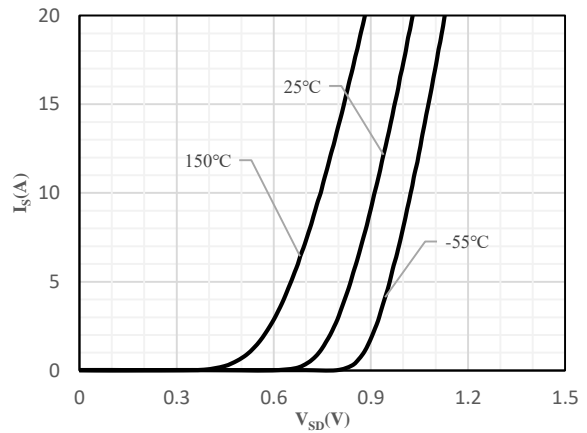


Fig 6 Body-Diode Characteristics

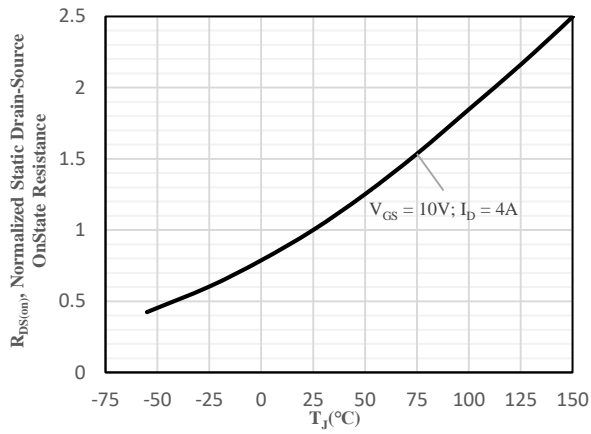


Fig 7 Normalized On-Resistance vs. Junction Temperature

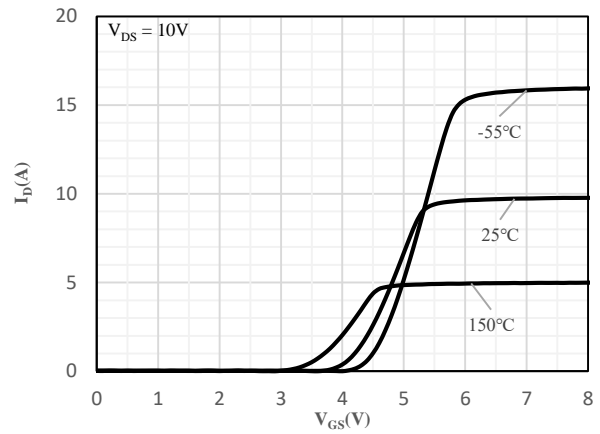


Fig 8 Transfer Characteristics

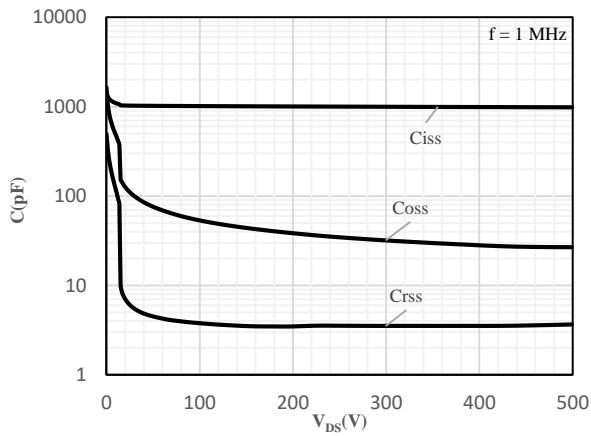


Fig 9 Capacitance Characteristics

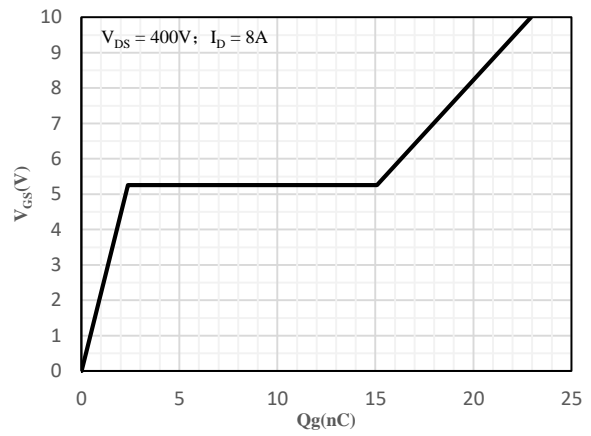


Fig 10 Gate-Charge Characteristics

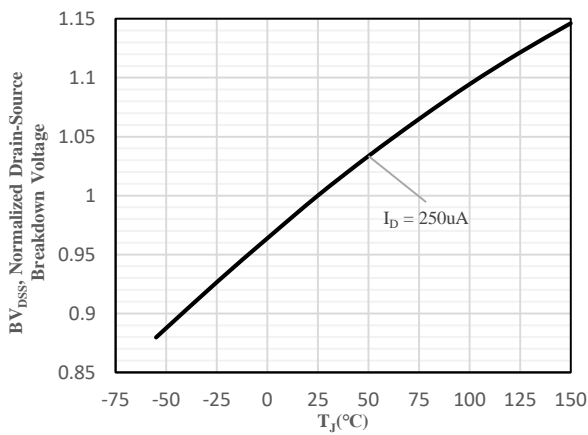


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

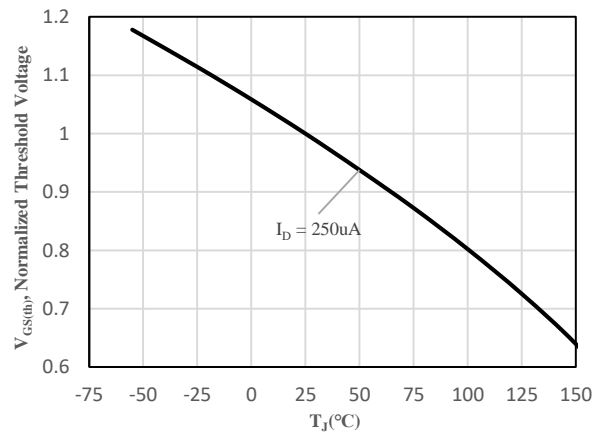


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

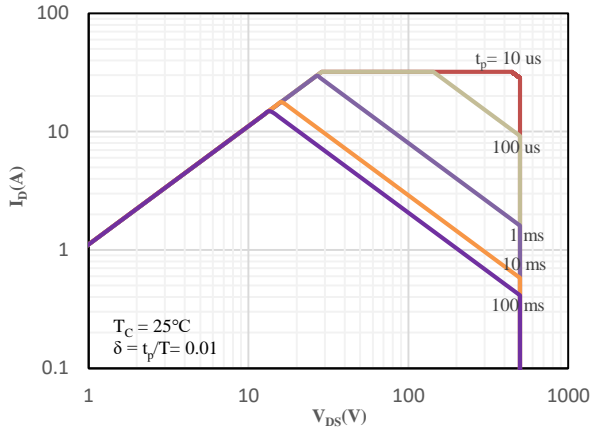


Fig 13 Safe Operation Area (TO-220AB / TO-263)

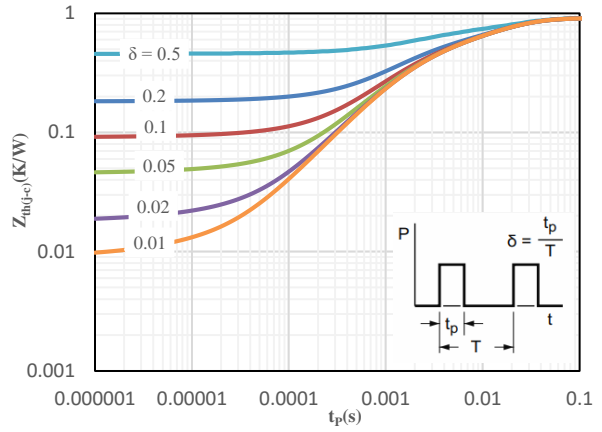
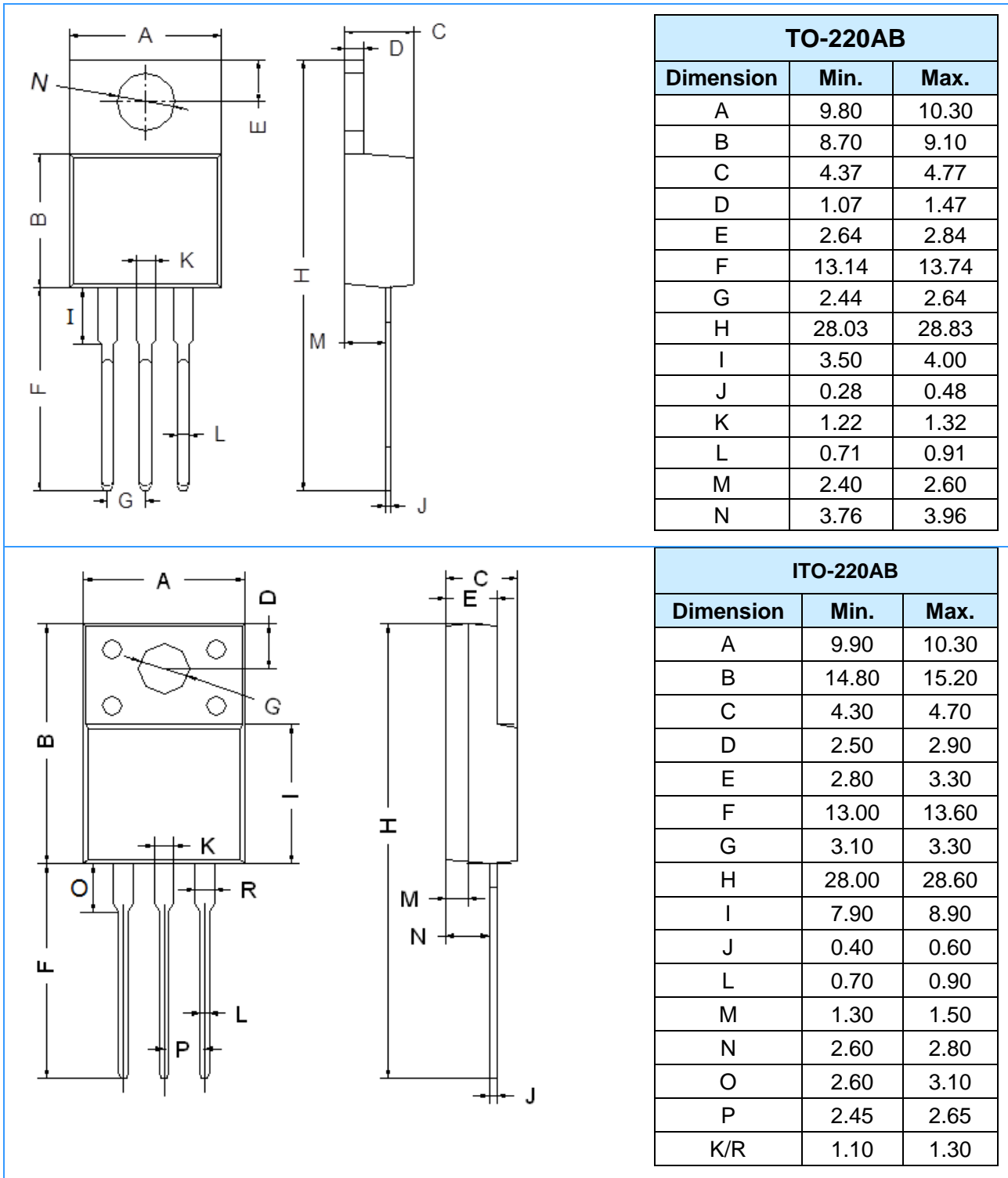
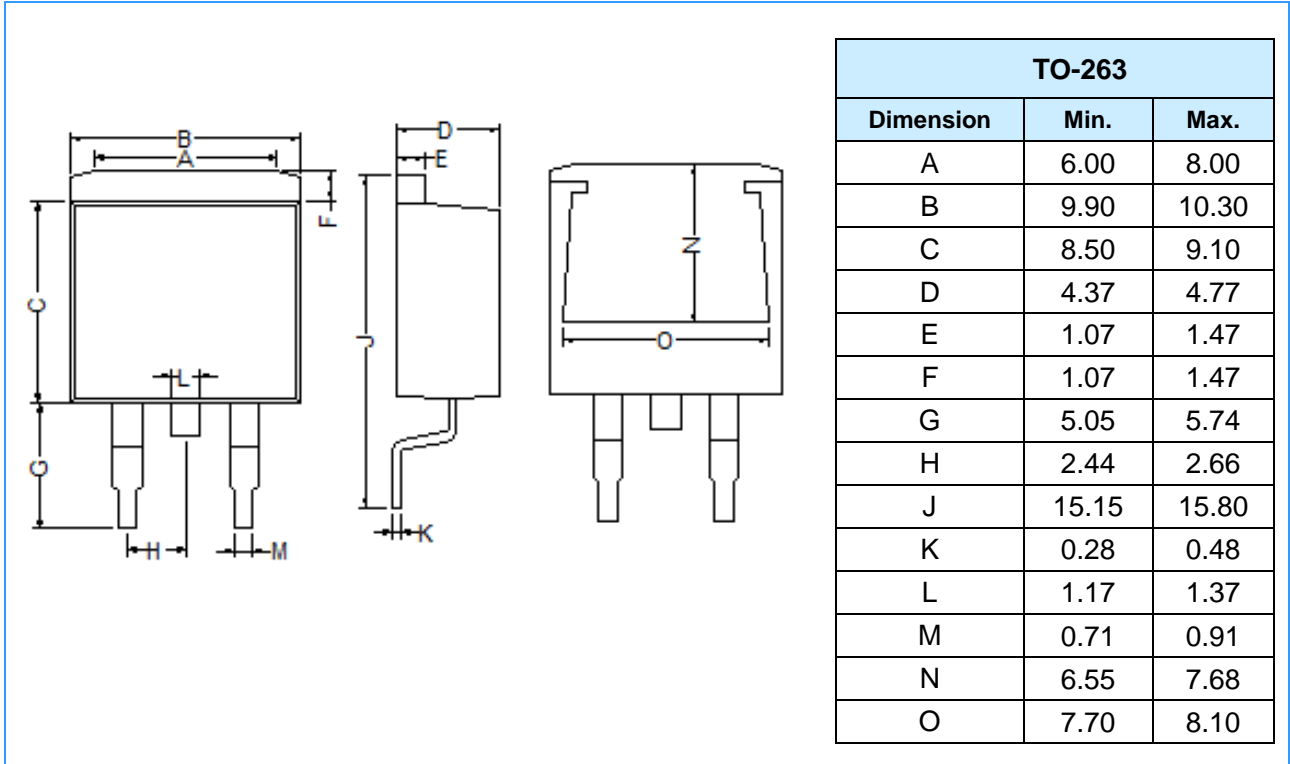


Fig 14 Maximum transient thermal impedance (TO-220AB / TO-263)

Package Outline Dimensions (Unit: mm)





Mounting Pad Layout (Unit: mm)

