# TMG160N15P

## N-Channel Enhancement Mosfet

**General Description**

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

**Applications**

- Load switch
- PWM

**General Features**

$V_{DS}$ = 150V $I_D$ =160A

$R_{DS(ON)}$ =5.5mΩ(typ.) @ $V_{GS}$=10V

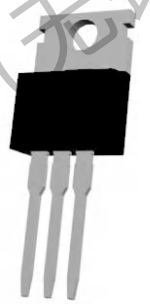
100% UIS Tested

100% $R_g$ Tested

Green Product

P:TO-220AB

Marking: G160N15



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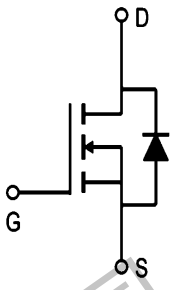


## Absolute Maximum Ratings: ($T_C$=25℃ unless otherwise noted)

| Symbol | Parameter | Ratings | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 150 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$ | Continuous Drain Current- | 160 | A |
| | Continuous Drain Current-TC=100℃ | 112 | |
| | Pulsed Drain Current | 560 | |
| $E_{AS}$ | Single Pulse Avalanche Energy | 625 | mJ |
| $P_D$ | Power Dissipation | 192 | W |
| $T_J$, $T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to +175 | ℃ |

## Thermal Characteristics:

| Symbol | Parameter | Max | Units |
|---|---|---|---|
| $R_{\Theta JC}$ | Thermal Resistance,Junction to Case | 1.67 | ℃/W |
| $R_{\Theta JA}$ | Thermal Resistance,Junction to Ambient | 62 | |

# TMG160N15P N-Channel Enhancement Mosfet

## Electrical Characteristics: ($T_C$=25℃ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Sourtce Breakdown Voltage | $V_{GS}$=0V,$I_D$=250μA | 150 | --- | --- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{GS}$=0V, $V_{DS}$=150V | --- | --- | 1 | μA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0A | --- | --- | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | GATE-Source Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=250μA | 2 | 2.5 | 3 | V |
| $R_{DS(ON)}$ | Drain-Source On Resistance | $V_{GS}$=10V,$I_D$=20A | --- | 5.5 | 7 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=75V, $V_{GS}$=0V, f=1MHz | --- | 5928 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 544 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 22 | --- | |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=75V,$R_{GEN}$=6Ω. $V_{GS}$=10V | --- | 31 | --- | ns |
| $t_r$ | Rise Time | | --- | 48 | --- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | --- | 79 | --- | ns |
| $t_f$ | Fall Time | | --- | 45 | --- | ns |
| $Q_g$ | Total Gate Charge | $V_{GS}$=10V, $V_{DS}$=75V, $I_D$=20A | --- | 84.2 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 23.8 | --- | nC |
| $Q_{gd}$ | Gate-Drain "Miller" Charge | | --- | 16.8 | --- | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| $V_{SD}$ | Source-Drain Diode Forward Voltage | $V_{GS}$=0V,$I_S$=1A | --- | 0.6 | 1 | V |
| Is | Diode Forward Current[1] | VD=VG=0V | --- | --- | 160 | A |
| $I_{SM}$ | Diode Forward Current | VD=VG=0V | --- | --- | 440 | A |
| Trr | Reverse Recovery Time | Tj=25℃,$I_F$=15A di/dt=100A/μs | --- | 92 | --- | NS |
| Qrr | Reverse Recovery Charge | | --- | 364 | --- | NC |

## Typical Characteristics

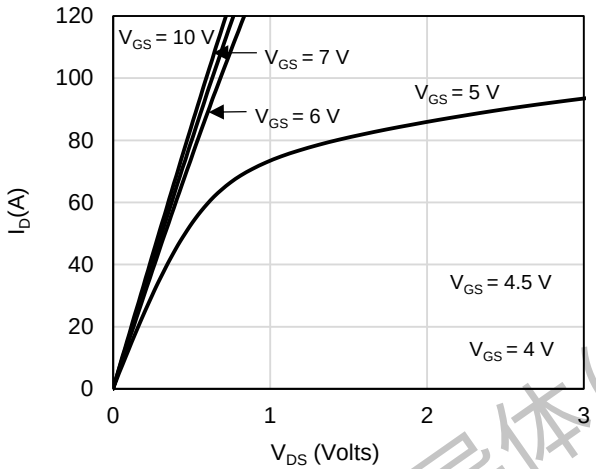


Figure 1: On-Region Characteristics

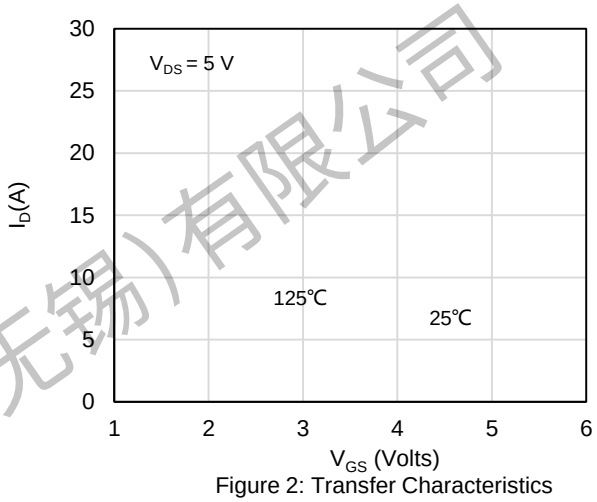


Figure 2: Transfer Characteristics

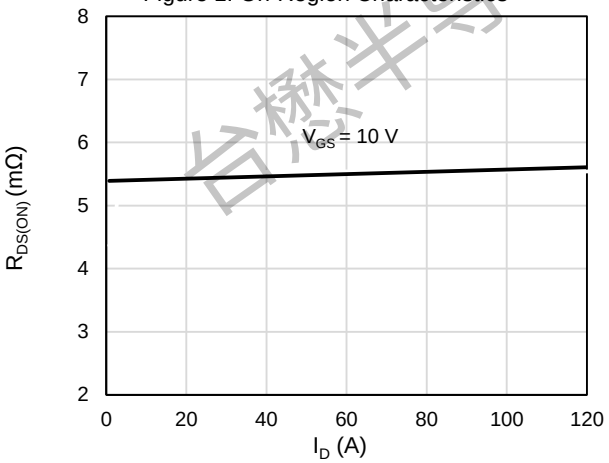


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

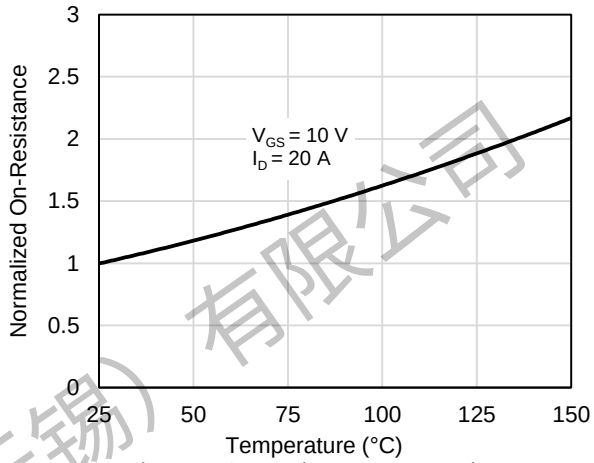


Figure 4: On-Resistance vs. Junction Temperature

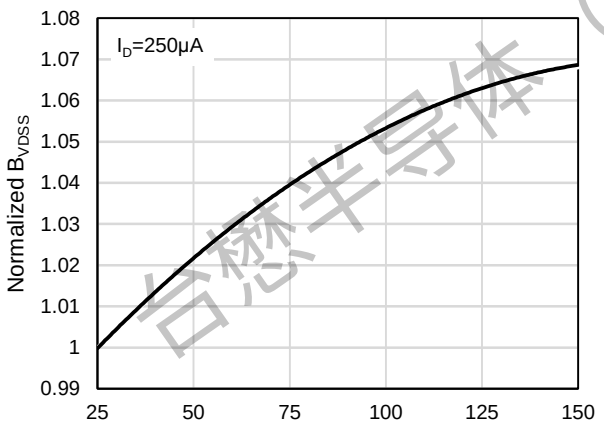


Figure 5: Breakdown Voltage vs. Junction Temperature

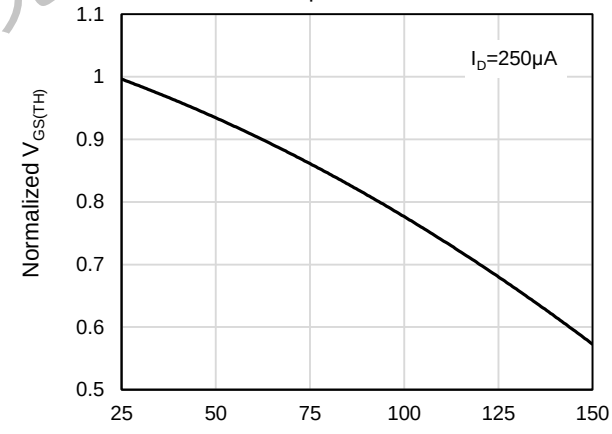


Figure 6: Threshold Voltage vs. Junction Temperature

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## N-Channel Enhancement Mosfet

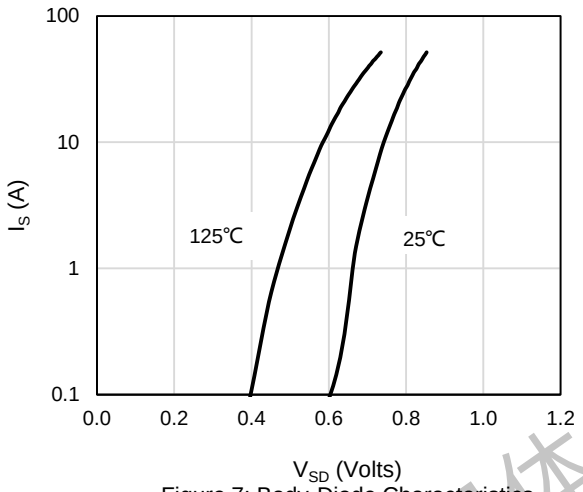



Figure 7: Body-Diode Characteristics

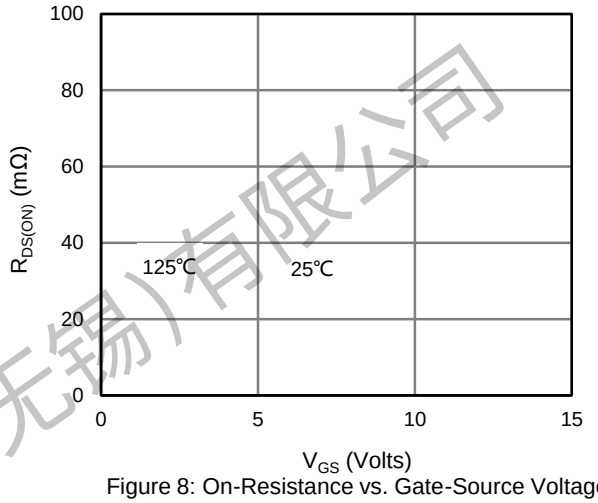



Figure 8: On-Resistance vs. Gate-Source Voltage

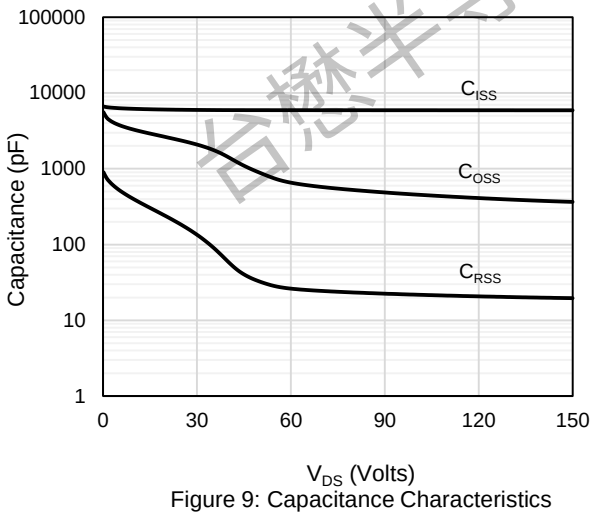



Figure 9: Capacitance Characteristics

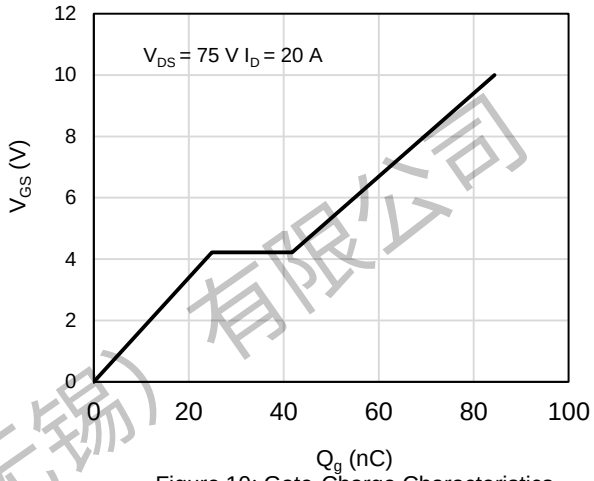



Figure 10: Gate-Charge Characteristics

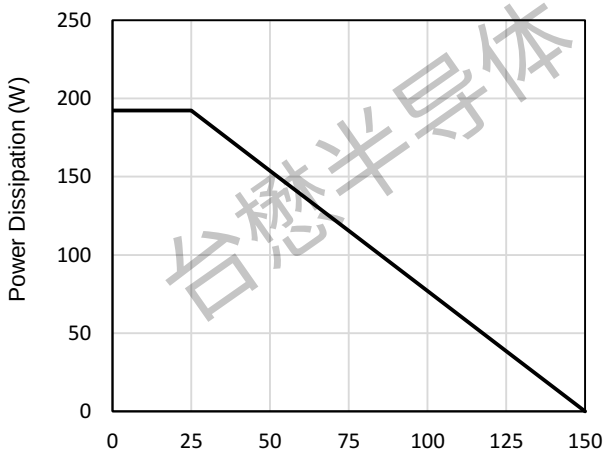



Figure 11: Power De-rating

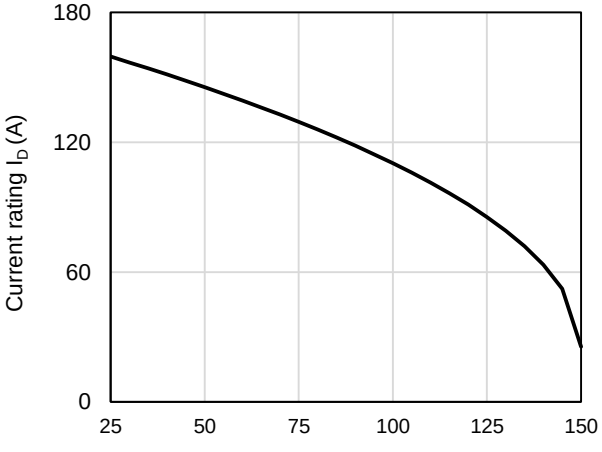



Figure 12: Current De-rating

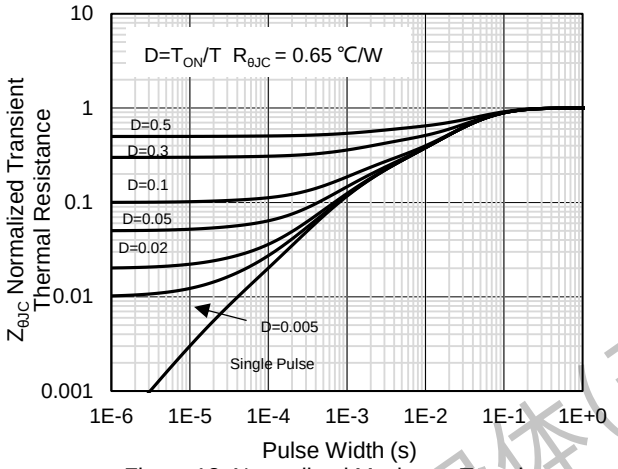



Figure 13: Normalized Maximum Transient Thermal Impedance

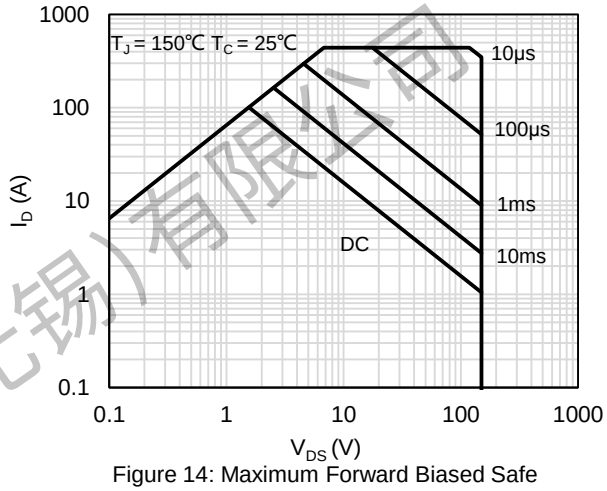
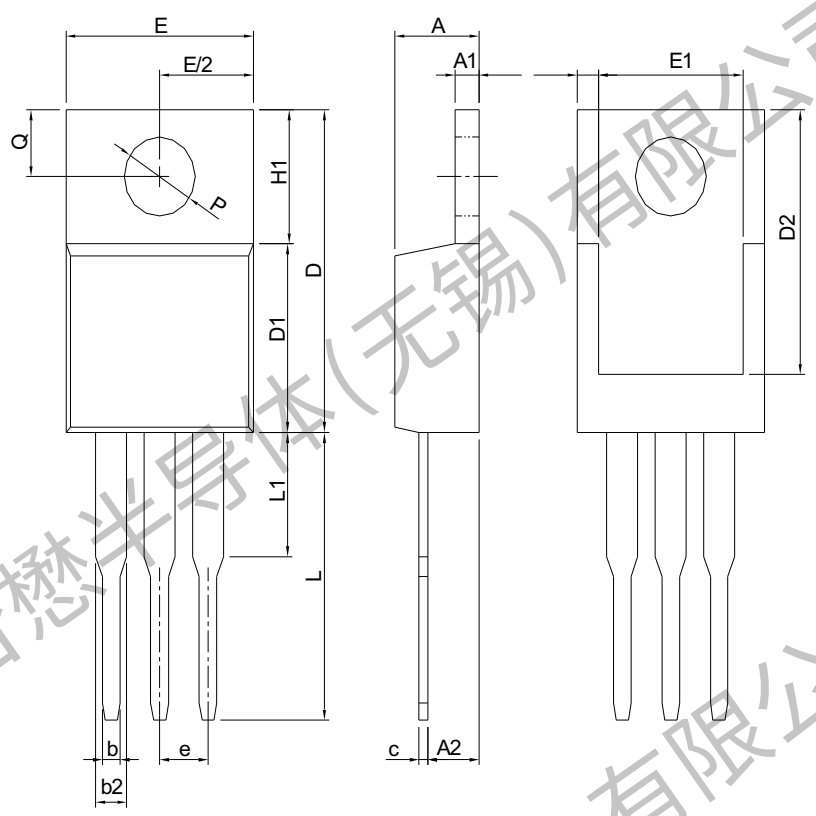



Figure 14: Maximum Forward Biased Safe Operating Area

# TMG160N15P

## N-Channel Enhancement Mosfet

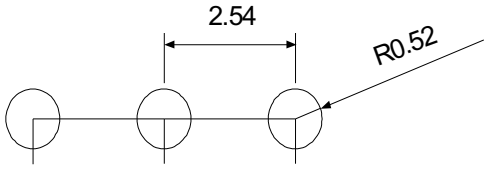
## Package Mechanical Data: TO-220AB



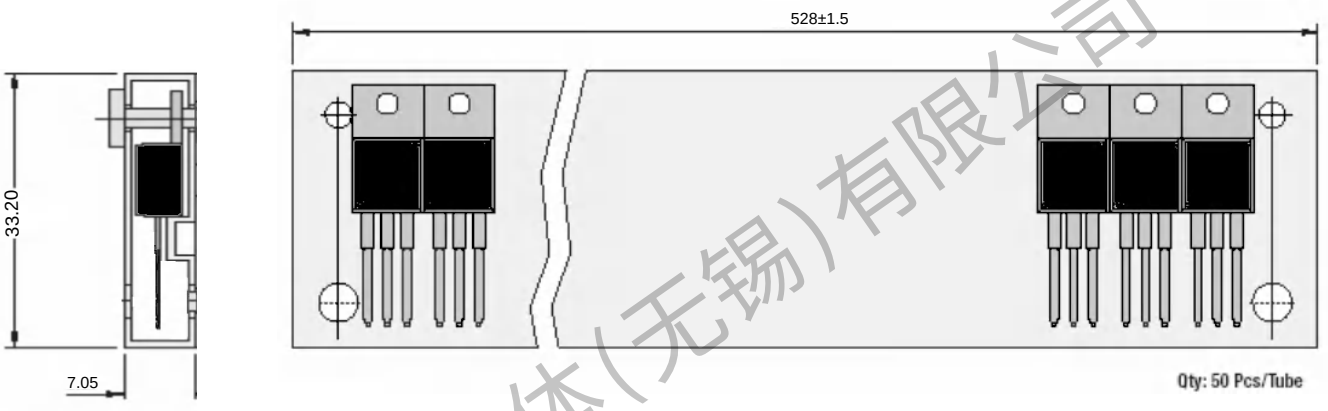

| SYMBOL | TO-220 | | | |
|---|---|---|---|---|
| | MILLIMETERS | | INCHES | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 3.56 | 4.83 | 0.140 | 0.190 |
| A1 | 0.51 | 1.40 | 0.020 | 0.055 |
| A2 | 2.03 | 2.92 | 0.080 | 0.115 |
| b | 0.38 | 1.02 | 0.015 | 0.040 |
| b2 | 1.14 | 1.78 | 0.045 | 0.070 |
| c | 0.36 | 0.61 | 0.014 | 0.024 |
| D | 14.22 | 16.51 | 0.560 | 0.650 |
| D1 | 8.38 | 9.02 | 0.330 | 0.355 |
| D2 | 12.19 | 13.65 | 0.480 | 0.537 |
| E | 9.65 | 10.67 | 0.380 | 0.420 |
| E1 | 6.86 | 8.89 | 0.270 | 0.350 |
| e | 2.54 BSC | | 0.100 BSC | |
| H1 | 5.84 | 6.86 | 0.230 | 0.270 |
| L | 12.70 | 14.73 | 0.500 | 0.580 |
| L1 | - | 6.35 | - | 0.250 |
| P | 3.53 | 4.09 | 0.139 | 0.161 |
| Q | 2.54 | 3.43 | 0.100 | 0.135 |

Note: Follow JEDEC TO-220 AB.

**RECOMMENDED LAND PATTERN**




UNIT: mm



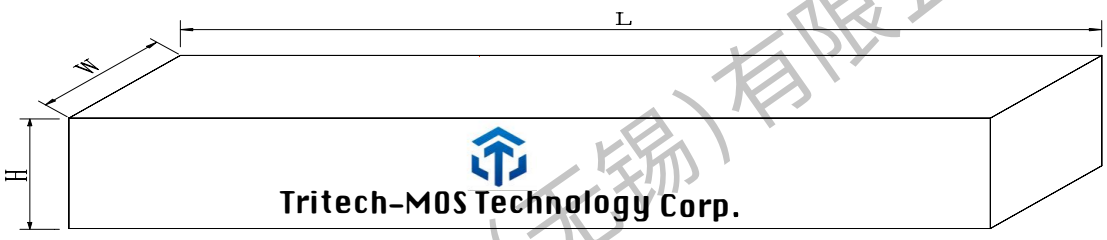

All Dimensions are in mm



## 1.TO-220AB Packaging

| Package | Packing Form | Quantity | | |
|---|---|---|---|---|
| | | Tube | Inner Box [kpcs] | Outbox [kpcs] |
| TO-220AB | Tube Tape | 50 | 5 | 1 |

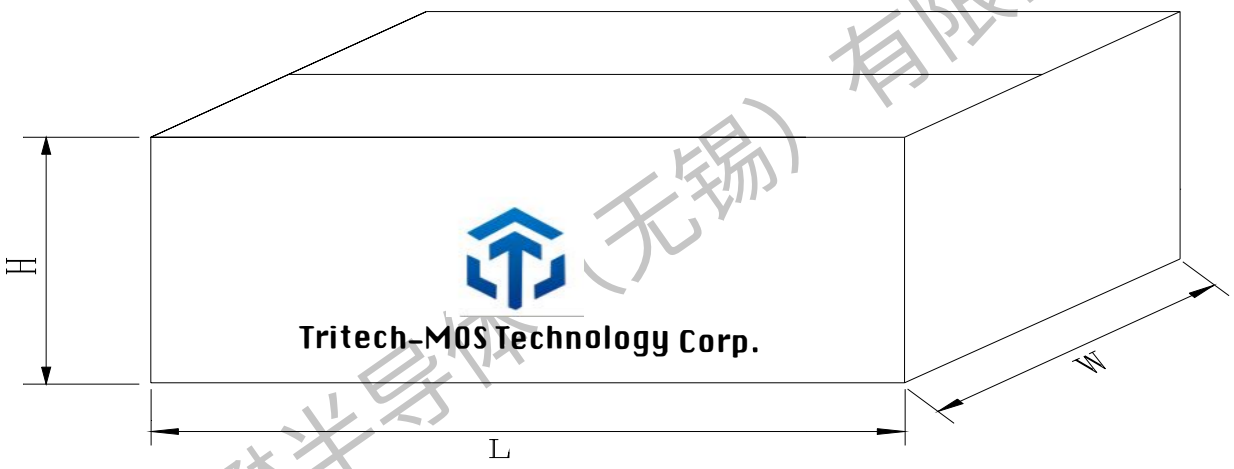
**Inner Box**




**Dimension : 580 (L)×154(W) ×49(H) mm**

**Quantity : 50 ×20Ea = 1Kpcs**

**Outer Box**




**Dimension : 595(L)×285(W) ×185(H) mm**

**Quantity : 1K×5Ea = 5Kpcs**

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Revision history:

| Date | Rev | Description | Page |
|---|---|---|---|
| 2023.08.11 | 23.08 | Original | |