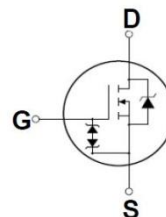
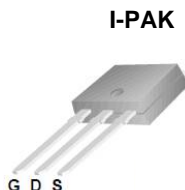


Features

- Low gate charge
- 100% avalanche tested
- Improved dv/dt capability
- RoHS compliant
- Halogen free package
- JEDEC Qualification
- Improved ESD performance

N-channel MOSFET

| | | |
|------------|-------|----------------|
| BV_{DSS} | I_D | $R_{DS(on)}$ |
| 600V | 4.2A | < 2.1 Ω |



| Device | Package | Marking | Remark |
|-------------------------|-------------|-------------------------|--------------|
| TMD5N60AZ / TMU5N60AZ | D-PAK/I-PAK | TMD5N60AZ / TMU5N60AZ | RoHS |
| TMD5N60AZG / TMU5N60AZG | D-PAK/I-PAK | TMD5N60AZG / TMU5N60AZG | Halogen Free |

Absolute Maximum Ratings

| Parameter | Symbol | TMD5N60AZ(G)/TMU5N60AZ(G) | Unit |
|---|----------------|-----------------------------------|------------------|
| Drain-Source Voltage | V_{DSS} | 600 | V |
| Gate-Source Voltage | V_{GS} | ± 30 | V |
| Continuous Drain Current | I_D | $T_C = 25\text{ }^\circ\text{C}$ | 4.2 |
| | | $T_C = 100\text{ }^\circ\text{C}$ | 2.71 |
| Pulsed Drain Current (Note 1) | I_{DM} | 16.8 | A |
| Single Pulse Avalanche Energy (Note 2) | E_{AS} | 217 | mJ |
| Repetitive Avalanche Current (Note 1) | I_{AR} | 4.2 | A |
| Repetitive Avalanche Energy (Note 1) | E_{AR} | 9.84 | mJ |
| Power Dissipation | P_D | $T_C = 25\text{ }^\circ\text{C}$ | 98.4 |
| | | Derate above 25 $^\circ\text{C}$ | 0.787 |
| Peak Diode Recovery dv/dt (Note 3) | dv/dt | 4.5 | V/ns |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55~150 | $^\circ\text{C}$ |
| Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds | T_L | 300 | $^\circ\text{C}$ |

* Limited only by maximum junction temperature

Thermal Characteristics

| Parameter | Symbol | TMD5N60AZ(G)/TMU5N60AZ(G) | Unit |
|---|-----------------|---------------------------|---------------------------|
| Maximum Thermal resistance, Junction-to-Case | $R_{\theta JC}$ | 1.27 | $^\circ\text{C}/\text{W}$ |
| Maximum Thermal resistance, Junction-to-Ambient | $R_{\theta JA}$ | 110 | $^\circ\text{C}/\text{W}$ |

Electrical Characteristics : $T_C=25^\circ\text{C}$, unless otherwise noted

| Parameter | Symbol | Test condition | Min | Typ | Max | Units |
|-------------------------------------|------------|--|-----|-----|------|---------------|
| OFF | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$ | 600 | -- | -- | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}$ | -- | -- | 1 | μA |
| | | $V_{DS} = 480\text{ V}, T_C = 125^\circ\text{C}$ | -- | -- | 10 | μA |
| Forward Gate-Source Leakage Current | I_{GSSF} | $V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$ | -- | -- | 100 | μA |
| Reverse Gate-Source Leakage Current | I_{GSSR} | $V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$ | -- | -- | -100 | μA |

ON

| | | | | | | |
|--|--------------|--|----|-----|-----|----------|
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$ | 3 | -- | 5 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS} = 10\text{ V}, I_D = 2.1\text{ A}$ | -- | 1.7 | 2.1 | Ω |
| Forward Transconductance ^(Note 4) | g_{FS} | $V_{DS} = 30\text{ V}, I_D = 2.1\text{ A}$ | -- | 5 | -- | S |

DYNAMIC

| | | | | | | |
|------------------------------|-----------|--|----|-----|----|----|
| Input Capacitance | C_{iss} | $V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$ | -- | 658 | -- | pF |
| Output Capacitance | C_{oss} | | -- | 72 | -- | pF |
| Reverse Transfer Capacitance | C_{rss} | | -- | 9 | -- | pF |

SWITCHING

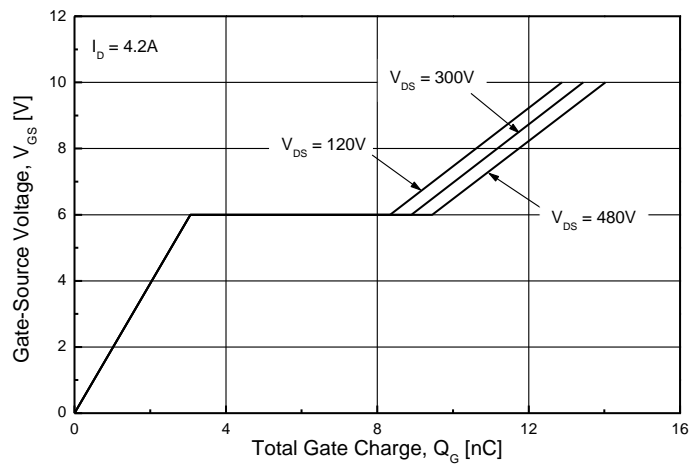
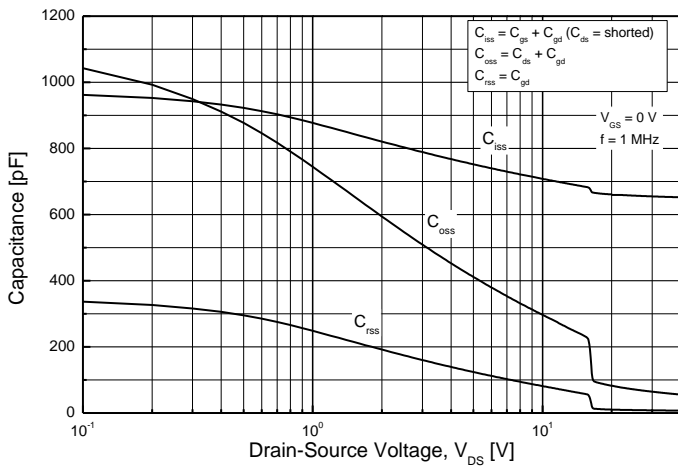
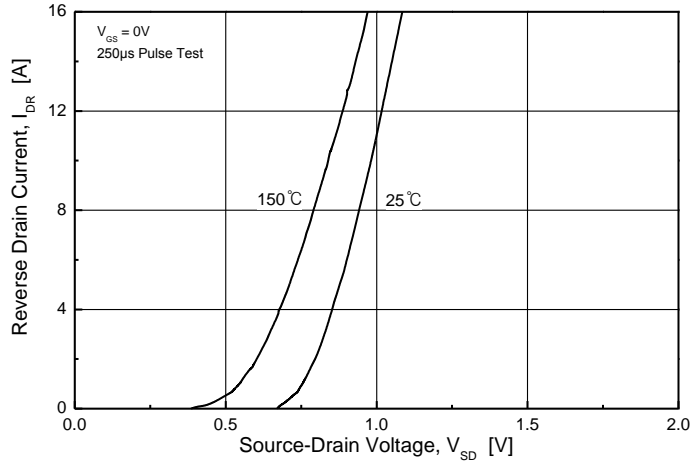
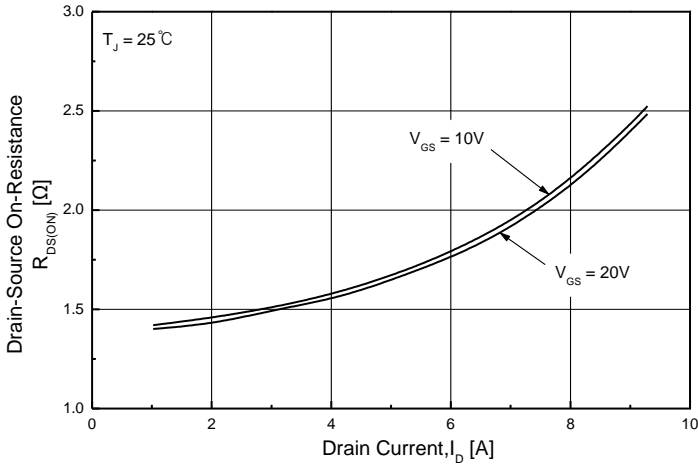
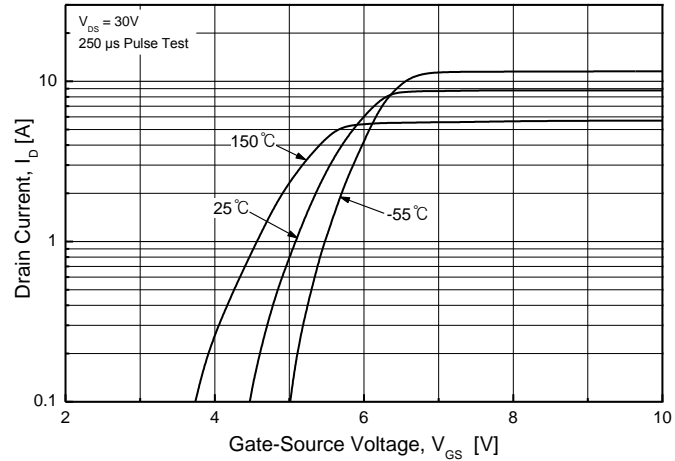
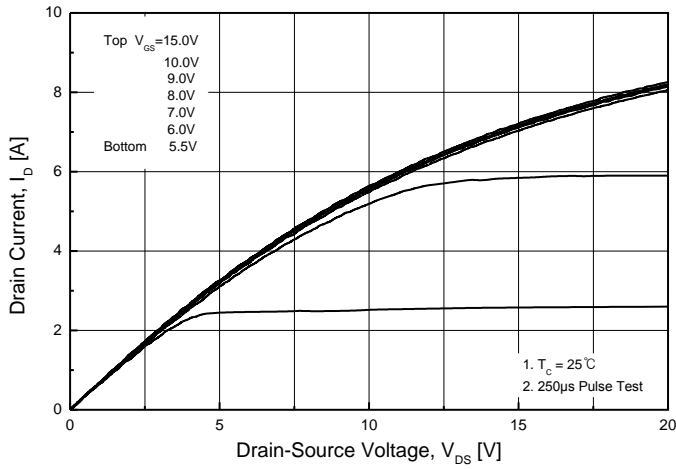
| | | | | | | |
|---|--------------|--|----|----|----|----|
| Turn-On Delay Time ^(Note 4,5) | $t_{d(on)}$ | $V_{DD} = 300\text{ V}, I_D = 4.2\text{ A},$ $R_G = 25\ \Omega, V_{GS} = 10\text{ V}$ | -- | 19 | -- | ns |
| Turn-On Rise Time ^(Note 4,5) | t_r | | -- | 25 | -- | ns |
| Turn-Off Delay Time ^(Note 4,5) | $t_{d(off)}$ | | -- | 34 | -- | ns |
| Turn-Off Fall Time ^(Note 4,5) | t_f | | -- | 19 | -- | ns |
| Total Gate Charge ^(Note 4,5) | Q_g | $V_{DS} = 480\text{ V}, I_D = 4.2\text{ A},$ $V_{GS} = 10\text{ V}$ | -- | 14 | -- | nC |
| Gate-Source Charge ^(Note 4,5) | Q_{gs} | | -- | 3 | -- | nC |
| Gate-Drain Charge ^(Note 4,5) | Q_{gd} | | -- | 7 | -- | nC |

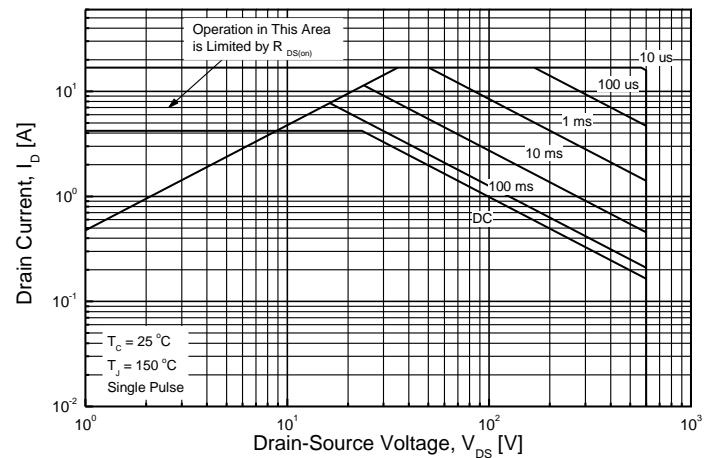
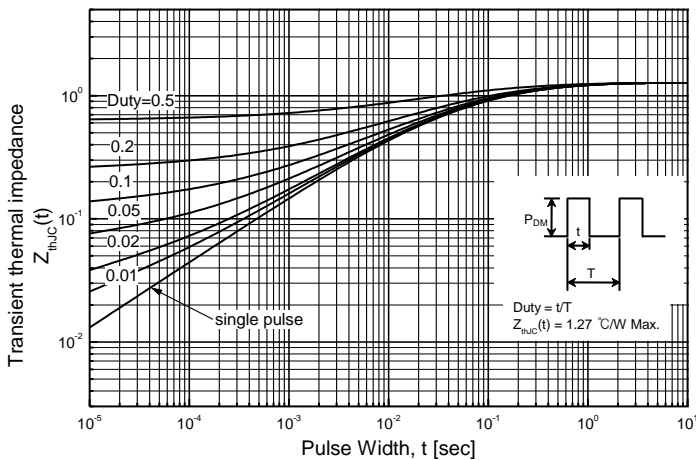
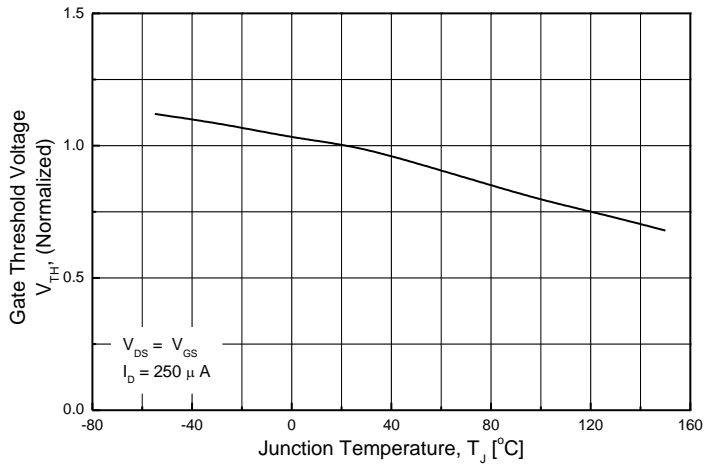
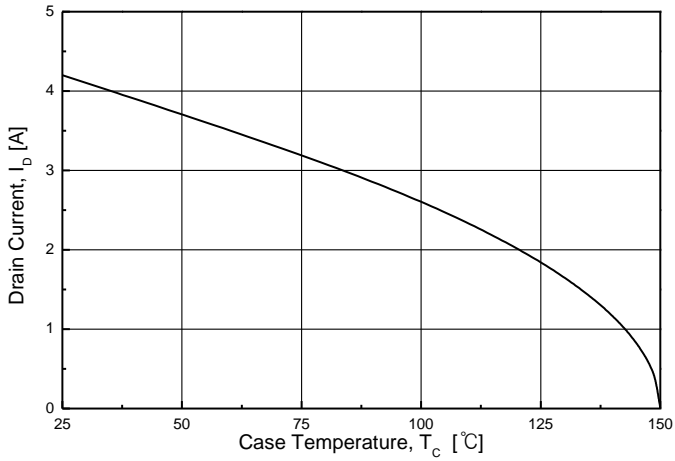
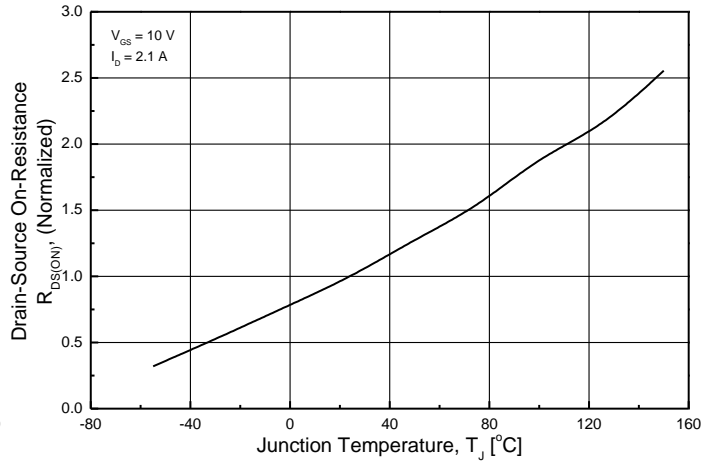
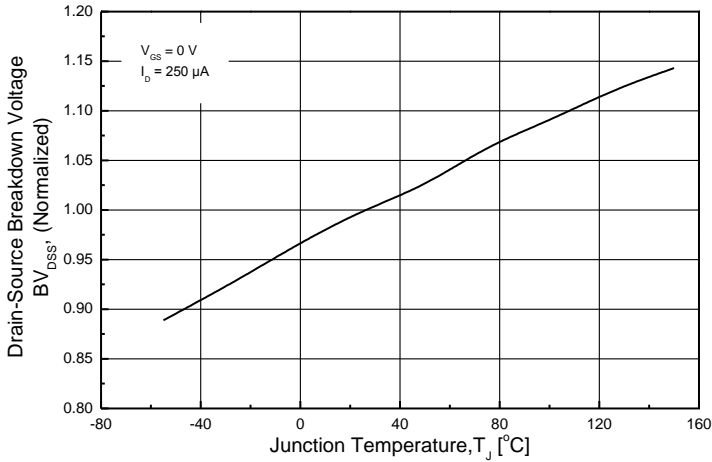
SOURCE DRAIN DIODE

| | | | | | | |
|---|----------|---|----|-----|------|---------------|
| Maximum Continuous Drain-Source Diode Forward Current | I_S | ---- | -- | -- | 4.2 | A |
| Maximum Pulsed Drain-Source Diode Forward Current | I_{SM} | ---- | -- | -- | 16.8 | A |
| Drain-Source Diode Forward Voltage | V_{SD} | $V_{GS} = 0\text{ V}, I_S = 4.2\text{ A}$ | -- | -- | 1.5 | V |
| Reverse Recovery Time ^(Note 4) | t_{rr} | $V_{GS} = 0\text{ V}, I_S = 4.2\text{ A}$ | -- | 283 | -- | ns |
| Reverse Recovery Charge ^(Note 4) | Q_{rr} | $di_F / dt = 100\text{ A}/\mu\text{s}$ | -- | 1.6 | -- | μC |

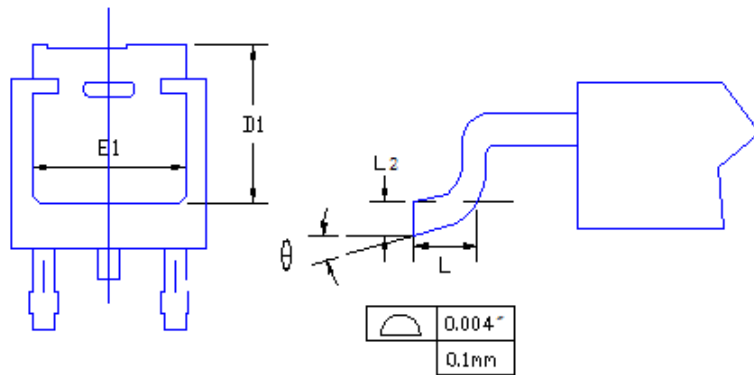
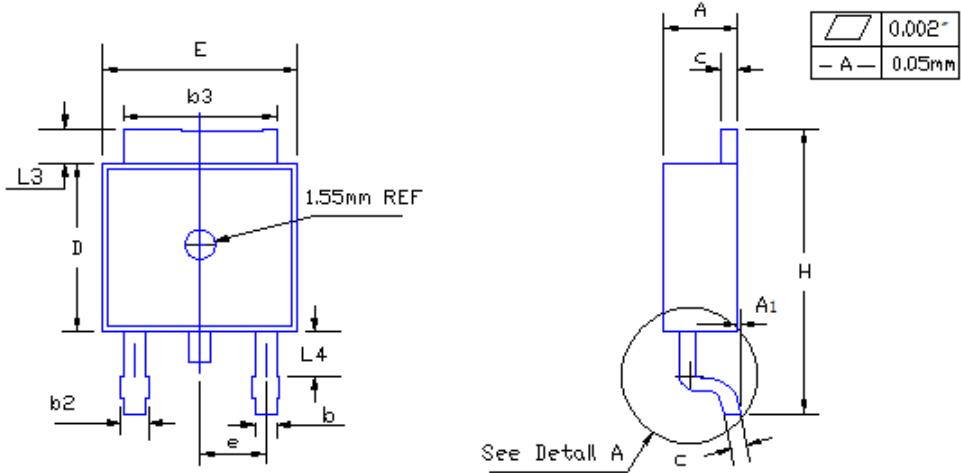
Note :

1. Repeated rating : Pulse width limited by safe operating area
2. $L=22.6\text{mH}, I_{AS} = 4.2\text{A}, V_{DD} = 50\text{V}, R_G = 25\Omega,$ Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 4.2\text{A}, di/dt \leq 200\text{A}/\mu\text{s}, V_{DD} \leq BV_{DS},$ Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\mu\text{s},$ Duty Cycle $\leq 2\%$
5. Essentially Independent of Operating Temperature Typical Characteristics



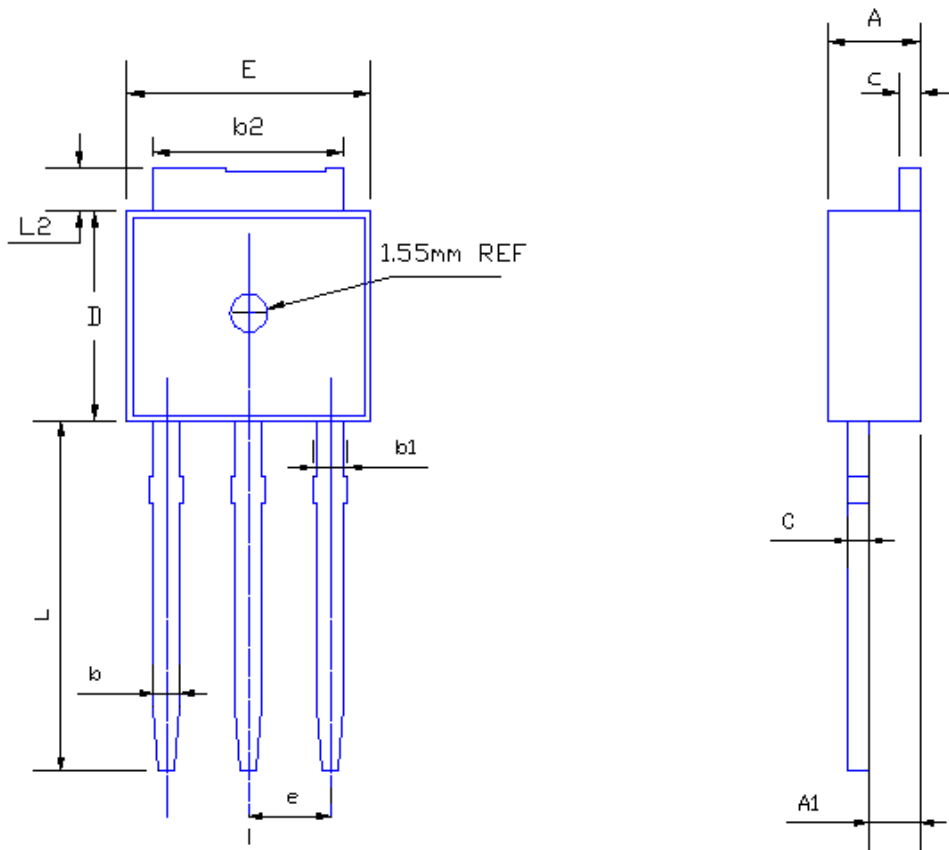


TO-252 (D-PAK) MECHANICAL DATA



| SYMBOL | MILLIMETERS | |
|--------|-------------|-------|
| | MIN | MAX |
| A | 2.19 | 2.38 |
| A1 | — | 0.13 |
| b | 0.64 | 0.89 |
| b2 | 0.84 | 1.14 |
| b3 | 5.21 | 5.46 |
| c | 0.46 | 0.61 |
| D | 5.97 | 6.22 |
| D1 | 5.21 | — |
| E | 6.35 | 6.73 |
| E1 | 4.83 | — |
| e | 2.29BSC | |
| H | 9.65 | 10.41 |
| L | 1.40 | 1.78 |
| L2 | 0.51BSC | |
| L3 | 0.89 | 1.27 |
| L4 | 0.64 | 1.01 |
| ⌀ | 0 | 8 |

TO-251 (I-PAK) MECHANICAL DATA



| SYMBOL | MILLIMETERS | |
|--------|-------------|------|
| | MIN | MAX |
| A | 2.19 | 2.38 |
| A1 | 1.04 | 1.23 |
| b | 0.64 | 0.89 |
| b1 | 0.84 | 1.14 |
| b2 | 5.23 | 5.48 |
| c | 0.46 | 0.61 |
| D | 5.91 | 6.28 |
| E | 6.21 | 6.59 |
| e | 2.28 TYP | |
| L | 8.89 | 9.65 |
| L2 | 0.89 | 1.27 |