

650V 0.8A 17Ω N-ch Power MOSFET

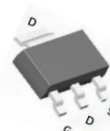
Description

DT2 MOS is DIN-TEK 2nd generation VDMOS family that is dramatic reduction in on-resistance and ultra-low gate charge for applications requiring high power density and high efficiency. And it is very robust and RoHS compliant.

TO-252



SOT-223-3L



TO-251-L4.0

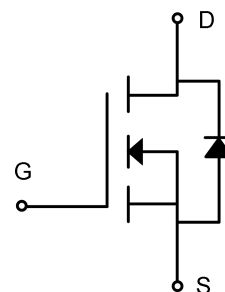


Features

- Typ. $R_{DS(on)}=17\Omega@V_{GS}=10V$
- 100% avalanche tested
- RoHS Compliant

Applications

- SMPS
- Charger
- DC-DC



Absolute Maximum Ratings ($T_c=25^\circ C$)

| Parameter | Symbol | DTU08N65/DTL08N65 | DTB08N65 | Unit |
|---------------------------------------------|-----------------|-------------------|----------|------|
| Drain-source voltage | V_{DSS} | 650 | | V |
| Gate-source voltage | V_{GS} | ± 30 | | V |
| Continuous drain current | I_D | 0.8 | | A |
| Pulsed drain current ¹ | I_{DM} | 3.2 | | A |
| Avalanche energy, single pulse ² | E_{AS} | 28 | | mJ |
| Power dissipation | P_D | 26 | | W |
| Derate above 25°C | | 0.2 | - | W/°C |
| Operating junction temperature | T_j | -55~150 | | °C |
| Storage temperature | T_{stg} | -55~150 | | °C |
| Continuous diode forward current | I_S | 0.8 | | A |
| Diode pulse current ¹ | I_{Spulse} | 3.2 | | A |
| Thermal resistance,junction-to-case | $R_{\theta JC}$ | 4.5 | - | °C/W |
| Thermal resistance,junction-to-ambient | $R_{\theta JA}$ | 62 | - | °C/W |

Electrical Characteristics of MOSFET

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|-----------------------------------------------|--------------|-----------------------------------------------------|------|------|------|----------|
| Drain-source break down voltage | BV_{DSS} | $I_D=250\mu A$, $V_{GS}=0V$, $T_J=25^\circ C$ | 650 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $I_D=250\mu A$, $V_{DS}=V_{GS}$, $T_J=25^\circ C$ | 2 | - | 4 | V |
| Drain-source leakage current | I_{DSS} | $V_{DS}=650V$, $V_{GS}=0V$, $T_J=25^\circ C$ | - | - | 1 | μA |
| | | $V_{DS}=520V$, $V_{GS}=0V$, $T_J=125^\circ C$ | - | - | 100 | μA |
| Gate-source leakage current,forward | I_{GSSF} | $V_{DS}=0V$, $V_{GS}=30V$, $T_J=25^\circ C$ | - | - | 100 | nA |
| Gate-source leakage current,reverse | I_{GSSR} | $V_{DS}=0V$, $V_{GS}=-30V$, $T_J=25^\circ C$ | - | - | -100 | nA |
| Drain-source on-state resistance ³ | $R_{DS(ON)}$ | $V_{GS}=10V$, $I_D=0.4A$, $T_J=25^\circ C$ | - | 17 | 19.5 | Ω |

Dynamic Characteristics of MOSFET ($T_C=25^\circ C$)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|------------------------------|-----------|---------------------------------------|------|------|------|------|
| Input capacitance | C_{iss} | $f=1MHz$, $V_{DS}=25V$, $V_{GS}=0V$ | - | 137 | - | pF |
| Output capacitance | C_{oss} | | - | 8.7 | - | pF |
| Reverse transfer capacitance | C_{rss} | | - | 0.8 | - | pF |
| Gate to source charge | Q_{gs} | $V_{DD}=350V$ | - | 0.5 | - | nC |
| Gate to drain charge | Q_{gd} | $I_D=0.8A$ | - | 1.1 | - | nC |
| Total gate charge | Q_g | $V_{GS}=0$ to 10V | - | 4.3 | - | nC |

Switching Characteristics of MOSFET ($T_C=25^\circ C$)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---------------------|-------------|--------------------------------------------------------------------|------|------|------|------|
| Turn-on delay time | $t_{d on}$ | $V_{DS}=350V$, $I_D=0.8A$, $R_G=25\Omega$, $V_{GS}=0$ to 10V | - | 4.8 | - | ns |
| Rise time | t_r | | - | 6 | - | ns |
| Turn-off delay time | $t_{d off}$ | | - | 10.8 | - | ns |
| Fall time | t_f | | - | 18 | - | ns |

Characteristics of Body Diode ($T_C=25^\circ C$)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|--------------------------|----------|-----------------------------------------------------------------|------|------|------|---------|
| Forward voltage | V_{SD} | $I_{SD}=0.8A$, $V_{GS}=0V$ | - | - | 1.5 | V |
| Reverse recovery time | t_{rr} | $V_{DS}=50V$, $I_S=0.8A$, $V_{GS}=10V$ $-di/dt=100A/\mu s$ | - | 650 | - | ns |
| Reverse recovery current | I_{rr} | | - | 0.7 | - | A |
| Recovery charge | Q_{rr} | | - | 0.22 | - | μC |

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ C$.
2. The E_{AS} data shows Max. rating . The test condition is $V_{DD}=50V$, $V_{GS}=10V$, $L=1mH$, $I_{AS}=7.5A$, $T_C=25^\circ C$.
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

TYPICAL CHARACTERISTICS

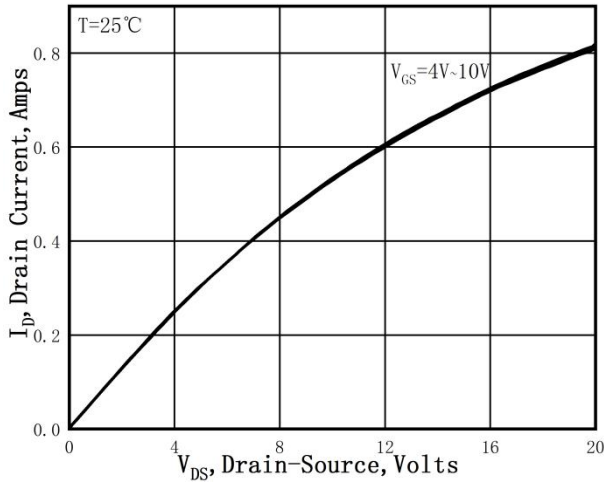


Figure 1. On-Region Characteristics

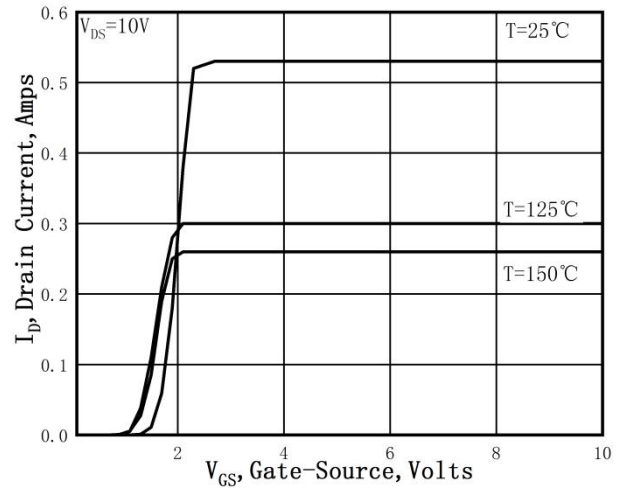


Figure 2. Transfer Characteristics

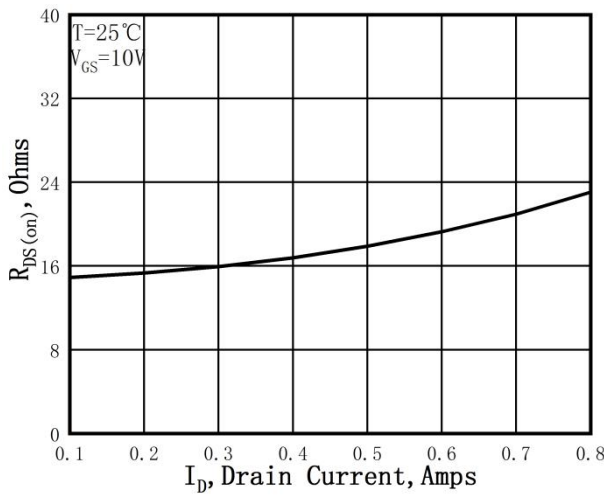


Figure 3. Static Drain-Source On Resistance

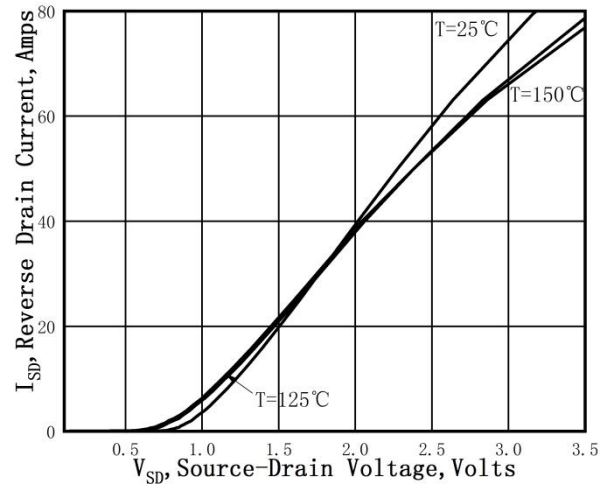


Figure 4. Typical Body Diode Transfer Characteristics

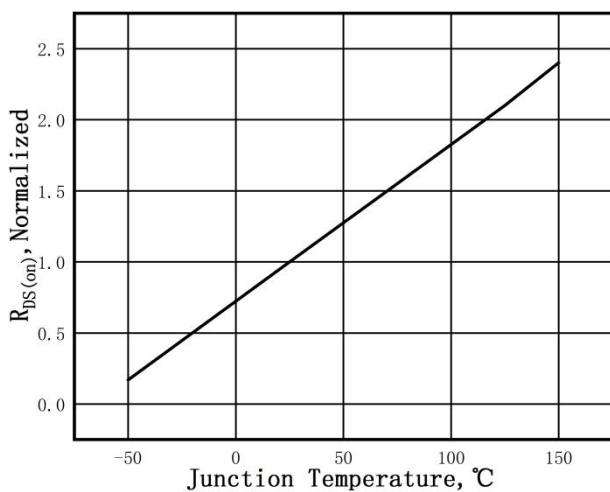


Figure 5. Normalized $R_{DS(on)}$ vs. Temperature

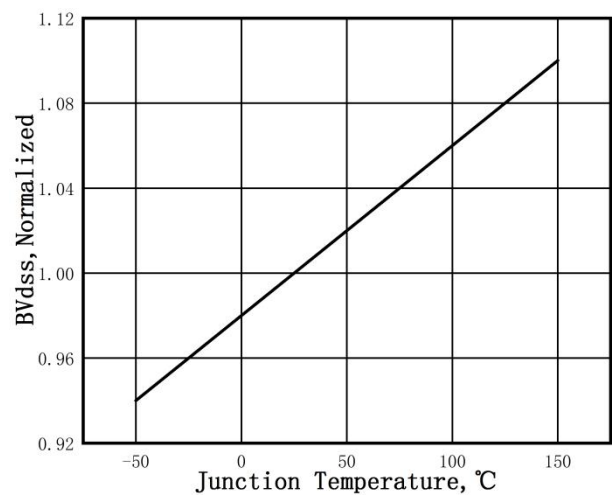


Figure 6. Normalized BV_{DSS} vs. Temperature

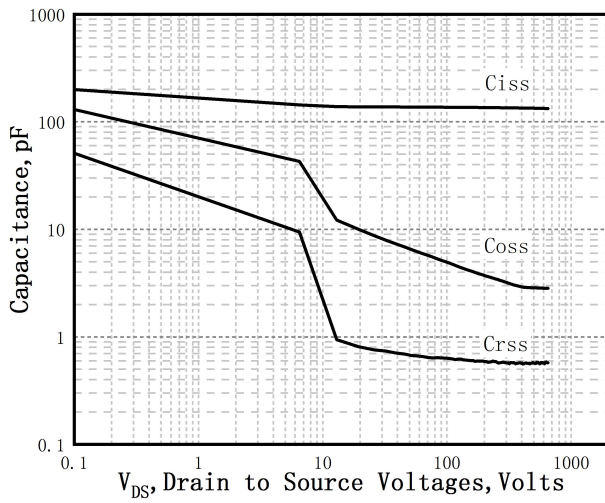


Figure 7. Capacitance Characteristics

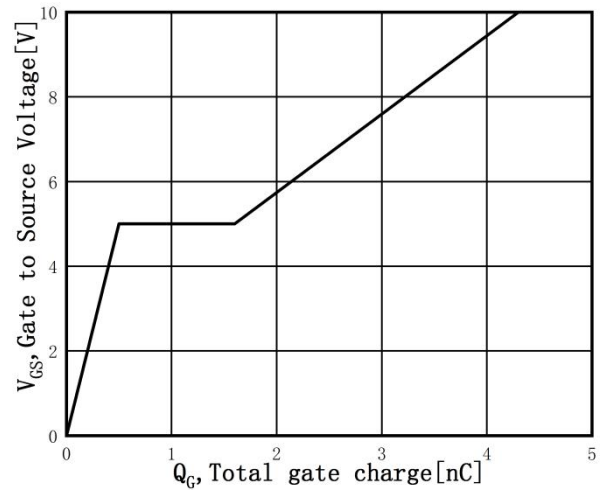


Figure 8. Gate Charge Characteristics

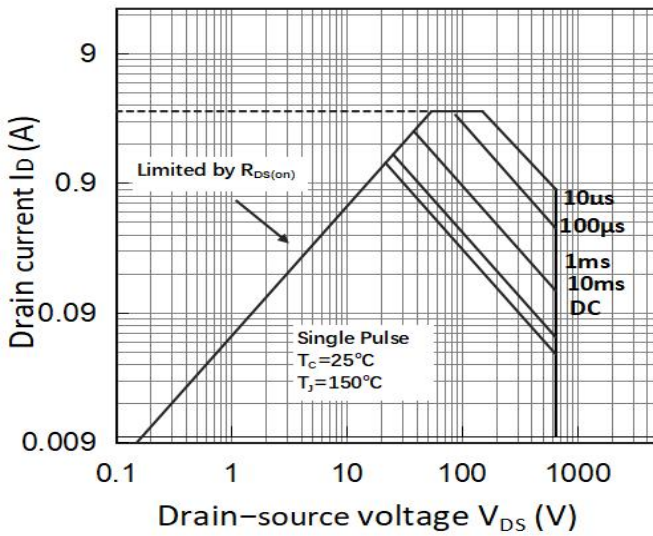


Figure 9. Maximum Safe Operating Area (TO-252/TO-251-L4.0)

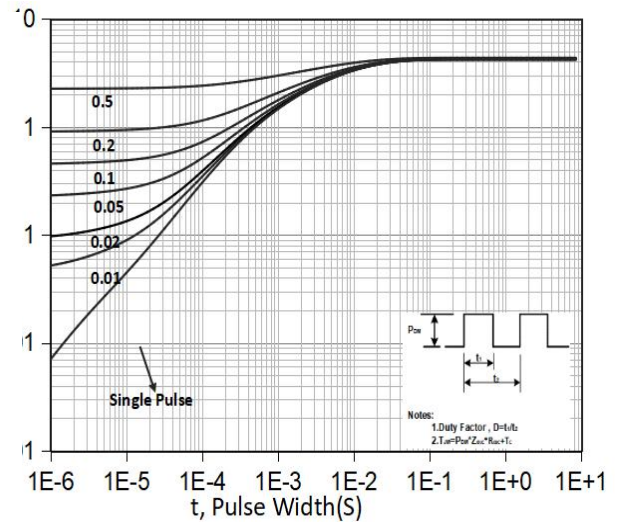
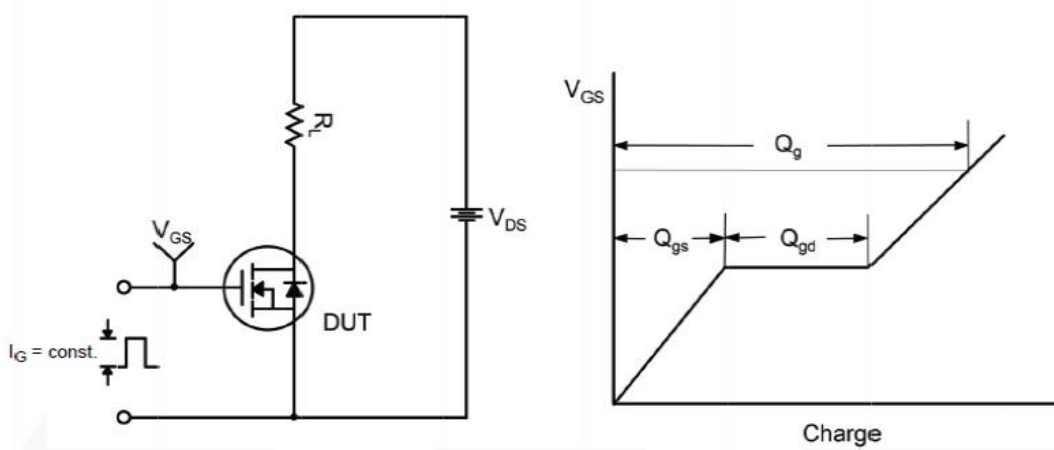
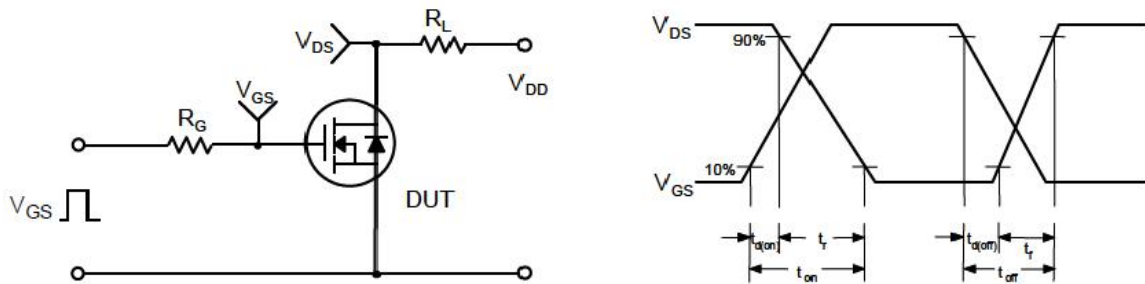


Figure 10. Transient Thermal Response Curve (TO-252/TO-251-L4.0)

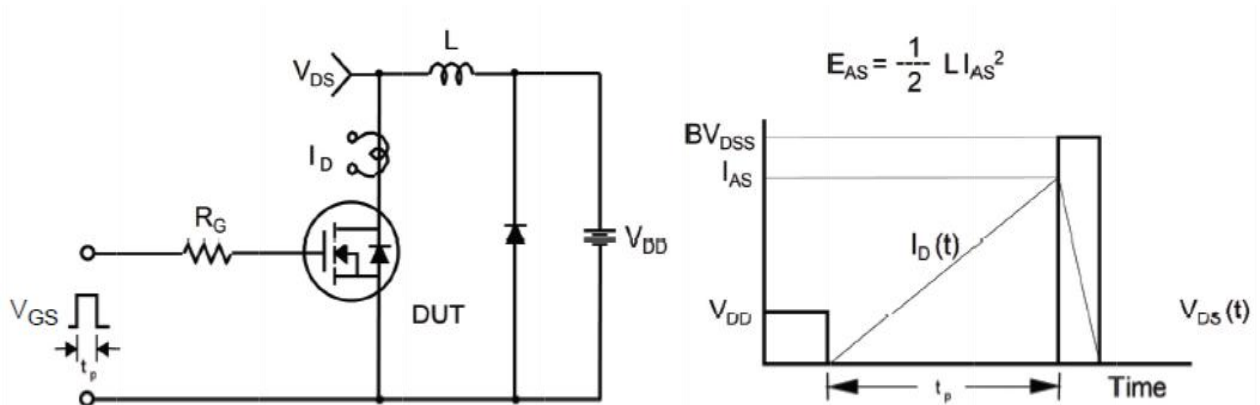
Gate Charge Test Circuit & Waveform



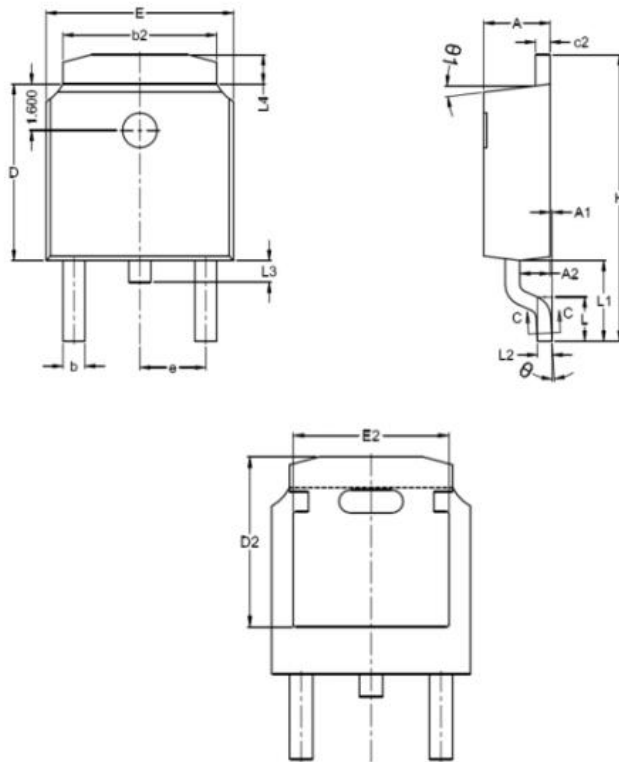
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



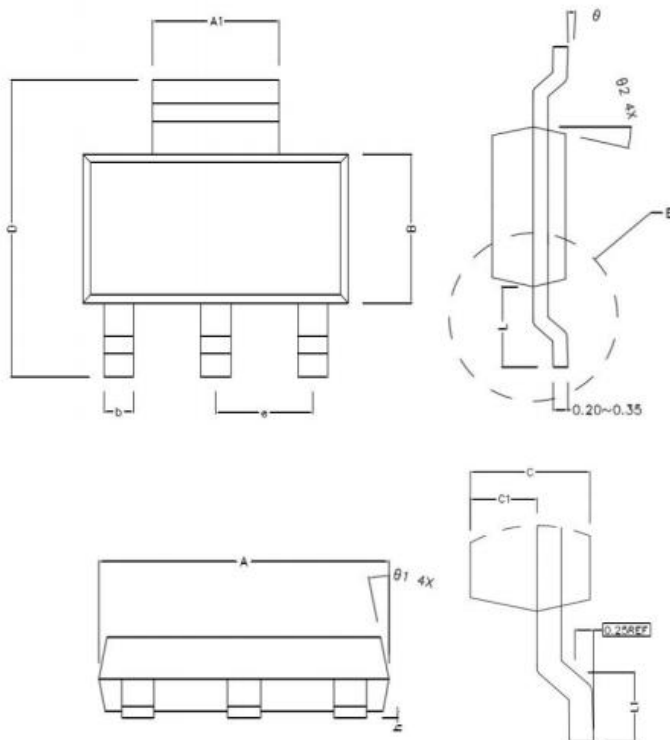
Mechanical Dimensions for TO-252



COMMON DIMENSIONS

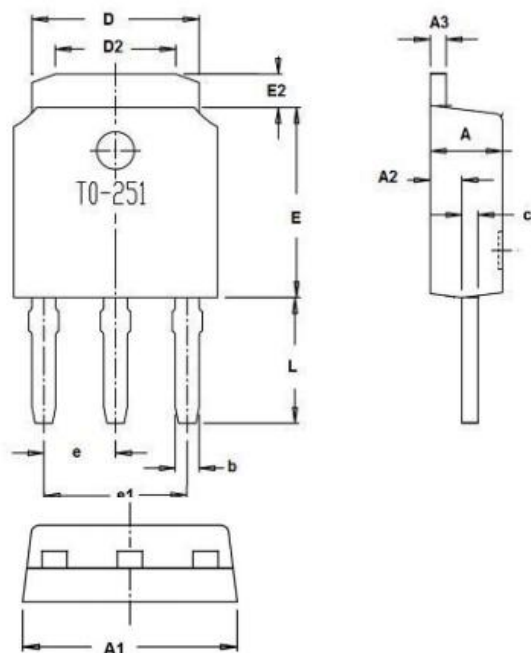
| SYMBOL | MM | |
|--------|------|------|
| | MIN | MAX |
| A | 2.10 | 2.50 |
| A1 | 0 | 0.15 |
| b | 0.7 | 0.9 |
| b2 | 5.13 | 5.54 |
| c | 0.44 | 0.65 |
| c2 | 0.45 | 0.65 |
| D | 6.00 | 6.20 |
| D2 | 5.37 | 5.78 |
| E | 6.30 | 6.90 |
| E2 | 4.90 | 5.30 |
| e | 2.23 | 2.33 |
| H | 9.7 | 10.5 |
| L | 1.38 | 1.73 |
| L1 | 2.58 | 3.00 |
| L2 | 0.50 | 0.52 |
| L3 | 0.60 | 1.00 |
| L4 | 0.81 | 1.42 |

Mechanical Dimensions for SOT-223-3L



COMMON DIMENSIONS

| SYMBOL | MM | |
|--------|---------|------|
| | MIN | MAX |
| A | 6.3 | 6.7 |
| A1 | 2.9 | 3.1 |
| B | 3.3 | 3.7 |
| C | 1.55 | 1.8 |
| D | 6.7 | 7.3 |
| L | 1.65 | 1.85 |
| L1 | 0.81 | 1.15 |
| b | 0.66 | 0.84 |
| h | 0.02 | 0.1 |
| e | 2.3TYPE | |



COMMON DIMENSIONS

| SYMBOL | MM | |
|--------|---------|------|
| | MIN | MAX |
| A | 2.15 | 2.45 |
| A1 | 6.3 | 6.9 |
| A2 | 0.9 | 1.1 |
| A3 | Typ0.5 | |
| b | 0.75 | 0.86 |
| c | 0.9 | 1.1 |
| D | 5.33 | 5.53 |
| D2 | 3.65 | 4.05 |
| E | 6.00 | 6.20 |
| E2 | 0.91 | 1.36 |
| e | Typ2.29 | |
| e1 | Typ4.58 | |
| L | 3.7 | 4.3 |

Ordering Information

| Part | Package | Marking | Packing method | Minimum packing number |
|----------|-------------|----------|----------------|------------------------|
| DTU08N65 | TO-252 | DTU08N65 | Tape and reel | 2.5K / Reel |
| DTB08N65 | TO-223-3L | DTB08N65 | Tape and reel | 2.5K / Reel |
| DTL08N65 | TO-251-L4.0 | DTL08N65 | Tube | 80 / Tube |

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