

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | I_D |
|---------------|-----------------|-------|
| 100V | 130mΩ@10V | 10A |
| | 140mΩ@4.5V | |

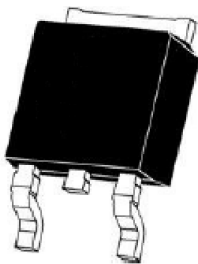
Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

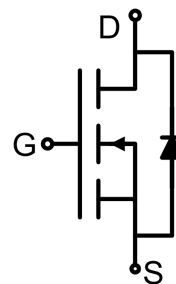
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package

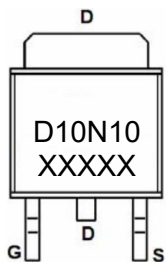


TO-252AB

Circuit diagram



Marking



Absolute maximum ratings (Ta=25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--------------------------------------|-----------------|------------|------|
| Drain-Source Voltage | V_{DS} | 100 | V |
| Gate-Source Voltage | V_{GS} | ±20 | V |
| Continuous Drain Current | I_D | 10 | A |
| Pulsed Drain Current | I_{DM} | 40 | A |
| Power Dissipation | P_D | 40 | W |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 3.8 | °C/W |
| Single pulse avalanche energy | E_{AS} | 20 | mJ |
| Junction Temperature | T_J | 150 | °C |
| Storage Temperature | T_{STG} | -55 ~ +150 | °C |

Electrical characteristics (T_A=25 °C, unless otherwise noted)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---------------------------------------------|---------------|-------------------------------------------------------------------|------|------|------|------|
| Static Characteristics | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 100 | | | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 100V, V_{GS} = 0V$ | | | 1 | μA |
| Gate-body leakage current | I_{GSS} | $V_{GS} = \pm 20V, V_{DS} = 0V$ | | | ±100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1 | | 2 | V |
| Drain-source on-resistance ¹⁾ | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 10A$ | | 95 | 130 | mΩ |
| | | $V_{GS} = 4.5V, I_D = 8A$ | | 100 | 140 | |
| Forward transconductance ¹⁾ | g_{FS} | $V_{DS} = 25V, I_D = 6A$ | 3.5 | | | S |
| Dynamic characteristics²⁾ | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 50V, V_{GS} = 0V, f = 1MHz$ | | 980 | | pF |
| Output Capacitance | C_{oss} | | | 37 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 27 | | |
| Total Gate Charge | Q_g | $V_{DS} = 50V, V_{GS} = 10V, I_D = 10A$ | | 21.5 | | nC |
| Gate-Source Charge | Q_{gs} | | | 3.2 | | |
| Gate-Drain Charge | Q_{gd} | | | 6 | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD} = 50V, V_{GS} = 10V, R_L = 15\Omega, R_{GEN} = 2.5\Omega$ | | 11 | | nS |
| Turn-on rise time | t_r | | | 7.4 | | |
| Turn-off delay time | $t_{d(off)}$ | | | 35 | | |
| Turn-off fall time | t_f | | | 9.1 | | |
| Source-Drain Diode characteristics | | | | | | |
| Diode Forward Current ¹⁾ | I_S | | | | 10 | A |
| Diode Forward voltage | V_{DS} | $V_{GS} = 0V, I_S = 10A$ | | | 1.2 | V |
| Reverse Recovery Time | t_{rr} | $T_J = 25^\circ C, I_F = 10A, di/dt = 100A/\mu s$ ¹⁾ | | 21 | | nS |
| Reverse Recovery Charge | Q_{rr} | | | 97 | | nC |

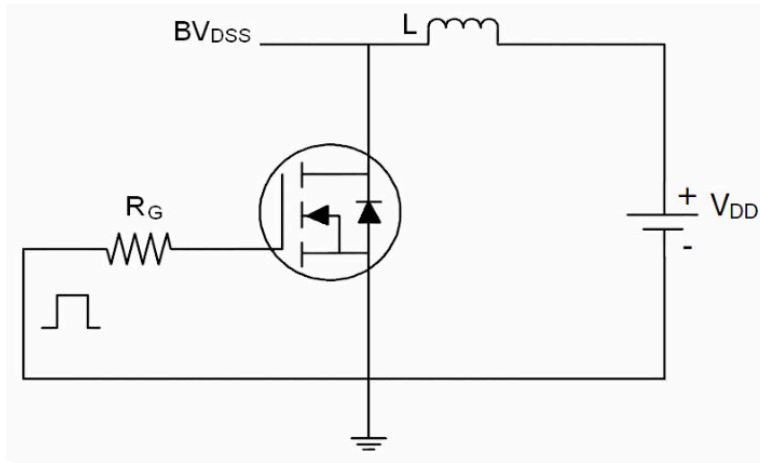
Notes:

1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤2%.

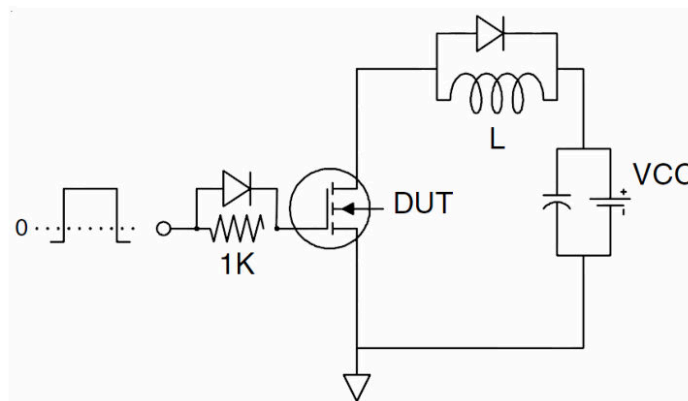
2) Guaranteed by design, not subject to production testing.

Test Circuit

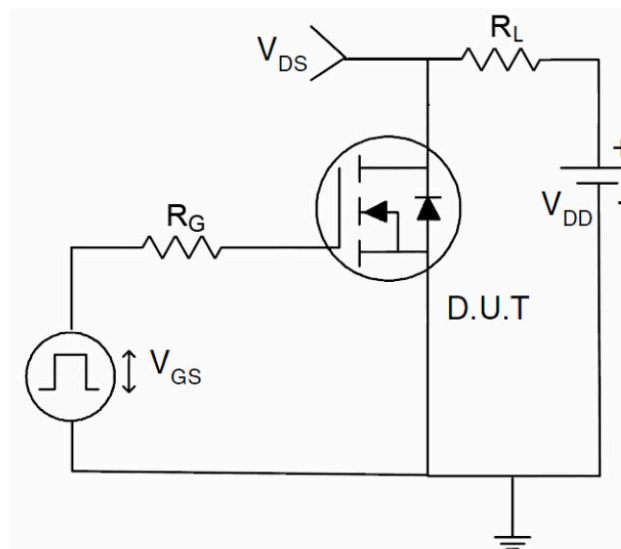
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Characteristics

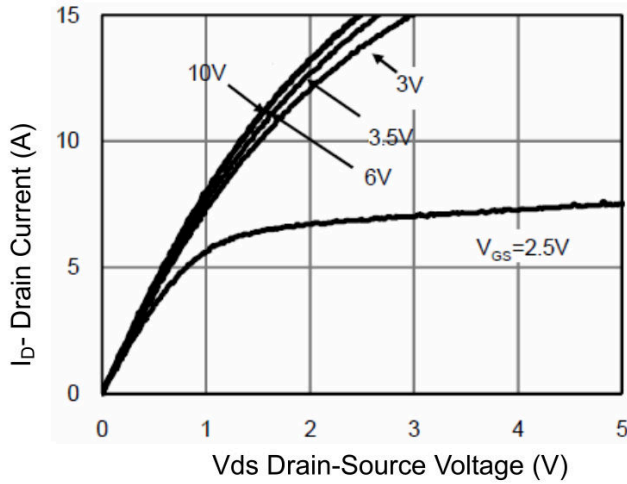


Figure 1 Output Characteristics

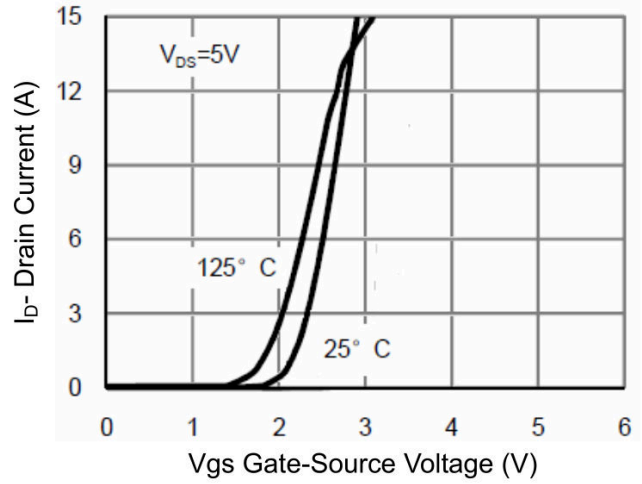


Figure 2 Transfer Characteristics

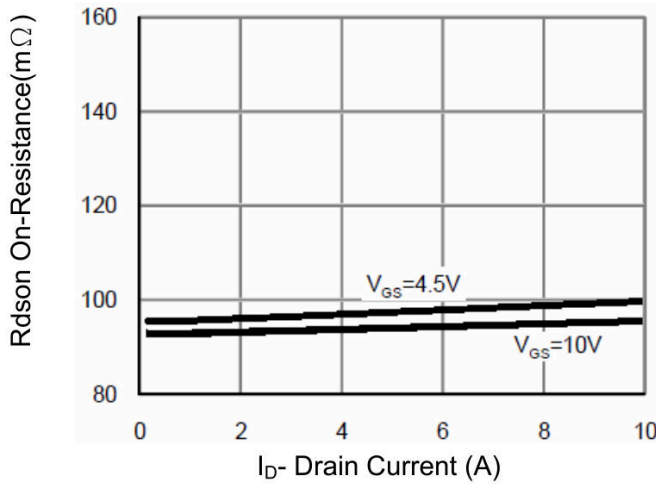


Figure 3 Rdson- Drain Current

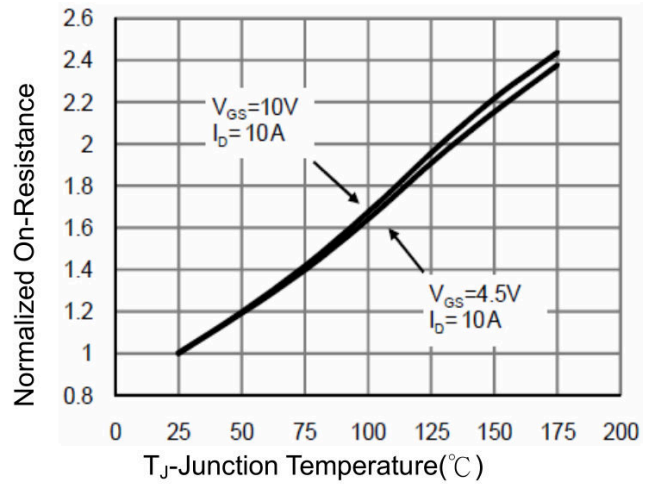


Figure 4 Rdson-Junction Temperature

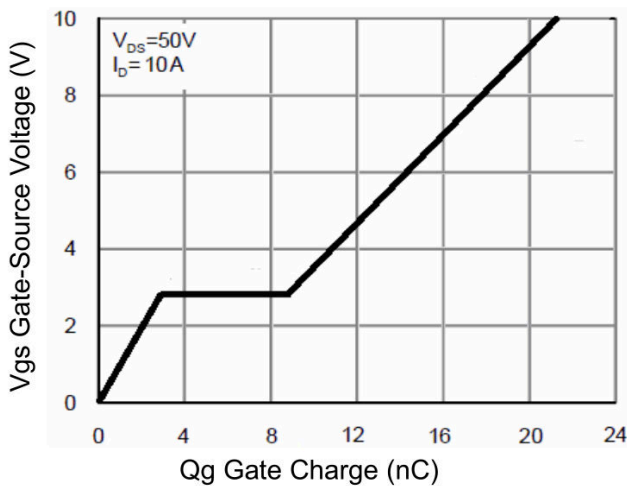


Figure 5 Gate Charge

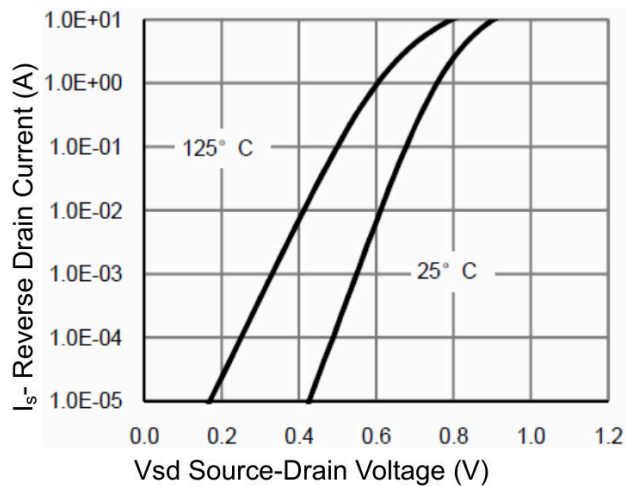


Figure 6 Source- Drain Diode Forward

Typical Characteristics

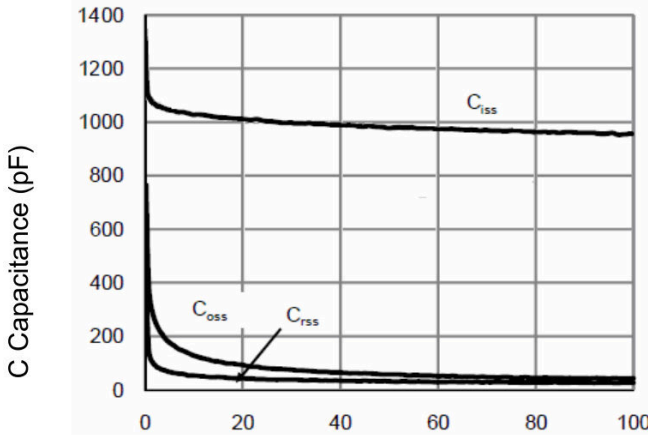


Figure 7 Capacitance vs Vds

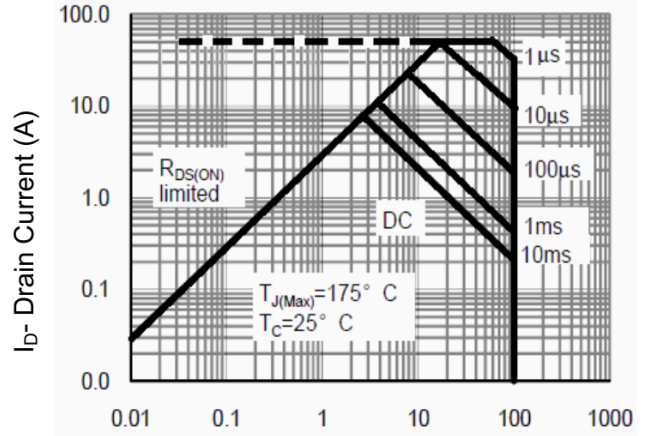


Figure 8 Safe Operation Area

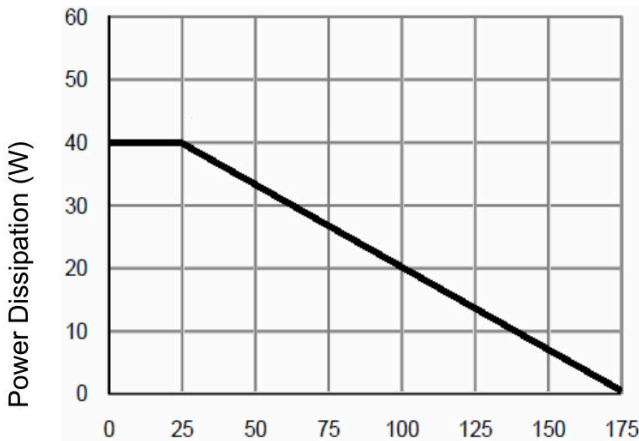


Figure 9 Power De-rating

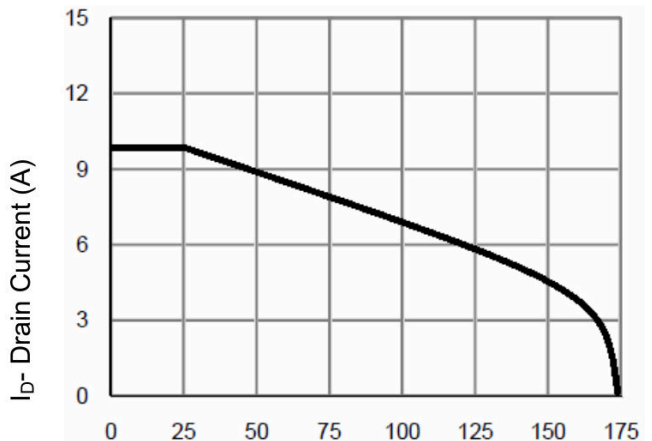
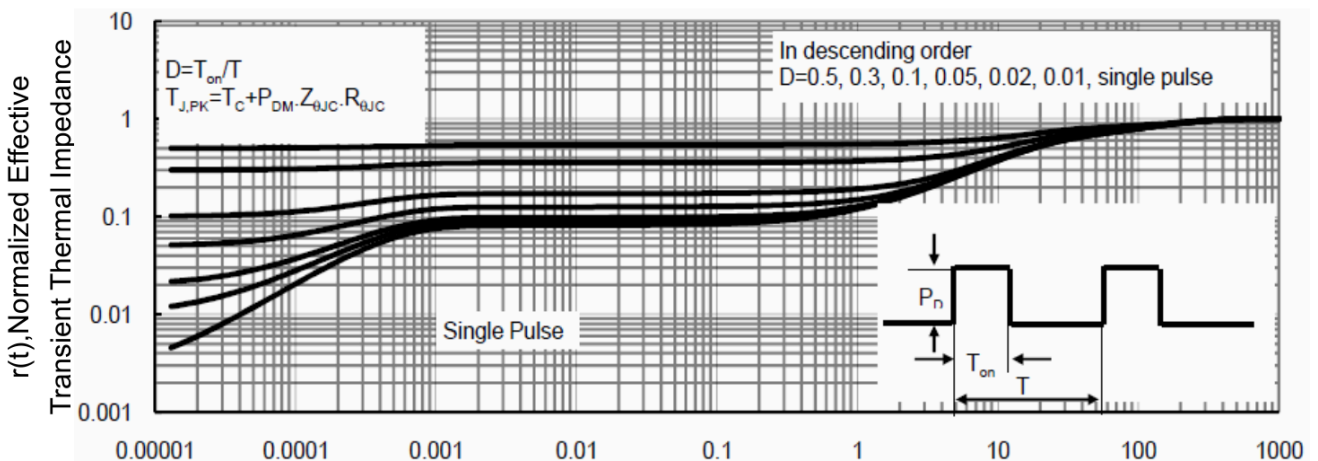


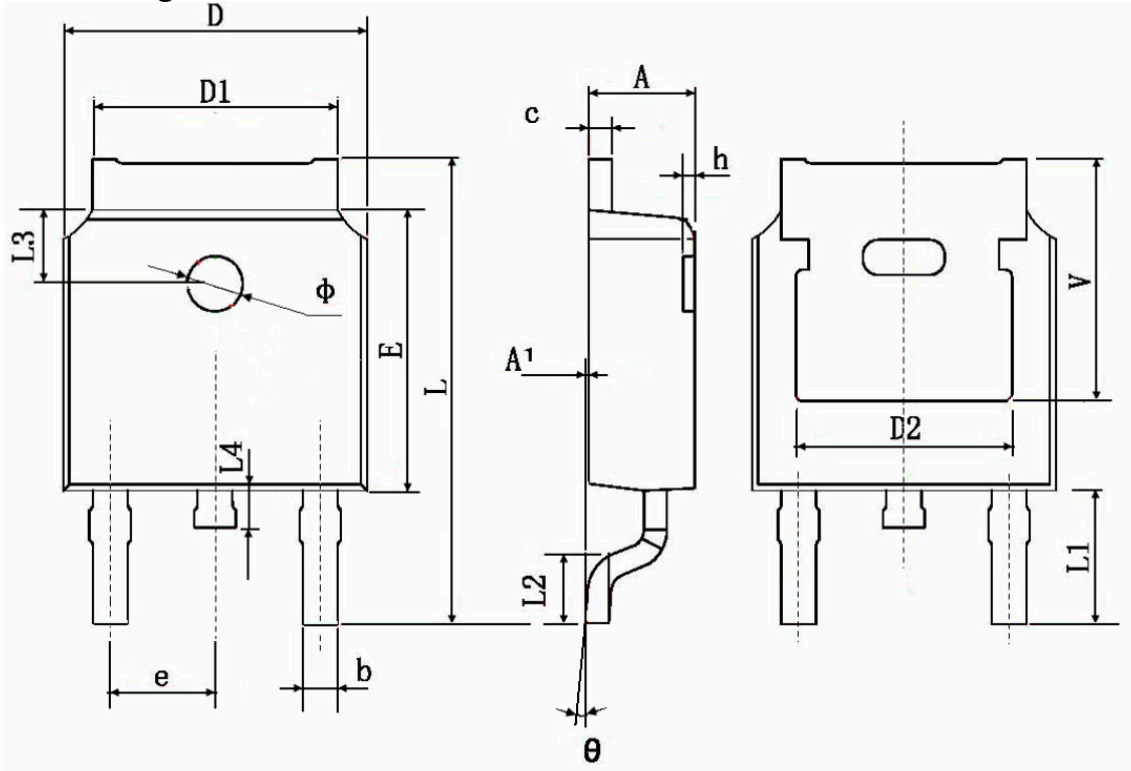
Figure 10 Current De-rating



Square Wave Pulse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252AB Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| b | 0.660 | 0.860 | 0.026 | 0.034 |
| c | 0.460 | 0.580 | 0.018 | 0.023 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.100 | 5.460 | 0.201 | 0.215 |
| D2 | 4.830 TYP. | | 0.190 TYP. | |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.186 | 2.386 | 0.086 | 0.094 |
| L | 9.800 | 10.400 | 0.386 | 0.409 |
| L1 | 2.900 TYP. | | 0.114 TYP. | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| L3 | 1.600 TYP. | | 0.063 TYP. | |
| L4 | 0.600 | 1.000 | 0.024 | 0.039 |
| Φ | 1.100 | 1.300 | 0.043 | 0.051 |
| θ | 0° | 8° | 0° | 8° |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.350 TYP. | | 0.211 TYP. | |