

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | I_D |
|---------------|-----------------|-------|
| 85V | 3.8mΩ@10V | 160A |

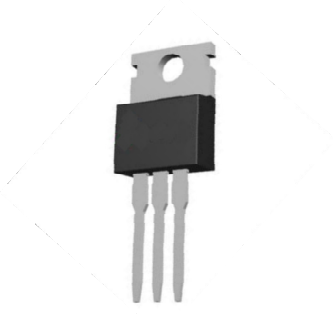
Feature

- 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
- Suffix "-Q1" for AEC-Q101

Application

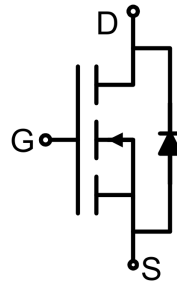
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

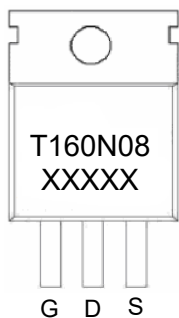


TO-220AB

Circuit diagram



Marking



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

| Parameter | Symbol | Value | Unit |
|---|------------------------|------------|------|
| Drain-Source Voltage | V _{DS} | 85 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current | I _D | 160 | A |
| Drain Current-Continuous(T _C =100°C) | I _D (100°C) | 112 | A |
| Pulsed Drain Current | I _{DM} | 480 | A |
| Power Dissipation | P _D | 220 | W |
| Thermal Resistance,Junction-to-Case | R _{θJC} | 0.6 | °C/W |
| Single pulse avalanche energy | E _{AS} | 1440 | 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 =250μA | 85 | | | V |
| Zero gate voltage drain current | I _{DSS} | V _{DS} =85V, V _{GS} = 0V | | | 1 | μA |
| Gate-body leakage current | I _{GSS} | V _{GS} =±20V, V _{DS} = 0V | | | ±100 | nA |
| Gate threshold voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 2.5 | | 4.5 | V |
| Drain-source on-resistance ¹⁾ | R _{DS(on)} | V _{GS} =10V, I _D =80A | | 3.1 | 3.8 | mΩ |
| Forward transconductance ¹⁾ | g _{FS} | V _{DS} =10V, I _D =80A | 75 | | | S |
| Dynamic characteristics²⁾ | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =40V, V _{GS} =0V, f =1MHz | | 8500 | | pF |
| Output Capacitance | C _{oss} | | | 1520 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 81 | | |
| Total Gate Charge | Q _g | V _{DS} =40V, V _{GS} =10V, I _D =80A | | 105 | | nC |
| Gate-Source Charge | Q _{gs} | | | 39 | | |
| Gate-Drain Charge | Q _{gd} | | | 28 | | |
| Turn-on delay time | t _{d(on)} | V _{DD} =40V, V _{GS} =10V, I _D =80A, R _{GEN} =4.7Ω | | 30.5 | | nS |
| Turn-on rise time | t _r | | | 29 | | |
| Turn-off delay time | t _{d(off)} | | | 95 | | |
| Turn-off fall time | t _f | | | 34.5 | | |
| Source-Drain Diode characteristics | | | | | | |
| Diode Forward Current ¹⁾ | I _S | | | | 160 | A |
| Diode Forward voltage | V _{DS} | V _{GS} =0V, I _S =80A | | | 1.2 | V |
| Reverse Recovery Time | t _{rr} | T _J = 25°C, I _F = I _S | | 95 | | nS |
| Reverse Recovery Charge | Q _{rr} | di/dt = 100A/μs ¹⁾ | | 225 | | nC |

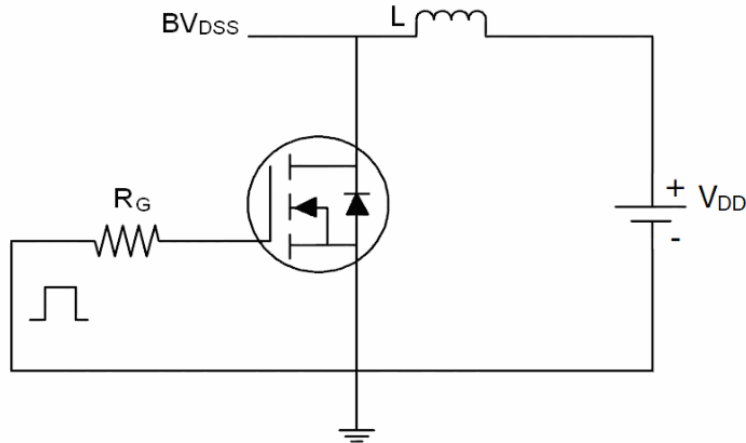
Notes:

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

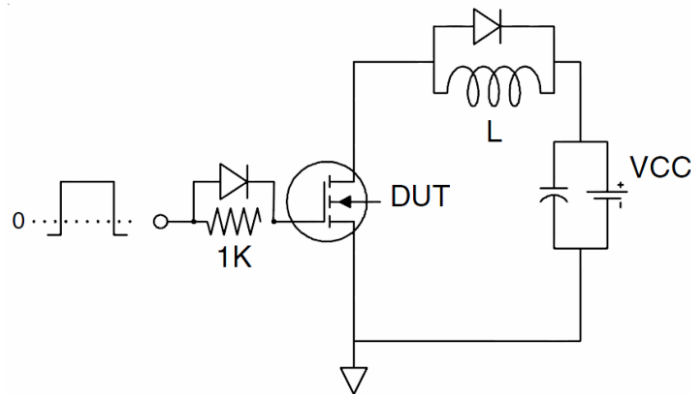
2) Guaranteed by design, not subject to production testing.

Test Circuit

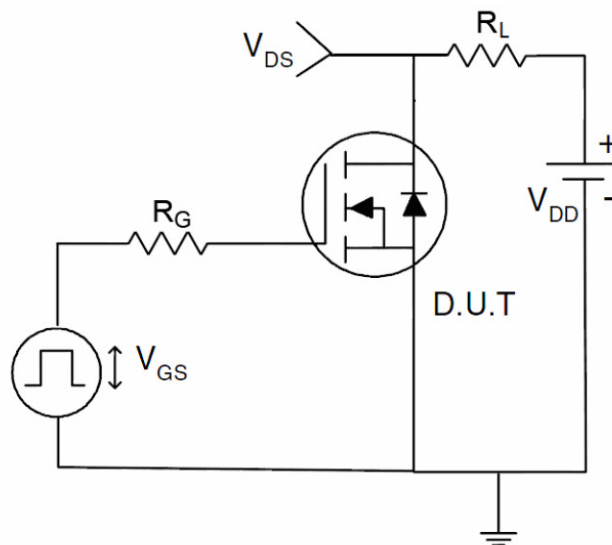
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Characteristics

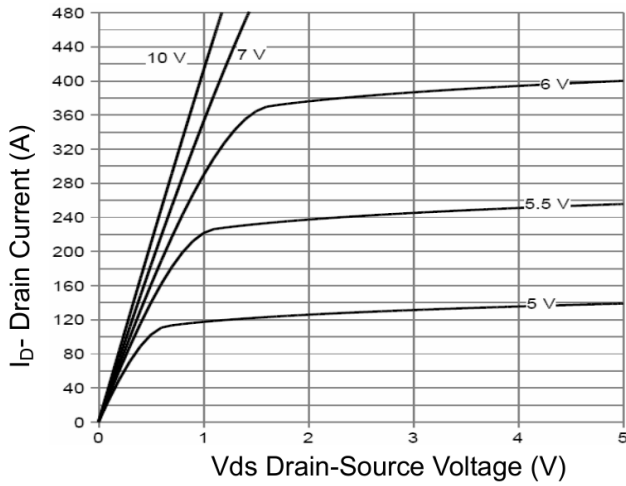


Figure 1 Output Characteristics

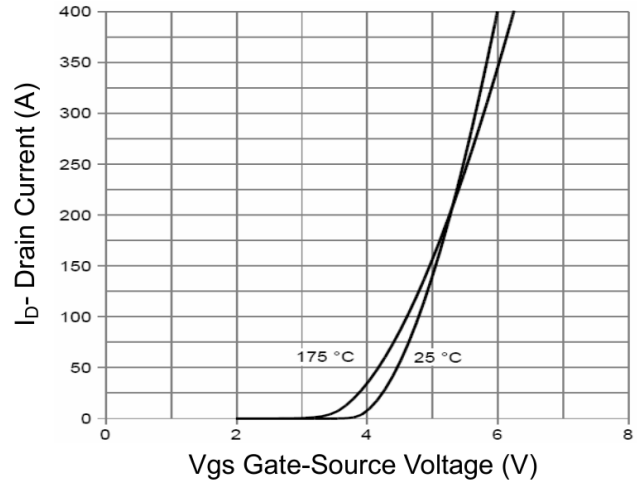


Figure 2 Transfer Characteristics

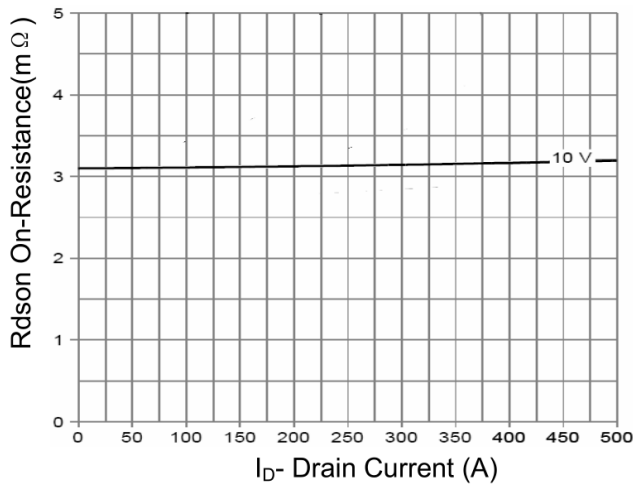


Figure 3 Rdson- Drain Current

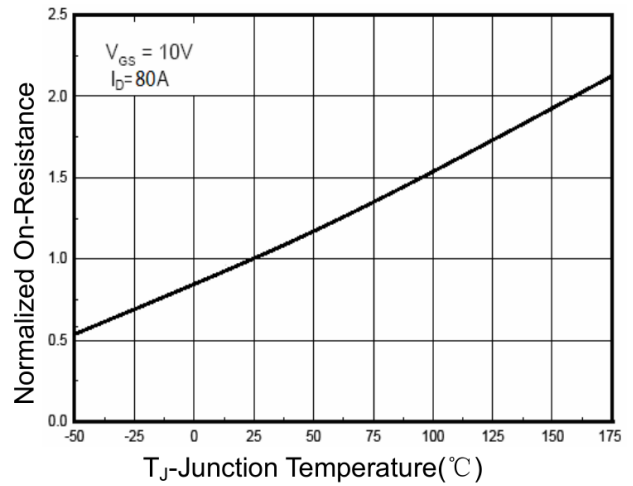


Figure 4 Rdson-Junction Temperature

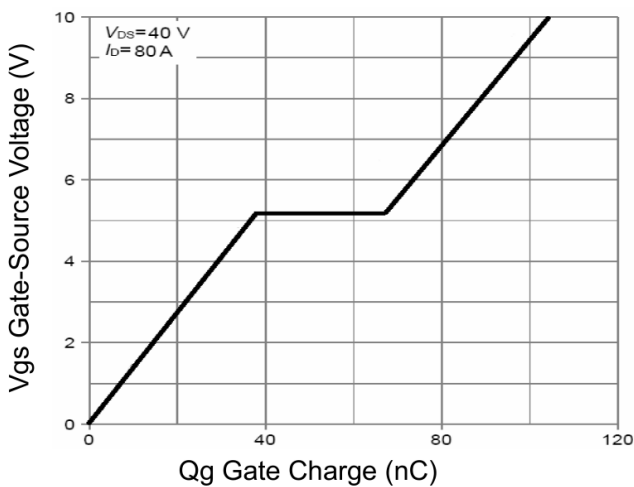


Figure 5 Gate Charge

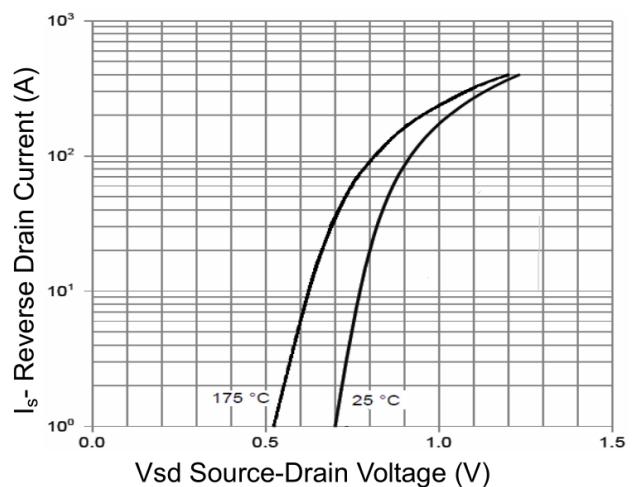


Figure 6 Source- Drain Diode Forward

Typical Characteristics

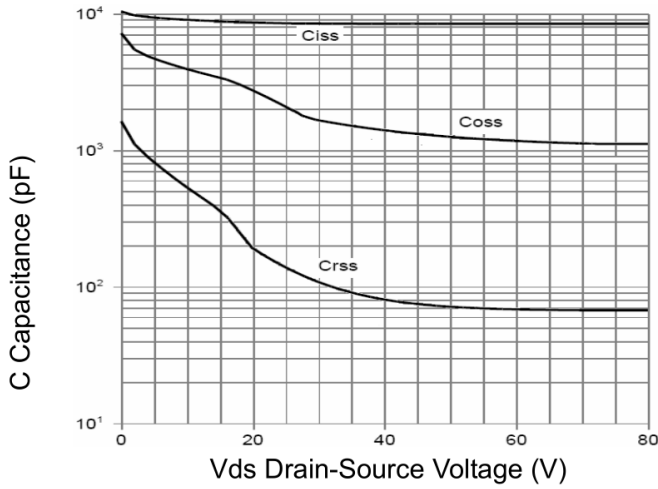


Figure 7 Capacitance vs Vds

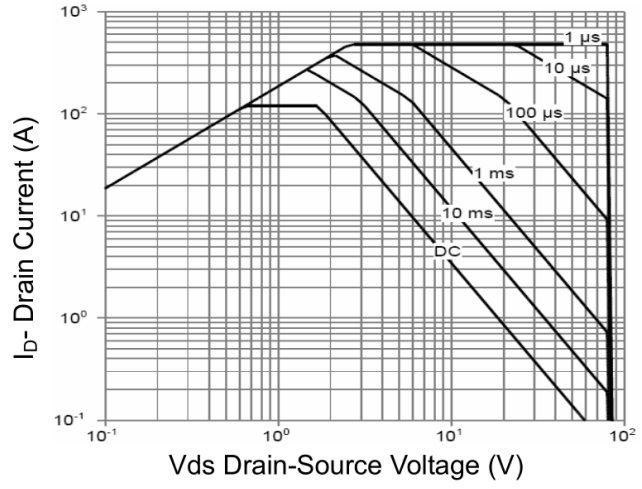


Figure 8 Safe Operation Area

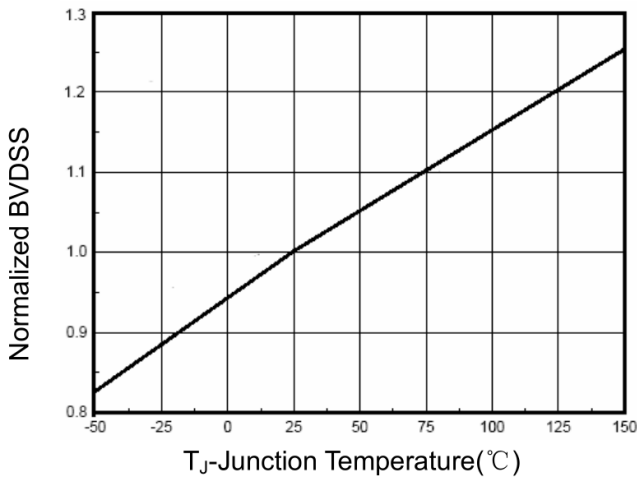


Figure 9 BV_{DSS} vs Junction Temperature

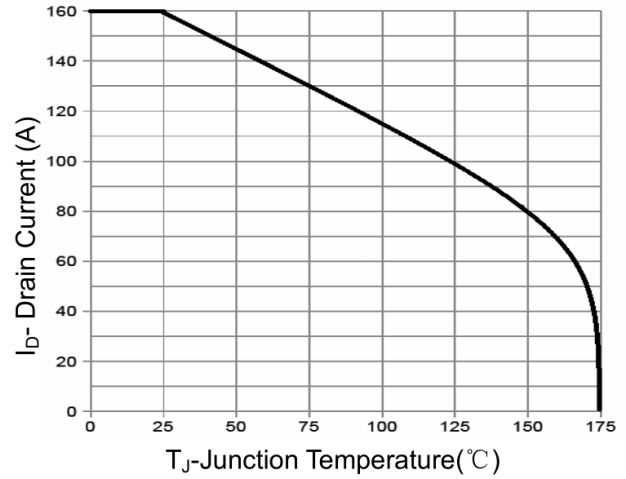


Figure 10 Current De-rating

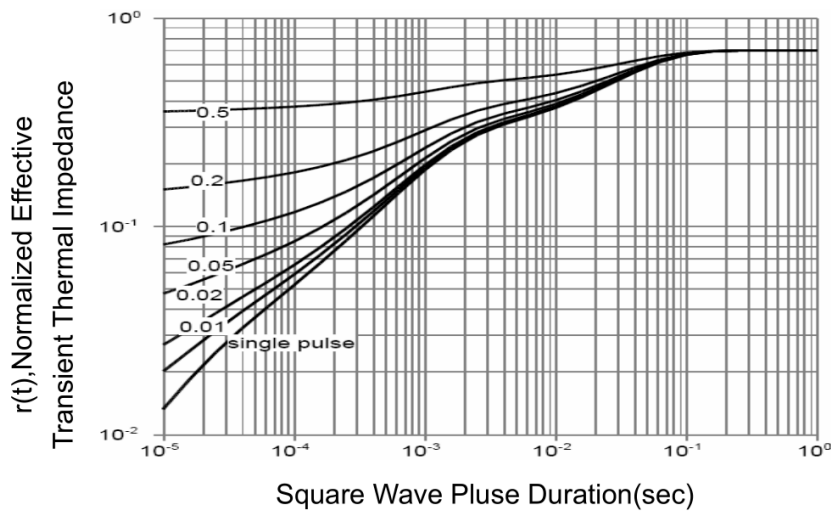
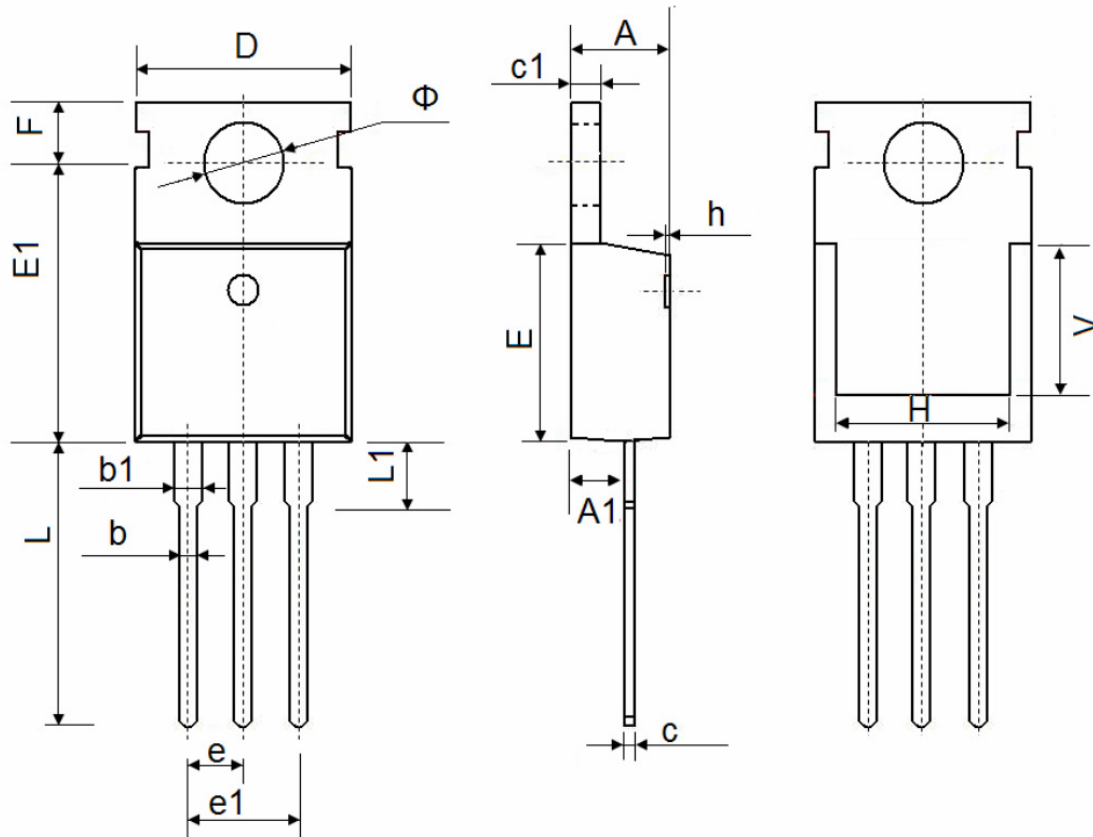


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220AB Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.400 | 4.600 | 0.173 | 0.181 |
| A1 | 2.250 | 2.550 | 0.089 | 0.100 |
| b | 0.710 | 0.910 | 0.028 | 0.036 |
| b1 | 1.170 | 1.370 | 0.046 | 0.054 |
| c | 0.330 | 0.650 | 0.013 | 0.026 |
| c1 | 1.200 | 1.400 | 0.047 | 0.055 |
| D | 9.910 | 10.250 | 0.390 | 0.404 |
| E | 8.9500 | 9.750 | 0.352 | 0.384 |
| E1 | 12.650 | 12.950 | 0.498 | 0.510 |
| e | 2.540 TYP. | | 0.100 TYP. | |
| e1 | 4.980 | 5.180 | 0.196 | 0.204 |
| F | 2.650 | 2.950 | 0.104 | 0.116 |
| H | 7.900 | 8.100 | 0.311 | 0.319 |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| L | 12.900 | 13.400 | 0.508 | 0.528 |
| L1 | 2.850 | 3.250 | 0.112 | 0.128 |
| V | 7.500 REF. | | 0.295 REF. | |
| Φ | 3.400 | 3.800 | 0.134 | 0.150 |