

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | I_D |
|---------------|-----------------|-------|
| -60V | 13mΩ@-10V | -80A |
| | 16mΩ@-4.5V | |

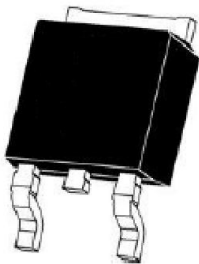
Feature

- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Suffix "-Q1" for AEC-Q101

Application

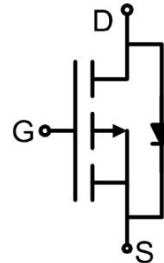
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

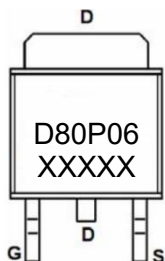


TO-252AB

Circuit diagram



Marking



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

| Parameter | Symbol | Value | Unit |
|---|-------------------------|------------|------|
| Drain-Source Voltage | V _{DS} | -60 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current | I _D | -80 | A |
| Continuous Drain Current(T _C =100 °C) | I _D (100 °C) | -58 | A |
| Pulsed Drain Current | I _{DM} | -328 | A |
| Power Dissipation | P _D | 150 | W |
| Thermal Resistance,Junction-to-Case | R _{θJC} | 1.0 | °C/W |
| Single pulse avalanche energy | E _{AS} | 722 | 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 | -60 | | | V |
| Zero gate voltage drain current | I _{DSS} | V _{DS} = -60V, 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 | -1.2 | -1.8 | -2.4 | V |
| Drain-source on-resistance ¹⁾ | R _{DS(on)} | V _{GS} = -10V, I _D = -20A | | 11 | 13 | mΩ |
| | | V _{GS} = -4.5V, I _D = -20A | | 13 | 16 | |
| Forward transconductance ¹⁾ | g _{FS} | V _{DS} = -5V, I _D = -20A | | 25 | | S |
| Dynamic characteristics²⁾ | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} = -30V, V _{GS} = 0V, f = 1MHz | | 5604 | | pF |
| Output Capacitance | C _{oss} | | | 356 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 265 | | |
| Total Gate Charge | Q _g | V _{DS} = -30V, V _{GS} = -10V, I _D = -20A | | 62.1 | | nC |
| Gate-Source Charge | Q _{gs} | | | 9.3 | | |
| Gate-Drain Charge | Q _{gd} | | | 16.8 | | |
| Turn-on delay time | t _{d(on)} | V _{DD} = -30V, V _{GS} = -10V, R _L = 1.5Ω, R _{GEN} = 3Ω | | 18 | | nS |
| Turn-on rise time | t _r | | | 20 | | |
| Turn-off delay time | t _{d(off)} | | | 55 | | |
| Turn-off fall time | t _f | | | 35 | | |
| Source-Drain Diode characteristics | | | | | | |
| Diode Forward Current ¹⁾ | I _S | | | | -80 | A |
| Diode Forward voltage | V _{DS} | V _{GS} = 0V, I _S = -20A | | | -1.2 | V |
| Reverse Recovery Time | t _{rr} | T _J = 25°C, I _F = -20A | | 49 | | nS |
| Reverse Recovery Charge | Q _{rr} | di/dt = -100A/μs ¹⁾ | | 71 | | nC |

Notes:

- 1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤2%.
- 2) Guaranteed by design, not subject to production testing.

Typical Characteristics

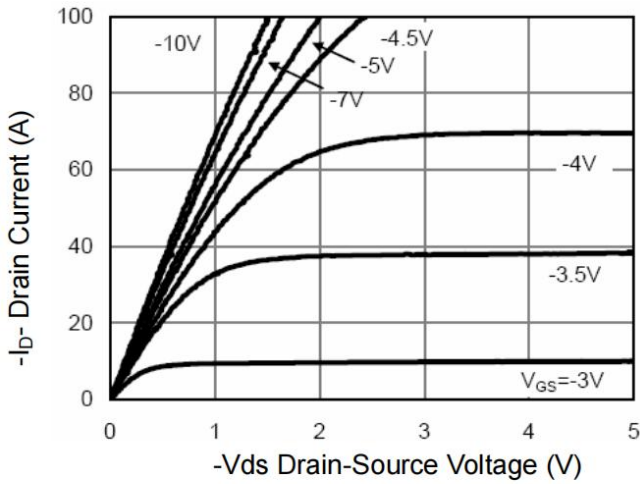


Figure 1 Output Characteristics

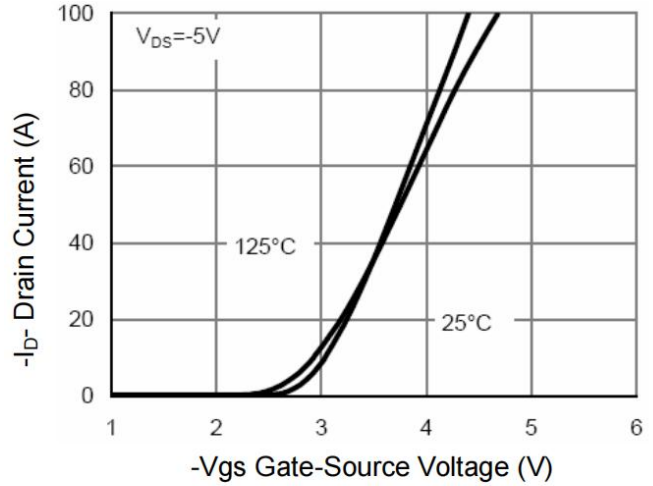


Figure 2 Transfer Characteristics

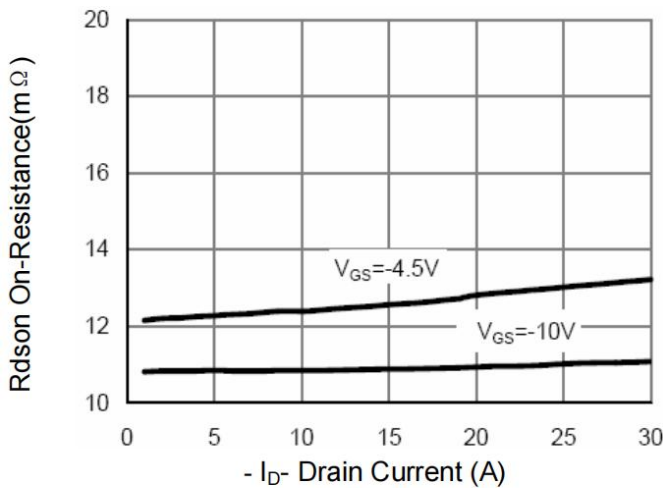


Figure 3 Rdson- Drain Current

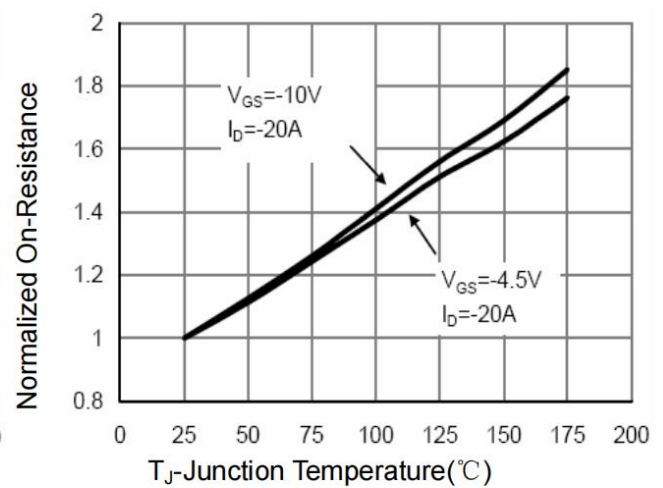


Figure 4 Rdson-Junction Temperature

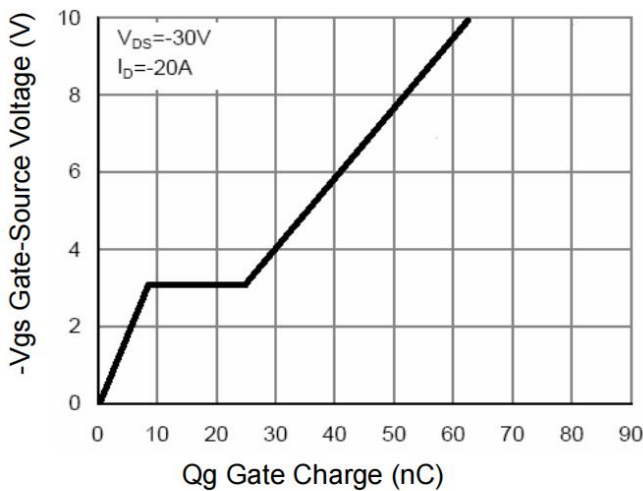


Figure 5 Gate Charge

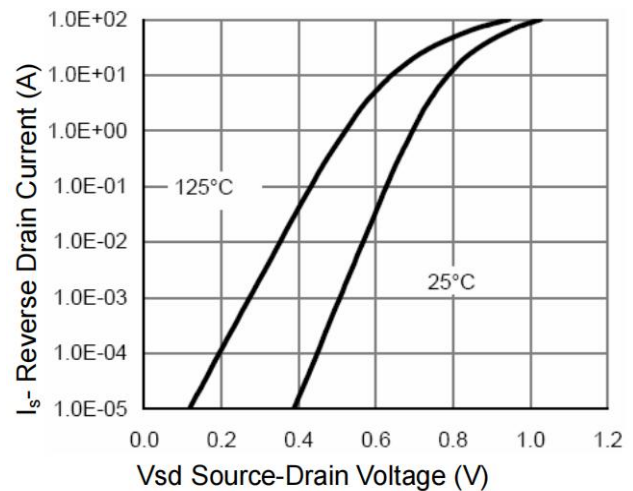


Figure 6 Source- Drain Diode Forward

Typical Characteristics

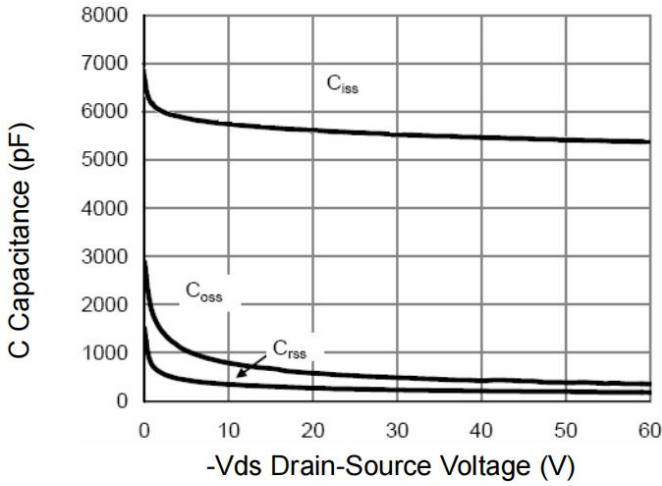


Figure 7 Capacitance vs Vds

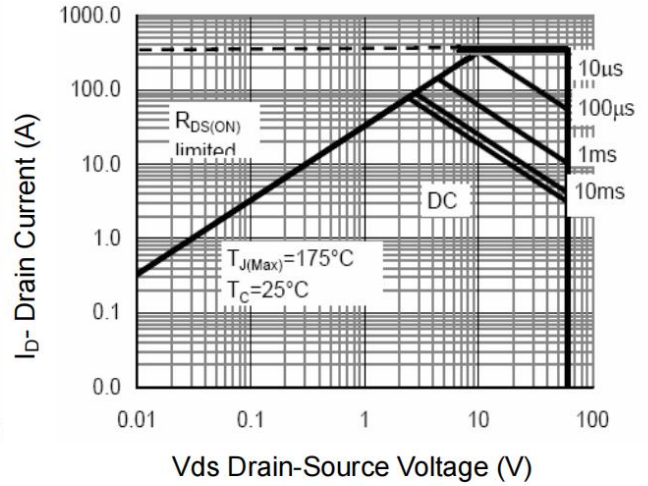


Figure 8 Safe Operation Area

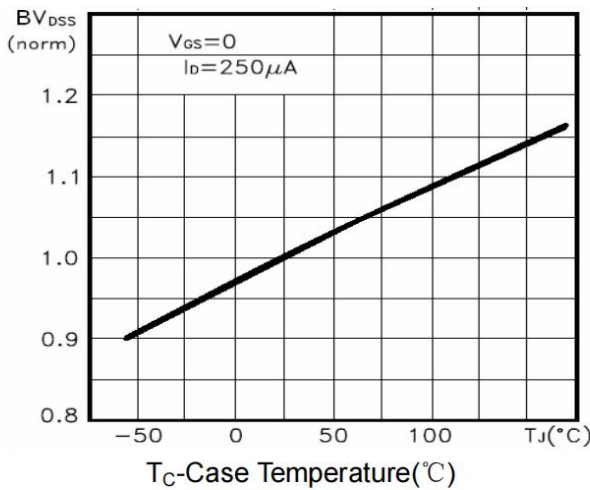


Figure 9 BV_{DSS} vs Junction Temperature

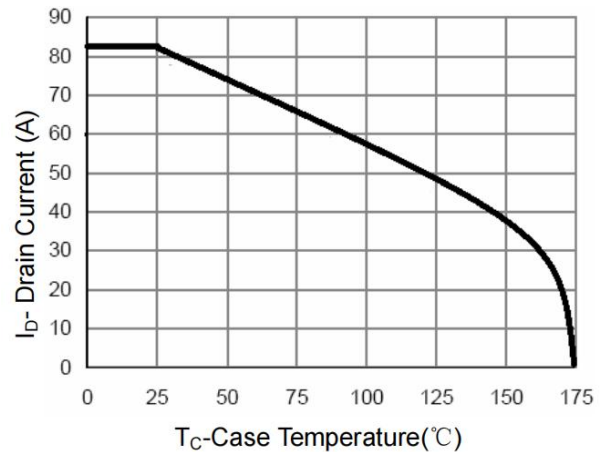


Figure 10 I_D Current Derating vs Junction Temperature

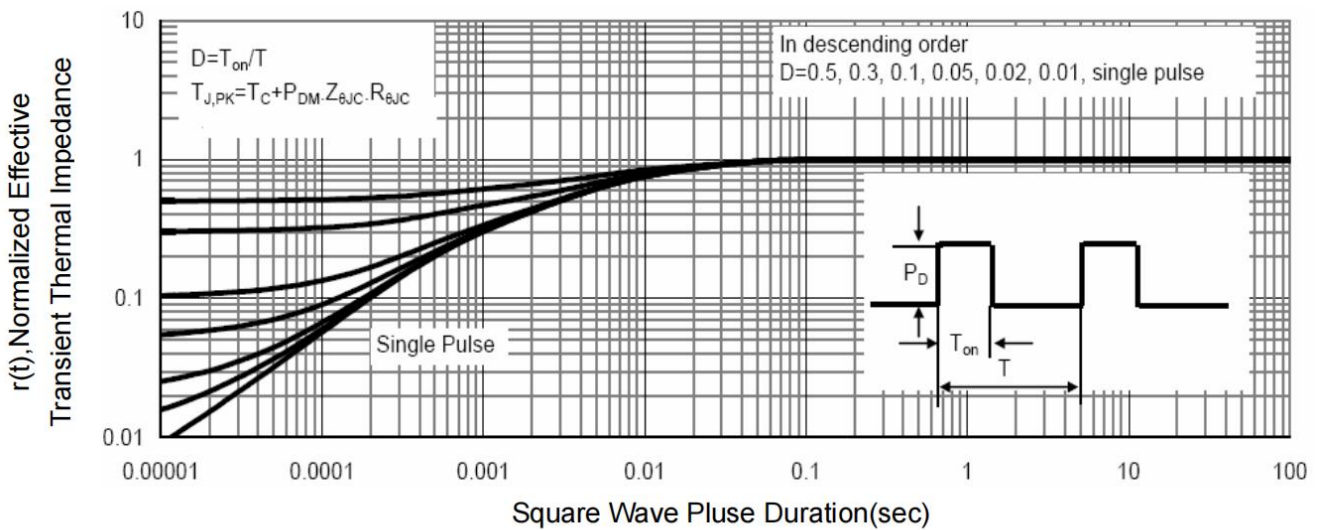
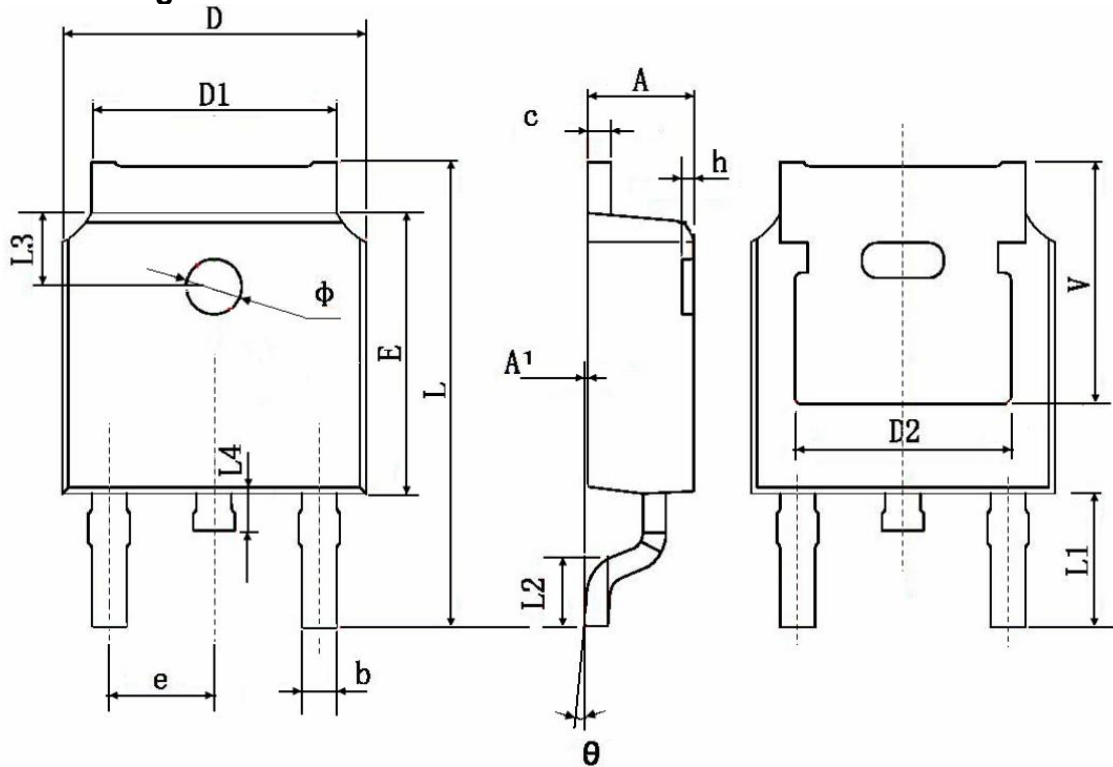


Figure 11 Normalized Maximum Transient Thermal Impedance

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. | |