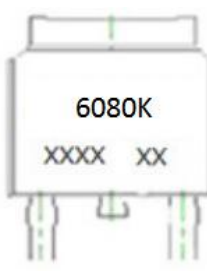

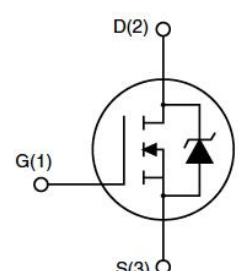




| | |
|--|--|
| Features <ul style="list-style-type: none"> Extremely Low RDS(on): Typ.RDS(on) = 7.9mΩ @VGS=10 V,Id=30 A Low gate charge (typical 75 nC) Fast switching 100% avalanche tested | General Description The 6080K uses advanced trench Technology and design to provide excellent RDS(ON) with low gate charge. It can be use in a wide variety of applications. |
| Package <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Marking and pin assignment</p> </div> <div style="text-align: center;">  <p>TO-252top view</p> </div> <div style="text-align: center;">  <p>Schematic diagram</p> </div> </div> | |

Absolute Maximum Ratings (T_c=25°C unless otherwise specified)

| Symbol | Parameter | Value | Units |
|-----------------------------------|---|-------------|-------|
| V _{DS} | Drain-Source Voltage | 60 | V |
| I _D | Drain Current - Continuous (T _C = 25°C) - Continuous (T _C = 70° C) | 80 | A |
| | | 52* | A |
| I _{DM} | Drain Current - Pulsed (Note 1) | 208* | A |
| V _{GS} | Gate-Source Voltage | ± 20 | V |
| E _{AS} | Single Pulsed Avalanche Energy (Note 2) | 285 | mJ |
| E _{AR} | Repetive Avalanche Energy (Note 1) | 40 | mJ |
| dv/dt | Peak diode recovery dv/dt (note 3) | 5.5 | V/ns |
| P _D | Power Dissipation (T _C = 25°C) - Derate above 25°C | 108 | W |
| | | 1.6 | W/°C |
| T _J , T _{stg} | Operating and Storage Temperature Range | -55 to +150 | °C |
| T | Maximum lead temperature for soldering,purpose, 1/8 from case for 5 seconds | 280 | °C |

* Drain current limited by maximum junction temperature

Thermal Characteristics

| Symbol | Parameter | Value | Units |
|------------------|---|-------|-------|
| R _{θJC} | Thermal Resistance, Junction-to-Case | 0.58 | °C/W |
| R _{θJA} | Thermal Resistance, Junction-to-Ambient | 62.8 | °C/W |



Electrical Characteristics (T_C=25°C unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|---|---|---|-----|------|------|-------|
| Off Characteristics | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} = 0 V, I _D = 250 μA | 60 | | | V |
| ΔBV _{DSS} /ΔT _J | Breakdown Voltage Temperature Coefficient | I _D = 250 μA, Referenced to 25°C | | 68 | | mV/°C |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} = 60 V, V _{GS} = 0 V | | | 1 | μA |
| | | V _{DS} = 50 V, T _C = 125°C | | | 10 | μA |
| I _{GSSF} | Gate Leakage Current, Forward | V _{GS} = 20 V, V _{DS} = 0 V | | | 100 | nA |
| I _{GSSR} | Gate Leakage Current, Reverse | V _{GS} = -20 V, V _{DS} = 0 V | | | -100 | nA |
| On Characteristics | | | | | | |
| V _{GS(TH)} | Gate Threshold voltage | V _{DS} = V _{GS} , I _D = 250 μA | 2 | 3 | 4 | V |
| R _{DS(on)} | Drain-Source on-state resistance | V _{GS} = 10 V, I _D = 30 A | | 7.9 | 9.5 | mΩ |
| g _{FS} | Forward Transconductance | V _{DS} = 10 V, I _D = 30 A(Note 3) | | 34.0 | | S |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input capacitance | V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz | | 3988 | | pF |
| C _{oss} | Output capacitance | | | 339 | | pF |
| C _{rss} | Reverse transfer capacitance | | | 312 | | pF |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn On Delay Time | | | 22 | | ns |
| t _r | Rising Time | | | 54 | | ns |
| t _{d(off)} | Turn Off Delay Time | V _{DD} = 35 V, I _D = 40 A, V _{GS} = 10 V, R _G = 4.7 Ω (Note 3, 4) | | 50 | | ns |
| t _f | Fall Time | | | 25 | | ns |
| Q _g | Total Gate Charge | V _{DS} = 35 V, I _D = 40 A, V _{GS} = 10 V (Note 3, 4) | | 78 | | nC |
| Q _{gs} | Gate-Source Charge | | | 26 | | nC |
| Q _{gd} | Gate-Drain Charge | | | 22 | | nC |
| R _g | Gate Resistance | V _{DS} = 0 V, Scan F mode | | 2.4 | | Ω |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I _S | Maximum Continuous Drain-Source Diode Forward Current | | | | 80 | A |
| I _{SM} | Maximum Pulsed Drain-Source Diode Forward Current | | | | 208 | A |
| V _{SD} | Diode Forward Voltage | V _{GS} = 0 V, I _S = 40 A | | | 1.2 | V |
| I _{rrm} | Reverse recovery current | I _S = 40A, V _{GS} = 0V, di/dt = 100A/us | | -1.2 | | A |
| T _{rr} | Reverse recovery time | | | 25 | | ns |
| Q _{rr} | Reverse recovery charge | | | 19 | | nC |

Notes:1. Repetitive Rating : Pulse width limited by maximum junction temperature

2. L = 0.95 mH, I_{AS} = 32 A, V_{DD} = 10V, R_G = 25 Ω, Starting T_J = 25°C

3. I_{SD} ≤ 40A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

4. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%

5. Essentially independent of operating temperature



Typical Characteristics

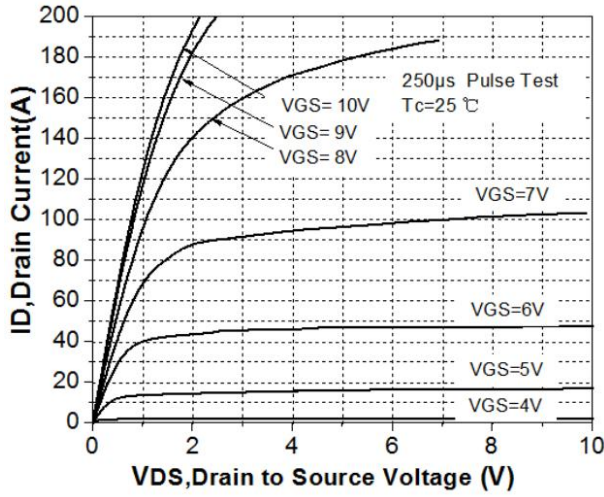


Figure 1. On-Region Characteristics

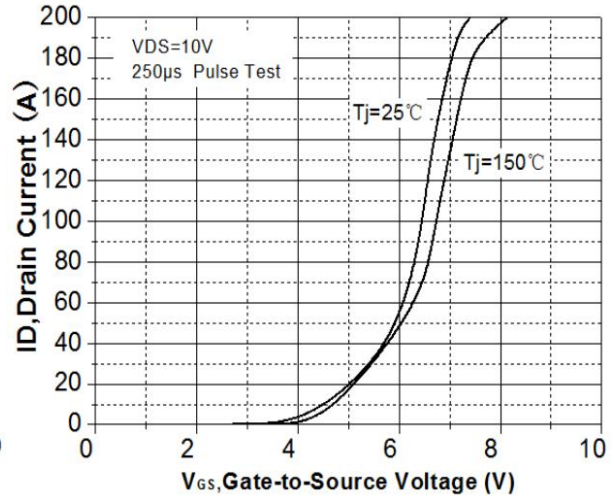


Figure 2. Transfer Characteristics

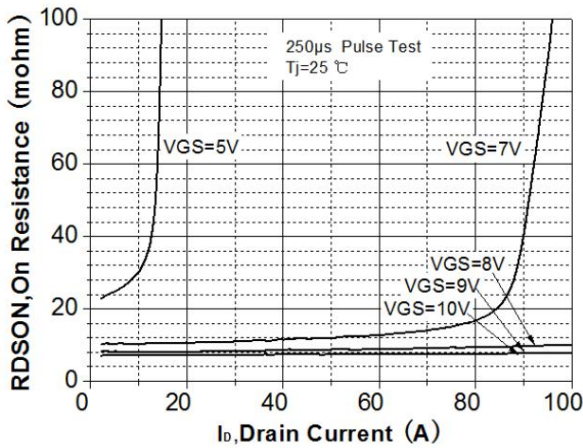


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

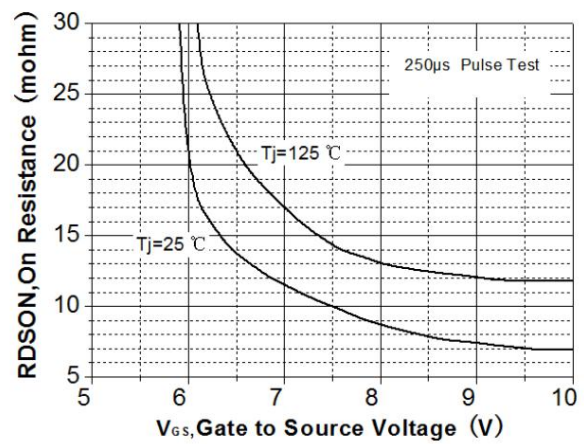


Figure 4. On-Resistance vs. Gate to Source Voltage

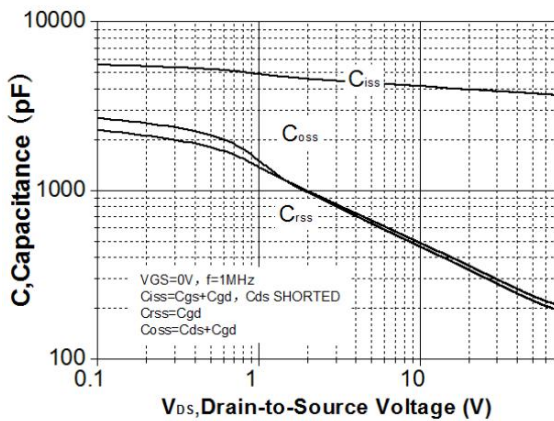


Figure 5. Capacitance Characteristics

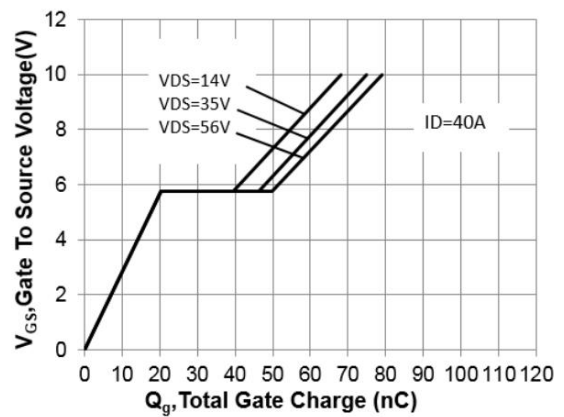


Figure 6. Gate Charge Characteristics

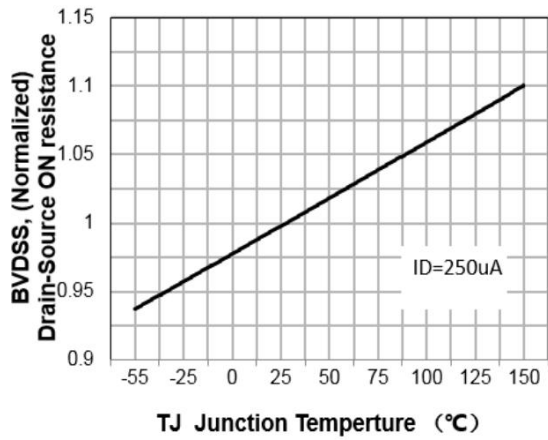


Figure 7. Breakdown Voltage Variation vs Temperature

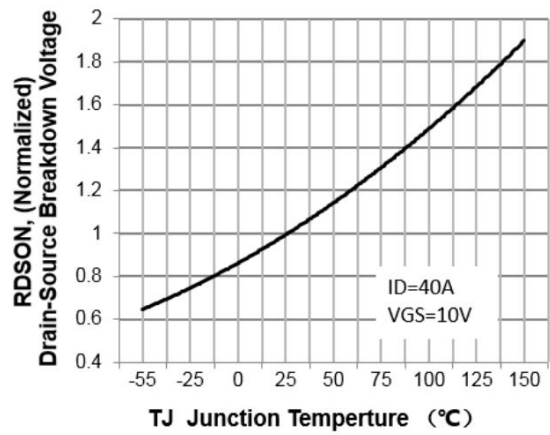


Figure 8. On-Resistance Variation vs Temperature

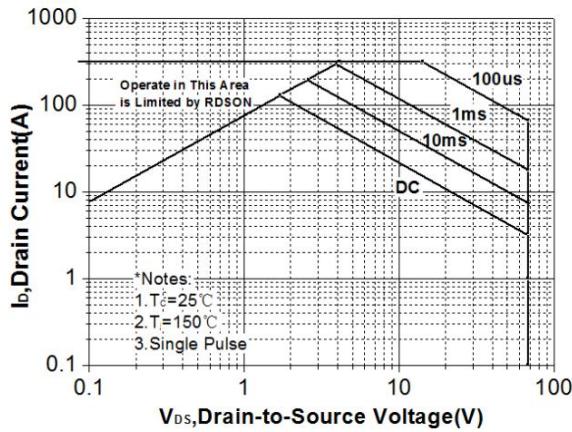


Figure 9. Maximum Safe Operating Area

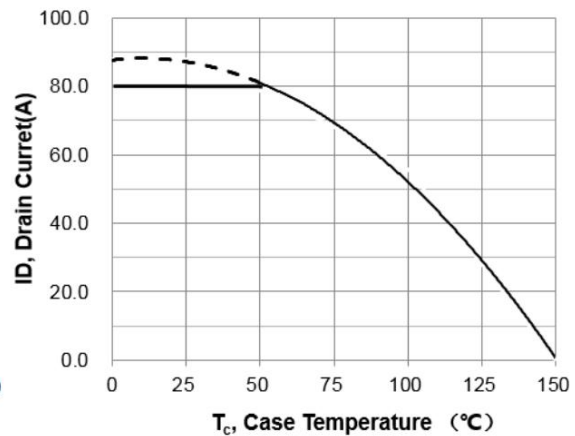


Figure 10. Maximum Drain Current vs Case Temperature

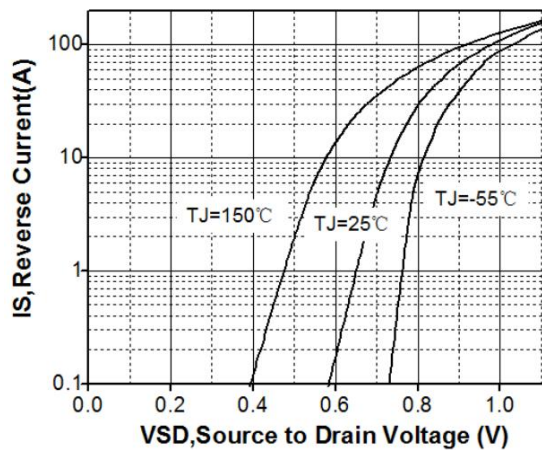


Figure 11. Body Diode Forward Voltage Vs Reverse Drain Current

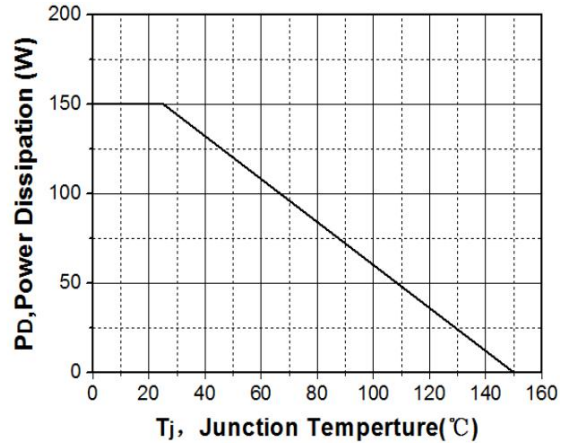


Figure 12. Power Dissipation vs Junction Temperature

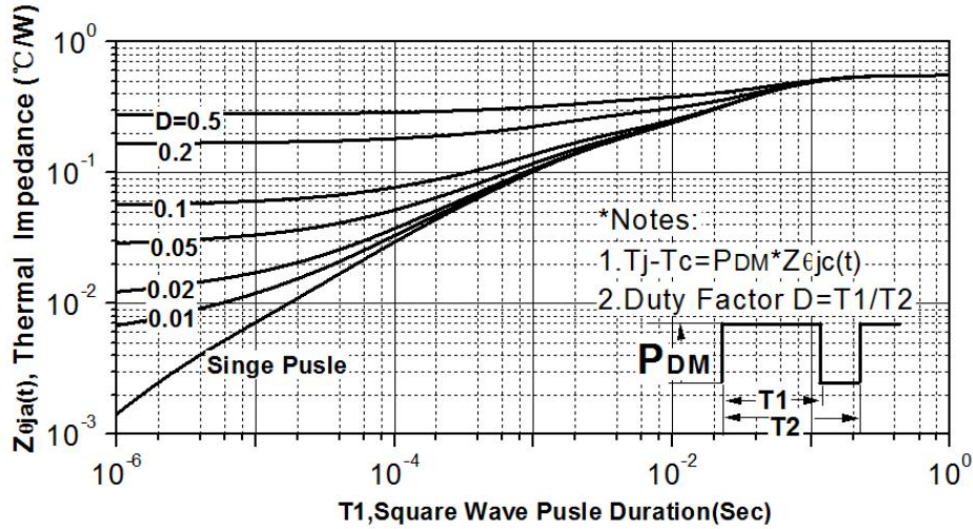


Figure 13. Transient Thermal Response Curve

Test Circuit

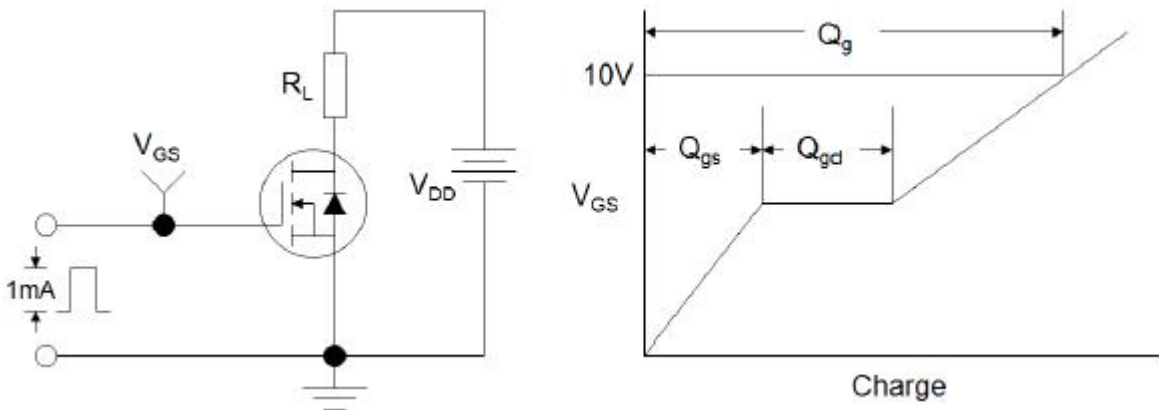


Figure 14. Gate Charge Test Circuit & Waveform

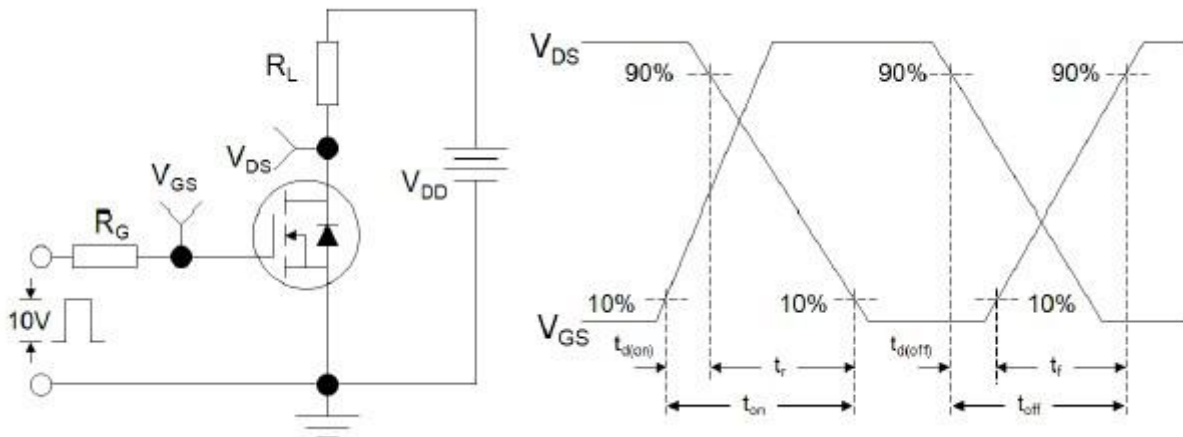


Figure 15. Switching time test circuit & waveform

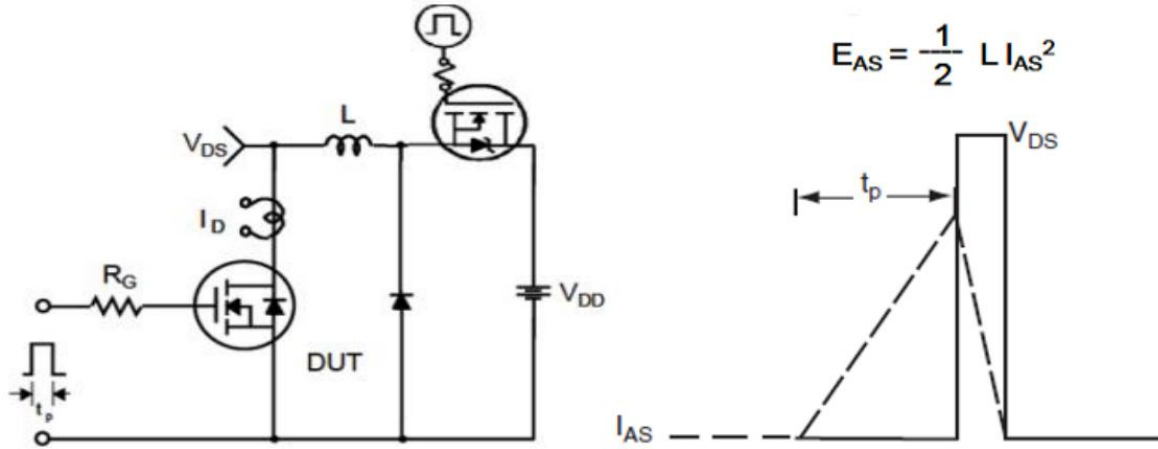


Figure 16. Unclamped Inductive switching test circuit & waveform

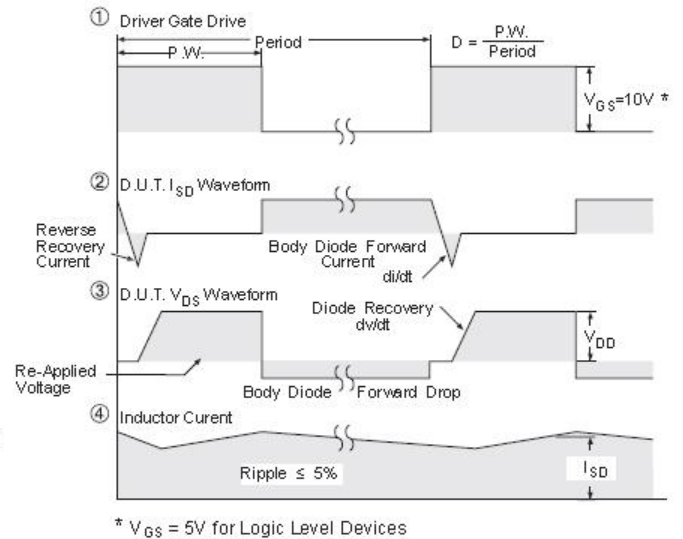
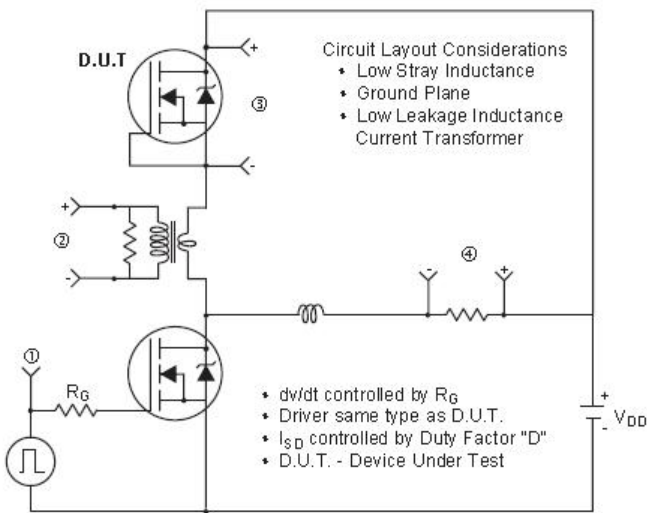
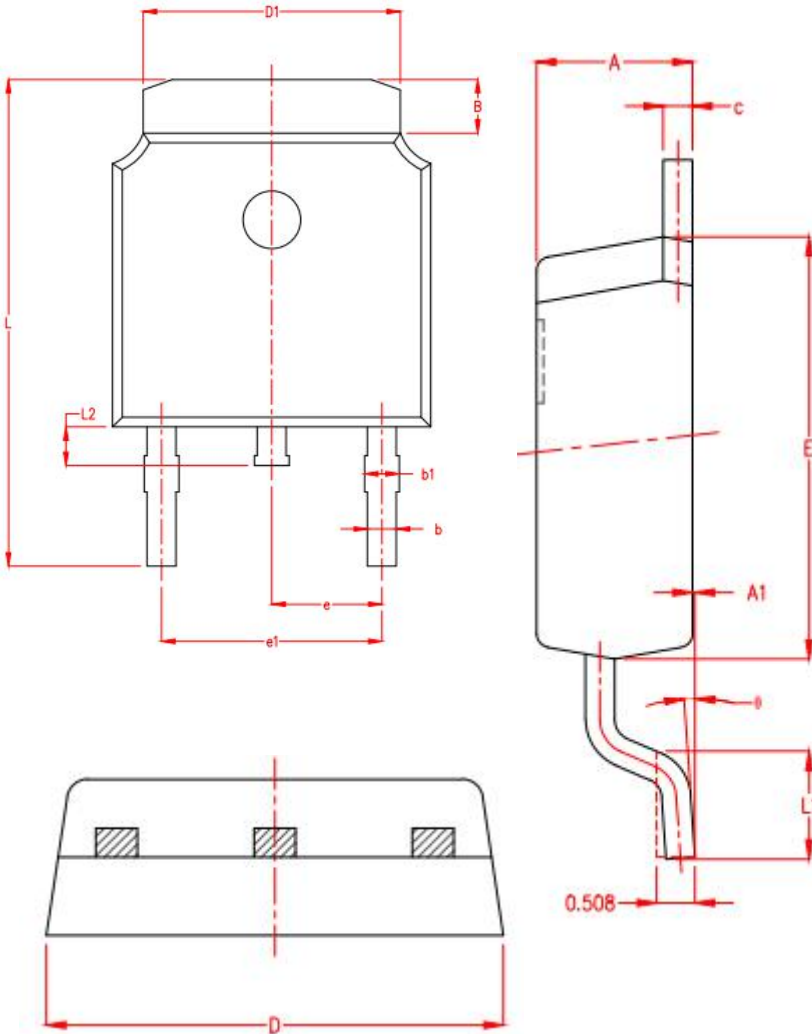


Figure 17. Peak diode recovery dv/dt test circuit & waveform



TO-252 Package Information



| SYMBOL | MILLIMETER | | |
|--------|------------|-------|-------|
| | MIN | NOM | MAX |
| A | 2.15 | 2.25 | 2.35 |
| A1 | 0.00 | 0.06 | 0.12 |
| B | 0.96 | 1.11 | 1.26 |
| b | 0.59 | 0.69 | 0.79 |
| b1 | 0.69 | 0.81 | 0.93 |
| c | 0.34 | 0.42 | 0.50 |
| D | 6.45 | 6.60 | 6.75 |
| D1 | 5.23 | 5.33 | 5.43 |
| E | 5.95 | 6.10 | 6.25 |
| e | 2.286TYP. | | |
| e1 | 4.47 | 4.57 | 4.67 |
| L | 9.90 | 10.10 | 10.30 |
| L1 | 1.40 | 1.55 | 1.70 |
| L2 | 0.60 | 0.80 | 1.00 |
| θ | 0° | 4° | 8° |