



650V/7A N-Channel Advanced Power MOSFET

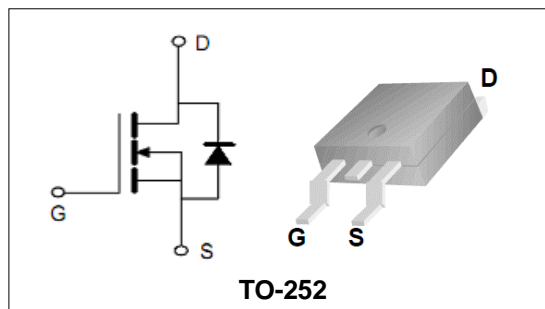
Features

- Improved dv/dt Capability, High Ruggedness.
- Maximum Junction Temperature Range (150°C)
- 100% Avalanche Tested

| | | |
|---------------|-----|---|
| BVDSS | 650 | V |
| ID | 7 | A |
| RDSON@VGS=10V | 1.1 | Ω |

Applications

- Power factor correction (PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply (UPS)



Order Information

| Product | Package | Marking | Reel Size | Reel | Carton |
|---------|---------|---------|-----------|---------|----------|
| PTD7N65 | TO-252 | PTD7N65 | 13inch | 2500PCS | 50000PCS |

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit | |
|--|--|------------|------|---|
| Common Ratings (TC=25°C Unless Otherwise Noted) | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | 650 | V | |
| V_{GS} | Gate-Source Voltage | ±30 | V | |
| T_J | Maximum Junction Temperature | 150 | °C | |
| T_{STG} | Storage Temperature Range | -55 to 150 | °C | |
| I_S | Diode Continuous Forward Current | TC =25°C | 7 | A |
| Mounted on Large Heat Sink | | | | |
| E_{AS} | Single Pulse Avalanche Energy (Note1) | 385 | mJ | |
| I_{DM} | Pulse Drain Current Tested (Silicon Limit) (Note2) | TC =25°C | 28 | A |
| I_D | Continuous Drain current | TC =25°C | 7 | A |
| P_D | Maximum Power Dissipation | TC =25°C | 90 | W |
| $R_{\theta Jc}$ | Thermal Resistance Junction-to-Case (Note3) | 1.39 | °C/W | |



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| Symbol | Parameter | Condition | Min. | Typ. | Max. | Unit |
|--|--|------------------|------|------|------|------|
| Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated) | | | | | | |
| V _{(BR)DSS} | Drain- Source Breakdown Voltage | VGS=0V ID=250μA | 650 | -- | -- | V |
| I _{DSS} | Zero Gate Voltage Drain current | VDS=650V,VGS=0V | -- | -- | 1 | μA |
| I _{GSS} | Gate-Body Leakage Current | VGS=±30V,VDS=0V | -- | -- | ±100 | nA |
| V _{GS(TH)} | Gate Threshold Voltage | VDS=VGS,ID=250μA | 2 | 3 | 4 | V |
| R _{DS(ON)} | Drain-Source On-State Resistance (Note4) | VGS=10V, ID=3.5A | -- | 1.1 | 1.3 | Ω |
| Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note5) | | | | | | |
| C _{iss} | Input Capacitance | VDS=25V, | -- | 930 | -- | pF |
| C _{oss} | Output Capacitance | VGS=0V, | -- | 100 | -- | pF |
| C _{rss} | Reverse Transfer Capacitance | F=1MHz | -- | 4.5 | -- | pF |
| Q _g | Total Gate Charge | VDS=520V, | -- | 16 | -- | nC |
| Q _{gs} | Gate-Source Charge | ID=7A, | -- | 4 | -- | nC |
| Q _{gd} | Gate-Drain Charge | VGS=10V | -- | 3.6 | -- | nC |
| Switching Characteristics (Note5) | | | | | | |
| t _{d(on)} | Turn-on Delay Time | VDS=300V, | -- | 26 | -- | nS |
| t _r | Turn-on Rise Time | ID=7A, | -- | 17 | -- | nS |
| t _{d(off)} | Turn-off Delay Time | RG=25Ω, | -- | 57 | -- | nS |
| t _f | Turn-off Fall Time | VGS=10V | -- | 23 | -- | nS |
| Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated) | | | | | | |
| V _{SD} | Forward on voltage | IS=5A,VGS=0V | -- | 0.85 | 1.4 | V |

Note:

- Limited by T_{Jmax}, starting T_J = 25° C, R_G = 25Ω, V_D =50V, VGS =10V. Part not recommended for use above this value.
- Repetitive Rating: Pulse width limited by maximum junction temperature.
- Surface Mounted on FR4 Board, t ≤ 10 sec.
- Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.



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Typical Characteristics

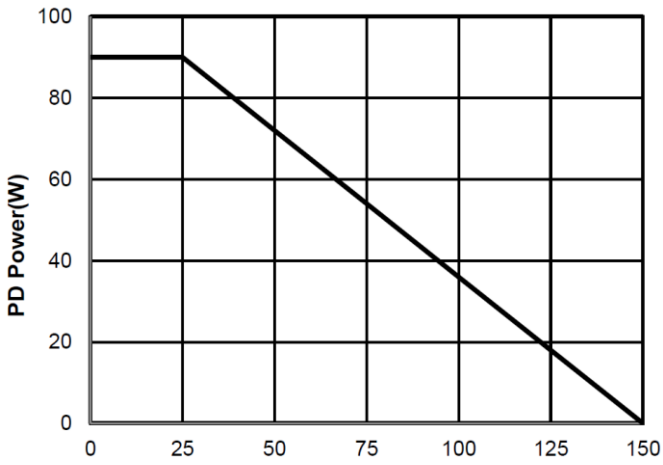


Figure1: T_j Junction Temperature (°C)

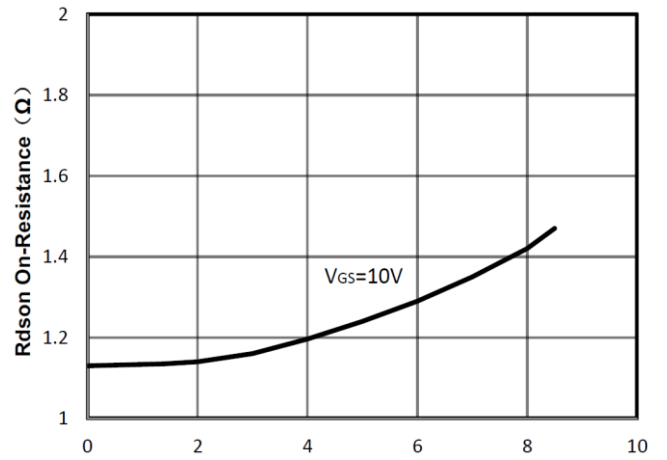


Figure2: I_d Drain Current (A)

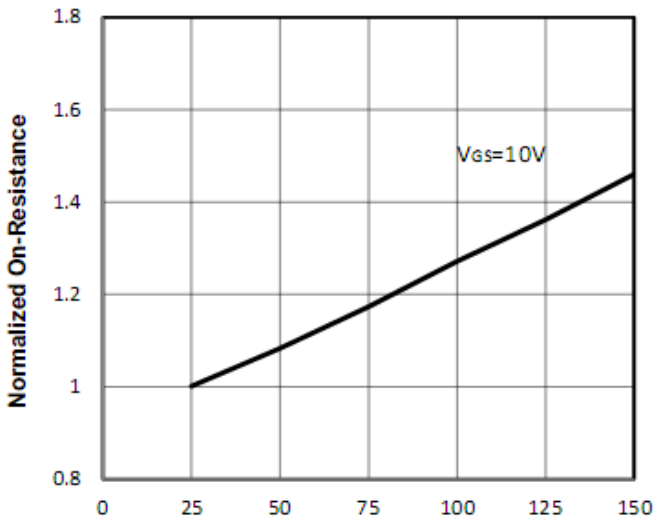


Figure3: T_j Junction Temperature (°C)

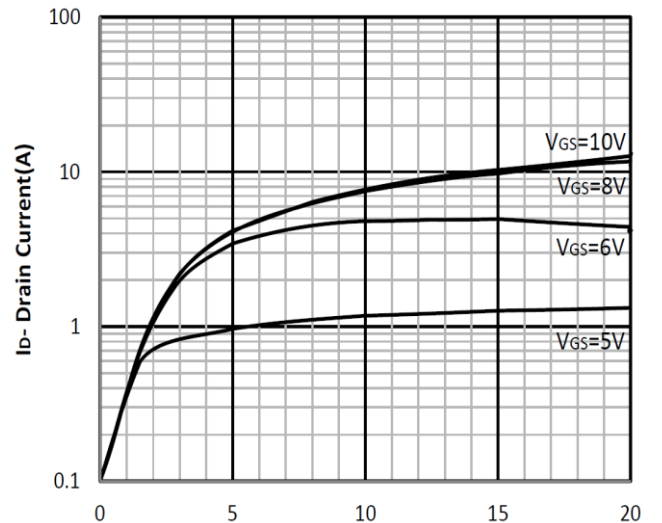


Figure4: V_{ds} Drain-Source Voltage (V)

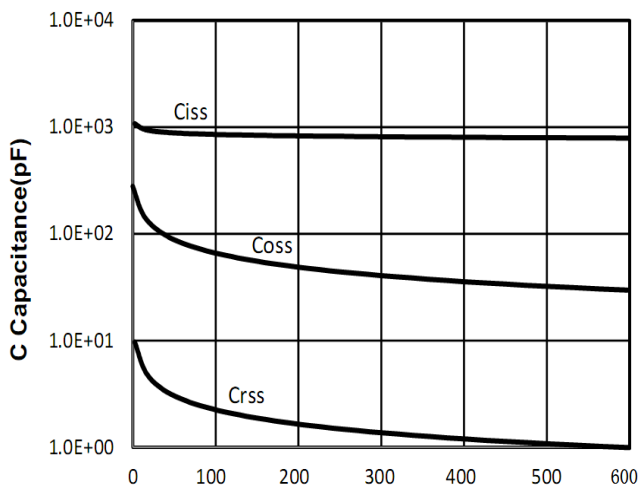


Figure5: V_{ds} Drain-Source Voltage (V)

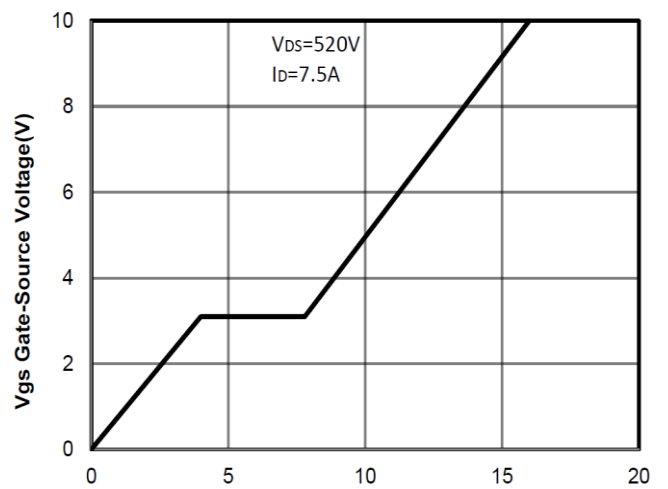


Figure6: Q_g Gate Charge (nC)



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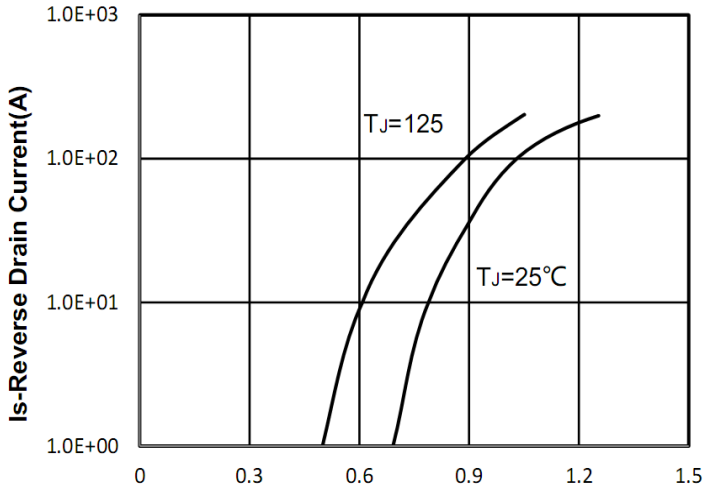


Figure7: Vsd Source-Drain Voltage (V)

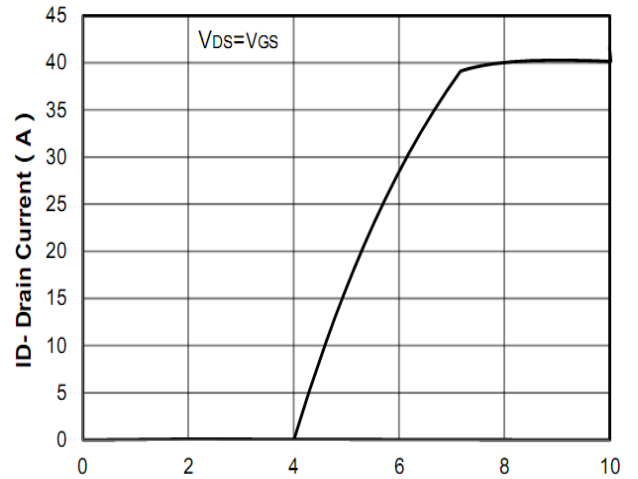


Figure8: Vgs Gate-Source Voltage (V)

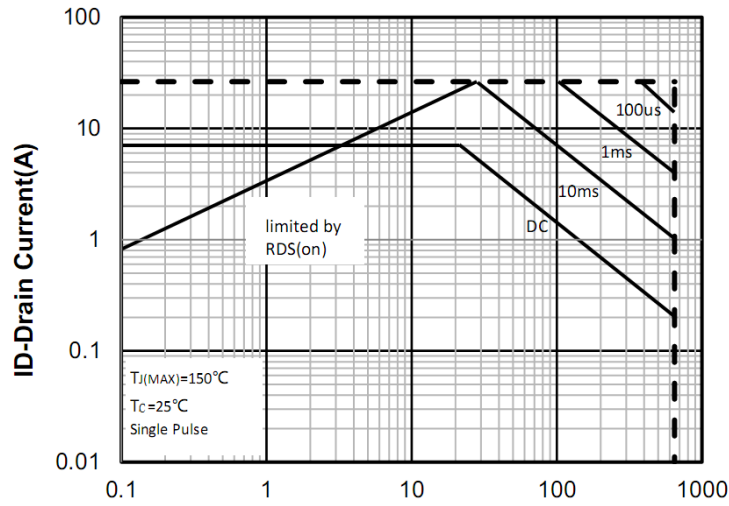


Figure9: Vds Drain -Source Voltage (V)

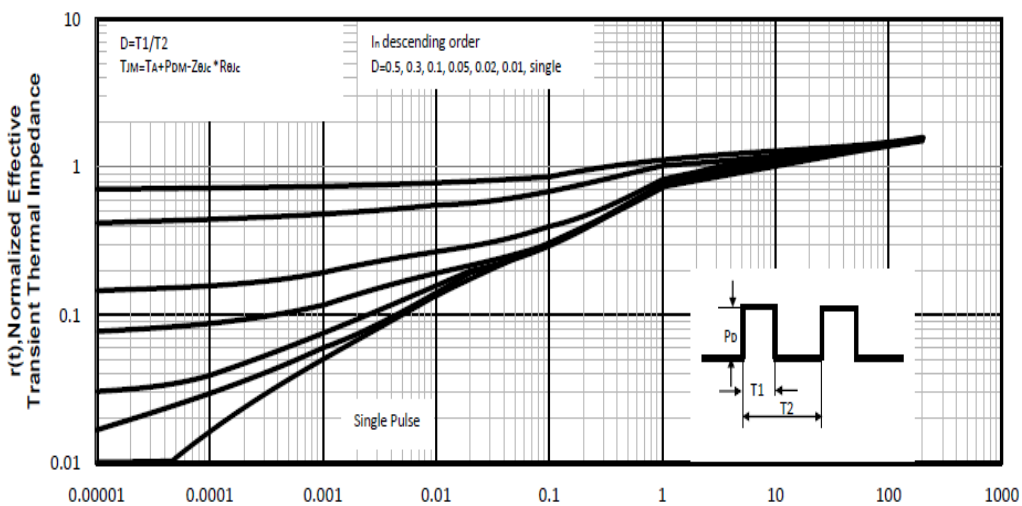
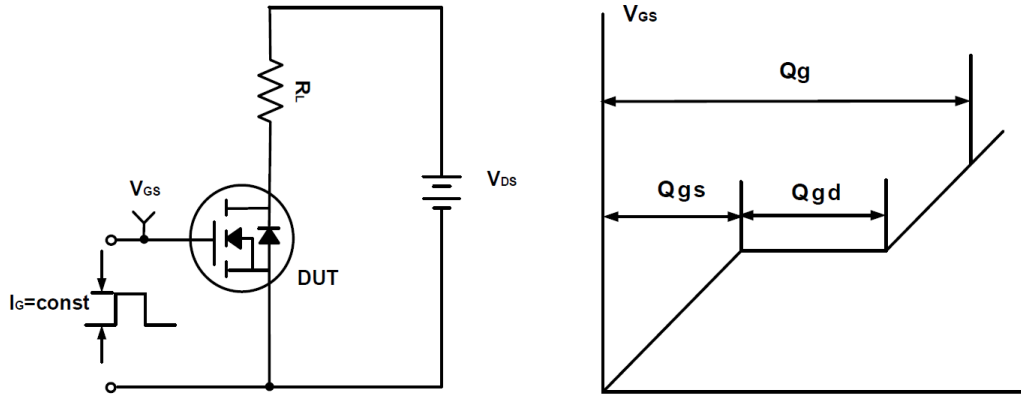
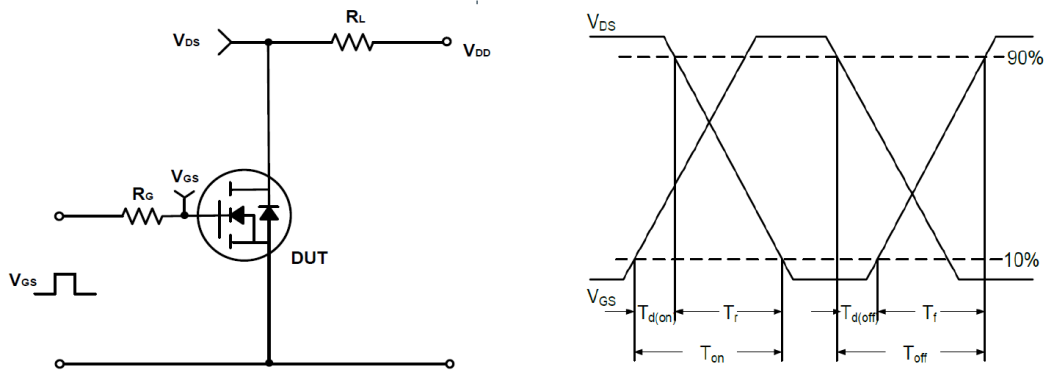
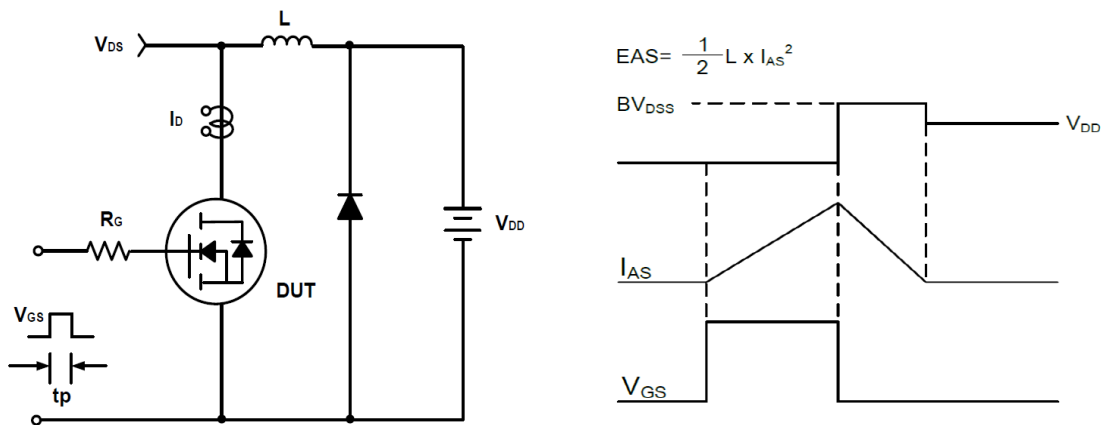


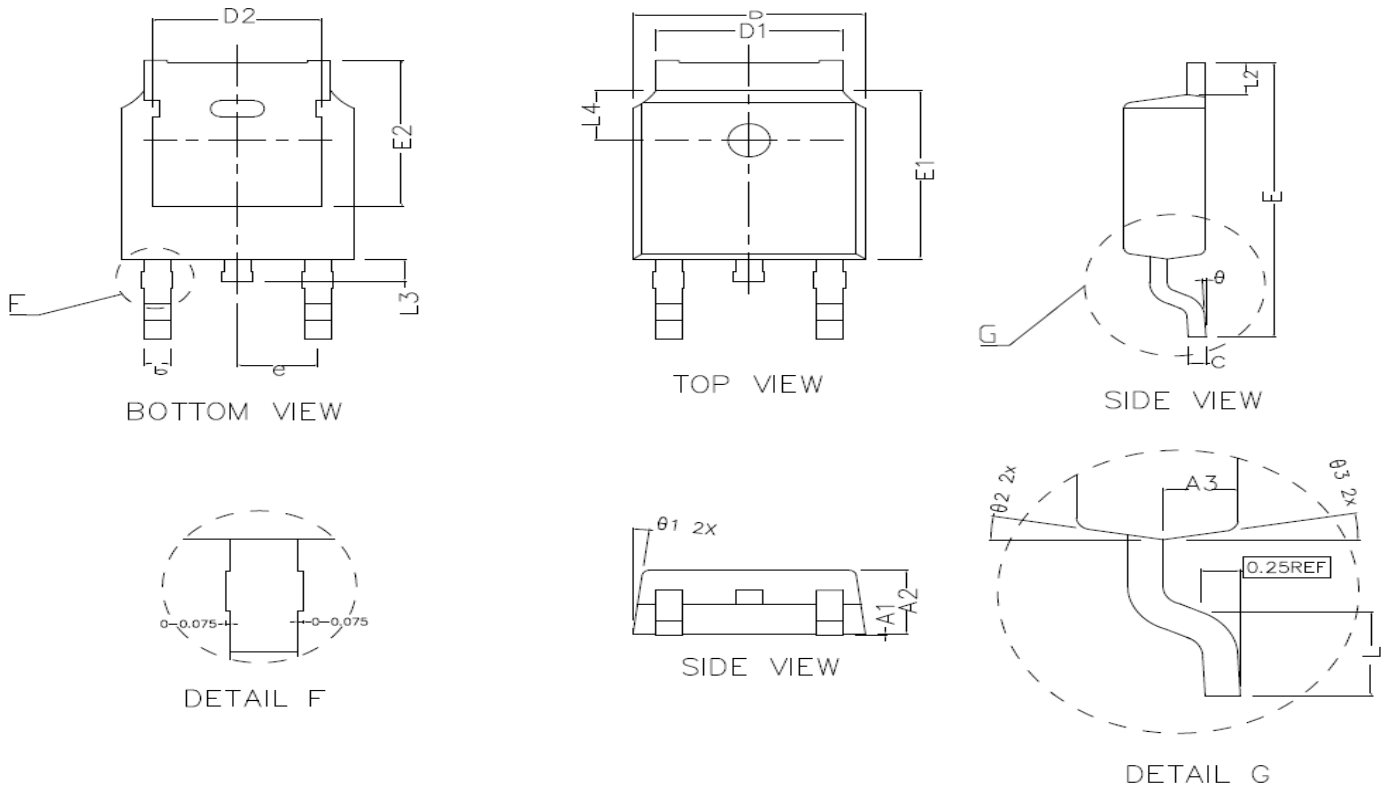
Figure10: Square Wave Pulse Duration (sec)

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Test Circuit and Waveform:

Figure A Gate Charge Test Circuit & Waveforms

Figure B Switching Test Circuit & Waveforms

Figure C Unclamped Inductive Switching Circuit & Waveforms



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TO-252 Package Outline Dimensions (Units: mm)



| COMMON DIMENSIONS (UNITS OF MEASURE IS mm) | | | |
|---|-----------|--------|--------|
| | MIN | NORMAL | MAX |
| A1 | 0.000 | 0.100 | 0.150 |
| A2 | 2.200 | 2.300 | 2.400 |
| A3 | 1.020 | 1.070 | 1.120 |
| b | 0.710 | 0.760 | 0.810 |
| c | 0.460 | 0.508 | 0.550 |
| D | 6.500 | 6.600 | 6.700 |
| D1 | 5.330REF | | |
| D2 | 4.830REF | | |
| E | 9.900 | 10.100 | 10.300 |
| E1 | 6.000 | 6.100 | 6.200 |
| E2 | 5.600REF | | |
| e | 2.286TYPE | | |
| L | 1.400 | 1.550 | 1.700 |
| L2 | 1.10REF | | |
| L3 | 0.80REF | | |
| L4 | 1.80REF | | |
| theta | 0~8° | | |
| theta1 | 7° TYPE | | |
| theta2 | 10° TYPE | | |
| theta3 | 10° TYPE | | |