

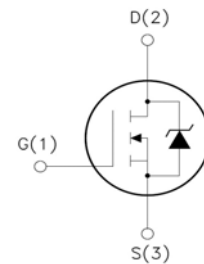
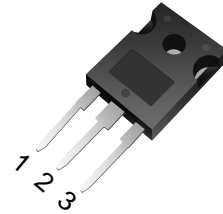
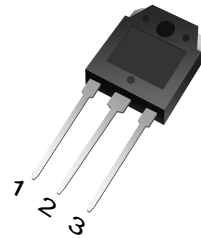
Features

- Low Intrinsic Capacitances
- Excellent Switching Characteristics
- Extended Safe Operating Area
- Ultra Low Gate Charge: Qg=136.2nC (Typ.)
- $V_{DSS}=300V$, $I_D=80A$
- $R_{ds(on)}:36m$ (Typ.) @ $V_G=10V$
- 100% Avalanche Tested

Package

TO-3P

TO-247S



1. Gate (G)
2. Drain (D)
3. Source (S)

Absolute Maximum Ratings (Ta=25°C unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|----------------|--|-----------------|-------|
| V_{DSS} | Drain-to-Source Voltage | 300 | V |
| I_D | Continuous Drain Current $T_C = 25\text{ }^\circ\text{C}$ | 80 | A |
| | Continuous Drain Current $T_C = 100\text{ }^\circ\text{C}$ | 42 | A |
| I_{DM}^{al} | Pulsed Drain Current | 280 | A |
| V_{GS} | Gate-to-Source Voltage | ± 30 | V |
| E_{AS}^{a2} | Single Pulse Avalanche Energy | 3450 | mJ |
| dv/dt^{a3} | Peak Diode Recovery dv/dt | 5.0 | V/ns |
| P_D | Power Dissipation $T_C = 25\text{ }^\circ\text{C}$ | 250 | W |
| | Derating Factor above 25°C | 2 | W/°C |
| T_J, T_{stg} | Operating Junction and Storage Temperature Range | 150, -55 to 150 | °C |
| T_L | Maximum Temperature for Soldering | 300 | °C |



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

| OFF Characteristics | | | | | | |
|-------------------------------------|-----------------------------------|--|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| V _{DSS} | Drain to Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 300 | -- | -- | V |
| ΔBV _{DSS} /ΔT _J | Bvdss Temperature Coefficient | I _D =250 uA, Reference 25 °C | -- | 0.30 | -- | V/°C |
| I _{DSS} | Drain to Source Leakage Current | V _{DS} =300V, V _{GS} =0V, T _J = 25°C | -- | -- | 1 | μA |
| | | V _{DS} =240V, V _{GS} =0V, T _J = 125°C | | | 100 | |
| I _{GSS(F)} | Gate to Source Forward Leakage | V _{DS} =0V, V _{GS} = 30V | -- | -- | 100 | nA |
| I _{GSS(R)} | Gate to Source Reverse Leakage | V _{DS} =0V, V _{GS} = -30V | -- | -- | -100 | nA |

| ON Characteristics | | | | | | |
|----------------------------|-------------------------------|--|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| R _{DS(ON)} | Drain-to-Source On-Resistance | V _{GS} =10V, I _D =40A | -- | 36 | 42 | mΩ |
| V _{GS(TH)} | Gate Threshold Voltage | V _{DS} = V _{GS} , I _D = 250μA | 2.0 | -- | 4.0 | V |
| Pulse width tp≤300μs, δ≤2% | | | | | | |

| Dynamic Characteristics | | | | | | |
|-------------------------|------------------------------|---|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| g _{fs} | Forward Trans conductance | V _{DS} =15V, I _D =40A | -- | 9.0 | -- | S |
| R _g | Gate resistance | f = 1.0MHz | -- | 3.2 | -- | Ω |
| C _{iss} | Input Capacitance | V _{GS} = 0V V _{DS} = 25V f = 1.0MHz | -- | 8280 | -- | pF |
| C _{oss} | Output Capacitance | | -- | 900 | -- | |
| C _{rss} | Reverse Transfer Capacitance | | -- | 107 | -- | |



| Resistive Switching Characteristics | | | | | | |
|-------------------------------------|---------------------------------|---|--------|-------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $I_D = 80A \quad V_{DD} = 150V$ $R_G = 25\Omega$ | -- | 82.4 | -- | ns |
| t_r | Rise Time | | -- | 301.6 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | | -- | 196 | -- | |
| t_f | Fall Time | | -- | 135 | -- | |
| Q_g | Total Gate Charge | $I_D = 80A \quad V_{DD} = 240V$ $V_{GS} = 10V$ | -- | 136.2 | -- | nC |
| Q_{gs} | Gate to Source Charge | | -- | 42.8 | -- | |
| Q_{gd} | Gate to Drain ("Miller") Charge | | -- | 47.5 | -- | |

| Source-Drain Diode Characteristics | | | | | | |
|--|--|---|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| I_S | Continuous Source Current (Body Diode) | | -- | -- | 70 | A |
| I_{SM} | Maximum Pulsed Current (Body Diode) | | -- | -- | 280 | A |
| V_{SD} | Diode Forward Voltage | $I_S = 80A, V_{GS} = 0V$ | -- | -- | 1.5 | V |
| t_{rr} | Reverse Recovery Time | $I_S = 80A, T_J = 25^\circ C$ $di/dt = 100A/\mu s,$ $V_{GS} = 0V$ | -- | 336 | -- | ns |
| Q_{rr} | Reverse Recovery Charge | | -- | 3460 | -- | nC |
| I_{RRM} | Reverse Recovery Current | | -- | 20.6 | -- | A |
| Pulse width $t_p \leq 300\mu s, \delta \leq 2\%$ | | | | | | |

| Symbol | Parameter | Max. | Units |
|-----------------|---------------------|------|--------------|
| $R_{\theta JC}$ | Junction-to-Case | 0.5 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction-to-Ambient | 40 | $^\circ C/W$ |

a1: Repetitive rating; pulse width limited by maximum junction temperature

a2: $L = 10.0mH, I_D = 26.3A, Start T_J = 25^\circ C$

a3: $I_{SD} = 80A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DS}, Start T_J = 25^\circ C$

Typical Characteristics

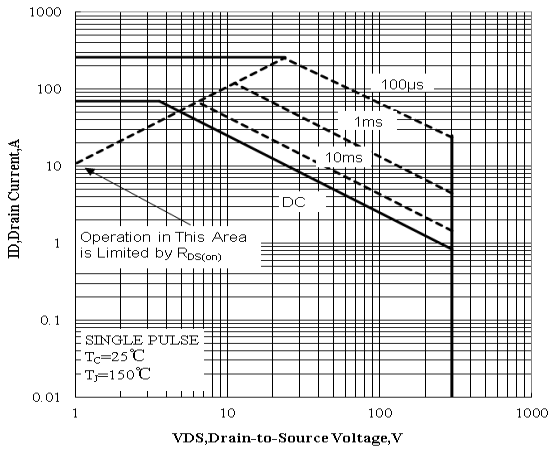


Figure 1 Maximum Forward Bias Safe Operating Area

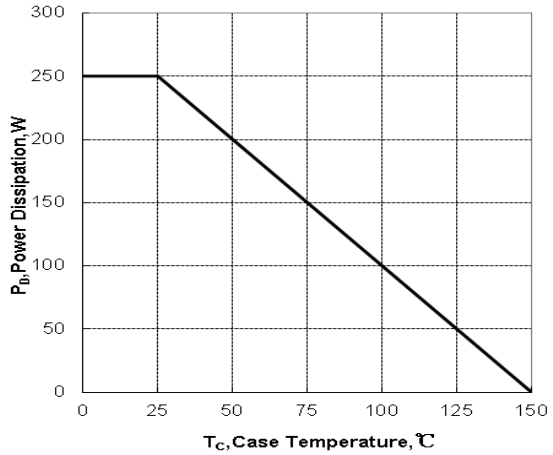


Figure 2 Maximum Power dissipation vs Case Temperature

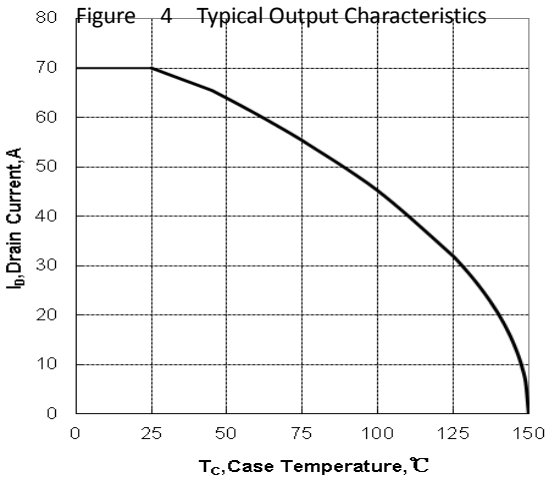


Figure 3 Maximum Continuous Drain Current vs Case Temperature

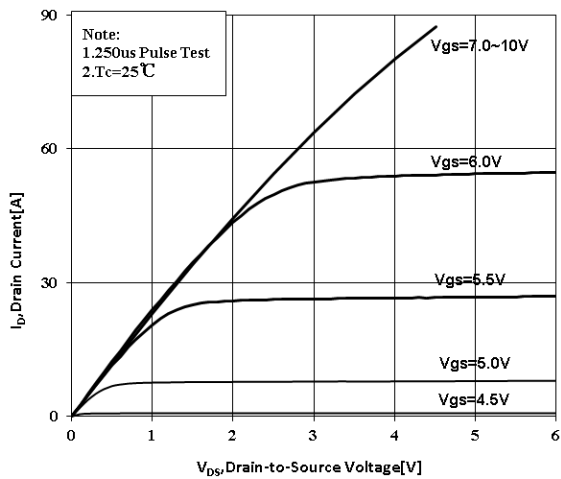


Figure 4 Typical Output Characteristics

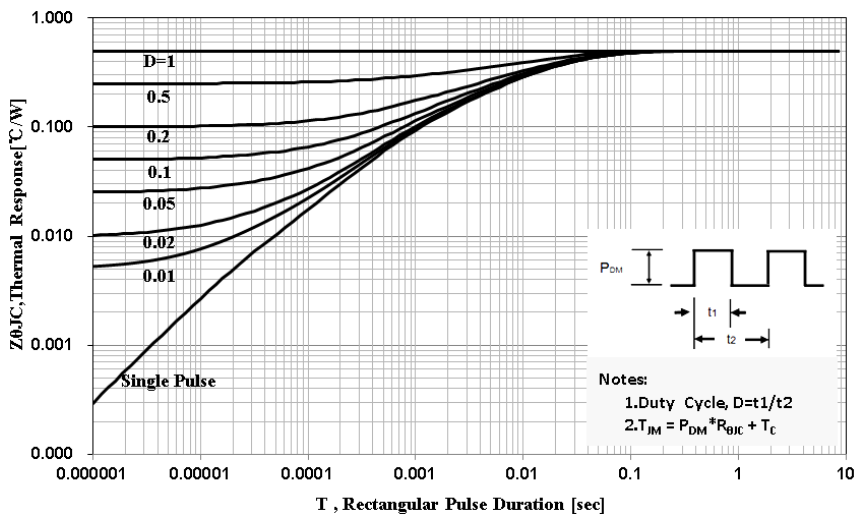


Figure 5 Maximum Effective Thermal Impedance , Junction to Case

Typical Characteristics(Continued)

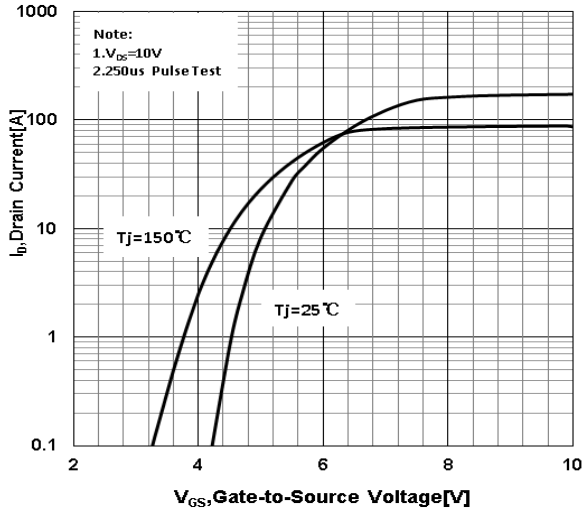


Figure 6 Typical Transfer Characteristics

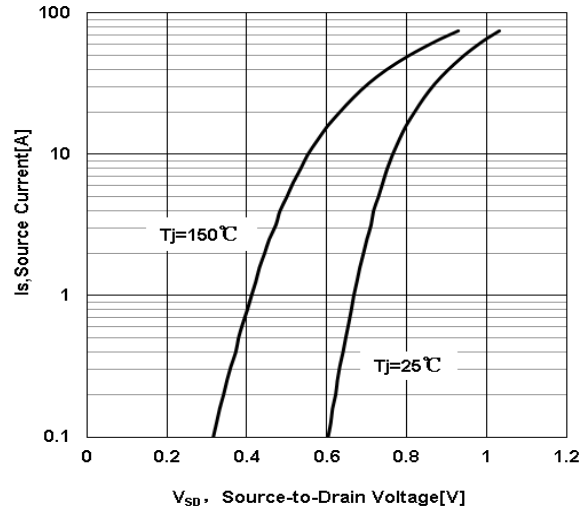


Figure 7 Typical Body Diode Transfer Characteristics

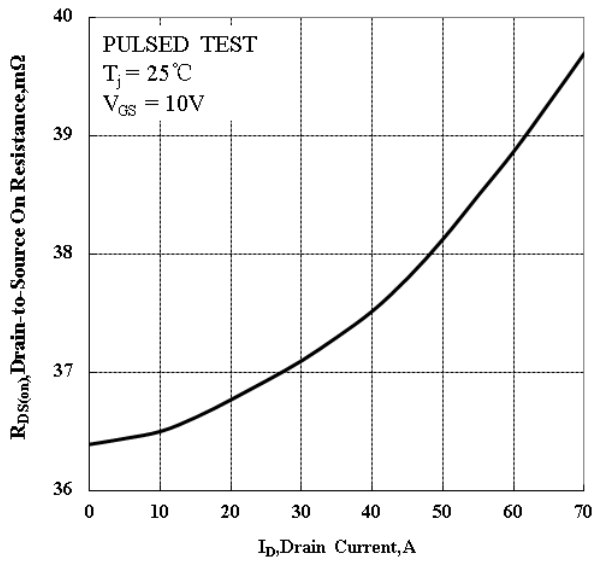


Figure 8 Typical Drain to Source ON Resistance vs Drain Current

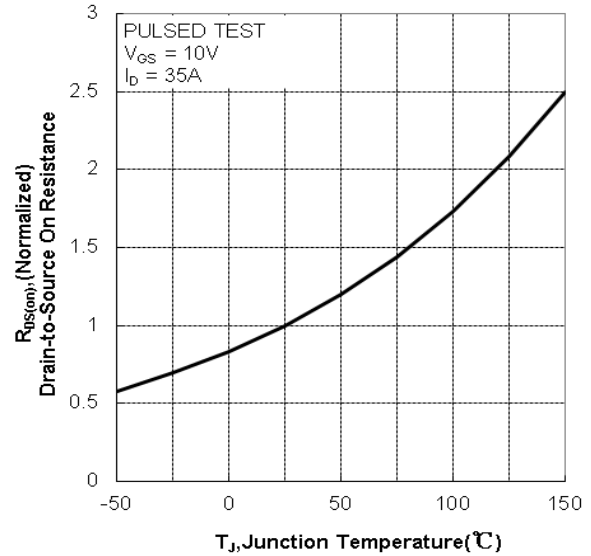


Figure 9 Typical Drain to Source on Resistance vs Junction Temperature

Typical Characteristics(Continued)

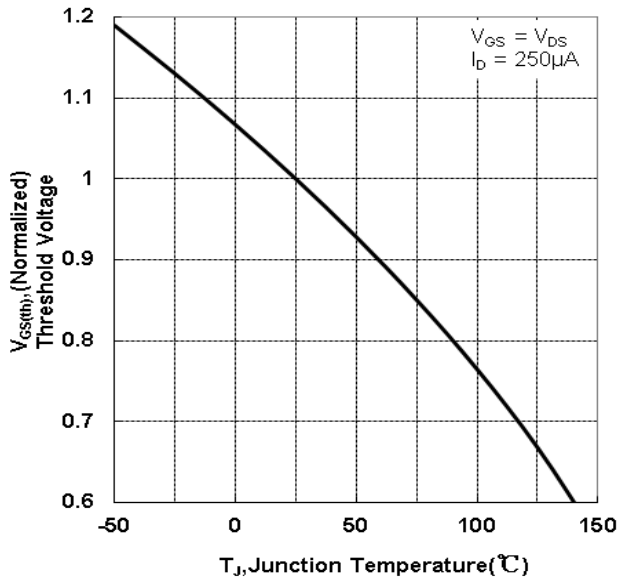


Figure 10 Typical Theshold Voltage vs Junction Temperature

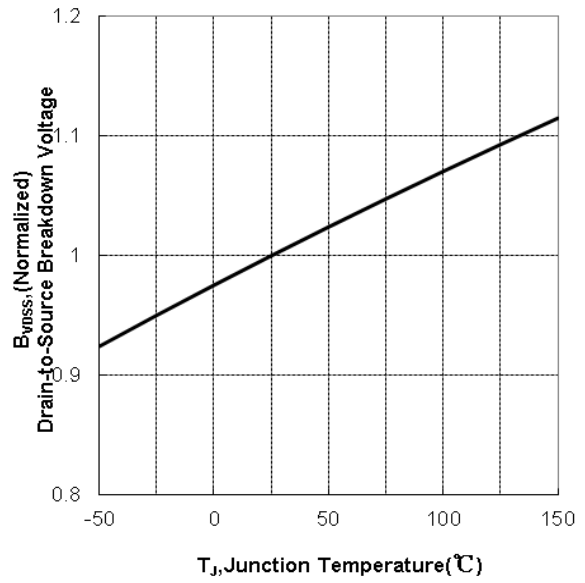


Figure 11 Typical Breakdown Voltage vs Junction Temperature

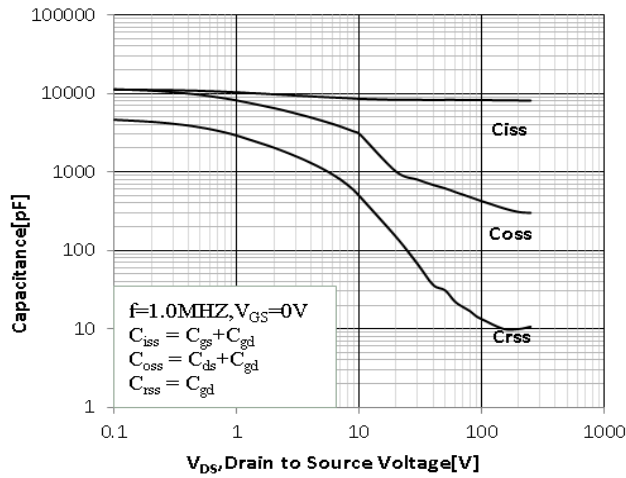


Figure 12 Typical Capacitance vs Drain to Source Voltage

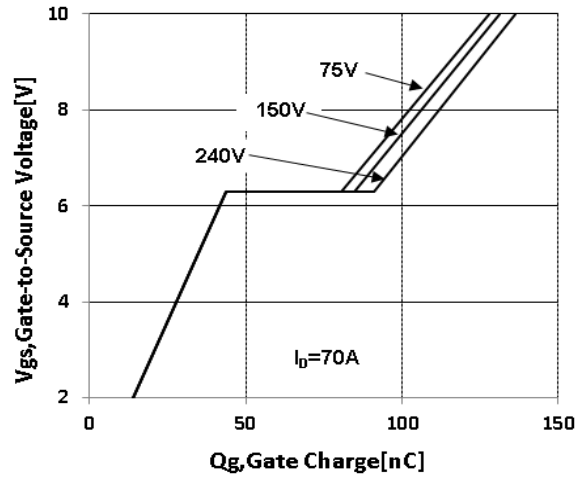


Figure 13 Typical Gate Charge vs Gate to Source Voltage

Test Circuit and Waveform



Figure 14. Gate Charge Test Circuit

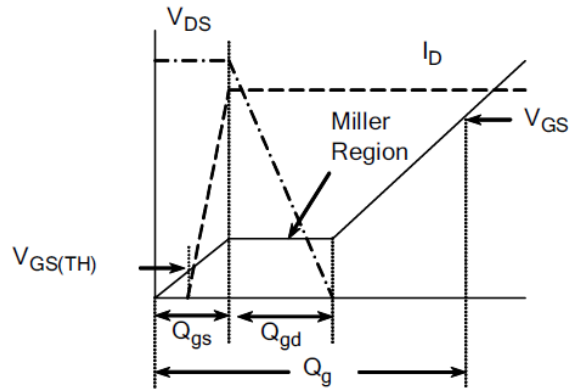


Figure 15. Gate Charge Waveforms



Figure 16. Resistive Switching Test Circuit

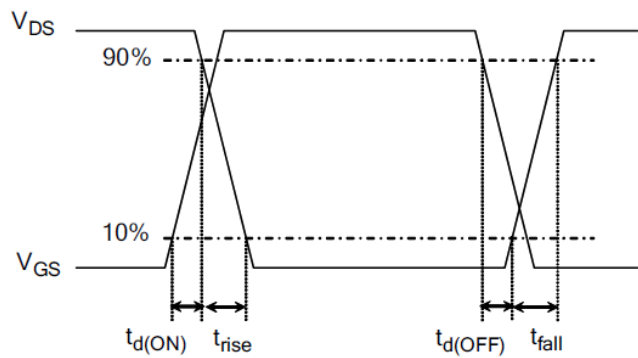


Figure 17. Resistive Switching Waveforms

Test Circuit and Waveform(Continued)

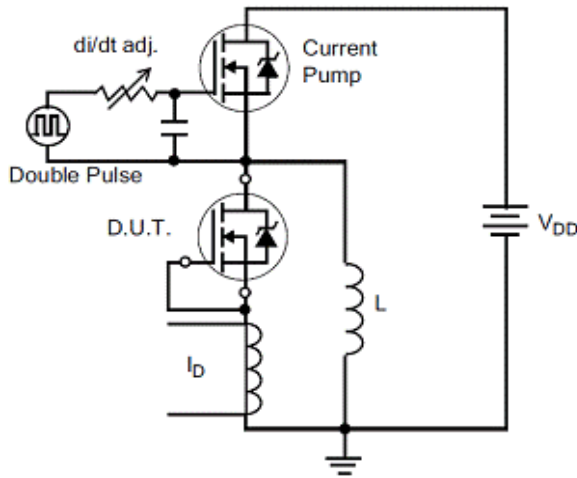


Figure 18. Diode Reverse Recovery Test Circuit

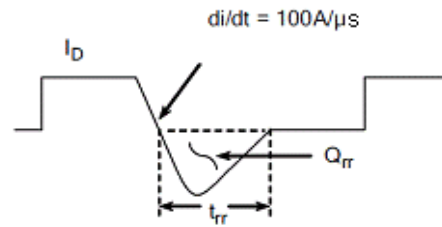


Figure 19. Diode Reverse Recovery Waveform

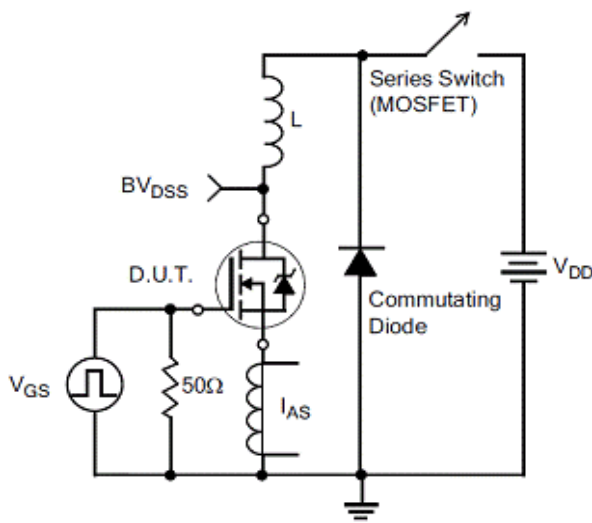


Figure20.Unclamped Inductive Switching Test Circuit

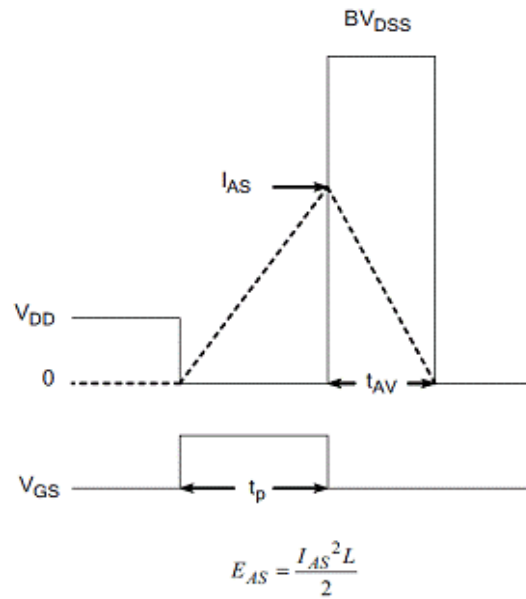
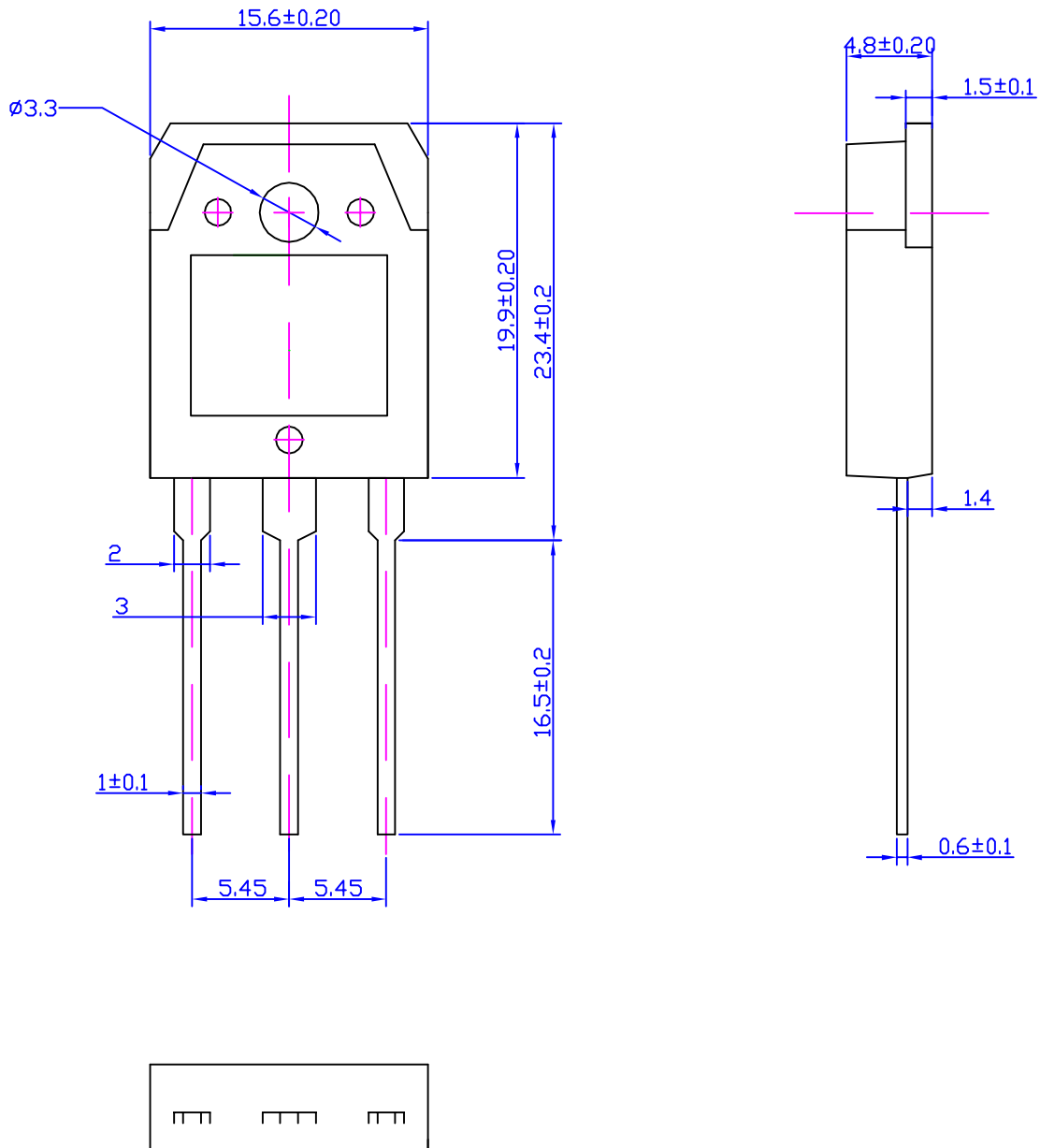


Figure21.Unclamped Inductive Switching Waveform

Package Dimension

TO-3P

Unit:mm



Package Dimension

TO-247S

Unit:mm

