

Features

- ◇ High Speed Power Switching, Logic Level
- ◇ Enhanced Body diode dv/dt capability
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free, Halogen Free

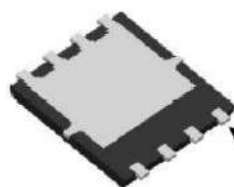
Application

- ◇ Synchronous Rectification in SMPS
- ◇ Hard Switching and High Speed Circuit
- ◇ DC/DC in Telecoms and Industrial

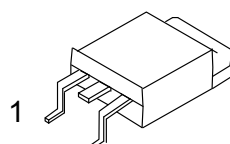
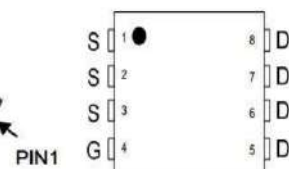
Product Summary



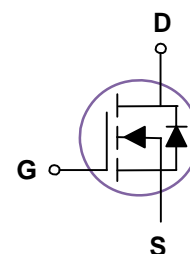
| | | |
|-----------------------------|-----|------------|
| V_{DS} | 100 | V |
| $R_{DS(on),typ} V_{GS}=10V$ | 9 | m Ω |
| I_D | 55 | A |



DFN5x6-8



TO-252



Absolute Maximum Ratings at $T_J=25^\circ\text{C}$ (unless otherwise specified)

| Parameter | Symbol | Conditions | Value | Unit |
|--|----------------|--|------------|------------------|
| Continuous Drain Current (Silicon Limited) | I_D | $T_C=25^\circ\text{C}$ | 55 | A |
| | | $T_C=100^\circ\text{C}$ | 38 | |
| Drain to Source Voltage | V_{DS} | - | 100 | V |
| Gate to Source Voltage | V_{GS} | - | +20/-12 | V |
| Pulsed Drain Current | I_{DM} | - | 80 | A |
| Avalanche Energy, Single Pulse | E_{AS} | $L=0.1\text{mH}, T_C=25^\circ\text{C}$ | 80 | mJ |
| Power Dissipation | P_D | $T_C=25^\circ\text{C}$ | 3.1 | W |
| Operating and Storage Temperature | T_J, T_{stg} | - | -55 to 150 | $^\circ\text{C}$ |

Absolute Maximum Ratings

| Parameter | Symbol | Max | Unit |
|---|-----------------|-----|--------------------|
| Thermal Resistance Junction-Lead | $R_{\theta JL}$ | 23 | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-Ambient ($t \leq 10\text{s}$) | $R_{\theta JA}$ | 40 | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-Ambient (steady state) | | 75 | $^\circ\text{C/W}$ |

Electrical Characteristics at $T_j=25^\circ\text{C}$ (unless otherwise specified)
Static Characteristics

| Parameter | Symbol | Conditions | Value | | | Unit |
|-----------------------------------|---------------|--|-------|-----|-----------|------------|
| | | | min | typ | max | |
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 100 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1 | 1.8 | 2.5 | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{GS}=0V, V_{DS}=95V, T_j=25^\circ\text{C}$ | - | - | 1 | μA |
| | | $V_{GS}=0V, V_{DS}=95V, T_j=125^\circ\text{C}$ | - | - | 100 | |
| Gate to Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| Drain to Source on Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=14A$ | - | 9 | 12 | m Ω |
| | | $V_{GS}=4.5V, I_D=10A$ | - | 12 | 15.5 | |
| Transconductance | g_{fs} | $V_{DS}=5V, I_D=14A$ | - | 70 | - | S |
| Gate Resistance | R_G | $V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$ | - | 1.5 | - | Ω |

Dynamic Characteristics

| | | | | | | |
|-------------------------------|--------------|--|---|------|---|----|
| Input Capacitance | C_{iss} | $V_{GS}=0V, V_{DS}=50V, f=1\text{MHz}$ | - | 3350 | - | pF |
| Output Capacitance | C_{oss} | | - | 270 | - | |
| Reverse Transfer Capacitance | C_{riss} | | - | 15 | - | |
| Total Gate Charge | $Q_g(10V)$ | $V_{DD}=50V, I_D=14A, V_{GS}=10V$ | - | 49 | - | nC |
| Total Gate Charge | $Q_g(4.5V)$ | | - | 21 | - | |
| Gate to Source Charge | Q_{gs} | | - | 8 | - | |
| Gate to Drain (Miller) Charge | Q_{gd} | | - | 7 | - | |
| Turn on Delay Time | $t_{d(on)}$ | $V_{DD}=50V, I_D=14A, V_{GS}=10V, R_G=10\Omega,$ | - | 10 | - | ns |
| Rise time | t_r | | - | 5 | - | |
| Turn off Delay Time | $t_{d(off)}$ | | - | 32 | - | |
| Fall Time | t_f | | - | 6 | - | |

Reverse Diode Characteristics

| | | | | | | |
|-------------------------|----------|--|---|-----|-----|----|
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_F=14A$ | - | 0.9 | 1.2 | V |
| Reverse Recovery Time | t_{rr} | $V_R=50V, I_F=14A, di_F/dt=500A/\mu s$ | - | 47 | - | ns |
| Reverse Recovery Charge | Q_{rr} | | - | 226 | - | nC |

Fig 1. Typical Output Characteristics

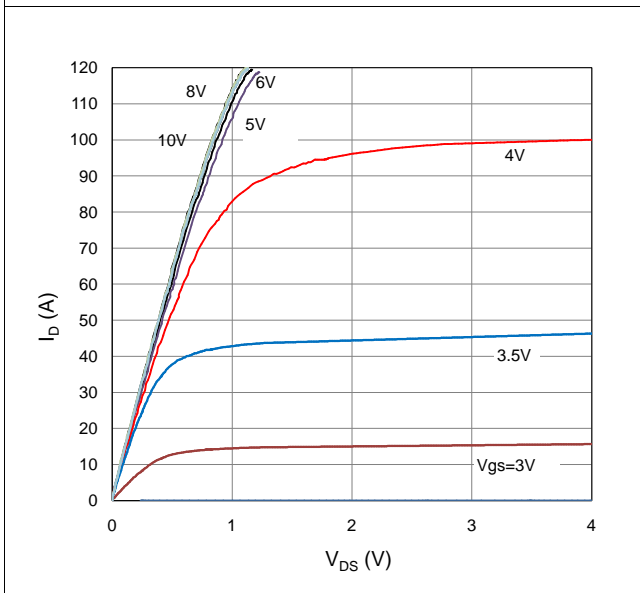


Figure 2. On-Resistance vs. Gate-Source Voltage

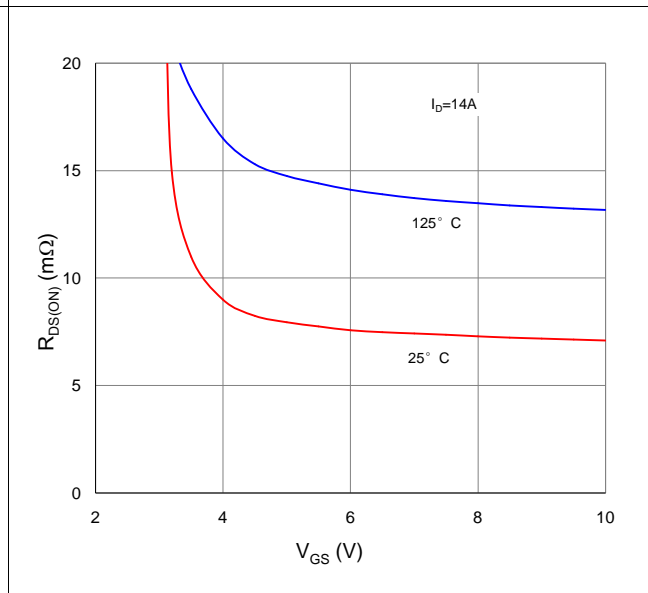


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

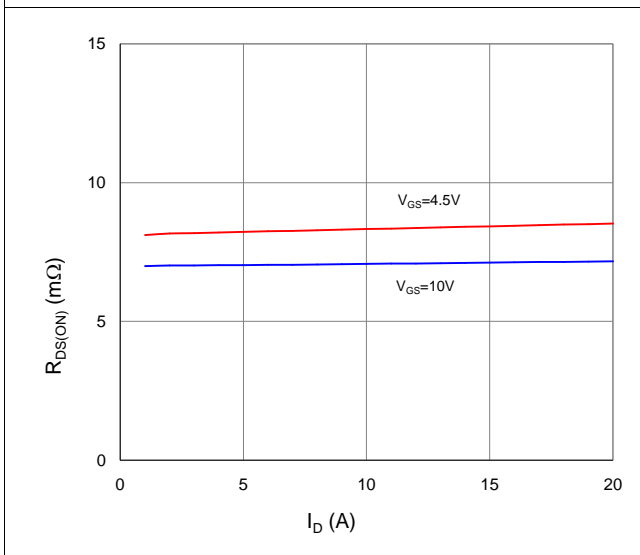


Figure 4. Normalized On-Resistance vs. Junction Temperature

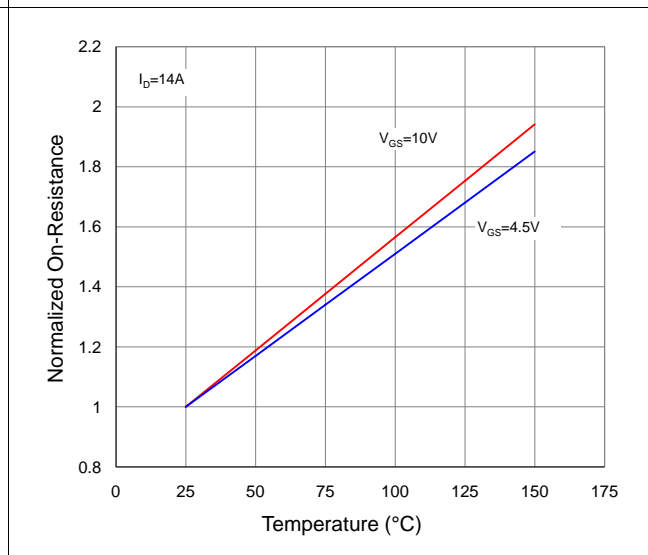


Figure 5. Typical Transfer Characteristics

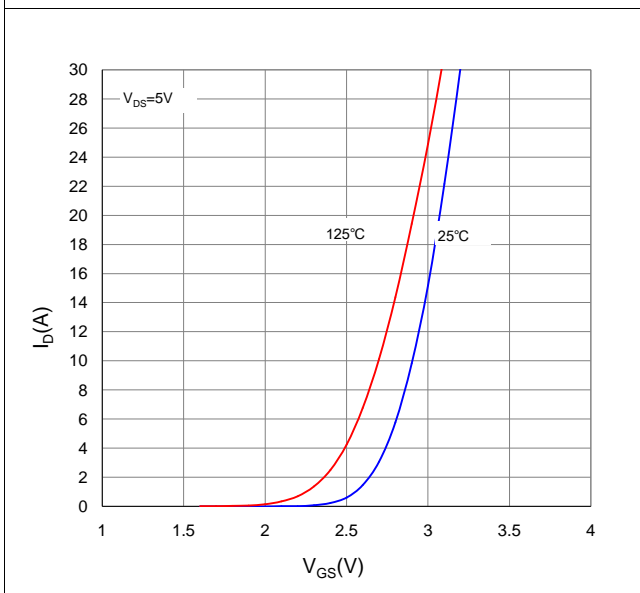


Figure 6. Typical Source-Drain Diode Forward Voltage

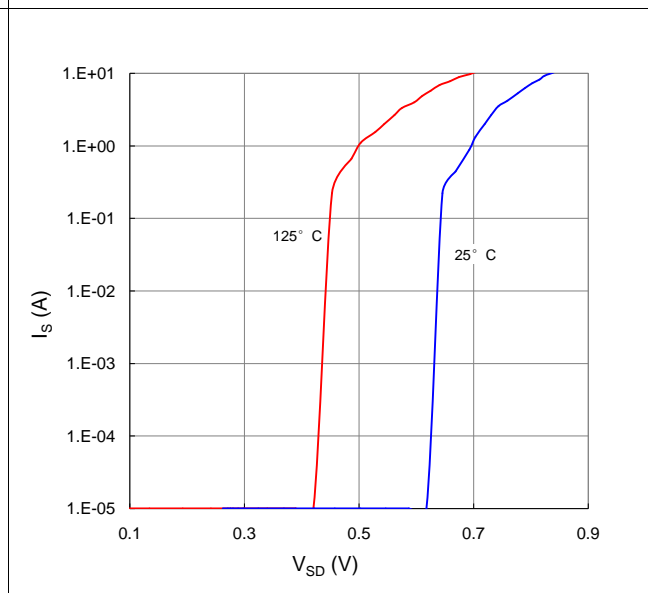


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

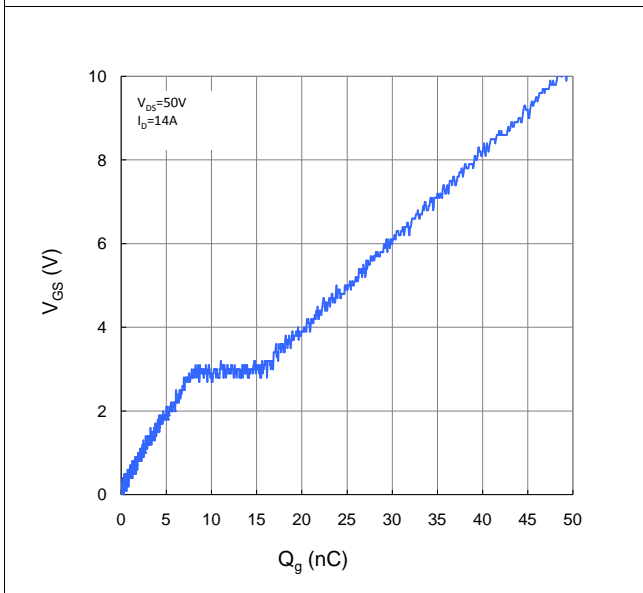


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

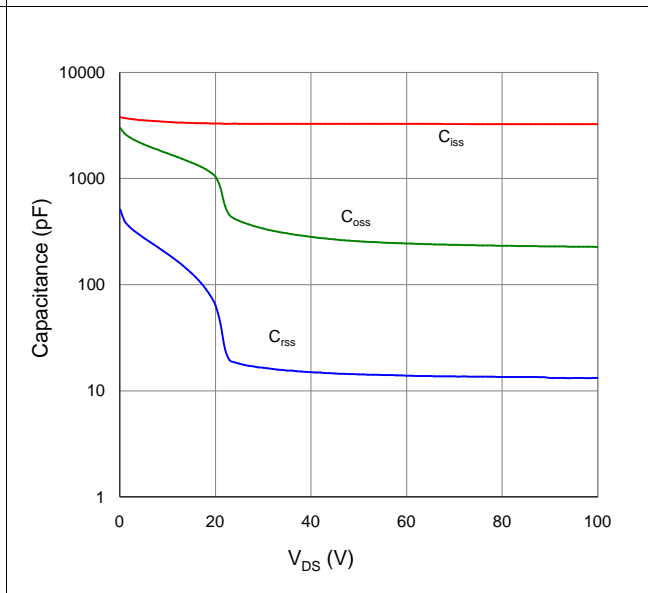


Figure 9. Maximum Safe Operating Area

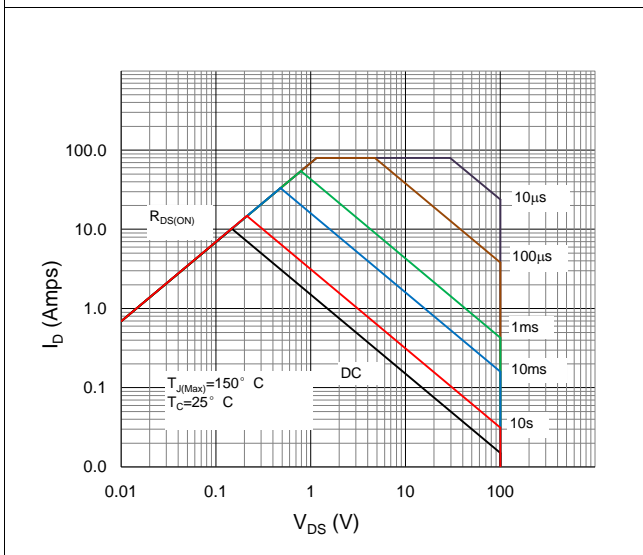


Figure 10. Maximum Drain Current vs. Case Temperature

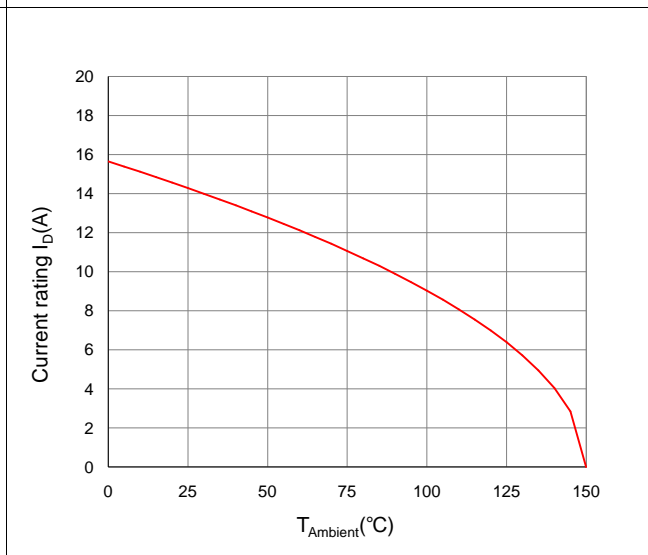
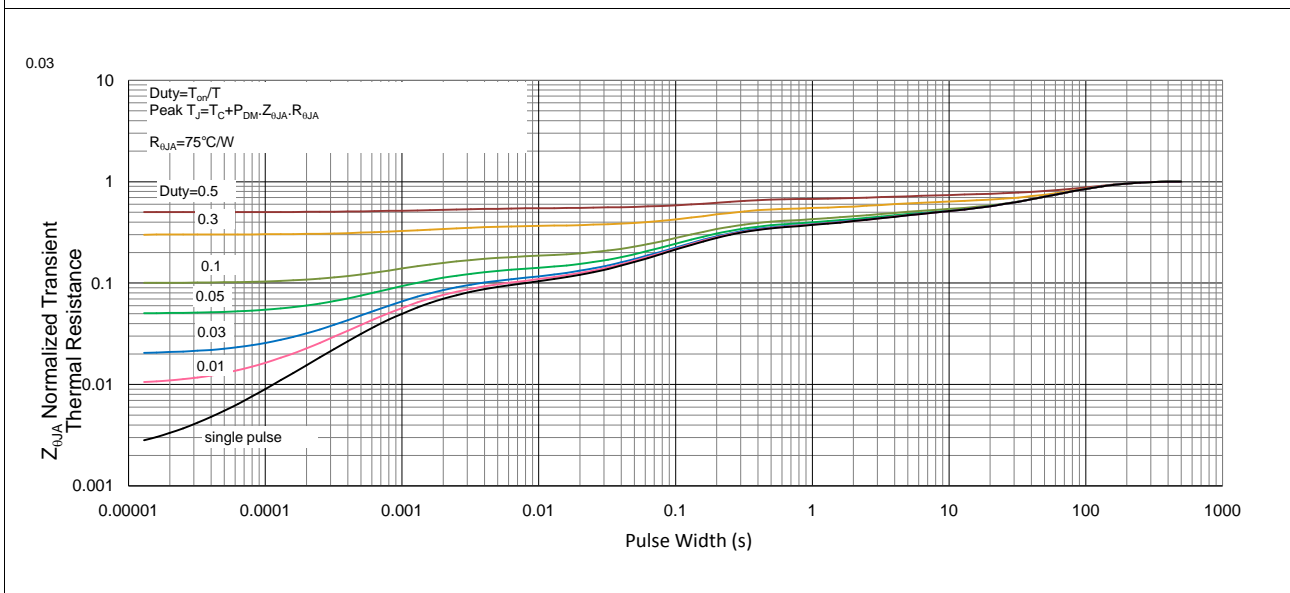
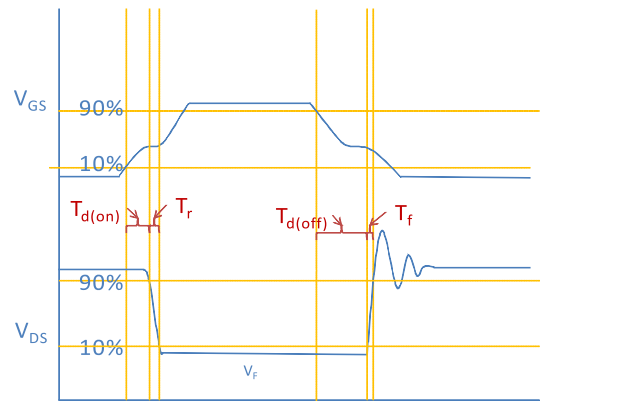
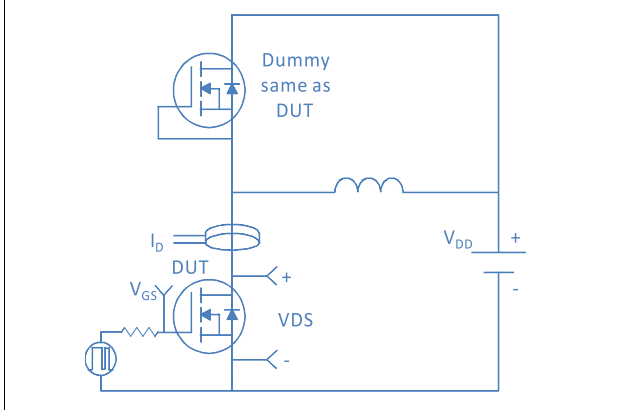


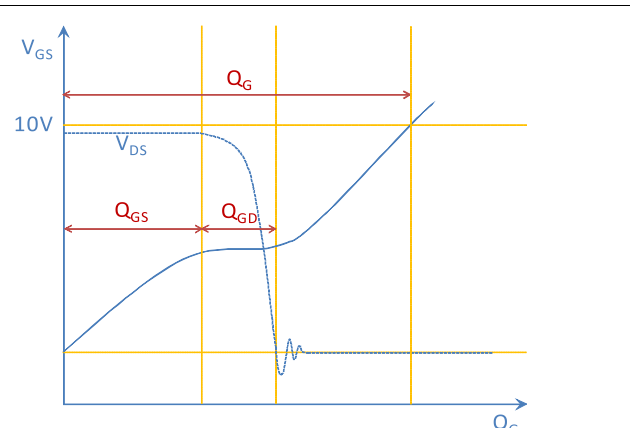
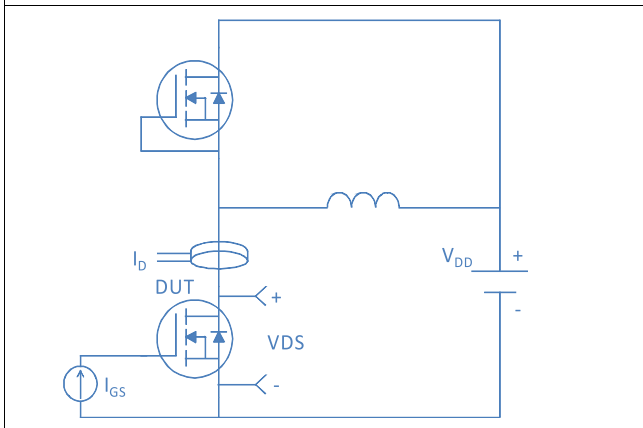
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



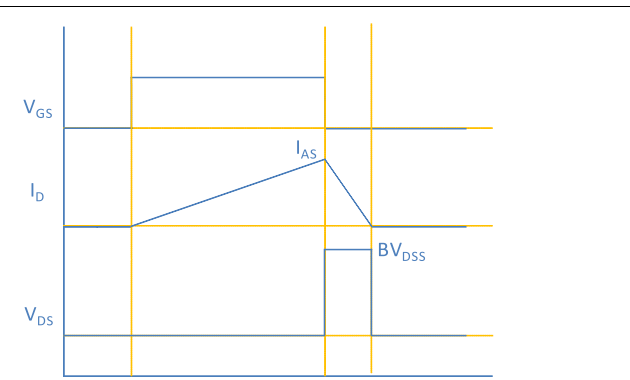
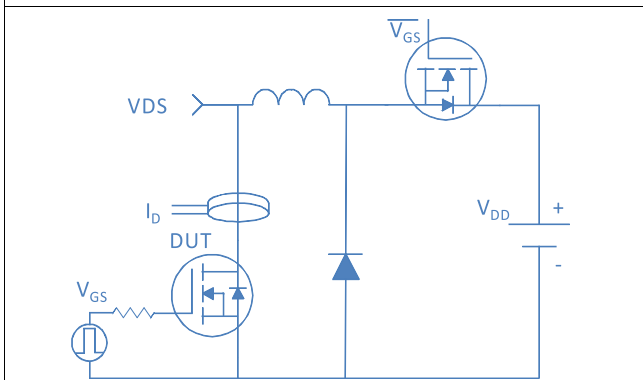
Inductive switching Test



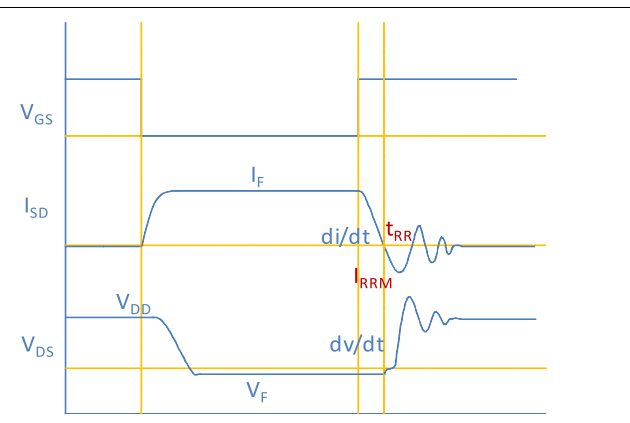
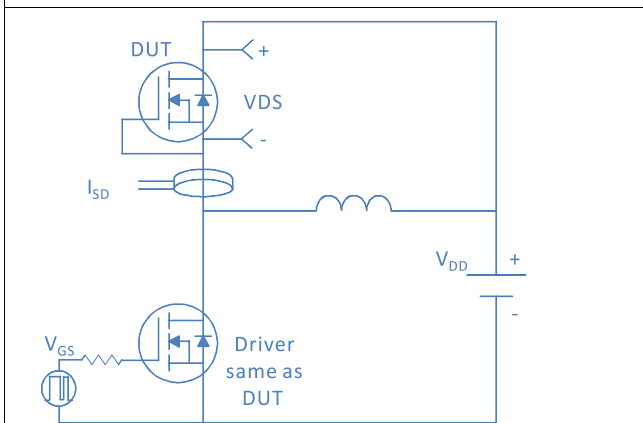
Gate Charge Test



Uclamped Inductive Switching (UIS) Test

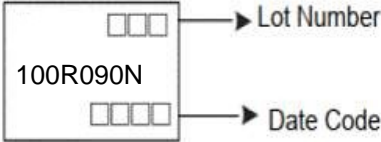
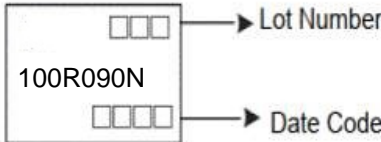


Diode Recovery Test

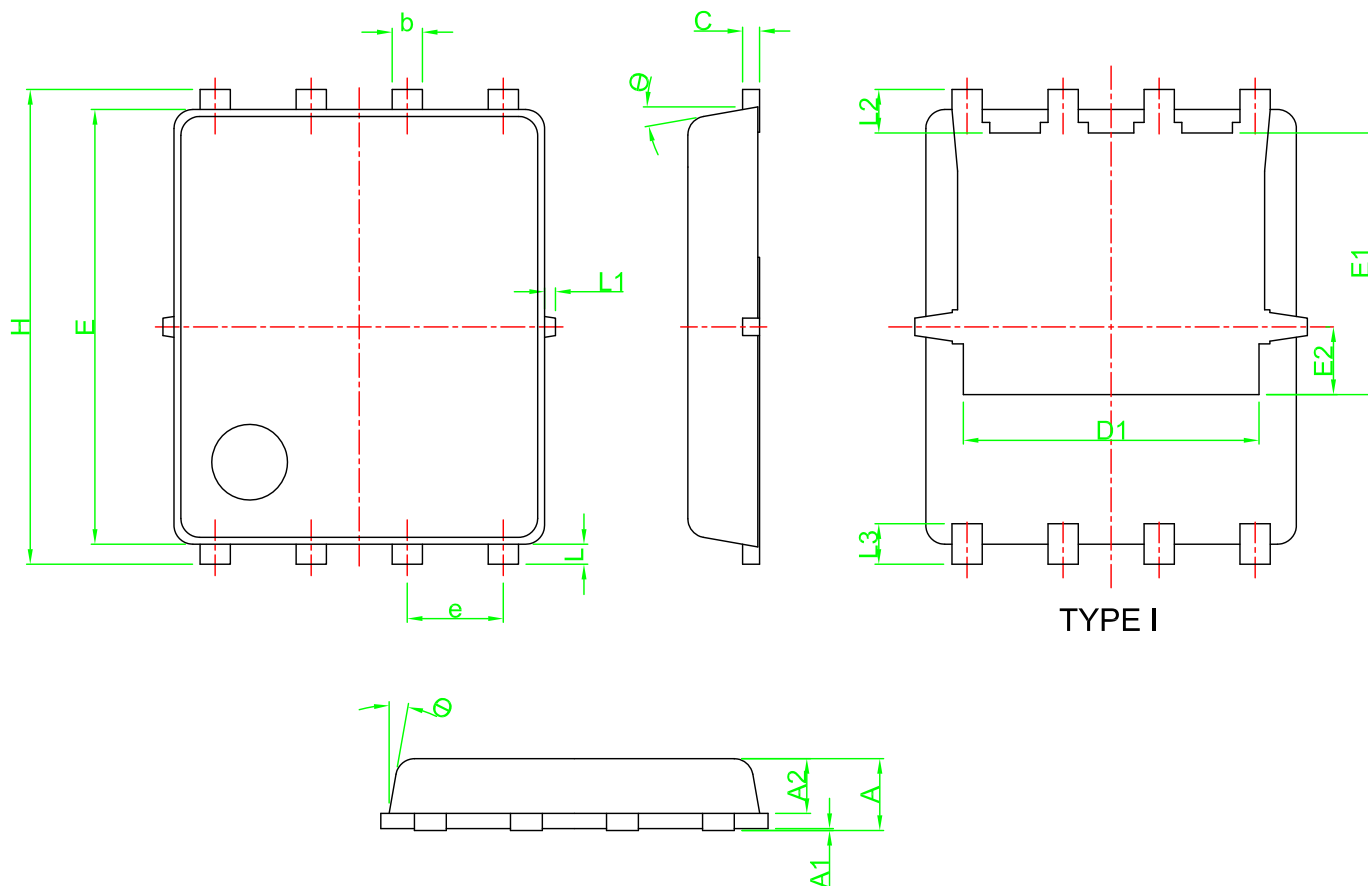


Ordering and Marking Information

| Ordering Device No. | Marking | Package | Packing | Quantity |
|---------------------|----------|----------|-----------|----------|
| JMN100R090NQ-R | 100R090N | DFN5*6-8 | Tape&Reel | 5000 |
| JMD100R090NKQ-R | 100R090N | TO-252 | Tape&Reel | 2500 |

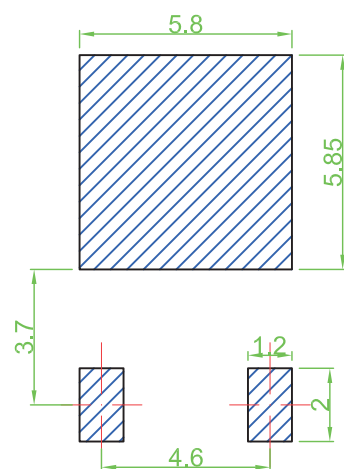
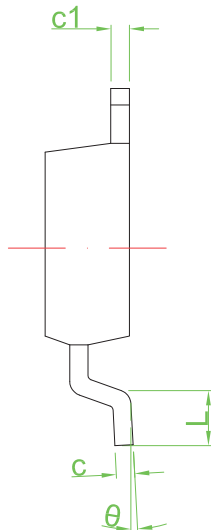
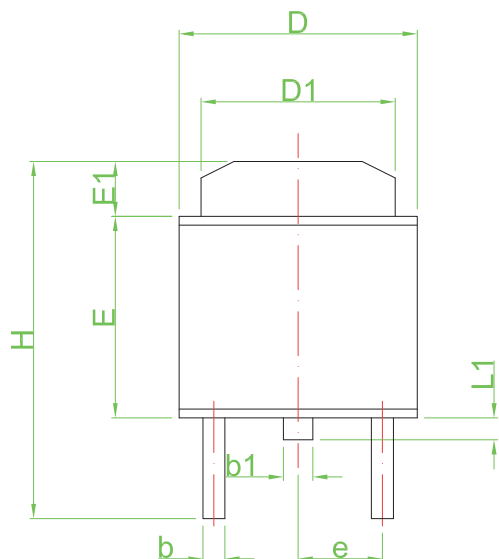
| PACKAGE | MARKING |
|----------|--|
| DFN5*6-8 |  <p>Diagram illustrating the marking layout for the DFN5*6-8 package. The marking consists of the part number "100R090N" in the center. Above it are three boxes representing the Lot Number, and below it are four boxes representing the Date Code. Arrows point from the text "Lot Number" and "Date Code" to their respective box groups.</p> |
| TO-252 |  <p>Diagram illustrating the marking layout for the TO-252 package. The marking consists of the part number "100R090N" in the center. Above it are three boxes representing the Lot Number, and below it are four boxes representing the Date Code. Arrows point from the text "Lot Number" and "Date Code" to their respective box groups.</p> |

DFN5*6-8 PACKAGE IN FORMATION

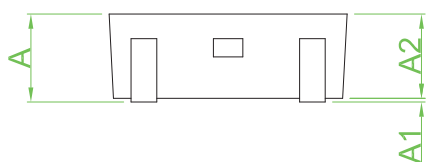


| Symbol | Dimensions in Millimeters | | Dimensions in Inches | |
|--------|---------------------------|------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.85 | 1.00 | 0.033 | 0.039 |
| A1 | 0.01 | 0.05 | 0.000 | 0.002 |
| A2 | 0.69 | 0.75 | 0.027 | 0.030 |
| b | 0.40 | 0.45 | 0.016 | 0.018 |
| C | 0.20 | 0.30 | 0.008 | 0.012 |
| D | 4.80 | 4.95 | 0.189 | 0.195 |
| D1 | 3.91 | 4.06 | 0.154 | 0.160 |
| e | 1.27 TYP | | 0.05 TYP | |
| E | 5.65 | 5.80 | 0.222 | 0.228 |
| E1 | 3.46 | 3.50 | 0.136 | 0.138 |
| E2 | 0.80 | 0.95 | 0.031 | 0.037 |
| L | 0.15 | 0.3 | 0.006 | 0.012 |
| L1 | 0.08 | 0.15 | 0.003 | 0.006 |
| L2 | 0.58 | 0.73 | 0.023 | 0.029 |
| L3 | 0.45 | 0.60 | 0.018 | 0.024 |
| H | 6.15 | 6.28 | 0.242 | 0.247 |
| theta | 8° | 12° | 8° | 12° |

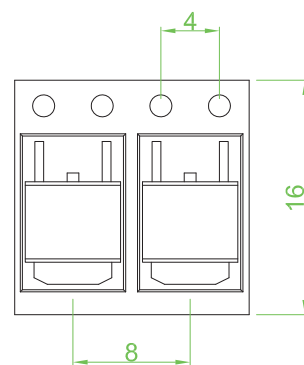
TO-252 PACKAGE IN FORMATION



Recommended Land Pattern



| Symbol | Dimensions in Millimeters | | Dimensions in Inches | |
|--------|---------------------------|------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 2.25 | 2.65 | 0.089 | 0.104 |
| A1 | 0.00 | 0.15 | 0.000 | 0.006 |
| A2 | 2.20 | 2.40 | 0.087 | 0.094 |
| b | 0.50 | 0.70 | 0.020 | 0.028 |
| b1 | 0.70 | 0.90 | 0.028 | 0.035 |
| c | 0.46 | 0.66 | 0.018 | 0.026 |
| c1 | 0.46 | 0.66 | 0.018 | 0.026 |
| D | 6.30 | 6.70 | 0.248 | 0.264 |
| D1 | 5.20 | 5.40 | 0.205 | 0.213 |
| E | 5.30 | 5.70 | 0.209 | 0.224 |
| E1 | 1.40 | 1.60 | 0.055 | 0.063 |
| H | 9.40 | 9.90 | 0.370 | 0.390 |
| e | 2.30 TYP | | 0.09 TYP | |
| L | 1.40 | 1.77 | 0.055 | 0.070 |
| L1 | 0.50 | 0.70 | 0.020 | 0.028 |
| θ | 0° | 8° | 0° | 8° |



| Q'ty / Reel | Reel Size |
|-------------|-----------|
| 2500pcs | 13" |

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