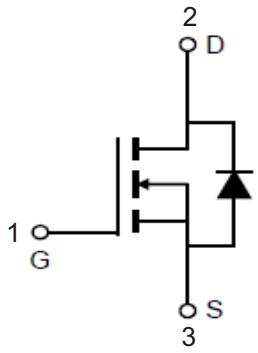
# WLE106R20G

## 200V N-Channel Power SGT MOSFET

### Features:

- ☐ Low Intrinsic Capacitances
- ☐ Excellent Switching Characteristics
- ☐ Extended Safe Operating Area
- ☐ Ultra Low Gate Charge:Qg=69nC (Typ.)
- ☐ VDSS=200V, ID=105A
- ☐ Rds(on):8.8mΩ(Typ.) @VG=10V
- ☐ 100% Avalanche Tested

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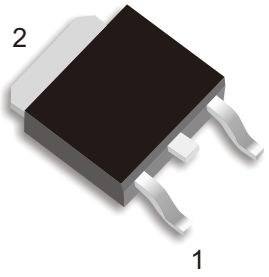



1.Gate (G)
2.Drain (D)
3.Source (S)

### Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 200 | V |
| Continuous drain current<br>$T_C$ = 25°C (Silicon limit)<br>$T_C$ = 25°C (Package limit)<br>$T_C$ = 100°C (Silicon limit) | $I_D$ | <br>105<br>160<br>67 | A |
| Pulsed drain current ($T_C$ = 25°C, $t_p$ limited by $T_{jmax}$) | $I_{D\ pulse}$ | 420 | A |
| Avalanche energy, single pulse (L=0.5mH, Rg=25Ω)[1] | $E_{AS(Note\ 1)}$ | 306 | mJ |
| Gate-Source voltage | $V_{GS}$ | ±20 | V |
| Power dissipation ($T_C$ = 25°C) | $P_{tot}$ | 278 | W |
| Operating junction and storage temperature | $T_j$ , $T_{stg}$ | -55...+150 | °C |

※. Notes:1.EAS is tested at starting Tj = 25℃, L = 0.5mH, IAS = 35A, Vgs=10V.

### Electrical Characteristic, at Tj = 25 °C, unless otherwise specified

| Parameter | Symbol | Max | Unit |
|---|---|---|---|
| Thermal resistance, junction – case. | $R_{thJC}$ | 0.45 | °C/W |
| Thermal resistance, junction – ambient(min. footprint) | $R_{thJA}$ | 62.5 | |

## Static Characteristic

| Parameter | Symbol | Value | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | min. | typ. | max. | | |
| **Static Characteristic** | | | | | | |
| Drain-source breakdown voltage | $BV_{DSS}$ | 200 | - | - | V | $V_{GS}$=0V, $I_D$=250uA |
| Gate threshold voltage | $V_{GS(th)}$ | 2 | 3 | 4 | V | $V_{DS}$=$V_{GS}$,$I_D$=250uA |
| Zero gate voltage drain current | $I_{DSS}$ | -<br>- | -<br>- | 1<br>100 | μA | $V_{DS}$=200V,$V_{GS}$=0V<br>$T_j$=25°C<br>$T_j$=125°C |
| Gate-source leakage current | $I_{GSS}$ | - | - | 100 | nA | $V_{GS}$=±20V,$V_{DS}$=0V |
| Drain-source on-state resistance | $R_{DS(on)}$ | - | 8.8 | 10.6 | mΩ | $V_{GS}$=10V, $I_D$=50A |
| Transconductance | $g_{fs}$ | - | 93 | - | S | $V_{DS}$=5V,$I_D$=50A |
| **Dynamic Characteristic** | | | | | | |
| Input Capacitance | $C_{iss}$ | - | 4819 | - | pF | $V_{GS}$=0V, $V_{DS}$=100V, f=1MHz |
| Output Capacitance | $C_{oss}$ | - | 405 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 23 | - | | |
| Gate Total Charge | $Q_G$ | - | 69 | - | nC | $V_{GS}$=10V, $V_{DS}$=100V, $I_D$=50A, f=1MHz |
| Gate-Source charge | $Q_{gs}$ | - | 25 | - | | |
| Gate-Drain charge | $Q_{gd}$ | - | 16 | - | | |
| Turn-on delay time | $t_{d(on)}$ | - | 16 | - | ns | $V_{DS}$=100V<br>$I_D$=50A<br>$R_G$=2.7Ω<br>$V_{GS}$=10V; |
| Rise time | $t_r$ | - | 82 | - | | |
| Turn-off delay time | $t_{d(off)}$ | - | 55 | - | | |
| Fall time | $t_f$ | - | 84 | - | | |
| Gate resistance | $R_G$ | - | 3.5 | - | Ω | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz |

## Body Diode Characteristic

| Parameter | Symbol | Value | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | min. | typ. | max. | | |
| Body Diode Forward Voltage | $V_{SD}$ | - | 0.85 | 1.4 | V | $V_{GS}$=0V,$I_{SD}$=50A |
| Body Diode Reverse Recovery Time | $t_{rr}$ | - | 129 | - | ns | $I_{SD}$=50A, $V_{GS}$=0V, dIF/dt=100A/us; |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | - | 752 | - | nC | |

## Typical Performance Characteristics

Fig 1: Output Characteristics

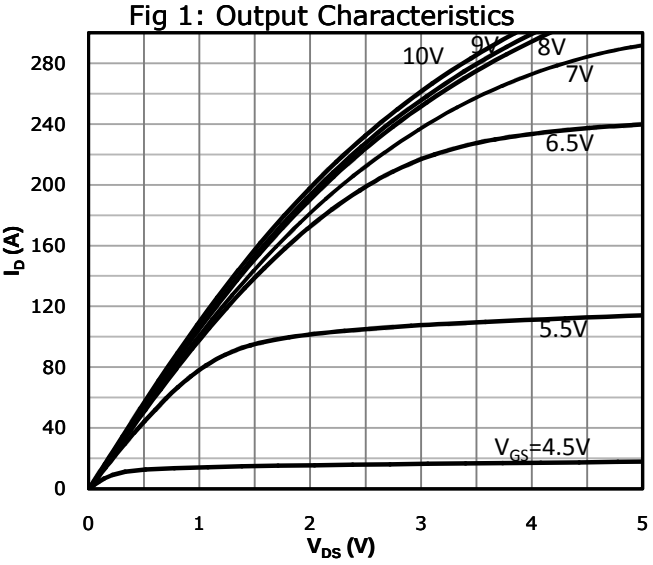



Fig 2: Transfer Characteristics

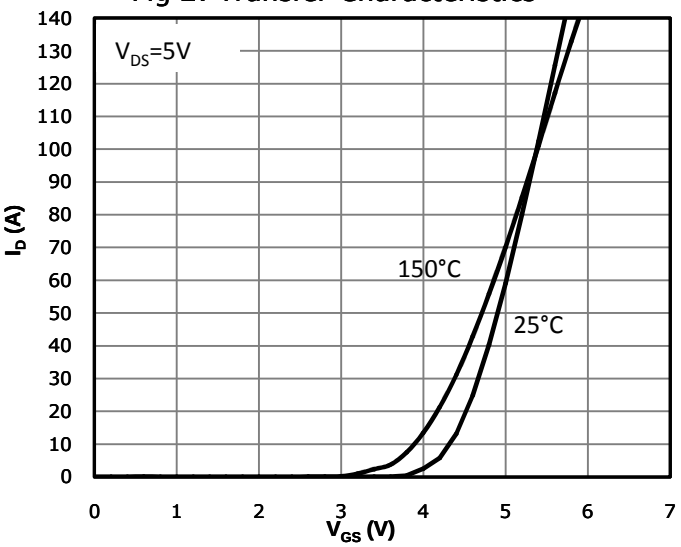



Fig 3: Rds(on) vs Drain Current and Gate Voltage

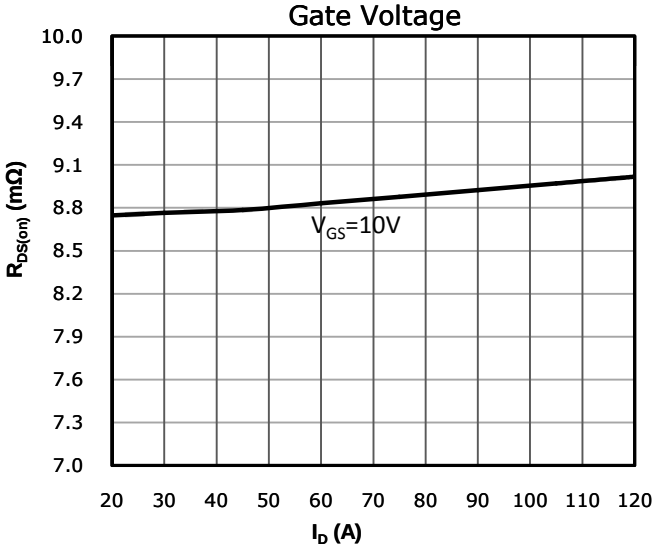



Fig 4: Rds(on) vs Gate Voltage

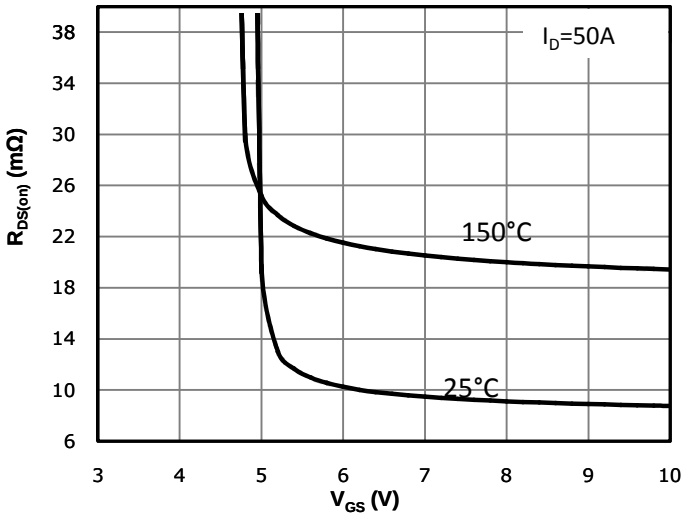



Fig 5: Rds(on) vs. Temperature

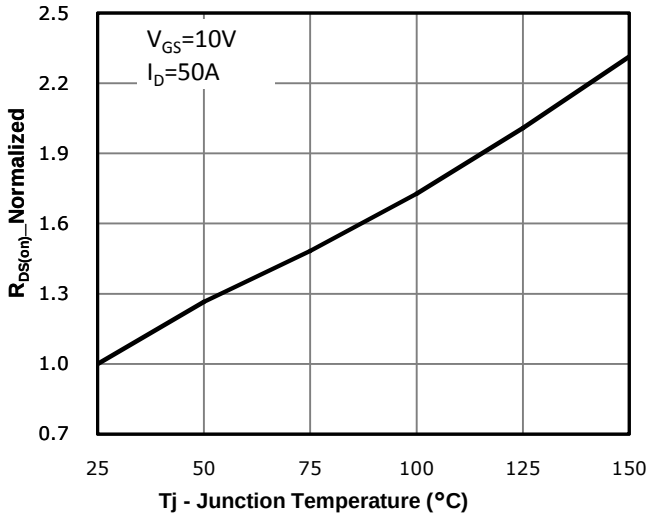
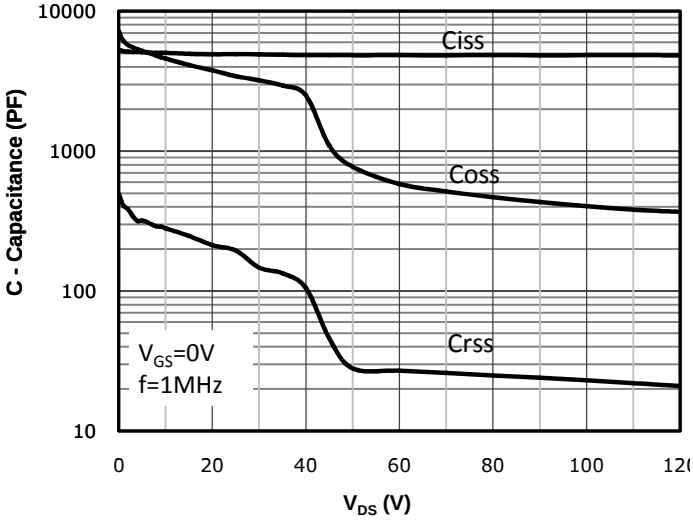



Fig 6: Capacitance Characteristics



## Typical Performance Characteristics

Fig 7: Gate Charge Characteristics

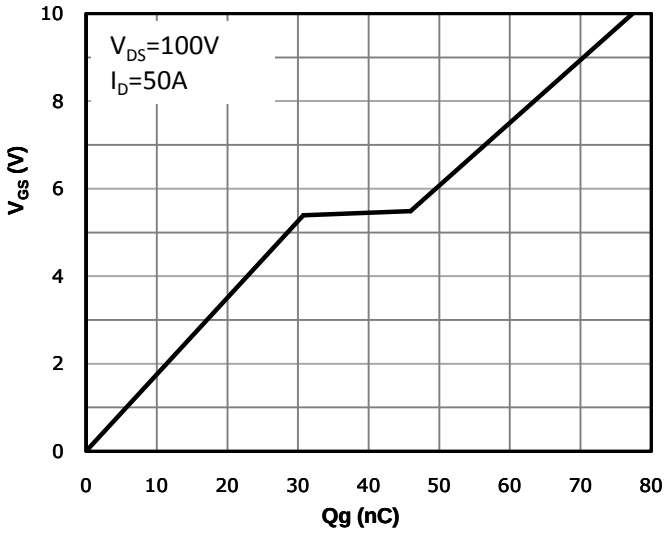



Fig 8: Body-diode Forward Characteristics

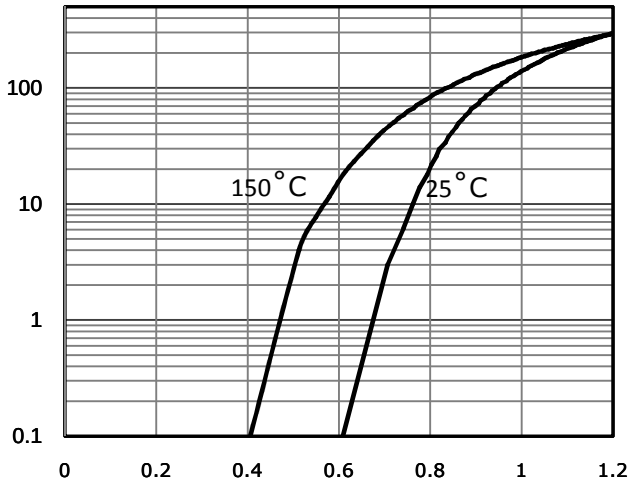



Fig 9: Power Dissipation

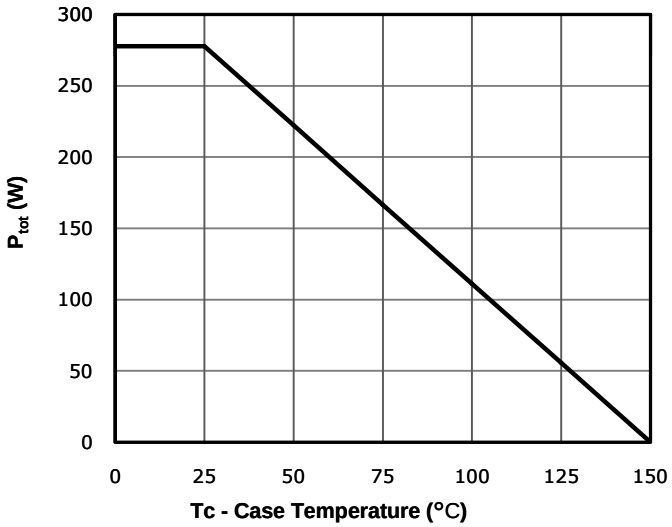



Fig 10: Drain Current Derating

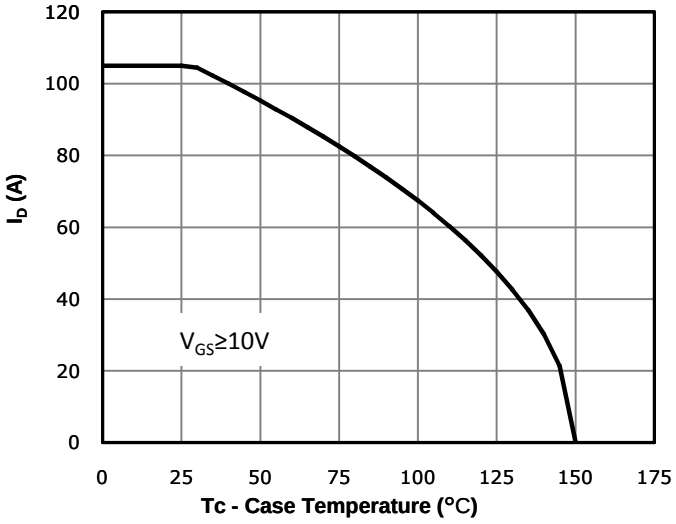
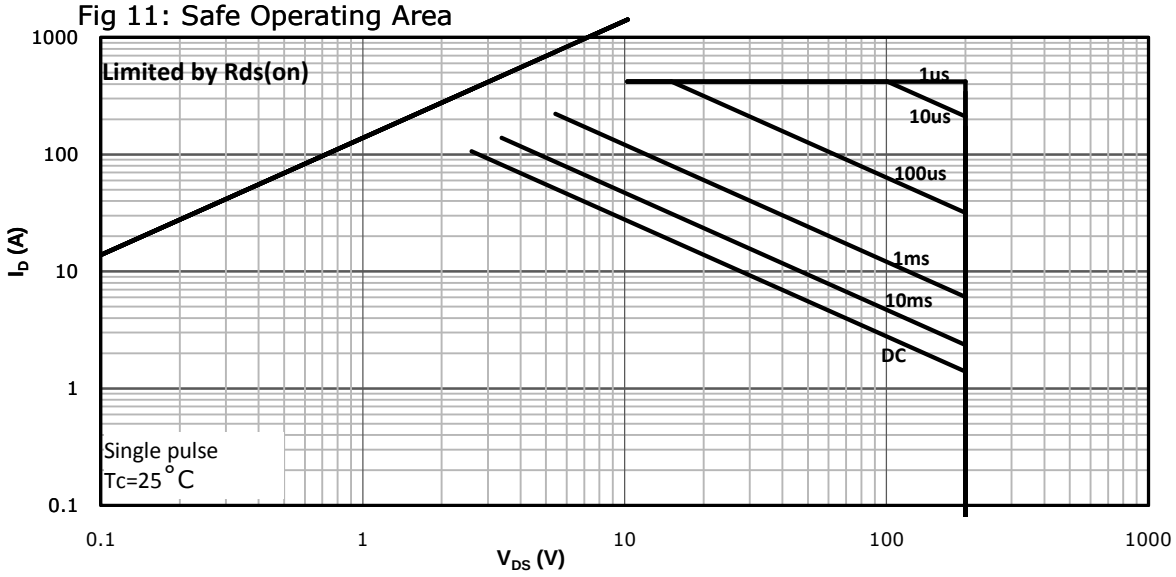
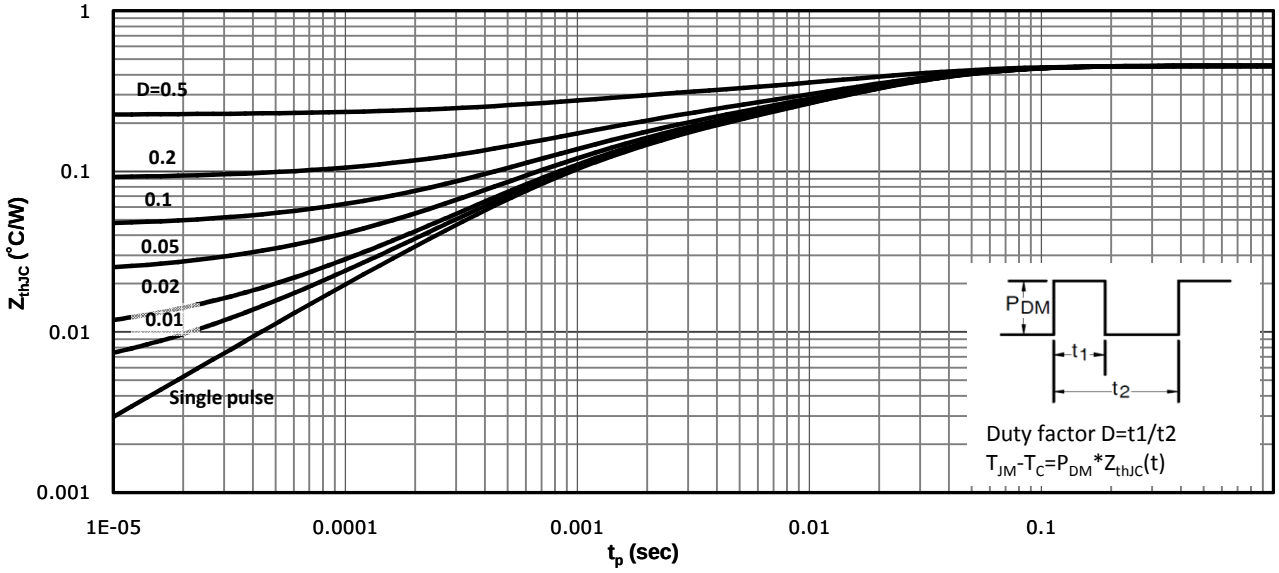



Fig 11: Safe Operating Area



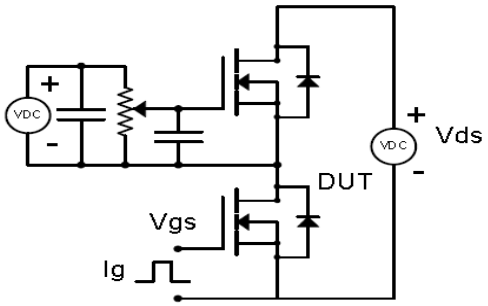
## Typical Performance Characteristics

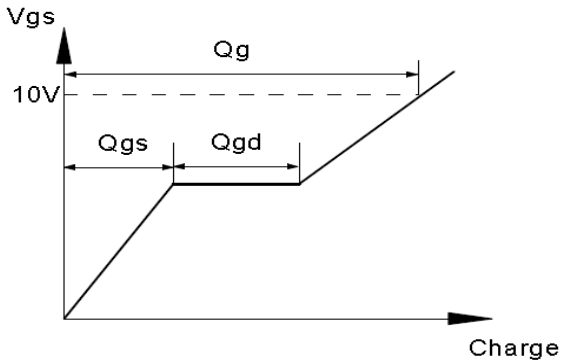
Fig 12: Max. Transient Thermal Impedance



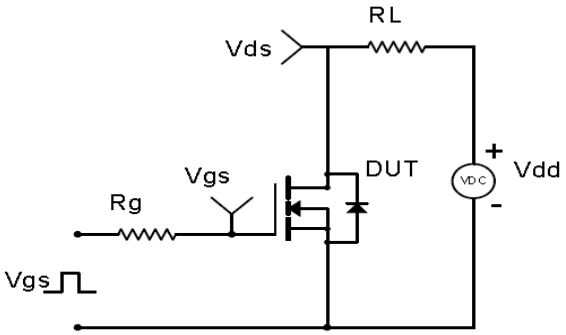
## Test Circuit & Waveform

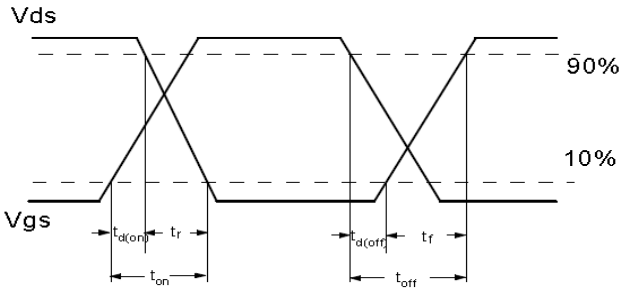
Gate Charge Test Circuit & Waveform



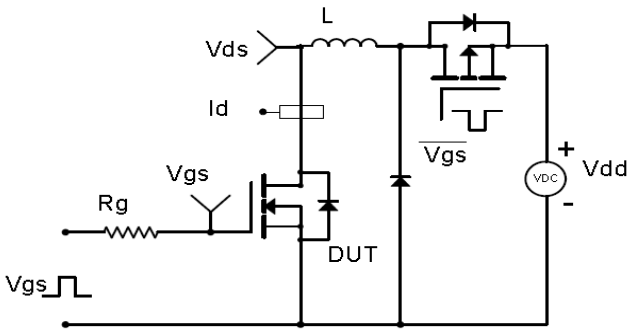



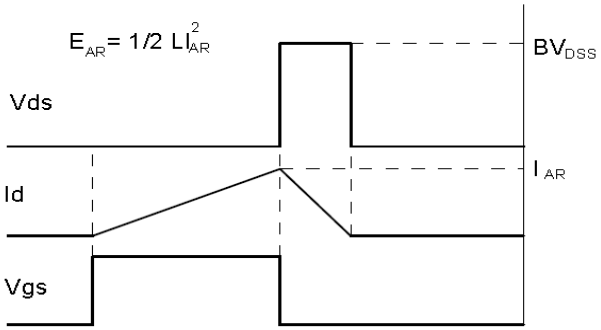

Resistive Switching Test Circuit & Waveforms



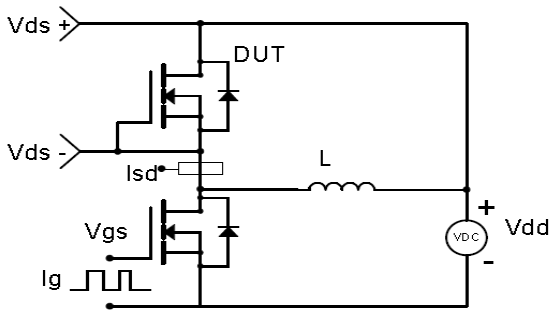



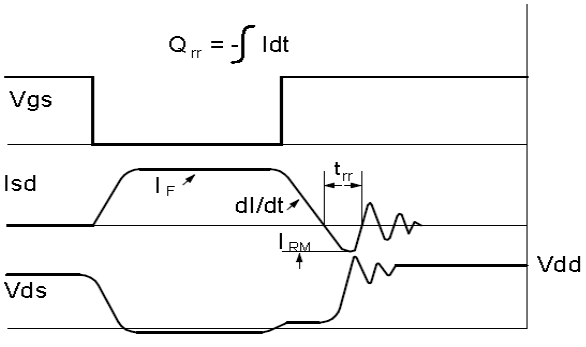

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



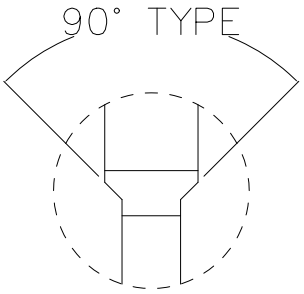




Diode Recovery Test Circuit & Waveforms

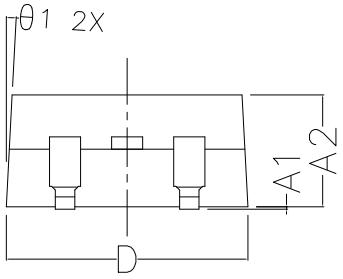


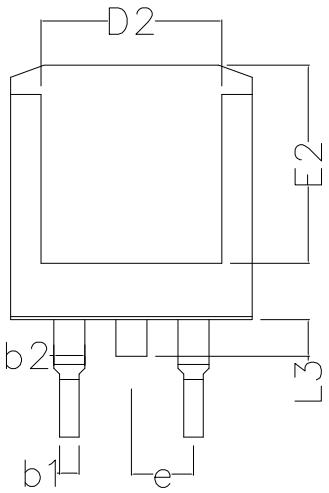
## Package Dimension



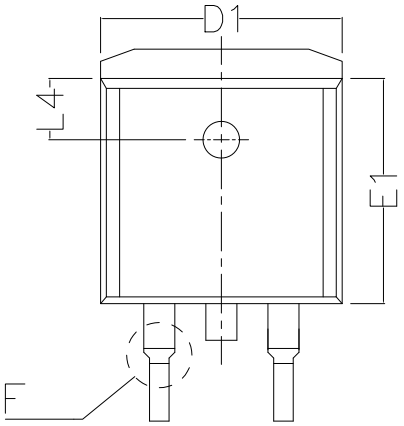

DETAIL F




SIDE VIEW




BOTTOM VIEW




TOP VIEW

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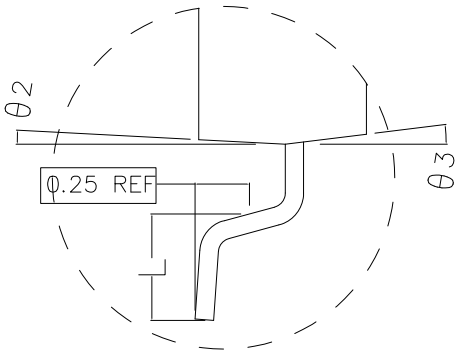
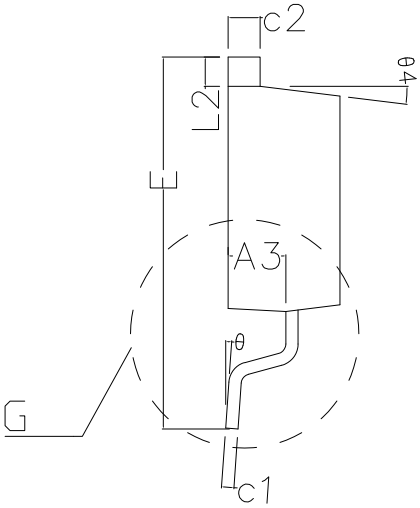
COMMON DIMENSIONS
(UNITS OF MEASURE IS mm)

| | MIN | NORMAL | MAX |
|---|---|---|---|
| A1 | 0.020 | 0.100 | 0.200 |
| A2 | 4.470 | 4.570 | 4.670 |
| A3 | 2.300 | 2.350 | 2.400 |
| b1 | 0.750 | 0.800 | 0.850 |
| b2 | 1.220 | 1.270 | 1.320 |
| c1 | 0.450 | 0.500 | 0.550 |
| c2 | 1.250 | 1.300 | 1.350 |
| D | 9.900 | 10.000 | 10.100 |
| D1 | 9.880REF | | |
| D2 | 7.400REF | | |
| E | 14.900 | 15.100 | 15.300 |
| ▲E1 | 9.000 | 9.100 | 9.200 |
| E2 | 8.100REF | | |
| e | 2.540TYPE | | |
| L | 2.100 | 2.300 | 2.500 |
| L2 | 1.100 | 1.200 | 1.300 |
| L3 | 1.300 | 1.500 | 1.700 |
| ▲L4 | 2.50 TYPE | | |
| θ1 | 3° TYPE | | |
| θ2 | 3° TYPE | | |
| θ3 | 7° TYPE | | |
| θ4 | 7° TYPE | | |
| θ | 0 ~ 8° | | |




DETAIL G




SIDE VIEW

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