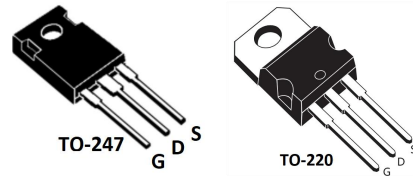


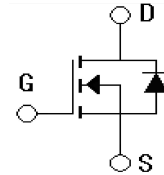
## Features

- $V_{DS}=200V, I_D=100A$   
 $R_{DS(on)}=23m\Omega @ V_{GS}=10V$
- High density cell design for ultra low  $R_{dson}$
- Low gate charge
- Improved  $dv/dt$  capability
- RoHS product



## Applications

- Power Management for Inverter Systems



## Absolute Ratings ( $T_C=25^\circ C$ )

| Parameter                               | Symbol         | Limit             | Unit       |   |
|---|----------------|-------------------|------------|---|
| Drain-Source Voltage                    | $V_{DSS}$      | 200               | V          |   |
| Gate-Source Voltage                     | $V_{GSS}$      | $\pm 20$          | V          |   |
| Drain Current-continuous                | $I_D$          | 100               | A          |   |
| Drain Current-pulse                     | $I_{DM}$       | 400               | A          |   |
| Single Pulsed Avalanche Energy          | $E_{AS}$       | 833               | mJ         |   |
| Maximum Power Dissipation               | PD             | $T_C=25^\circ C$  | 375        | W |
|   |                | $T_C=100^\circ C$ | 187.5      |   |
| Operating and Storage Temperature Range | $T_J, T_{STG}$ | -55~+150          | $^\circ C$ |   |

## Electrical Characteristics( $T_{CASE}=25^\circ C$ unless otherwise specified)

| Parameter                         | Symbol       | Tests conditions              | Min | Typ | Max       | Units      |
|-----------------------------------|--------------|-------------------------------|-----|-----|-----------|------------|
| Drain-Source Voltage              | $BV_{DSS}$   | $I_D=250\mu A, V_{GS}=0V$     | 200 | -   | -         | V          |
| Zero Gate Voltage Drain Current   | $I_{DSS}$    | $V_{DS}=V_{DSS}, V_{GS}=0V$   | -   | -   | 1         | $\mu A$    |
| Gate-Body Leakage Current         | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$   | -   | -   | $\pm 100$ | nA         |
| <b>On-Characteristics</b>         |              |                               |     |     |           |            |
| Gate Threshold Voltage            | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2.0 | 3.0 | 4.0       | V          |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=50A$         | -   | 23  | 25        | m $\Omega$ |

| Dynamic Characteristics                                |              |  |   |      |     |    |
|--|--------------|--|---|------|-----|----|
| Input capacitance                                      | $C_{iss}$    | $V_{DS}=25V, V_{GS}=0V,$<br>$f=1.0MHZ$                   | - | 5871 | -   | pF |
| Output capacitance                                     | $C_{oss}$    |  | - | 392  | -   | pF |
| Reverse transfer capacitance                           | $C_{rss}$    |  | - | 165  | -   | pF |
| Switching-Characteristics                              |              |  |   |      |     |    |
| Turn-On delay time                                     | $t_{d(on)}$  | $V_{DS}=100V, I_D=50A,$<br>$V_{GS}=10V$<br>$R_G=4\Omega$ | - | 29   | -   | ns |
| Turn-On rise time                                      | $t_r$        |  | - | 45   | -   | ns |
| Turn-Off delay time                                    | $t_{d(Off)}$ |  | - | 22   | -   | ns |
| Turn-Off rise time                                     | $t_f$        |  | - | 41   | -   | ns |
| Total Gate Charge                                      | $Q_g$        | $V_{DS}=100V, I_D=50A,$<br>$V_{GS}=10V$                  | - | 130  | -   | nC |
| Gate-Source charge                                     | $Q_{gs}$     |  | - | 22   | -   | nC |
| Gate-Drain charge                                      | $Q_{gd}$     |  | - | 38   | -   | nC |
| Drain-Source Diode Characteristics and Maximum Ratings |              |  |   |      |     |    |
| Maximum Continuous Drain-Source Diode Forward Current  | $V_{SD}$     | $V_{GS}=0V, I_S=50A$                                     |   | 0.85 | 1.2 | V  |
| Diode Forward Current                                  | $I_S$        | $TC=25^\circ C$  | - | -    | 100 | A  |
| Reverse recovery time                                  | $T_{rr}$     | $I_S=50A,$<br>$di/dt=100A/\mu s$                         | - | 80   |     | nS |
| Reverse recovery charge                                | $Q_{rr}$     |  | - | 160  |     | nC |

## Thermal Characteristic

| Parameter                               | Symbol        | Value | Unit         |
|---|---------------|-------|--------------|
| Thermal Resistance, junction to Case    | $R_{th(j-C)}$ | 0.4   | $^\circ C/W$ |
| Thermal Resistance, junction to Ambient | $R_{th(j-A)}$ | 40    | $^\circ C/W$ |

Notes:

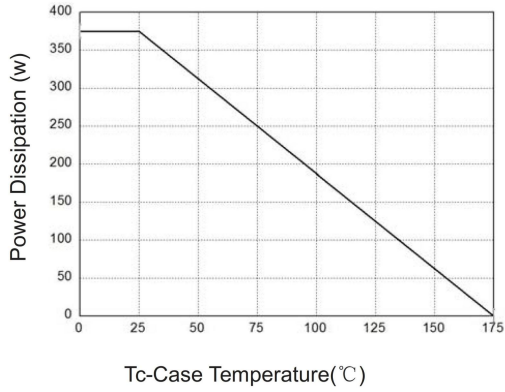
1. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$
2. Limited by  $T_{jmax}$ , starting  $T_j=25^\circ C, L=0.5mH, V_D=100V, V_{GS}=10V$

## Ordering Codes

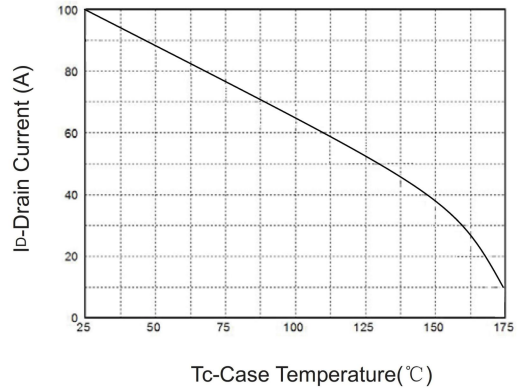
| Part Number  | Marking      | package |
|--------------|--------------|---------|
| MS100N20IDC0 | MS100N20IDC0 | TO-247  |
| MS100N20IDT0 | MS100N20IDT0 | TO-220  |

## Electrical Characteristics

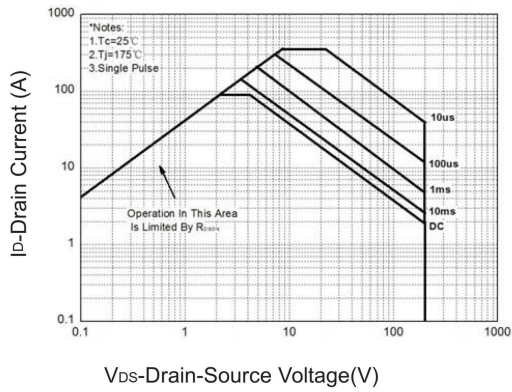
### Power Dissipation



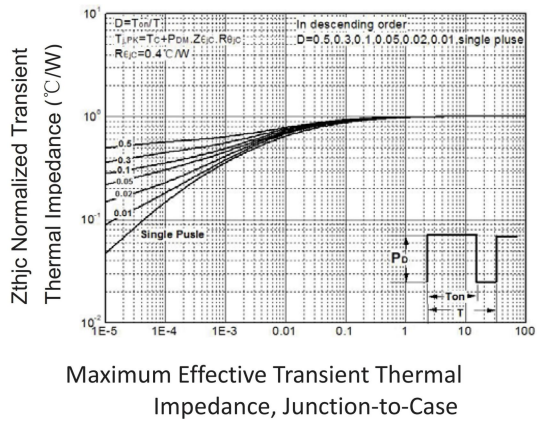
### Drain Current



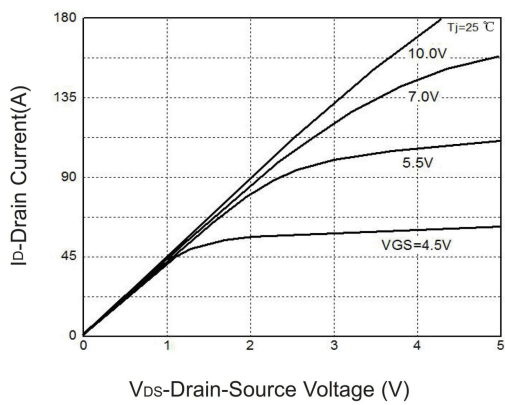
### Safe Operation Area



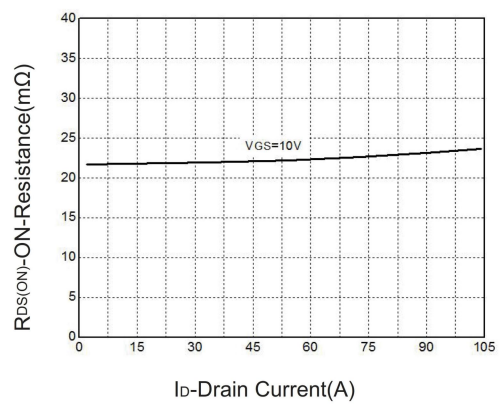
### Thermal Transient Impedance



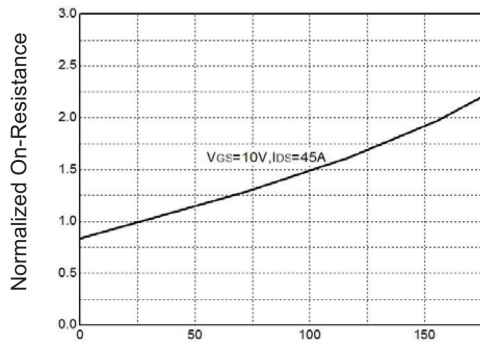
### Output Characteristics



### Drain-Source On Resistance

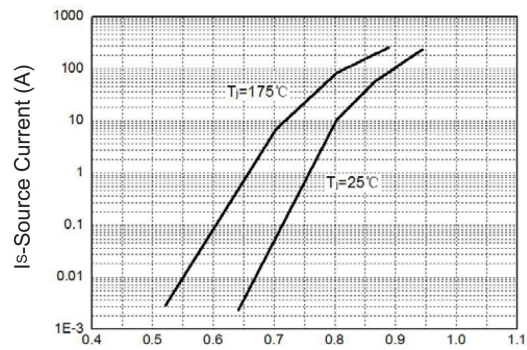


**On-Resistance vs. Temperature**



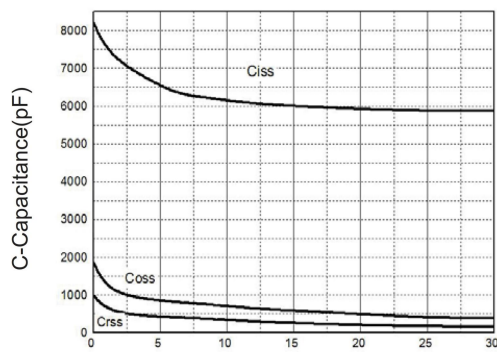
T<sub>j</sub>-Junction Temperature (°C)

**Source-Drain Diode Forward**



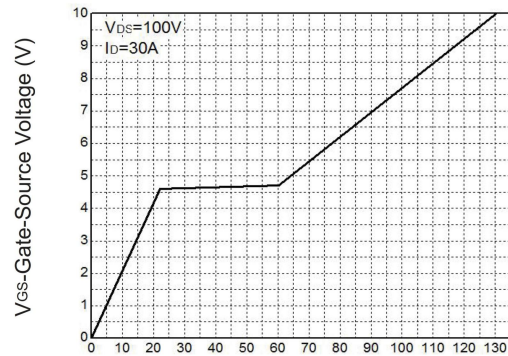
V<sub>sb</sub>, Source-Drain Voltage(V)

**Capacitance Characteristics**



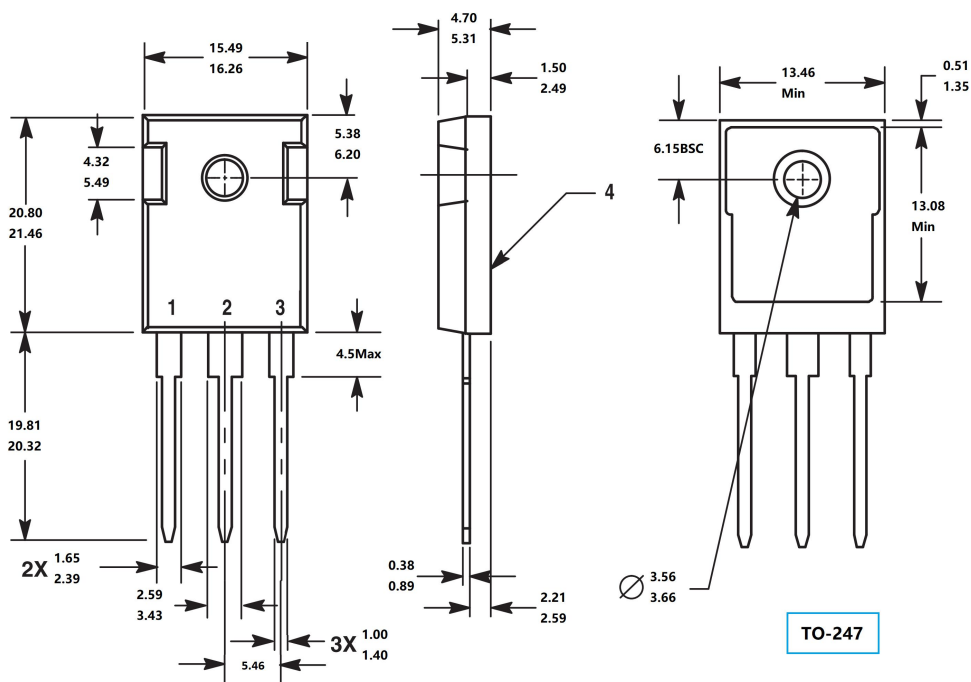
V<sub>ds</sub>-Drain-Source Voltage (V)

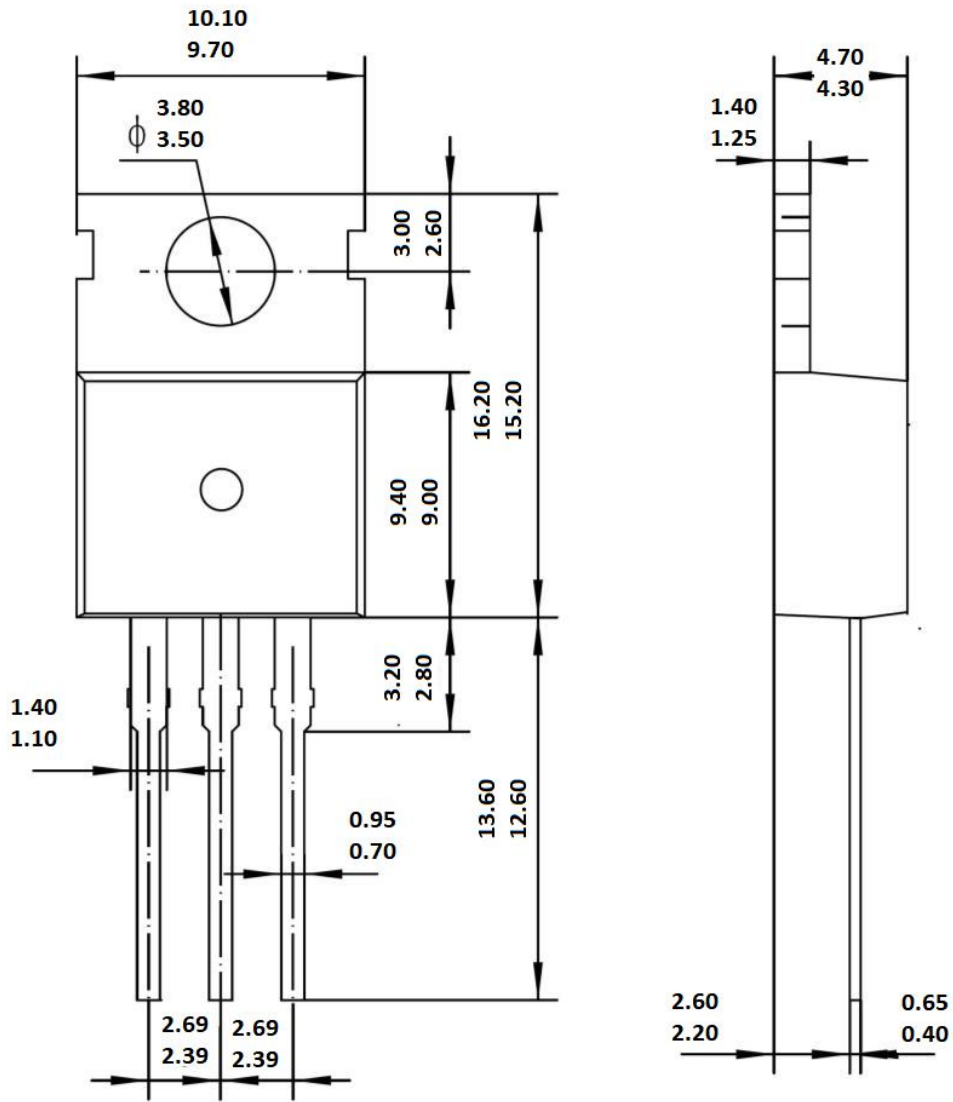
**Gate Charge Characteristics**



Q<sub>g</sub>-Gate Charge (nC)

## Package Mechanical DATA





**TO-220**

**Unit: mm**