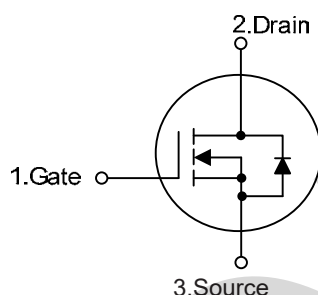
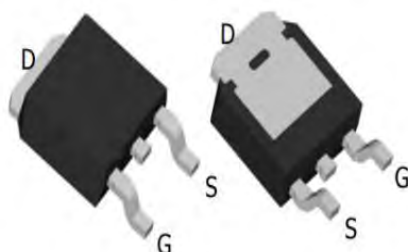


## Trench N-channel Power MOSFET

**MSR8R5N06D**

**TO-252**



|                              |     |            |
|------------------------------|-----|------------|
| $V_{DS}$                     | 60  | V          |
| $R_{DS(on),TYP@ V_{GS}=10V}$ | 7.4 | m $\Omega$ |
| $I_D$                        | 80  | A          |

### Features

- 1、Low on – resistance
- 2、Package TO-252
- 3、TrenchFET Power MOSFET

### Applications

- 1、Load Switch for Portable Devices
- 2、PWM Application
- 3、Power management

**Maximum ratings, at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

| Symbol   | Parameter                                |          | Rating      | Unit |
|----------|------------------------------------------|----------|-------------|------|
| V(BR)DSS | Drain-Source breakdown voltage           |          | 60          | V    |
| VGS      | Gate-Source voltage                      |          | ±20         | V    |
| Is       | Diode continuous forward current         | Tc=25°C  | 80          | A    |
| ID       | Continuous drain current @VGS=10V        | Tc=25°C  | 80          | A    |
|          |                                          | Tc=100°C | 50          | A    |
| IDM      | Pulse drain current tested (Note 1)      | Tc=25°C  | 320         | A    |
| EAS      | Avalanche energy, single pulsed (Note 2) |          | 123         | mJ   |
| PD       | Maximum power dissipation                | Tc=25°C  | 110         | W    |
| TSTG,TJ  | Storage and Junction Temperature Range   |          | -55 to +175 | °C   |

## Thermal Characteristics

| Symbol           | Parameter                            | Typical | Unit |
|------------------|--------------------------------------|---------|------|
| R <sub>θJC</sub> | Thermal Resistance, Junction-to-Case | 1.36    | °C/W |

## Electrical Characteristics

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Unit |
|--------|-----------|-----------|------|------|------|------|
|--------|-----------|-----------|------|------|------|------|

Static Electrical Characteristics @T<sub>j</sub>=25°C (unless otherwise stated)

|                     |                                           |                                                          |     |     |      |    |
|---------------------|-------------------------------------------|----------------------------------------------------------|-----|-----|------|----|
| V(BR)DSS            | Drain-Source Breakdown Voltage            | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA               | 60  | --  | --   | V  |
| I <sub>DSS</sub>    | Zero Gate Voltage Drain Current           | V <sub>DS</sub> =60V, V <sub>GS</sub> =0V                | --  | --  | 1    | μA |
| I <sub>GSS</sub>    | Gate-Body Leakage Current                 | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V               | --  | --  | ±100 | nA |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                    | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA | 2.0 | 3.0 | 4.0  | V  |
| R <sub>DS(on)</sub> | Drain-Source On-State Resistance (Note 3) | V <sub>GS</sub> =10V, I <sub>D</sub> =30A                | --  | 7.4 | 8.5  | mΩ |

## Dynamic Electrical Characteristics@T<sub>j</sub> = 25°C (unless otherwise stated)

|                  |                              |                                                                        |    |      |    |    |
|------------------|------------------------------|------------------------------------------------------------------------|----|------|----|----|
| C <sub>iss</sub> | Input Capacitance            | V <sub>DS</sub> =30V,<br>V <sub>GS</sub> =0V,<br>f=1MHz                | -- | 3300 | -- | pF |
| C <sub>oss</sub> | Output Capacitance           |                                                                        | -- | 274  | -- | pF |
| C <sub>rss</sub> | Reverse Transfer Capacitance |                                                                        | -- | 255  | -- | pF |
| g <sub>FS</sub>  | Forward Transconductance     | V <sub>DS</sub> = 5 V,<br>I <sub>D</sub> = 20A                         | 20 | --   | -- | S  |
| Q <sub>g</sub>   | Total Gate Charge            | V <sub>DS</sub> =30V,<br>I <sub>D</sub> =20A ,<br>V <sub>GS</sub> =10V | -- | 90   | -- | nC |
| Q <sub>gs</sub>  | Gate-Source Charge           |                                                                        | -- | 9    | -- | nC |
| Q <sub>gd</sub>  | Gate-Drain Charge            |                                                                        | -- | 18   | -- | nC |

## Switching Characteristics

|         |                     |                                                                                                 |    |     |    |    |
|---------|---------------------|-------------------------------------------------------------------------------------------------|----|-----|----|----|
| Td(on)  | Turn-on Delay Time  | V <sub>DD</sub> =30V,<br>R <sub>L</sub> =1.0Ω,<br>R <sub>G</sub> =3.0Ω,<br>V <sub>GS</sub> =10V | -- | 8.5 | -- | ns |
| Tr      | Turn-on Rise Time   |                                                                                                 | -- | 7   | -- | ns |
| Td(off) | Turn-Off Delay Time |                                                                                                 | -- | 40  | -- | ns |
| Tf      | Turn-Off Fall Time  |                                                                                                 | -- | 15  | -- | ns |

## Source -Drain Diode Characteristics @T<sub>j</sub> = 25°C (unless otherwise stated)

|                 |                                                          |                                                                 |    |     |       |
|-----------------|----------------------------------------------------------|-----------------------------------------------------------------|----|-----|-------|
| I <sub>S</sub>  | Maximum Continuous Drain to Source Diode Forward Current | --                                                              | -- | 80  | A     |
| I <sub>SM</sub> | Maximum Pulsed Drain to Source Diode Forward Current     | --                                                              | -- | 320 | A     |
| V <sub>SD</sub> | Forward on voltage                                       | I <sub>SD</sub> =20A, V <sub>GS</sub> =0V                       | -- | --  | 1.2 V |
| T <sub>rr</sub> | Reverse Recovery Time                                    | T <sub>J</sub> =25°C,<br>I <sub>F</sub> =20A ,<br>di/dt=100A/μs | -- | 32  | -- ns |
| Q <sub>rr</sub> | Reverse Recovery Charge                                  |                                                                 | -- | 45  | -- nC |

### NOTE:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. V<sub>DD</sub> = 30V, I<sub>AS</sub>=22.2A, L=0.5mH, Starting T<sub>J</sub> = 25°C.
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 0.5%.

## Typical Characteristics

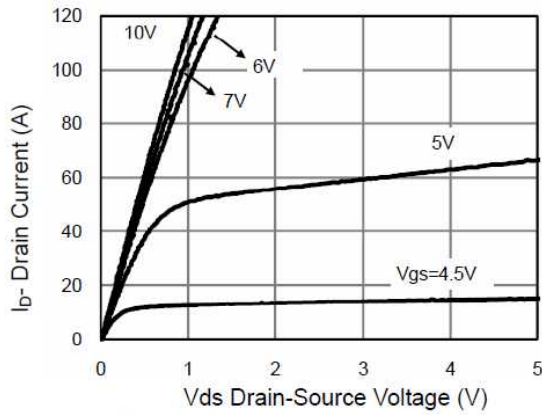


Figure 1 Output Characteristics

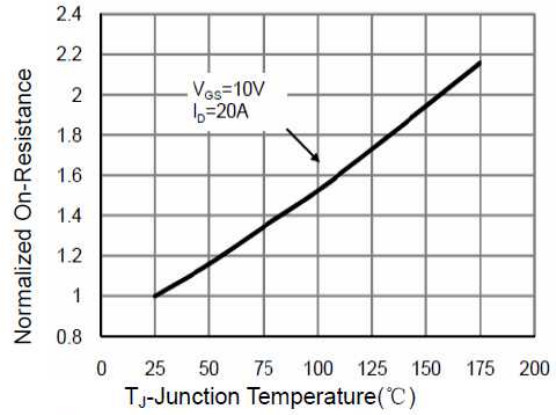


Figure 4 Rdson-Junction Temperature

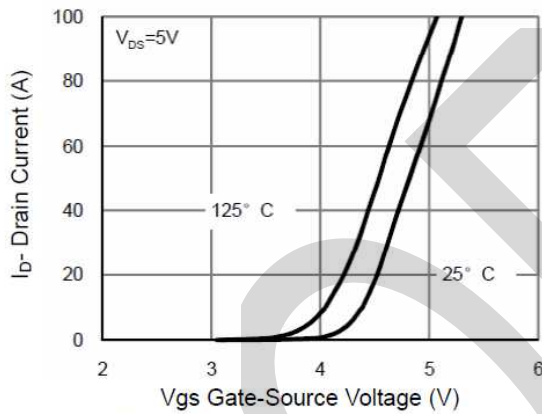


Figure 2 Transfer Characteristics

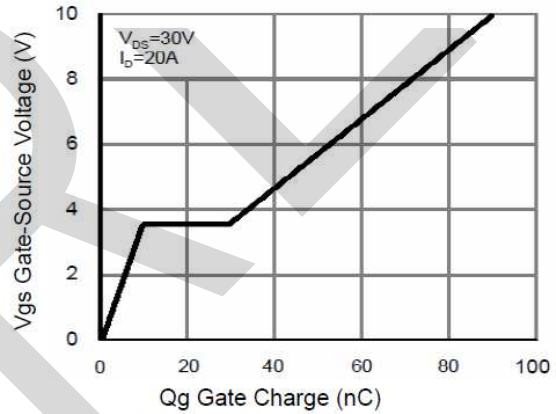


Figure 5 Gate Charge

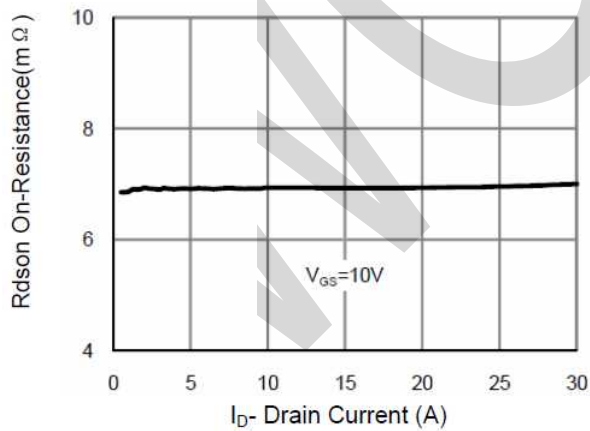


Figure 3 Rdson- Drain Current

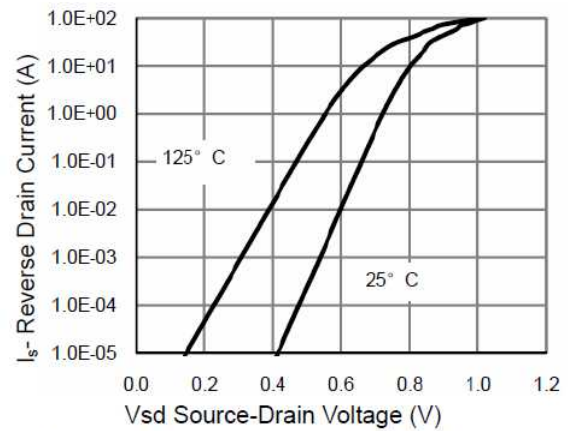


Figure 6 Source- Drain Diode Forward

## Typical Characteristics

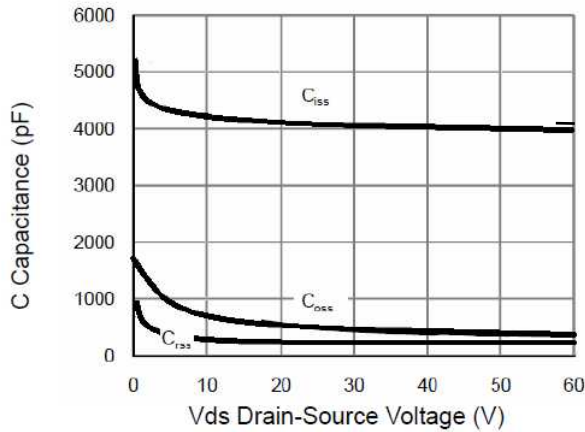


Figure 7 Capacitance vs Vds

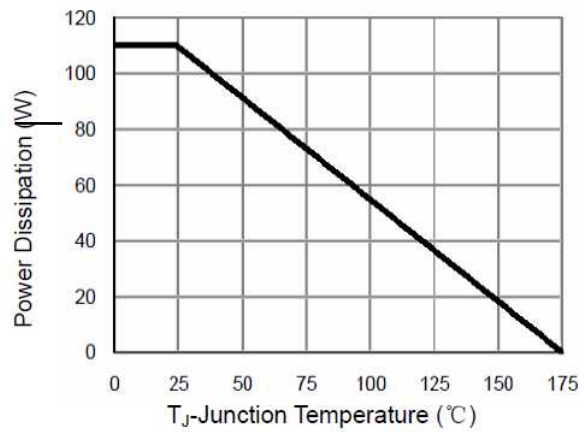


Figure 9 Power De-rating

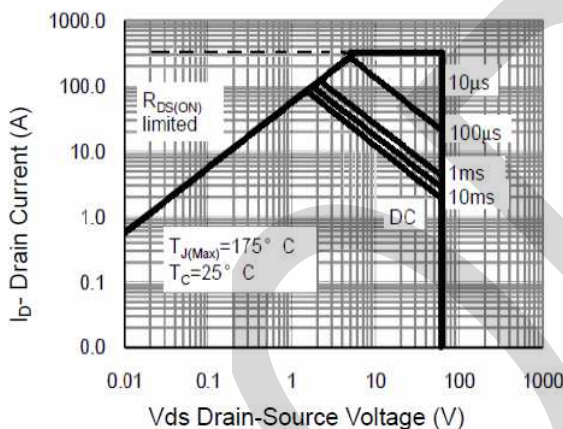


Figure 8 Safe Operation Area

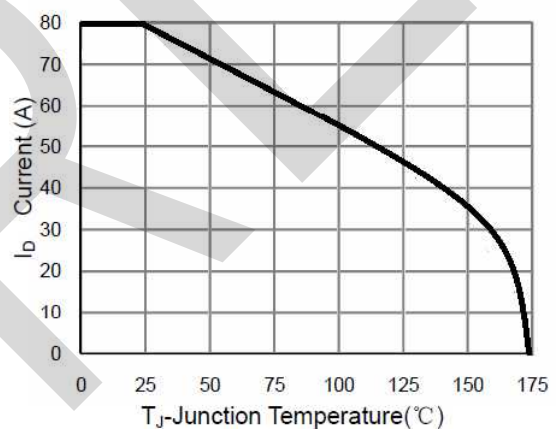


Figure 10 ID Current- Junction Temperature

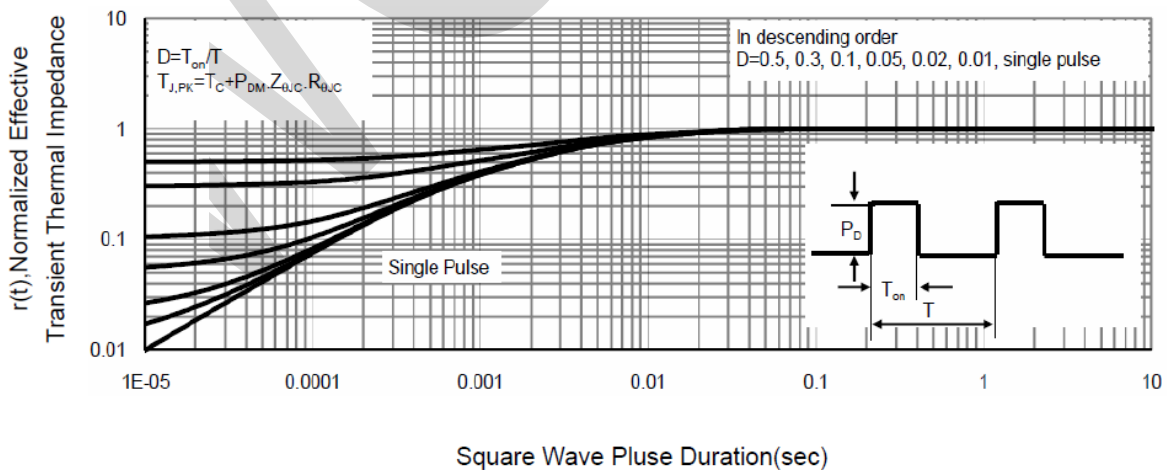
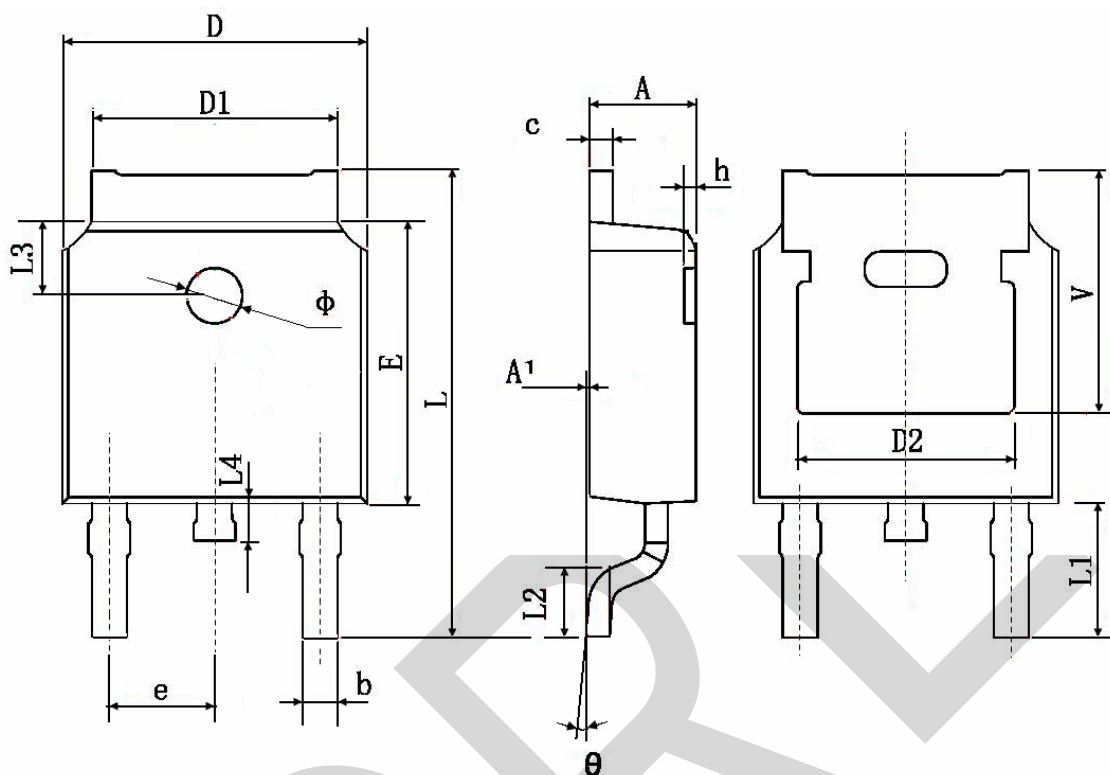


Figure 11 Normalized Maximum Transient Thermal Impedance

## PACKAGE OUTLINE DIMENSIONS

Note: unit mm



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 2.200                     | 2.400  | 0.087                | 0.094 |
| A1     | 0.000                     | 0.127  | 0.000                | 0.005 |
| b      | 0.660                     | 0.860  | 0.026                | 0.034 |
| c      | 0.460                     | 0.580  | 0.018                | 0.023 |
| D      | 6.500                     | 6.700  | 0.256                | 0.264 |
| D1     | 5.100                     | 5.460  | 0.201                | 0.215 |
| D2     | 4.830 TYP.                |        | 0.190 TYP.           |       |
| E      | 6.000                     | 6.200  | 0.236                | 0.244 |
| e      | 2.186                     | 2.386  | 0.086                | 0.094 |
| L      | 9.800                     | 10.400 | 0.386                | 0.409 |
| L1     | 2.900 TYP.                |        | 0.114 TYP.           |       |
| L2     | 1.400                     | 1.700  | 0.055                | 0.067 |
| L3     | 1.600 TYP.                |        | 0.063 TYP.           |       |
| L4     | 0.600                     | 1.000  | 0.024                | 0.039 |
| Φ      | 1.100                     | 1.300  | 0.043                | 0.051 |
| θ      | 0°                        | 8°     | 0°                   | 8°    |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| V      | 5.350 TYP.                |        | 0.211 TYP.           |       |