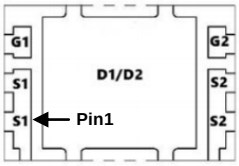
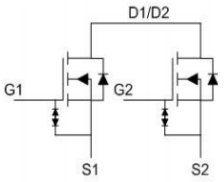
## Main Product Characteristics:

| | |
|---|---|
| $V_{DSS}$ | 20V |
| $R_{DS}$(on) | 7.8mΩ (typ.) |
| $I_D$ | 9.5A |

DFN 2x3-6




Pin Assignment




Schematic Diagram

## Features and Benefits:

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150℃ operating temperature
- ESD Protection HBM ≥ 2KV

## Description:

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

## Absolute max Rating:

| Symbol | Parameter | Max. | Units |
|---|---|---|---|
| $I_D$ @ $T_A$ = 25°C | Continuous Drain Current, $V_{GS}$ @ 4.5V ① | 9.5 | A |
| $I_D$ @ $T_A$ = 70°C | Continuous Drain Current, $V_{GS}$ @ 4.5V ① | 7.6 | |
| $I_{DM}$ | Pulsed Drain Current ② | 60 | |
| $P_D$ @ $T_A$ = 25°C | Power Dissipation ③ | 1.56 | W |
| $V_{DS}$ | Drain-Source Voltage | 20 | V |
| $V_{GS}$ | Gate-to-Source Voltage | ± 12 | V |
| $T_J$ $T_{STG}$ | Operating Junction and Storage Temperature Range | -55 to +150 | °C |

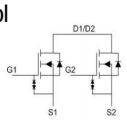
## Thermal Resistance

| Symbol | Characterizes | Typ. | Max. | Units |
|---|---|---|---|---|
| $R_{\theta JA}$ | Junction-to-ambient (t ≤ 10s) ④ | — | 80 | ℃/W |

## Electrical Characterizes @$T_A$=25℃ unless otherwise specified

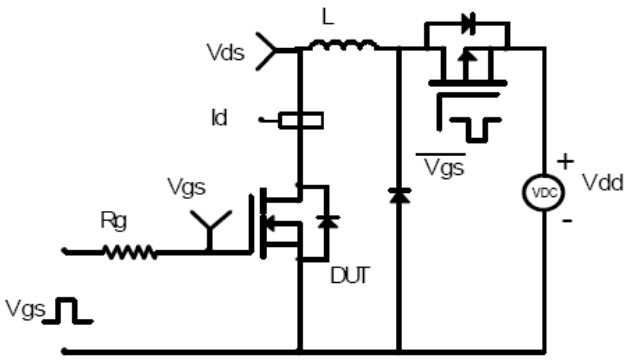
| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-to-Source breakdown voltage | 20 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250μA |
| $R_{DS(on)}$ | Static Drain-to-Source on-resistance | — | 7.8 | 9 | mΩ | $V_{GS}$= 4.5V,$I_D$ = 5A |
| | | — | 8 | 9.5 | | $V_{GS}$= 4V,$I_D$ = 5A |
| | | — | 8.2 | 10 | | $V_{GS}$= 3.7V,$I_D$ = 5A |
| | | — | 8.7 | 11.2 | | $V_{GS}$= 3.1V,$I_D$ = 5A |
| | | — | 10.5 | 13.5 | | $V_{GS}$= 2.5V,$I_D$ = 5A |
| $V_{GS(th)}$ | Gate threshold voltage | 0.45 | — | 1.5 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA |
| $I_{DSS}$ | Drain-to-Source leakage current | — | — | 1 | μA | $V_{DS}$ = 16V,$V_{GS}$ = 0V |
| $I_{GSS}$ | Gate-to-Source forward leakage | — | — | 10 | μA | $V_{GS}$ =12V |
| | | — | — | -10 | | $V_{GS}$ = -12V |
| $Q_g$ | Total gate charge | — | 21 | — | nC | $I_D$ = 5.5A, |
| $Q_{gs}$ | Gate-to-Source charge | — | 3 | — | | $V_{DS}$= 15V, |
| $Q_{gd}$ | Gate-to-Drain("Miller") charge | — | 8 | — | | $V_{GS}$ = 4.5V |
| $t_{d(on)}$ | Turn-on delay time | — | 10 | — | ns | $V_{GS}$= 4.5V, $V_{DS}$= 15V, $R_{GEN}$=6Ω $I_D$ = 5.5A |
| $t_r$ | Rise time | — | 40 | — | | |
| $t_{d(off)}$ | Turn-Off delay time | — | 63 | — | | |
| $t_f$ | Fall time | — | 28 | — | | |
| $C_{iss}$ | Input capacitance | — | 1640 | — | pF | $V_{GS}$ = 0V $V_{DS}$ = 10V $f$ = 1MHz |
| $C_{oss}$ | Output capacitance | — | 168 | — | | |
| $C_{rss}$ | Reverse transfer capacitance | — | 145 | — | | |

## Source-Drain Ratings and Characteristics

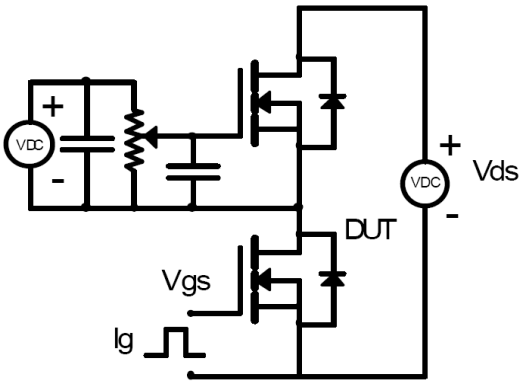
| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | — | — | 9.5 | A | MOSFET symbol showing the integral reverse p-n junction diode.   |
| $I_{SM}$ | Pulsed Source Current (Body Diode) | — | — | 60 | A | |
| $V_{sd}$ | Diode Forward Voltage | — | — | 1.2 | V | $I_S$= 9.5A, $V_{GS}$=0V |

## Test circuits and Waveforms

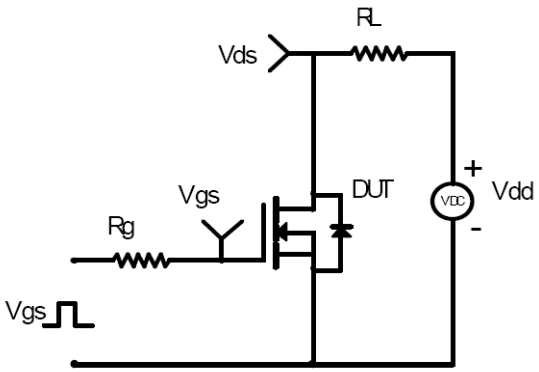
**EAS Test Circuit:**



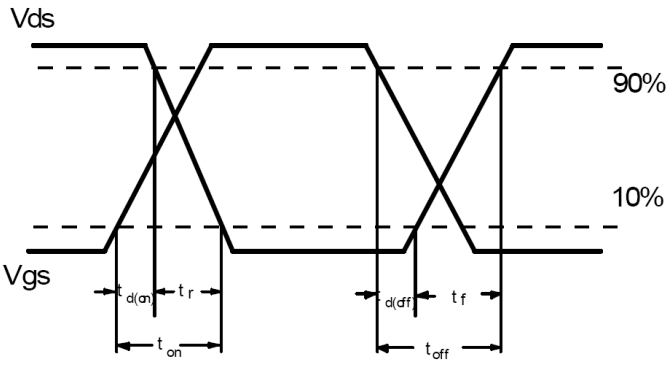

**Gate charge test circuit:**




**Switching Time Test Circuit:**




**Switching Waveforms:**




## Notes:

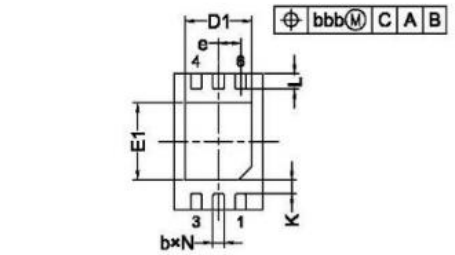
①Calculated continuous current based on maximum allowable junction temperature.

②Repetitive rating; pulse width limited by max. junction temperature.

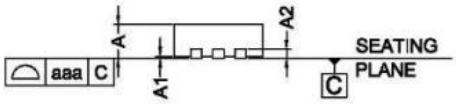
③The power dissipation PD is based on max. junction temperature, using Junction-to-ambient thermal resistance.

④The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C

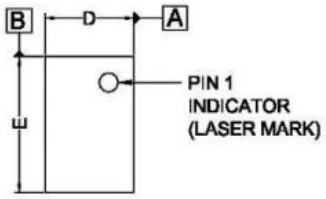
## Mechanical Data：




BOTTOM VIEW




SIDE VIEW




TOP VIEW

COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | TYP | MAX |
|---|---|---|---|
| A | 0.70 | 0.75 | 0.80 |
| A1 | 0.00 | 0.02 | 0.05 |
| A2 | | 0.203 | |
| b | 0.20 | 0.25 | 0.30 |
| D | 1.95 | 2.00 | 2.05 |
| D1 | 1.45 | 1.50 | 1.55 |
| E | 2.95 | 3.00 | 3.05 |
| E1 | 1.65 | 1.70 | 1.75 |
| e | | 0.50BSC | |
| L | 0.30 | 0.35 | 0.40 |
| K | | 0.20MIN | |
| N | | 6 | |
| aaa | | 0.08 | |
| bbb | | 0.10 | |

NOTES:
1.CONTROLLING DIMENSIONS ARE IN MILLIMETERS(ANGLES IN DEGREES).
2. COPLANARITY APPLIES TO THE EXPOSED PAD AS THE TERMINALS.

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