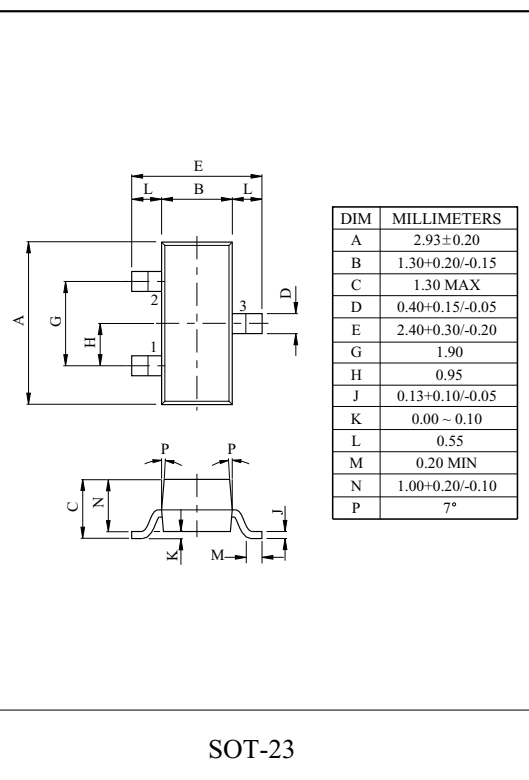


## General Description

This Trench MOSFET has better characteristics, such as fast switching time, low on resistance, low gate charge and excellent avalanche characteristics. It is mainly suitable for portable equipment and SMPS.

## FEATURES

- $V_{DS}=20V$ ,  $I_D=3A$
- Drain-Source ON Resistance  
 $R_{DS(ON)}=60m\ \Omega$  (Max.) @  $V_{GS}=4.5V$   
 $R_{DS(ON)}=120m\ \Omega$  (Max.) @  $V_{GS}=2.5V$
- Super Hige Dense Cell Design

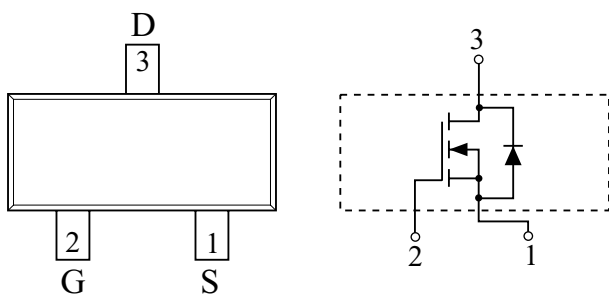


## MAXIMUM RATING (Ta=25 °C)

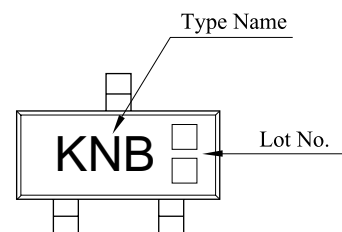
| CHARACTERISTIC                          |                    | SYMBOL     | N-Ch      | UNIT |
|-----------------------------------------|--------------------|------------|-----------|------|
| Drain-Source Voltage                    |                    | $V_{DS}$   | 20        | V    |
| Gate-Source Voltage                     |                    | $V_{GS}$   | ±10       | V    |
| Drain Current                           | DC                 | $I_D$      | 3         | A    |
|                                         | Pulsed             | $I_{DP}$   | 12        |      |
| Drain-Source-Diode Forward Current      |                    | $I_S$      | 1.25      | A    |
| Drain Power Dissipation                 | $T_A=25\ ^\circ C$ | $P_D$      | 1.25      | W    |
|                                         | $T_A=70\ ^\circ C$ |            | 0.8       |      |
| Maximum Junction Temperature            |                    | $T_j$      | 150       | °C   |
| Storage Temperature Range               |                    | $T_{stg}$  | -55 ~ 150 | °C   |
| Thermal Resistance, Junction to Ambient |                    | $R_{thJA}$ | 100       | °C/W |

Note : Surface Mounted on FR4 Board,  $t \leq 10\text{sec.}$

## PIN CONNECTION (TOP VIEW)



## Marking



# KMA3D0N20SA

## ELECTRICAL CHARACTERISTICS (Ta=25℃)

| CHARACTERISTIC                                                     | SYMBOL         | TEST CONDITION                                                    | MIN. | TYP. | MAX.      | UNIT       |
|--------------------------------------------------------------------|----------------|-------------------------------------------------------------------|------|------|-----------|------------|
| Static                                                             |                |                                                                   |      |      |           |            |
| Drain-Source Breakdown Voltage                                     | $BV_{DSS}$     | $I_{DS}=250\mu A$ , $V_{GS}=0V$ ,                                 | 20   | -    | -         | V          |
| Drain Cut-off Current                                              | $I_{DSS}$      | $V_{GS}=0V$ , $V_{DS}=16V$                                        | -    | -    | 1         | $\mu A$    |
| Gate Leakage Current                                               | $I_{GSS}$      | $V_{GS}=\pm 10V$ , $V_{DS}=0V$                                    | -    | -    | $\pm 100$ | nA         |
| Gate Threshold Voltage                                             | $V_{th}$       | $V_{DS}=V_{GS}$ , $I_D=250\mu A$                                  | 0.5  | 0.8  | 1.5       | V          |
| Drain-Source ON Resistance                                         | $R_{DS(ON)}^*$ | $V_{GS}=4.5V$ , $I_D=2.5A$                                        | -    | 50   | 60        | m $\Omega$ |
|                                                                    |                | $V_{GS}=2.5V$ , $I_D=1A$                                          | -    | 90   | 120       |            |
| On-State Drain Current                                             | $I_{D(ON)}^*$  | $V_{GS}=4.5V$ , $V_{DS}=5V$                                       | 8    | -    | -         | A          |
| Forward Transconductance                                           | $g_{fs}^*$     | $V_{DS}=5V$ , $I_D=2.5A$                                          | -    | 6    | -         | S          |
| Dynamic                                                            |                |                                                                   |      |      |           |            |
| Input Capacitance                                                  | $C_{iss}$      | $V_{DS}=10V$ , $V_{GS}=0V$ , $f=1MHz$ ,                           | -    | 330  | -         | pF         |
| Ouput Capacitance                                                  | $C_{oss}$      |                                                                   | -    | 110  | -         |            |
| Reverse Transfer Capacitance                                       | $C_{rss}$      |                                                                   | -    | 60   | -         |            |
| Total Gate Charge                                                  | $Q_g^*$        | $V_{DS}=10V$ , $V_{GS}=4.5V$ , $I_D=2.5A$                         | -    | 4.7  | -         | nC         |
| Gate-Source Charge                                                 | $Q_{gs}^*$     |                                                                   | -    | 1.6  | -         |            |
| Gate-Drain Charge                                                  | $Q_{gd}^*$     |                                                                   | -    | 1.3  | -         |            |
| Turn-On Delat Time                                                 | $t_{d(on)}^*$  | $V_{DD}=10V$ , $V_{GS}=4.5V$<br>$I_D=1A$ , $R_G=6\Omega$ (NOTE 1) | -    | 9.2  | -         | ns         |
| Turn-On Rise Time                                                  | $t_r^*$        |                                                                   | -    | 6.8  | -         |            |
| Turn-On Deley Time                                                 | $t_{d(off)}^*$ |                                                                   | -    | 6.1  | -         |            |
| Turn-On Fall Time                                                  | $t_r^*$        |                                                                   | -    | 8.3  | -         |            |
| Source-Drain Diode Ratings                                         |                |                                                                   |      |      |           |            |
| Source-Drain Forward Voltage                                       | $V_{SDF}^*$    | $V_{GS}=0V$ , $I_{DR}=1.25A$                                      | -    | 0.81 | 1.2       | V          |
| NOTE 1> *: Pulse Test : Pulse width <300 $\mu s$ , Duty cycle < 2% |                |                                                                   |      |      |           |            |

# KMA3D0N20SA

Fig1.  $I_D - V_{DS}$

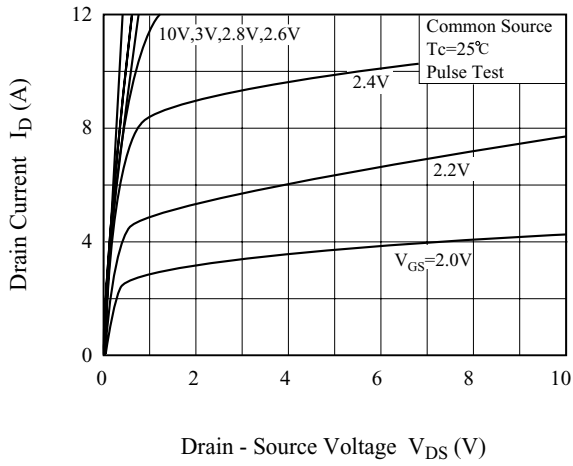


Fig2.  $R_{DS(on)} - I_D$

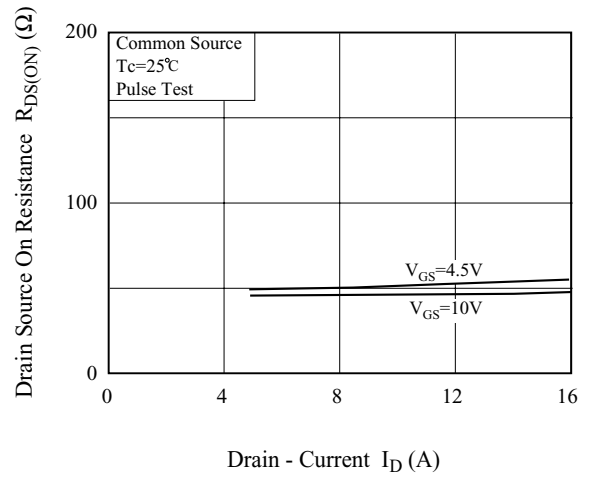


Fig3.  $I_D - V_{GS}$

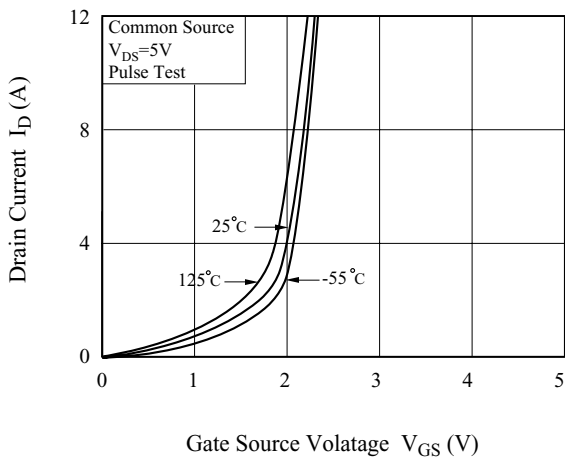


Fig4.  $R_{DS(on)} - T_j$

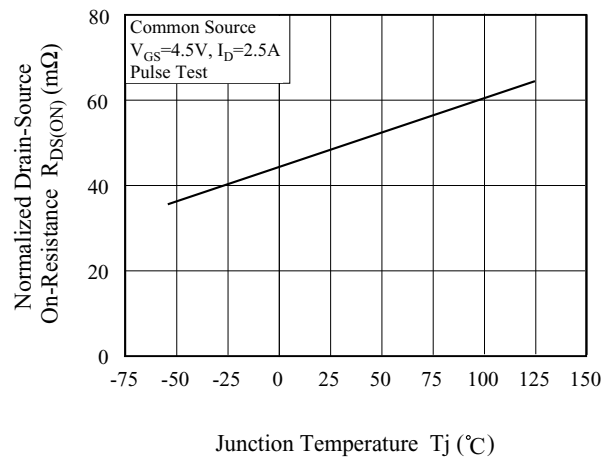


Fig5.  $V_{th} - T_j$

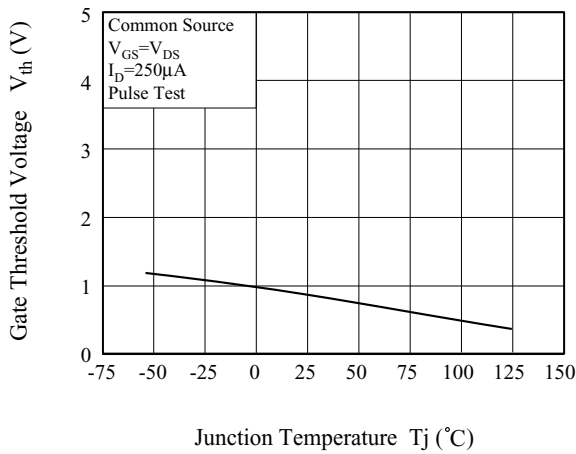


Fig6.  $I_S - V_{SDF}$

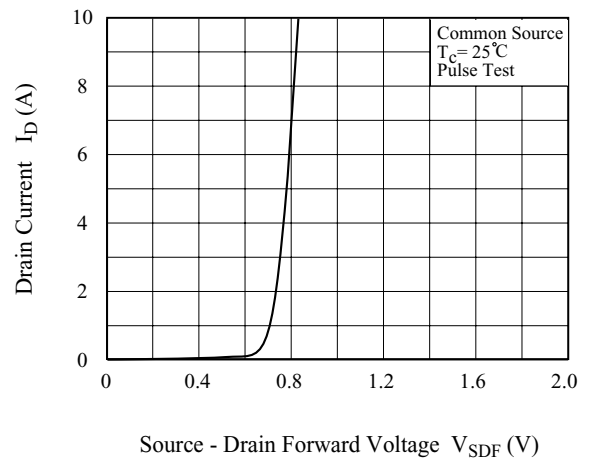


Fig7. Transient Thermal Response Curve

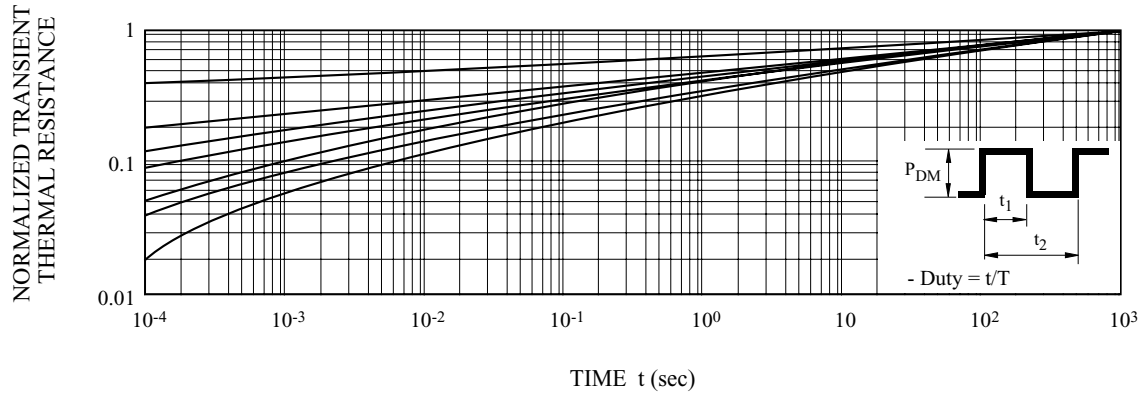


Fig8. Safe Operation Area

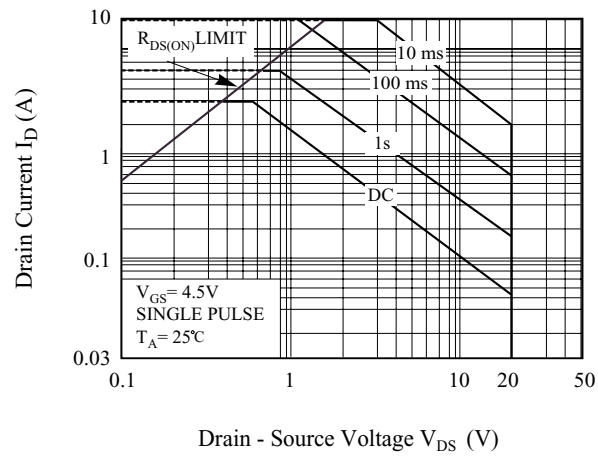


Fig9. Gate Charge Circuit and Wave Form

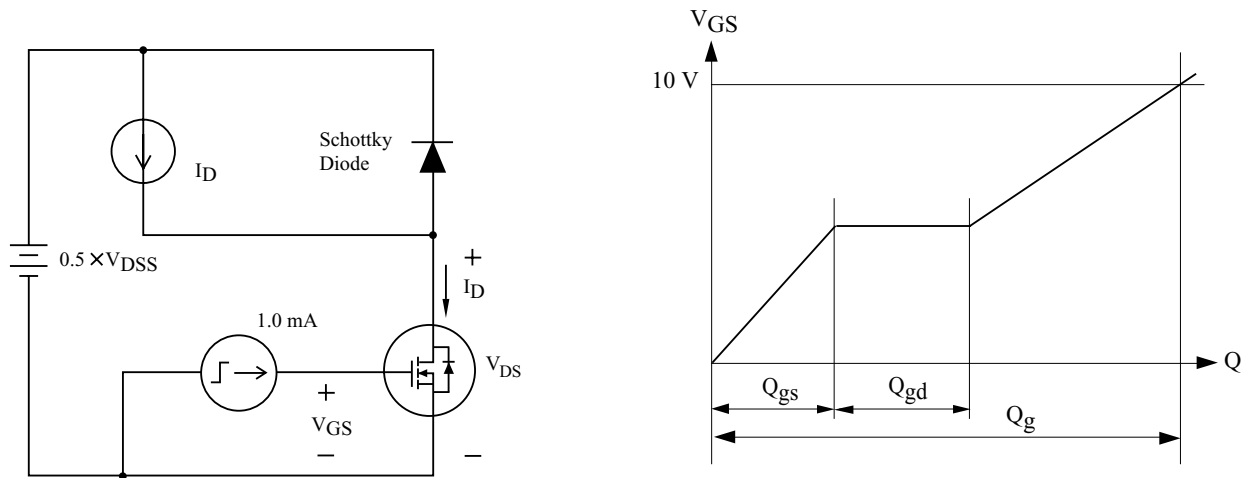


Fig10. Resistive Load Switching

