

General Description

It is mainly suitable for low voltage applications such as automotive, DC/DC converters and a load switch in battery powered applications

FEATURES

- $V_{DSS} = 60V$, $I_D = 60A$
- Drain-Source ON Resistance :
 $R_{DS(ON)} = 14m$ (Max.) @ $V_{GS} = 10V$

MOSFET MAXIMUM RATING (Ta=25 Unless otherwise noted)

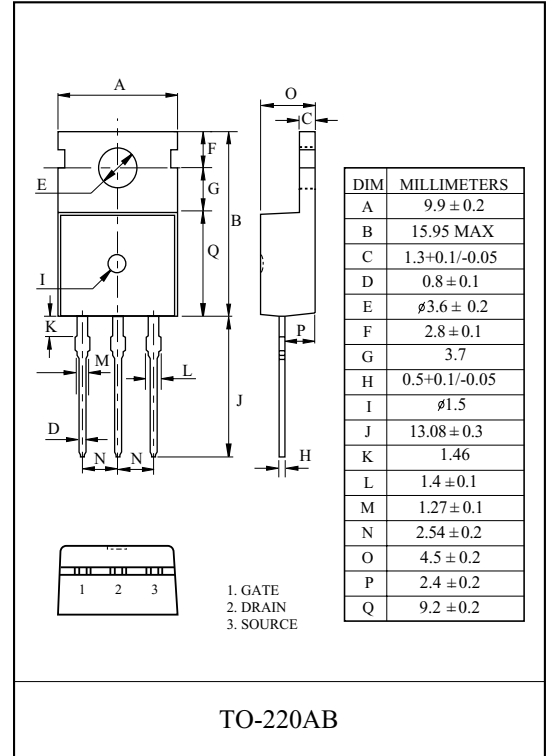
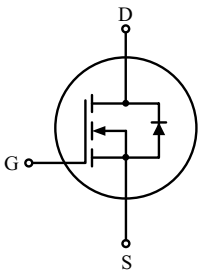
| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|------------------------------------|-----------------|------------|----------|------|
| Drain-Source Voltage | | V_{DSS} | 60 | V |
| Gate-Source Voltage | | V_{GSS} | ± 25 | V |
| Drain Current | DC | I_{D^*} | 60 | A |
| | Pulsed (Note 1) | I_{DP} | 240 | A |
| Drain-Source Diode Forward Current | | I_S | 60 | A |
| Drain Power Dissipation | | P_D^* 25 | 150 | W |
| Maximum Junction Temperature | | T_j | -55 175 | |
| Storage Temperature Range | | T_{stg} | -55 175 | |

Note1) Pulse Test : Pulse width 10 μs Duty cycle 1%

Thermal Characteristics

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|------------|--------|------|
| Thermal Resistance, Junction-to-Ambient | R_{thJA} | 62.5 | /W |
| Thermal Resistance, Junction-to-Case | R_{thJC} | 1.0 | /W |

Equivalent Circuit



Not recommended for new design

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MOSFET Electrical Characteristics (Ta=25 Unless otherwise noted)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--------------------------------|--------------|---|------|------|-----------|---------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $I_D=250\ \mu A, V_{GS}=0V$ | 60 | - | - | V |
| Drain Cut-off Current | I_{DSS} | $V_{DS}=60V, V_{GS}=0V,$ | - | - | 1 | μA |
| Gate Leakage Current | I_{GSS} | $V_{GS}=\pm 15V, V_{DS}=0V$ | - | - | ± 100 | nA |
| Gate Threshold Voltage | V_{th} | $V_{DS}=V_{GS}, I_D=250\ \mu A$ | 2.0 | - | 4.0 | V |
| Drain-Source ON Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=30A$ | - | 11.5 | 14 | m |
| Forward Transconductance | g_{FS} | $V_{DS}=15V, I_D=30A$ | - | 20 | - | S |
| Dynamic | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=25V, V_{GS}=0V, f=1.0MHz$ | - | 2000 | - | pF |
| Output Capacitance | C_{oss} | | - | 360 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 125 | - | |
| Total Gate Charge | Q_g | $V_{DS}=48V,$ $V_{GS}=10V,$ $I_D=30A$ (Note1,2) | - | 70 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 15 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 20 | - | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}=30V$ $I_D=30A$ $R_G=25$ (Note1,2) | - | 35 | - | ns |
| Turn-On Rise Time | t_r | | - | 220 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 55 | - | |
| Turn-Off Fall Time | t_f | | - | 30 | - | |

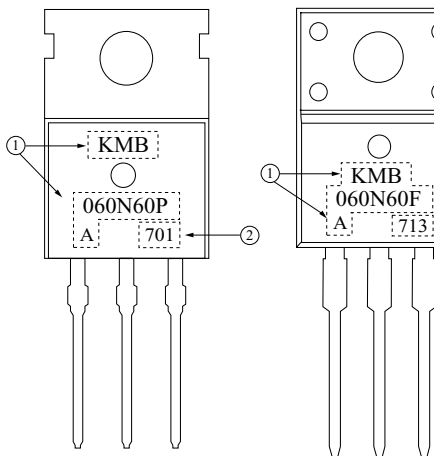
Note 1) Pulse Test : Pulse width 10 μs , Duty Cycle 1%.

Note 2) Essentially Independent of Operating Temperature.

DIODE Electrical Characteristics (Ta=25 Unless otherwise noted)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------------------|----------|--|------|------|------|------|
| Diode Forward Voltage | V_{SD} | $I_{SD}=60A, V_{GS}=0V$ | - | - | 1.5 | V |
| Reverse Recovery Time | T_{rr} | $V_{GS}=0V, I_S=60A, dI_F/dt=100A/\mu s$ | - | 110 | - | ns |

Marking



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Fig 1. $I_D - V_{DS}$

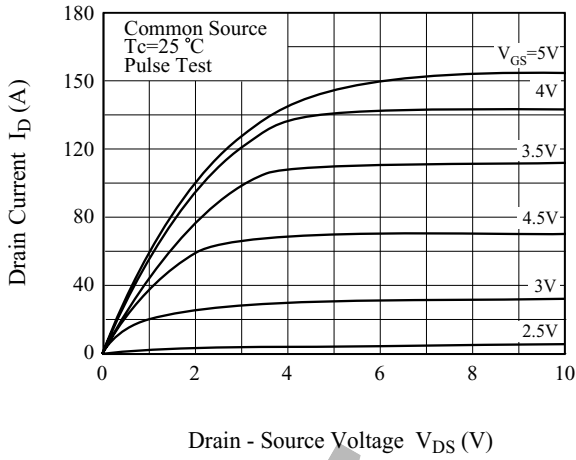


Fig 2. $R_{DS(ON)} - I_D$

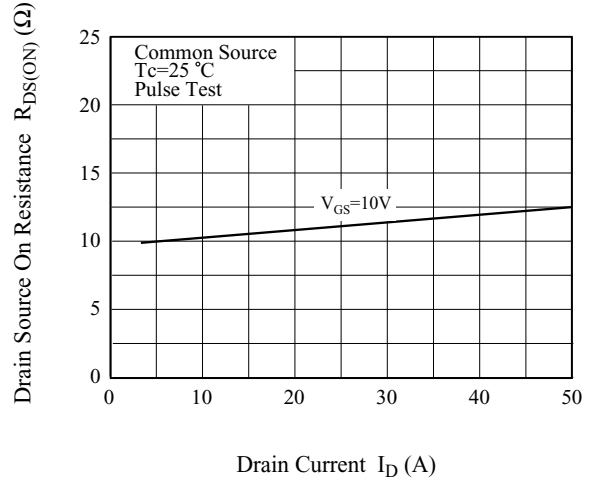


Fig 3. $I_D - V_{GS}$

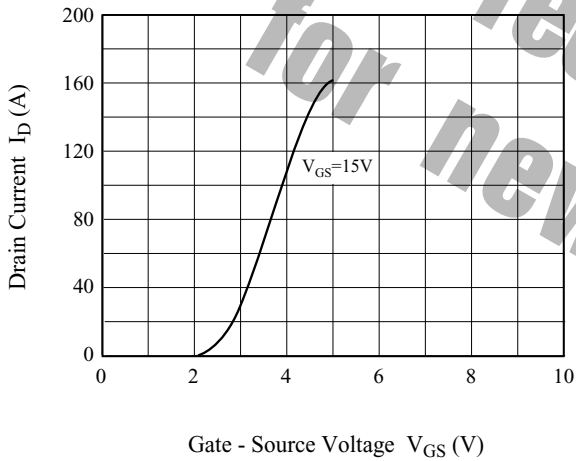


Fig 4. $R_{DS(ON)} - T_j$

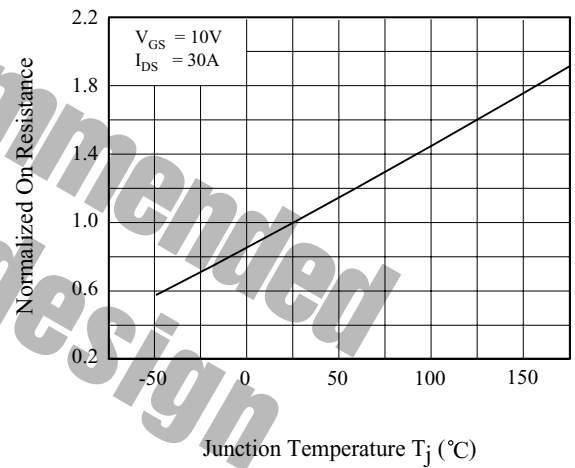


Fig 5. $V_{th} - T_j$

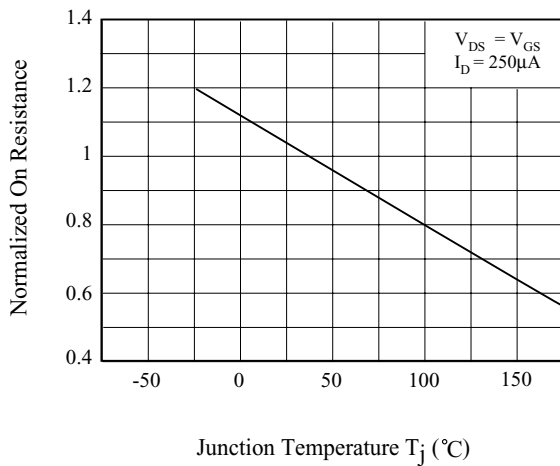
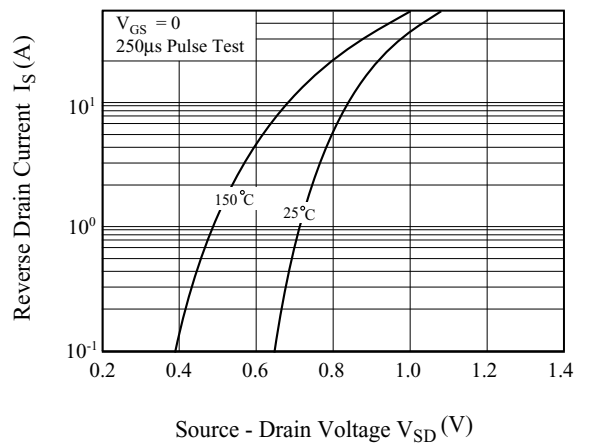


Fig 6. $I_{DR} - V_{DSF}$



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Fig 7. $Q_g - V_{DS}$

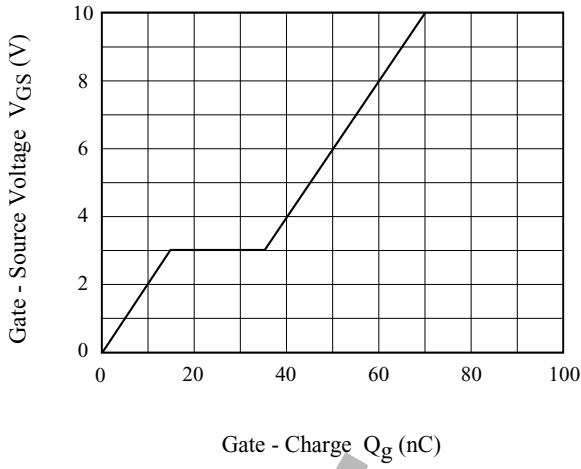


Fig 8. $C - V_{DS}$

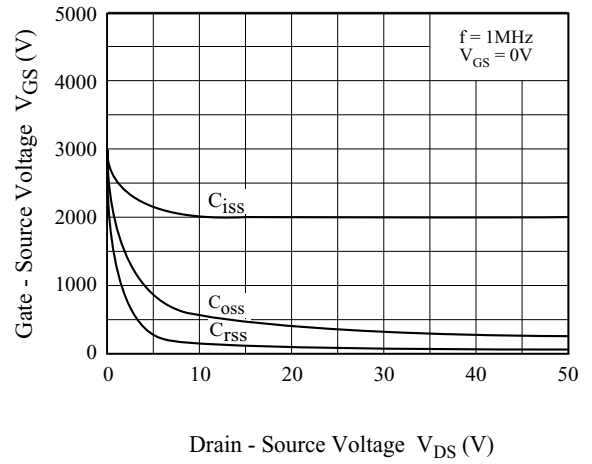


Fig 9. Safe Operation Area

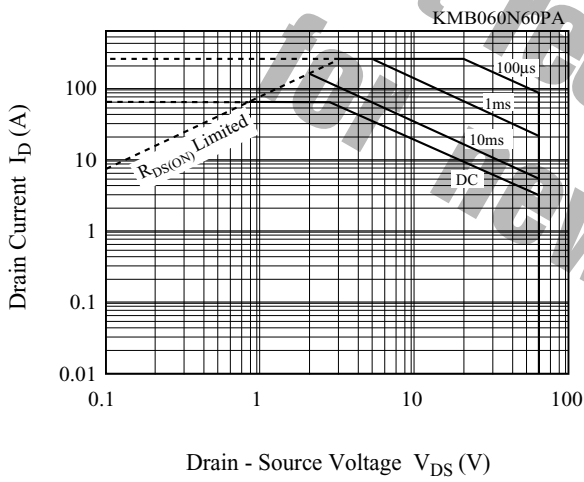
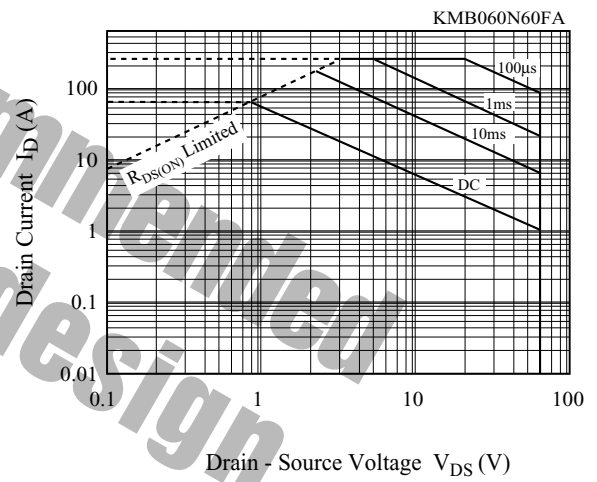
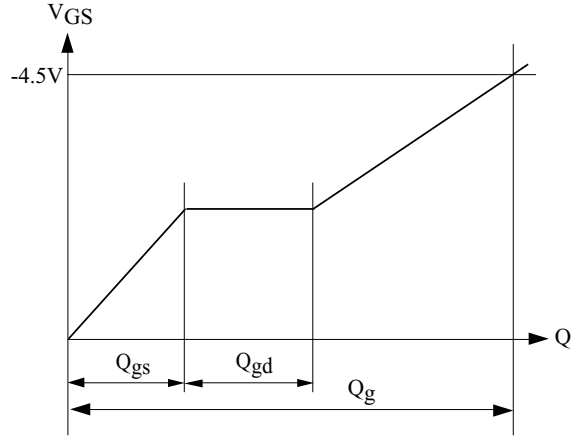
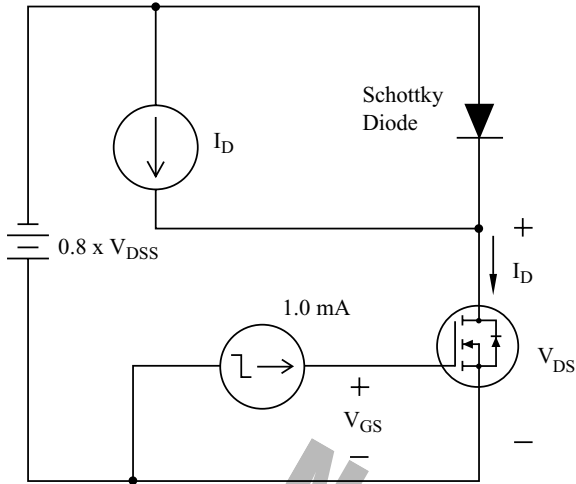


Fig 10. Safe Operation Area

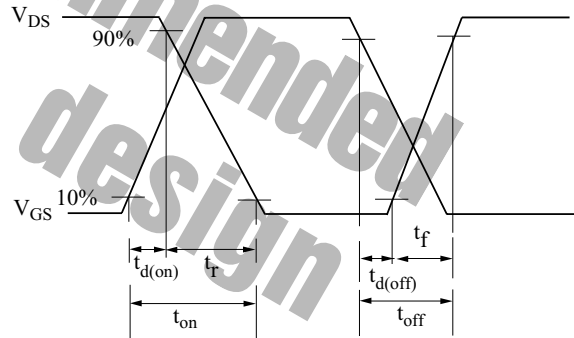
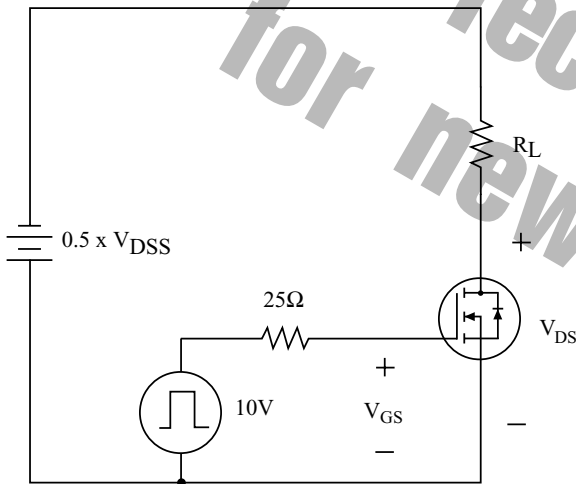


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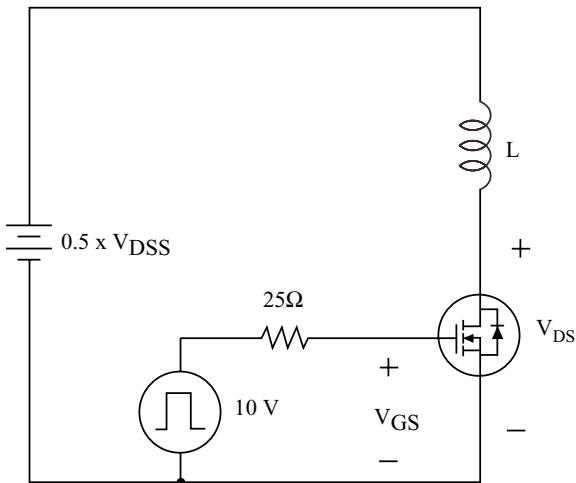
- Gate Charge



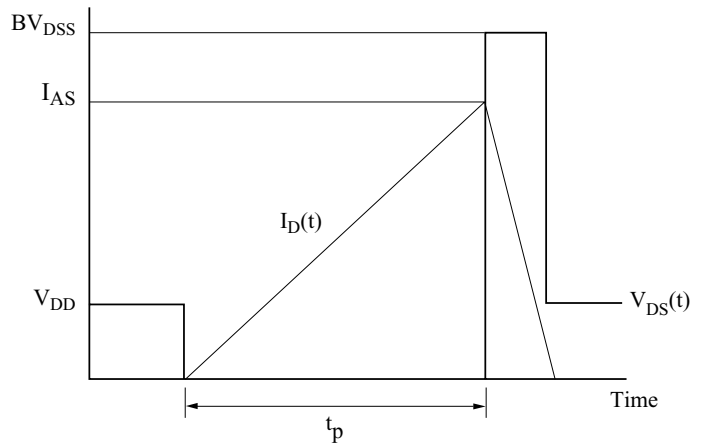
- Resistive Load Switching



- Single Pulsed Avalanche Energy

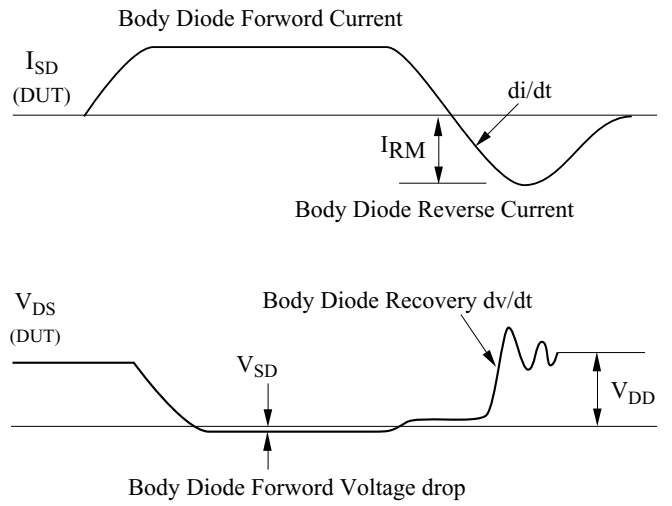
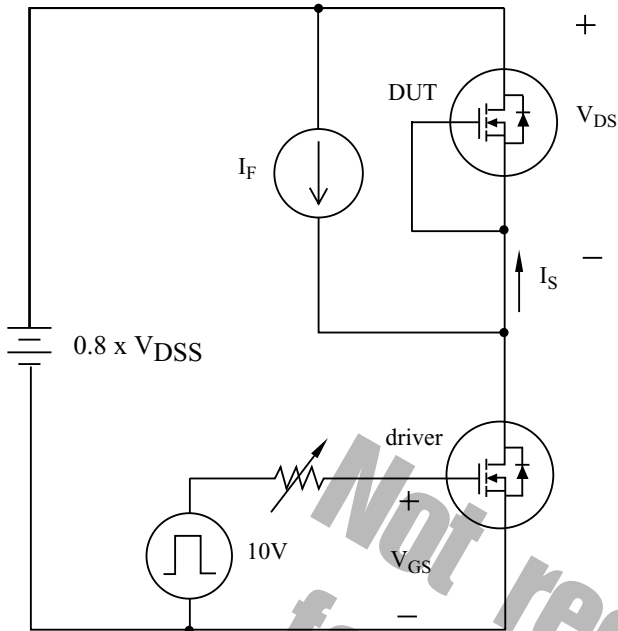


$$E_{AS} = \frac{1}{2} I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



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- Source - Drain Diode Reverse Recovery and dv/dt



Not recommended for new design