

**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 :
- $R_{DS(ON)} = 14m\ \Omega$  (Max.) @  $V_{GS} = 10V$

**MOSFET MAXIMUM RATING (Ta=25 °C Unless otherwise noted)**

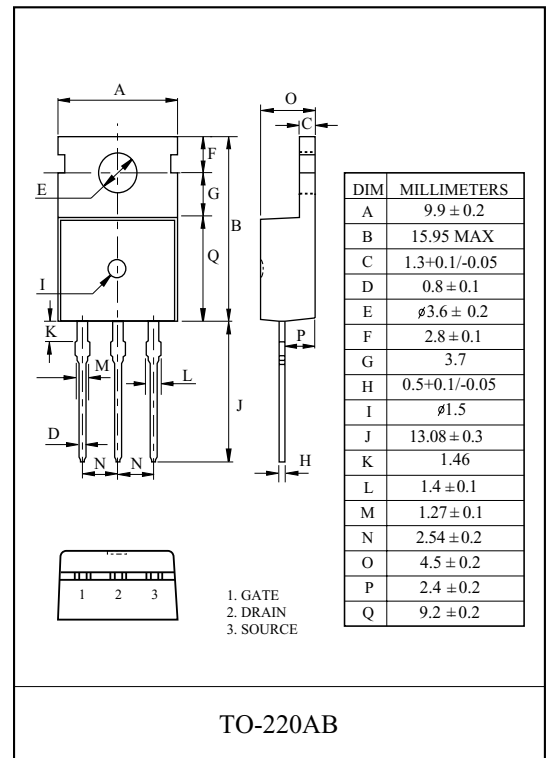
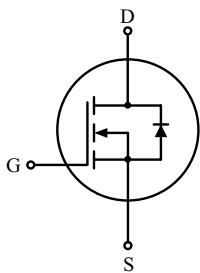
CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DSS}$	60	V
Gate-Source Voltage		$V_{GSS}$	$\pm 25$	V
Drain Current	DC	$I_D^*$	60	A
	Pulsed (Note 1)	$I_{DP}$	240	A
Drain-Source Diode Forward Current		$I_S$	60	A
Drain Power Dissipation		$P_D^*$   25 °C	150	W
Maximum Junction Temperature		$T_j$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

Note1) Pulse Test : Pulse width  $\leq 10\ \mu S$  Duty cycle  $\leq 1\%$

**Thermal Characteristics**

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

**Equivalent Circuit**



# KMB060N60PA

## MOSFET Electrical Characteristics (Ta=25 °C Unless otherwise noted)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
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	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{GS}=\pm 15V, V_{DS}=0V$	-	-	$\pm 100$	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 $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=15V, I_D=30A$	-	20	-	S
<b>Dynamic</b>						
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	$t_{d(on)}$	$V_{DD}=30V$ $I_D=30A$ $R_G=25\Omega$ (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	-	

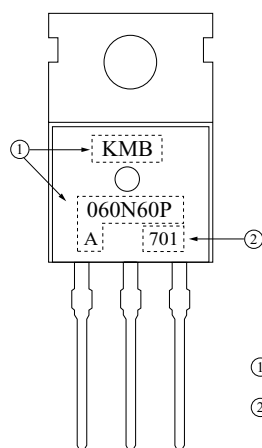
Note 1) Pulse Test : Pulse width  $\leq 10\mu s$ , Duty Cycle  $\leq 1\%$ .

Note 2) Essentially Independent of Operating Temperature.

## DIODE Electrical Characteristics (Ta=25 °C 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	$T_{rr}$	$V_{GS}=0V, I_S=60A, diF/dt=100A/\mu s$	-	110	-	ns

## Marking



① PRODUCT NAME

② LOT NO

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Fig 1.  $I_D - V_{DS}$

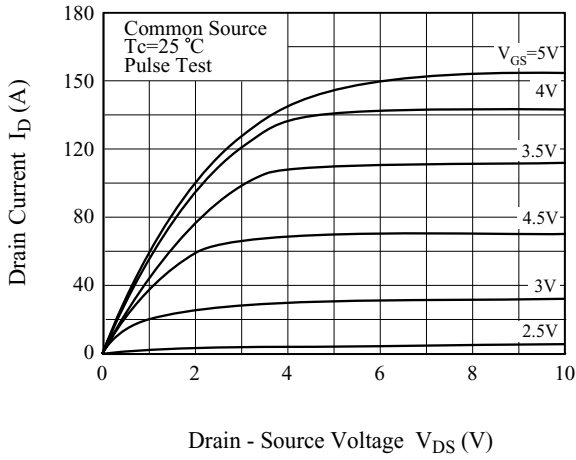


Fig 2.  $R_{DS(ON)} - I_D$

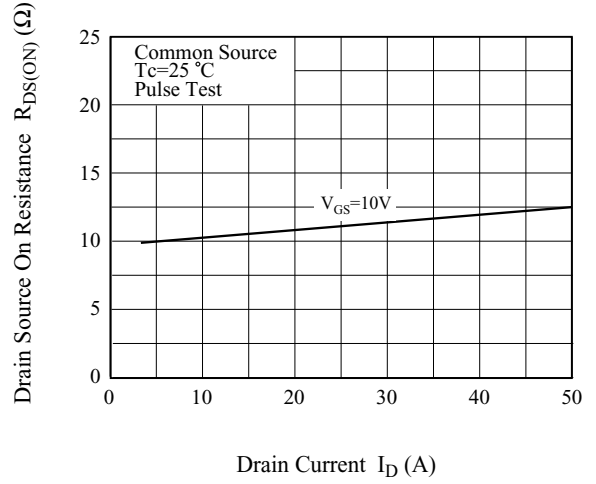


Fig 3.  $I_D - V_{GS}$

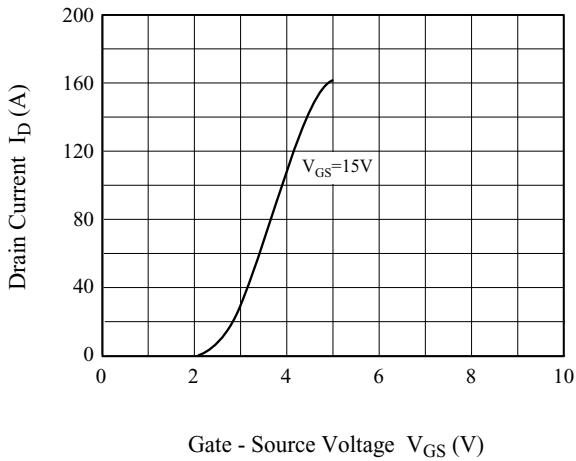


Fig 4.  $R_{DS(ON)} - T_j$

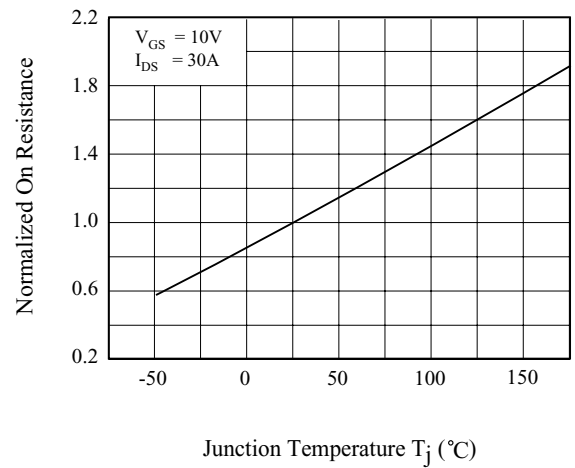


Fig 5.  $V_{th} - T_j$

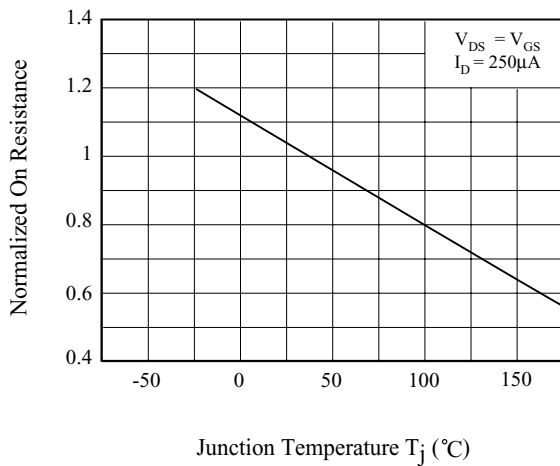
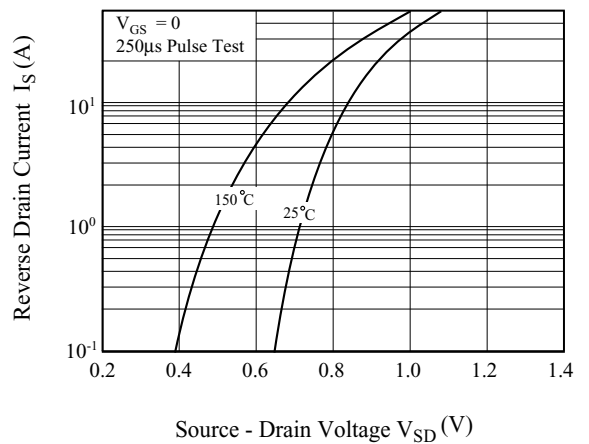


Fig 6.  $I_{DR} - V_{DSF}$



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Fig 7.  $Q_g - V_{DS}$

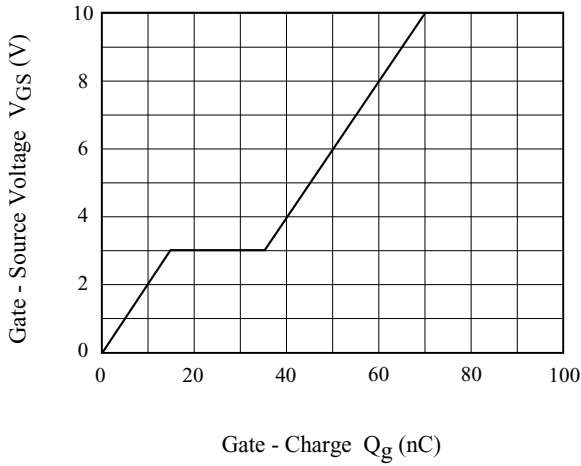


Fig 8.  $C - V_{DS}$

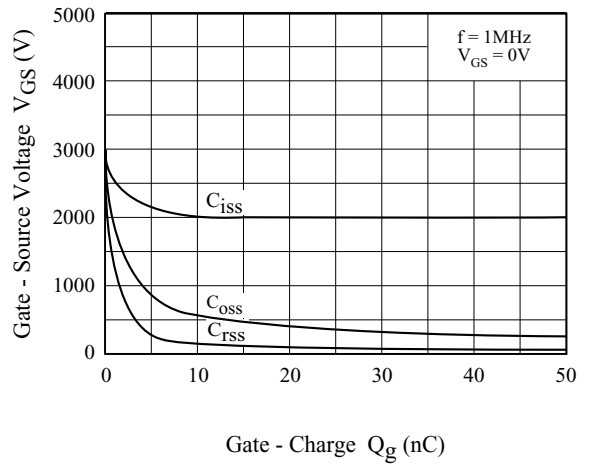


Fig 9. Safe Operation Area

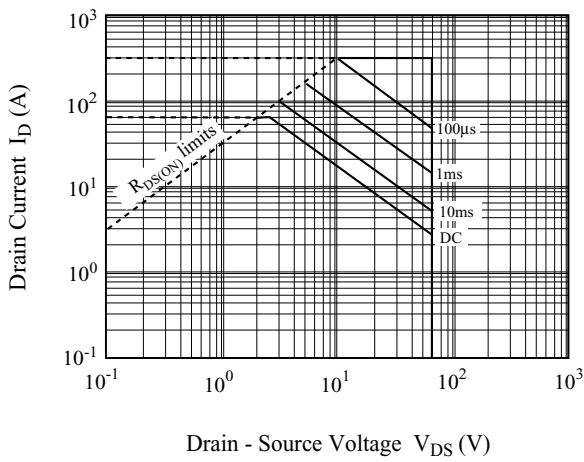


Fig 9.  $I_D - T_j$

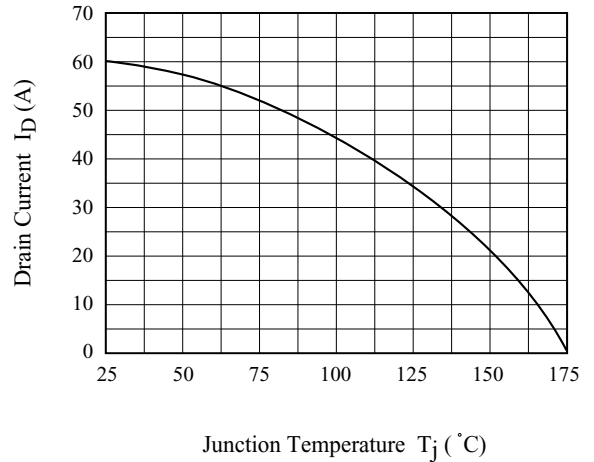
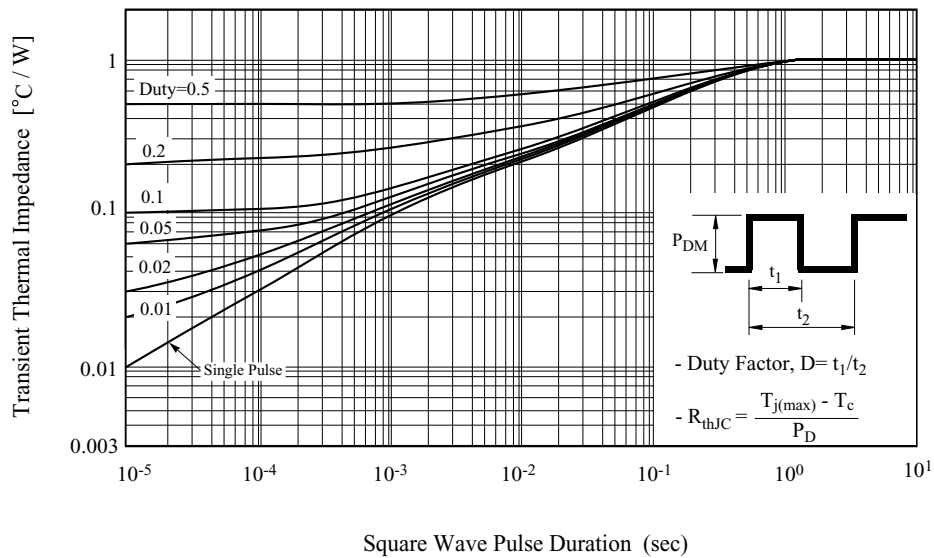
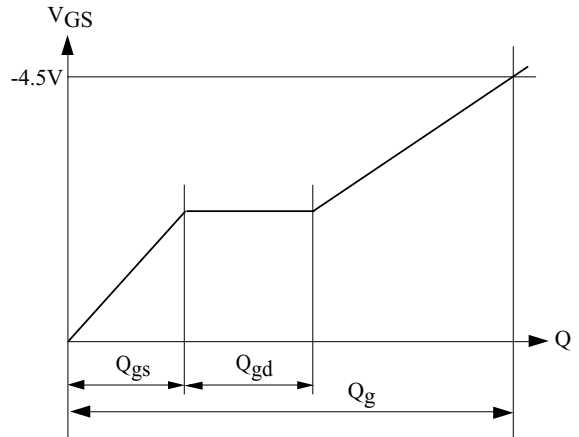
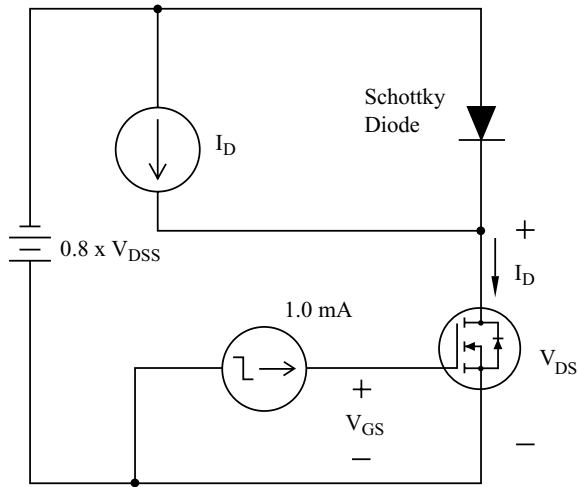


Fig 11.  $R_{th}$

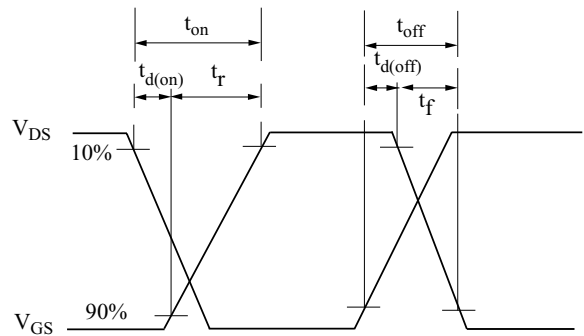
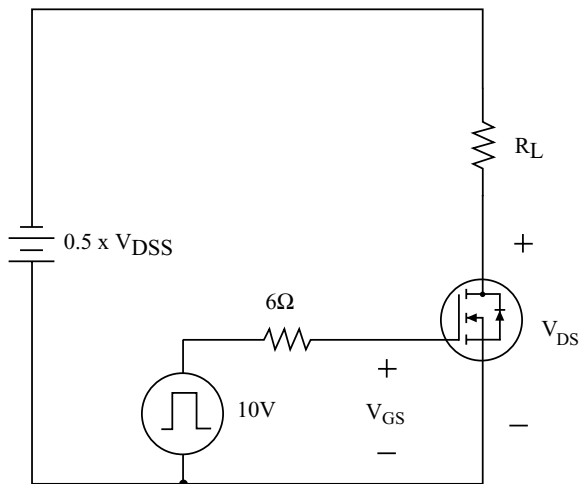


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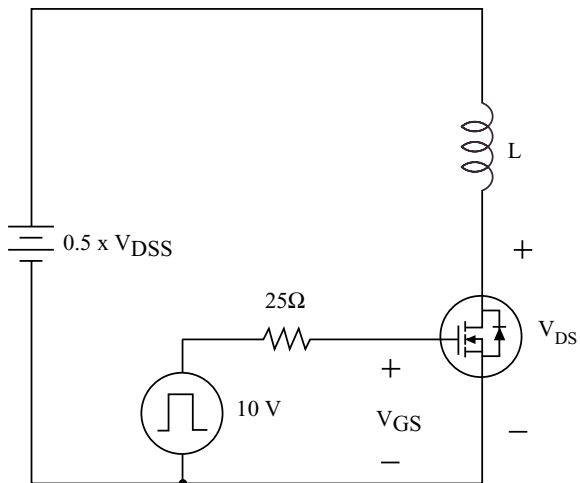
## - Gate Charge



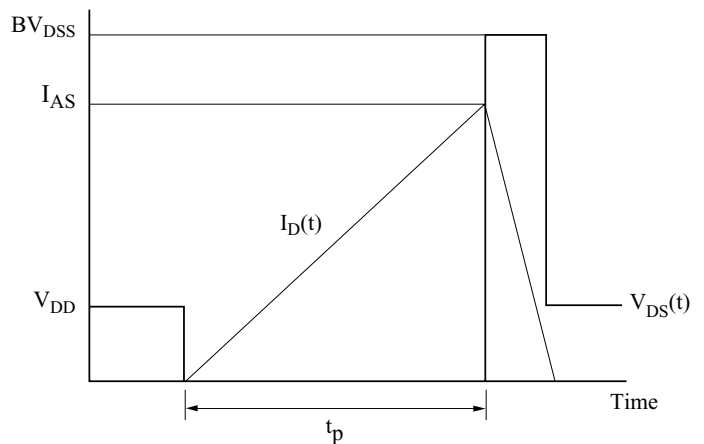
## - Resistive Load Switching



## - 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  $dv/dt$

