

### 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 Back-light Inverter and Power Supply.

### FEATURES

- $V_{DSS}=40V$ ,  $I_D=54A$ .
- Low Drain-Source ON Resistance.
  - :  $R_{DS(ON)}=8.5m$  (Max.) @  $V_{GS}=10V$
  - :  $R_{DS(ON)}=11m$  (Max.) @  $V_{GS}=4.5V$
- Super High Dense Cell Design.
- High Power and Current Handling Capability.

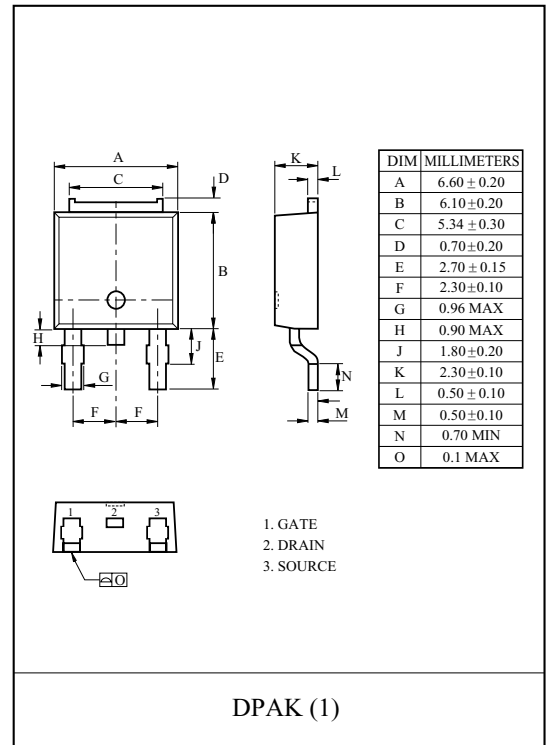
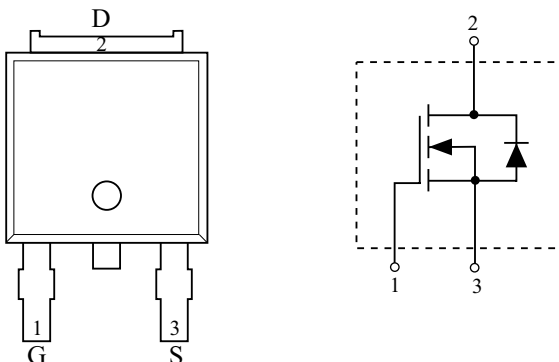
### MAXIMUM RATING (Ta=25 Unless otherwise Noted)

CHARACTERISTIC		SYMBOL	N-Ch	UNIT
Drain-Source Voltage		$V_{DSS}$	40	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	DC@ $T_C=25$ (Note1)	$I_D$	54	A
	Pulsed (Note2)	$I_{DP}$	100	
Drain-Source-Diode Forward Current		$I_S$	100	A
Drain Power Dissipation	@ $T_C=25$ (Note1)	$P_D$	45	W
	@ $T_a=25$ (Note2)		3.1	
Maximum Junction Temperature		$T_j$	150	
Storage Temperature Range		$T_{stg}$	-55 150	
Thermal Resistance, Junction to Case (Note1)		$R_{thJC}$	2.8	/W
Thermal Resistance, Junction to Ambient (Note2)		$R_{thJA}$	40	/W

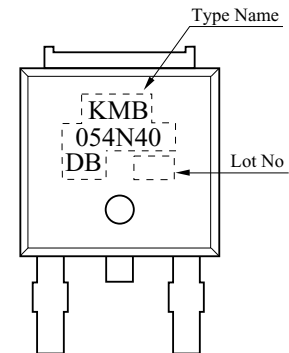
Note 1)  $R_{thJC}$  means that the infinite heat sink is mounted.

Note 2) Surface Mounted on 1 × 1 Pad of 2 oz copper.

### PIN CONNECTION (TOP VIEW)



### Marking



# KMB054N40DB

## ELECTRICAL CHARACTERISTICS (Ta=25 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT		
<b>Static</b>								
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V		
Drain Cut-off Current	$I_{DSS}$	$V_{GS}=0V, V_{DS}=32V$	-	-	1	$\mu A$		
Gate Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA		
Gate Threshold Voltage	$V_{th}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.9	3	V		
Drain-Source ON Resistance	$R_{DS(ON)*}$	$V_{GS}=10V, I_D=14A$	-	6.5	8.5	m		
		$V_{GS}=4.5V, I_D=11A$	-	8.5	11			
		$V_{GS}=10V, I_D=14A, T_j=125$	-	10.4	14			
Forward Transconductance	$g_{fs*}$	$V_{DS}=10V, I_D=20A$	-	58	-	S		
<b>Dynamic</b>								
Input Capacitance	$C_{iss}$	$V_{DS}=20V, f=1MHz, V_{GS}=0V$	-	1280	-	pF		
Output Capacitance	$C_{oss}$		-	250	-			
Reverse Transfer Capacitance	$C_{rss}$		-	125	-			
Total Gate Charge	$V_{GS}=10V$	$Q_g^*$	$V_{DS}=20V, V_{GS}=10V, I_D=14A$	-	25.4	-	nC	
	$V_{GS}=5V$	$Q_g^*$		-	13.8	-		
Gate-Source Charge	$Q_{gs}^*$	-		5.7	-			
Gate-Drain Charge	$Q_{gd}^*$	-		5.4	-			
Turn-On Delay Time	$t_{d(on)}^*$	$V_{DD}=20V, V_{GS}=10V$ $I_D=1A, R_G=6$		-	19	-		ns
Turn-On Rise Time	$t_r^*$			-	16	-		
Turn-Off Delay Time	$t_{d(off)}^*$		-	60	-			
Turn-Off Fall Time	$t_f^*$		-	14	-			
<b>Source-Drain Diode Ratings</b>								
Source-Drain Forward Voltage	$V_{SDF}^*$	$V_{GS}=0V, I_S=14A$	-	0.8	1.2	V		
Note>* Pulse Test : Pulse width <300 $\mu s$ , Duty cycle < 2%								

# KMB054N40DB

Fig1.  $I_D - V_{DS}$

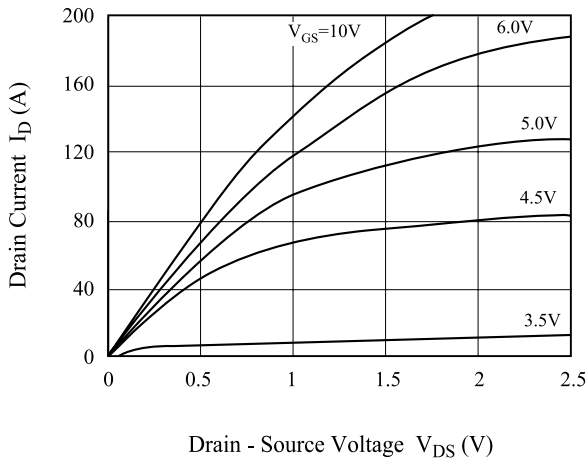


Fig2.  $R_{DS(ON)}-I_D$

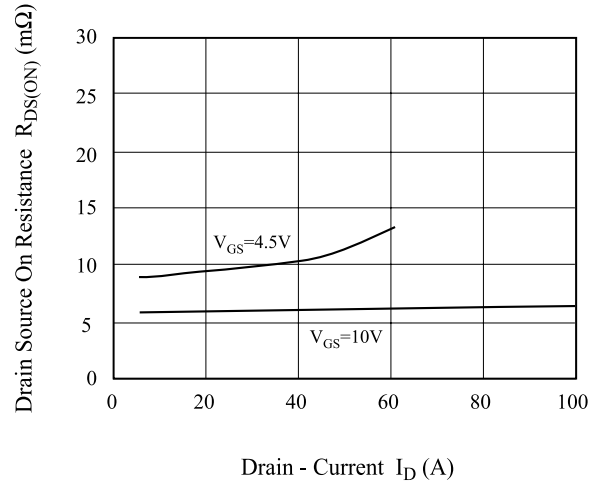


Fig3.  $I_D - V_{GS}$

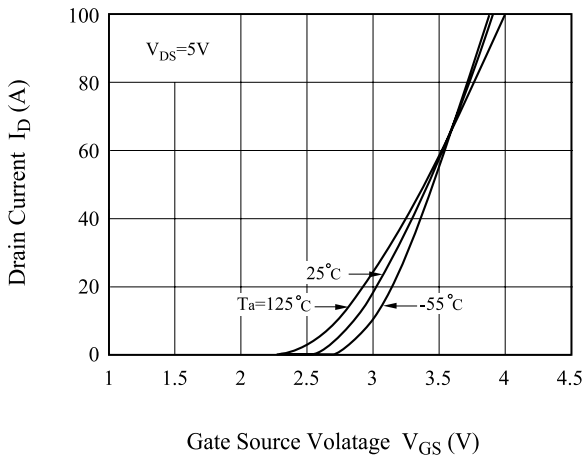


Fig4.  $R_{DS(on)} - T_j$

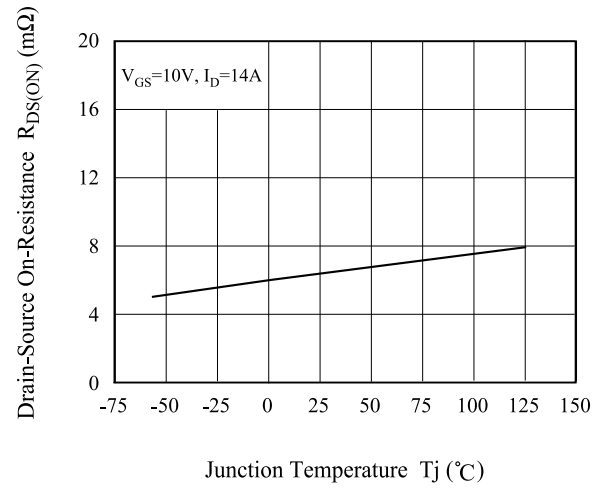


Fig5.  $V_{th} - T_j$

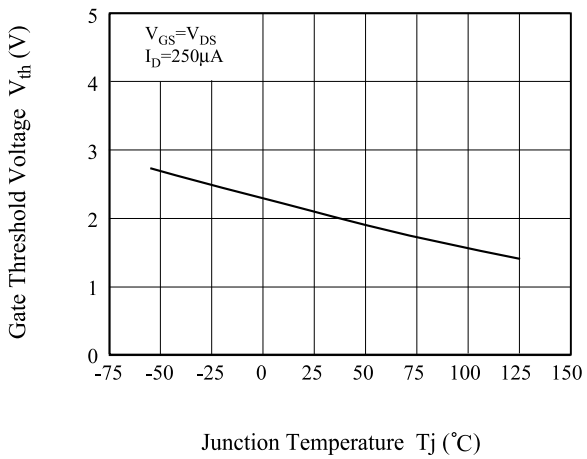
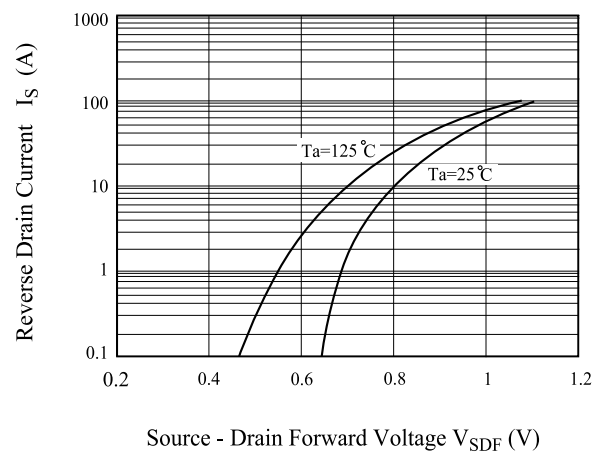


Fig6.  $I_S - V_{SDF}$



# KMB054N40DB

Fig 7.  $V_{GS} - Q_g$

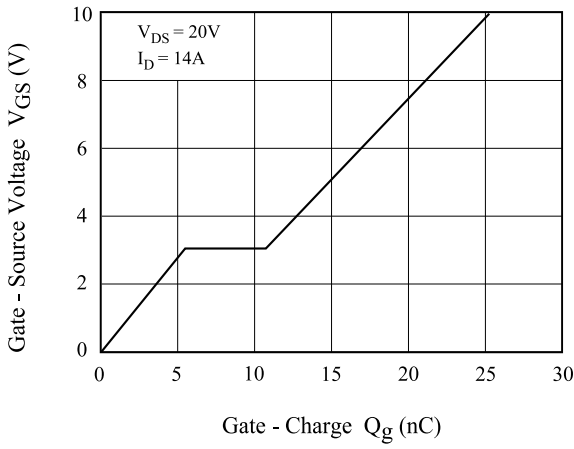


Fig 8.  $C - V_{DS}$

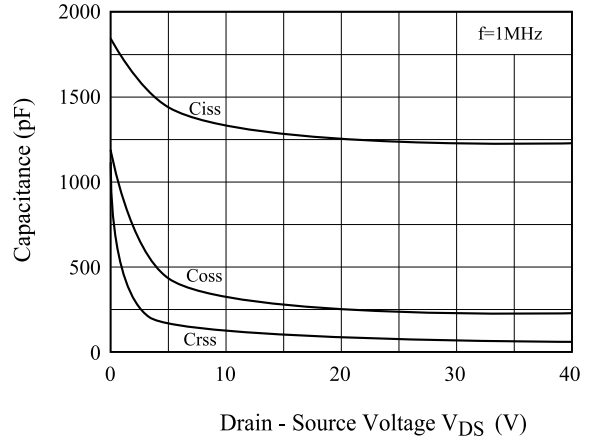


Fig9. Safe Operation Area

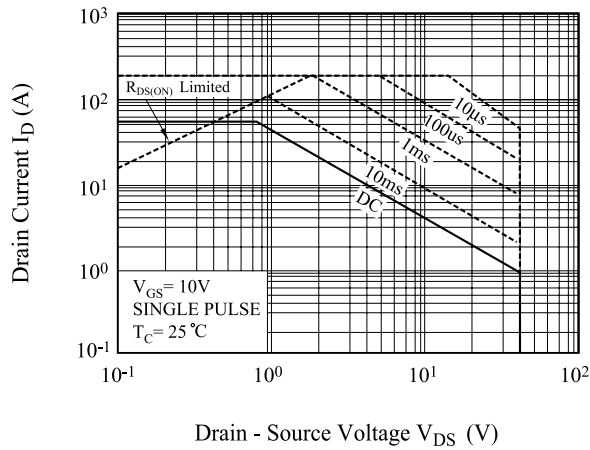
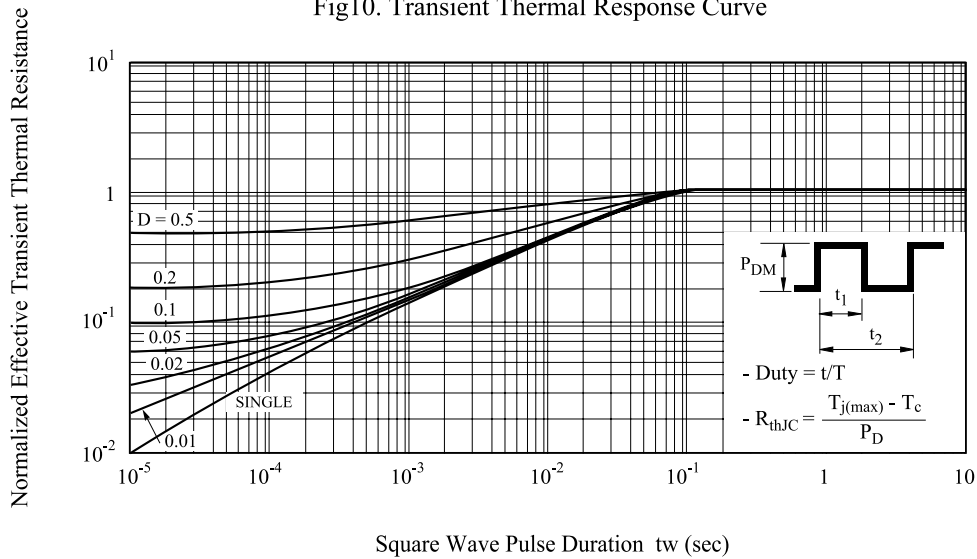


Fig10. Transient Thermal Response Curve



# KMB054N40DB

Fig11. Gate Charge Circuit and Wave Form

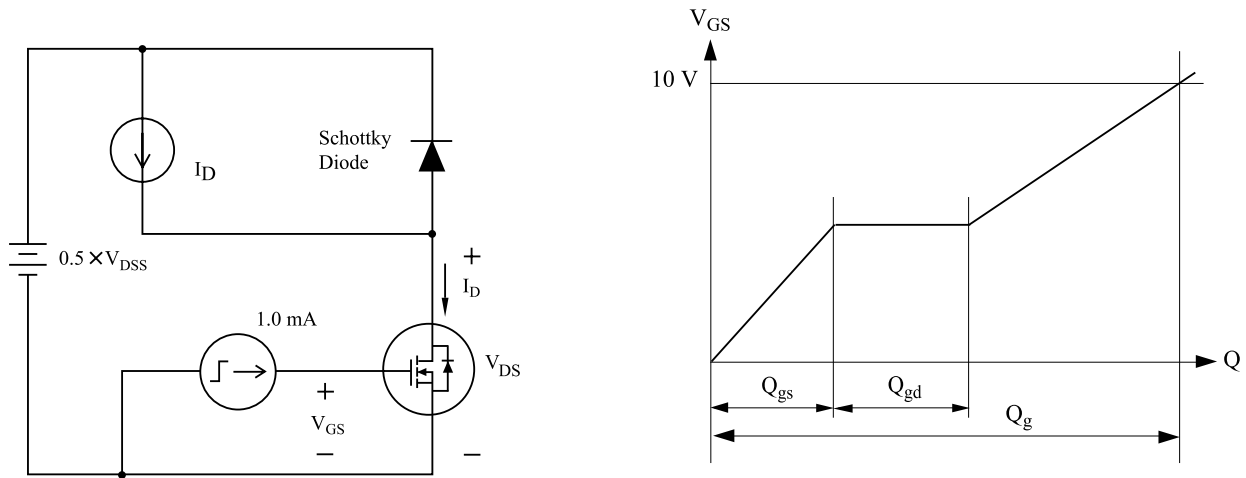


Fig12. Resistive Load Switching

