

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 DC/DC Converters.

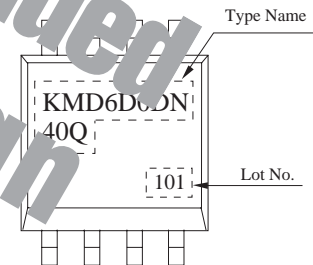
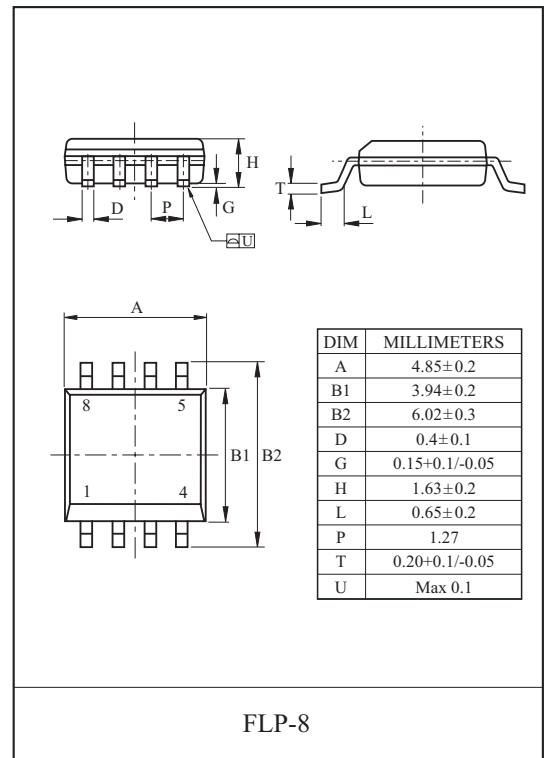
FEATURES

- $V_{DSS}=40V$, $I_D=6A$.
- Drain-Source ON Resistance.
 - $R_{DS(ON)}=38m\Omega$ (Max.) @ $V_{GS}=10V$
 - $R_{DS(ON)}=50m\Omega$ (Max.) @ $V_{GS}=4.5V$
- Super High Dense Cell Design
- Very fast switching

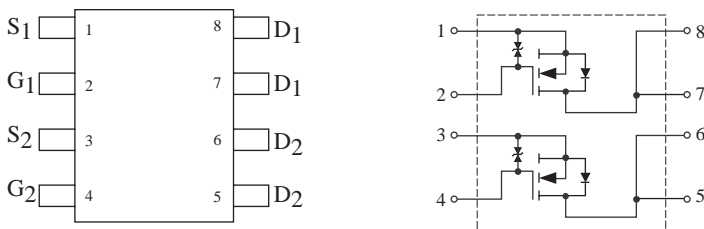
MAXIMUM RATING (Ta=25°C unless otherwise noted)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain Source Voltage	V_{DSS}	40	V
Gate Source Voltage	V_{GSS}	±14	V
Drain Current	$T_a=25^\circ C$	I_D^*	6
	Pulsed(Note1)	I_{DP}	24
Peak Diode Recovery dv/dt (Note 2)	dv/dt	4.5	V/ns
Peak Diode Recovery di/dt	di/dt	2.7	A/us
Single pulsed Avalanche Energy (Note 3)	E_{AS}	66	mJ
Repetitive Avalanche Energy (Note 1)	E_{AR}	2.7	mJ
Drain Power Dissipation	P_D^*	2.0	W
Maximum Junction Temperature	T_j	-50~150	°C
Storage Temperature Range	T_{stg}	-50~150	°C
Thermal Resistance, Junction to Ambient	R_{thJA}^*	62.5	°C/W

* : Surface Mounted on FR4 Board (25mm×25mm, 1.5t, t≤10sec)



PIN CONNECTION (TOP VIEW)



KMD6D0DN40Q

ELECTRICAL CHARACTERISTICS (T_j=25 °C) UNLESS OTHERWISE NOTED

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	40	-	-	V
Drain Cut-off Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	1	μA
Gate Leakage Current	I _{GSS}	V _{GS} =± 12V, V _{DS} =0V	-	-	± 10	μA
Gate Threshold Voltage	V _{th}	V _{DS} =V _{GS} , I _D =250μA	1.0	2.0	2.5	V
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} =10.0V, I _D =6A	-	27	38	mΩ
		V _{GS} =4.5V, I _D =5A	-	35	50	
Forward Transconductance	g _{fs}	V _{DS} =10V, I _D =6A(Note4, 5)	-	10	-	S
Dynamic						
Input Capacitance	C _{iss}	V _{DS} =15V, f=1MHz, V _{GS} =0V	-	460	-	pF
Output Capacitance	C _{oss}		-	80	-	
Reverse Transfer Capacitance	C _{rss}		-	50	-	
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =10V, I _D =6A (Note4, 5)	-	8.0	-	nC
Gate-Source Charge	Q _{gs}		-	1.5	-	
Gate-Drain Charge	Q _{gd}		-	2.0	-	
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =5V, I _D =6A (Note4, 5)	-	4.1	-	nC
Turn-On Delay Time	t _{d(on)}	V _{DD} =20V, V _{GS} =10V, I _D =6A, R _G =6Ω (Note4, 5)	-	12	-	ns
Turn-On Rise Time	t _r		-	8	-	
Turn-Off Delay Time	t _{d(off)}		-	-	-	
Turn-Off Fall Time	t _f		-	6	-	
Source-Drain Diode Ratings						
Source-Drain Forward Voltage	V _{SDF}	I _{DR} =6A, V _{GS} =0V	-	0.87	1.2	V

Note1) Repetivity rating : Pulse width Limited by junction temperature.

Note2) I_S ≤ 6A, dI/dt ≤ 100A/μs, V_{DD} ≤ BV_{DSS}, Starting T_j = 25 °C.

Note3) L = 1mH, I_{AS} = 6A, V_{DD} = 32V, R_G = 25Ω, Starting T_j = 25 °C.

Note4) Pulse test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

Note5) Essentially independent of operating temperature.

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Fig1. $I_D - V_{DS}$

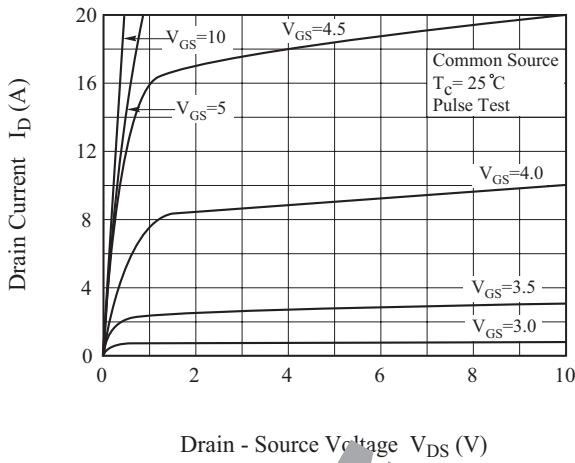


Fig2. $R_{DS(on)} - I_D$

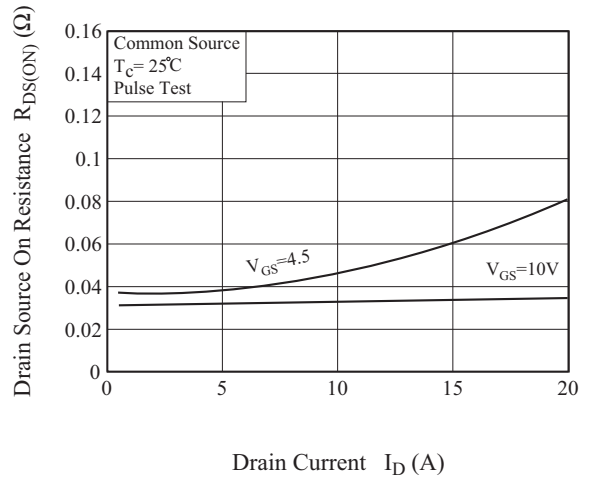


Fig3. $I_D - V_{GS}$

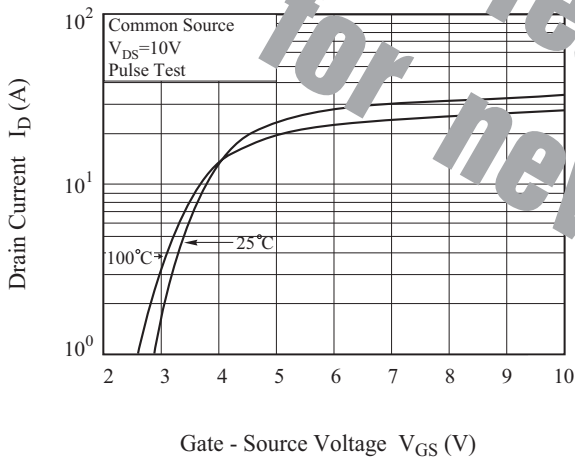


Fig4. $R_{DS(on)} - T_j$

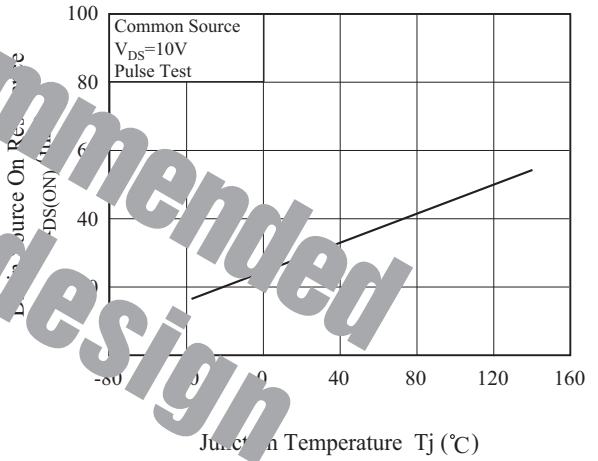


Fig5. $V_{th} - T_j$

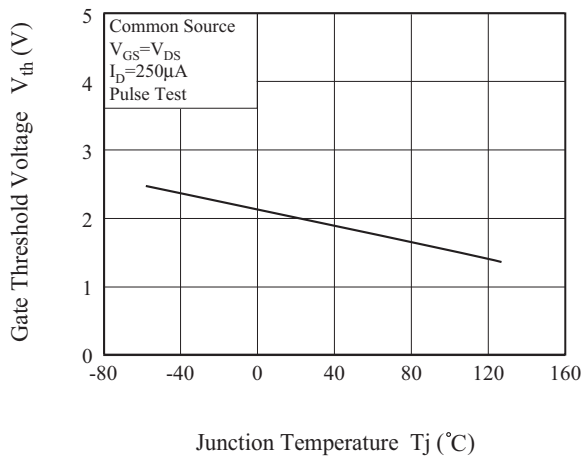
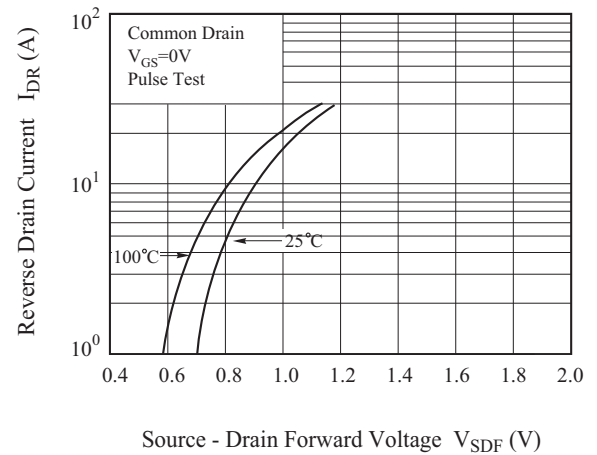


Fig6. $I_{DR} - V_{SDF}$



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Fig7. Qg - V_{GS}

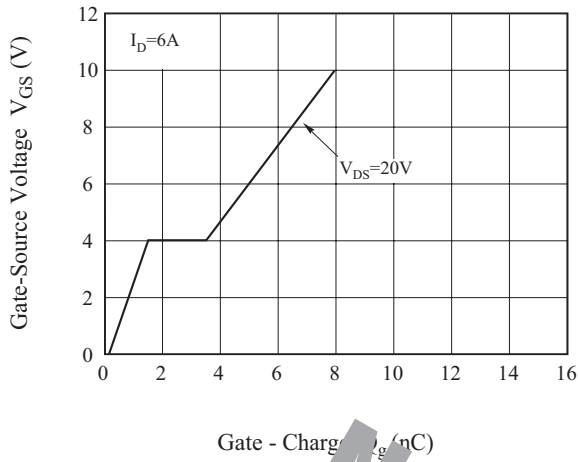


Fig8. Safe Operation Area

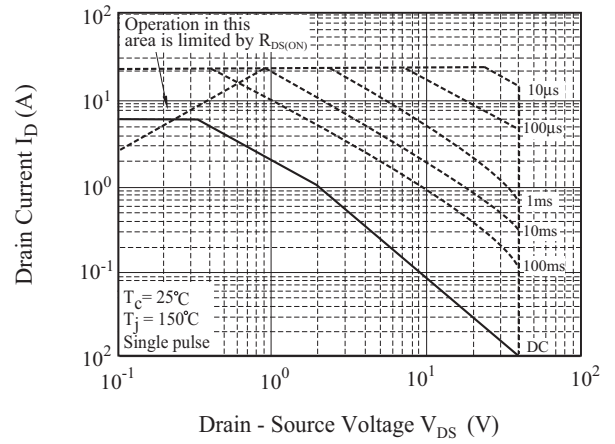
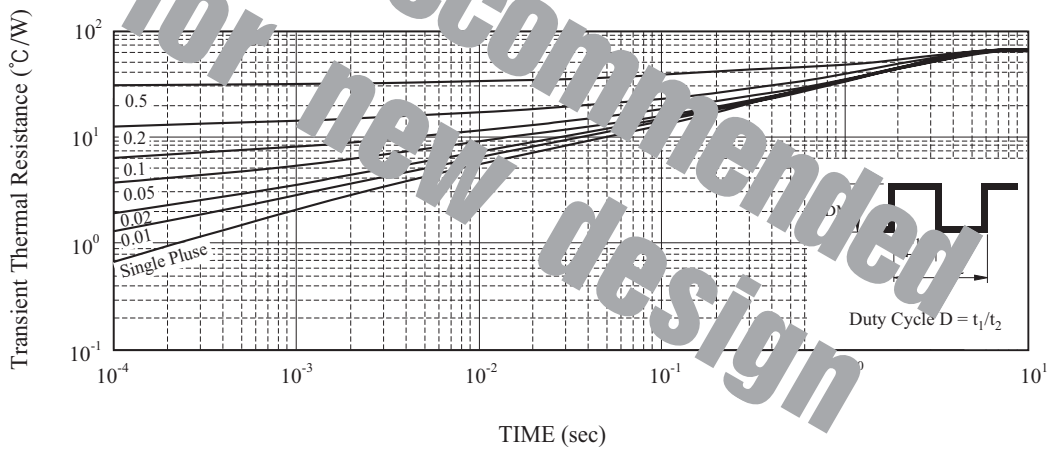


Fig9. Transient Thermal Response Curve



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Fig. 10 Gate Charge

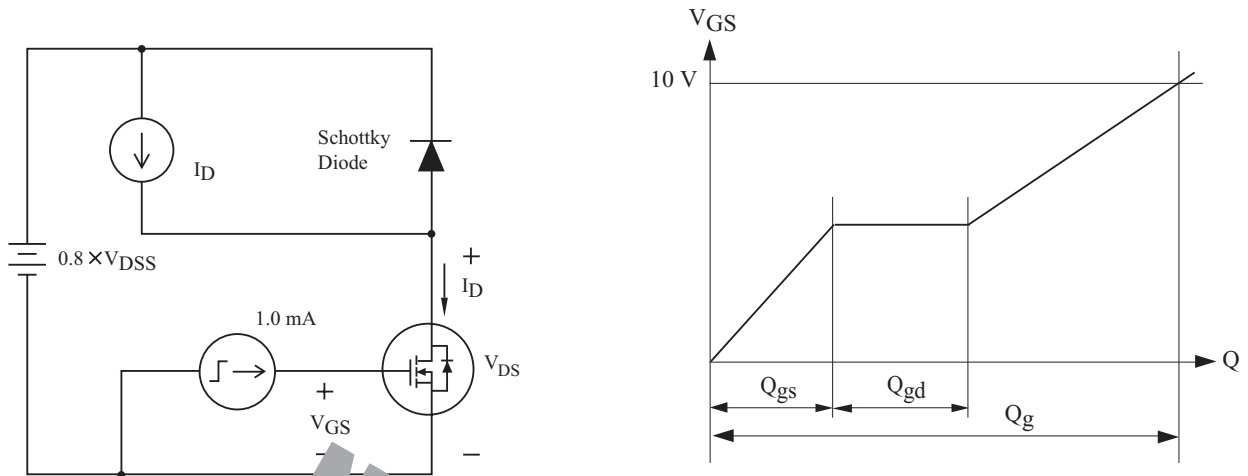


Fig. 11 Resistive Load Switching

