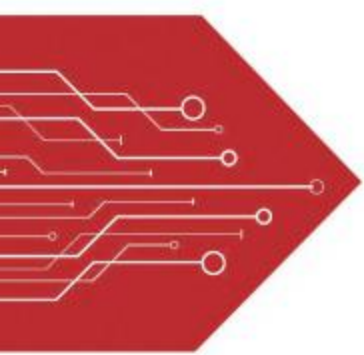


MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT

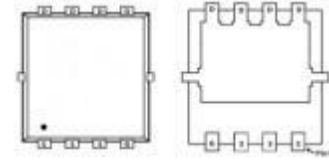


PLED

Product data sheet

Description

The MSK50P03NF uses advanced trench technology excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a load switch or in PWM applications.



General Features

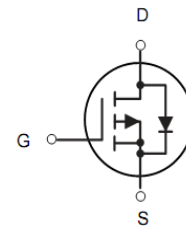
$V_{DS} = -30V, I_D = -50A$
 $R_{DS(ON)} < 18m\Omega @ V_{GS} = -4.5V$
 $R_{DS(ON)} < 13m\Omega @ V_{GS} = -10V$

High Power and current handling capability
 Lead free product is acquired
 Surface mount package

Application

PWM applications
 Load switch
 Power management

DFN5X6-8L



P-Channel MOSFET

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	-30	V
Gate-Source Voltage	V _{GS}	±20	V
Drain Current-Continuous ($T_C = 25^\circ C$)	I _D	-50	A
Drain Current-Continuous ($T_C = 100^\circ C$)		-24	
Drain Current-Pulsed (Note 1)	I _{DM}	-80	A
Maximum Power Dissipation ($T_C = 25^\circ C$)	P _D	3	W
Maximum Power Dissipation ($T_C = 100^\circ C$)		1.3	
Single pulse avalanche energy (Note 5)	E _{AS}	231	mJ
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 To 150	°C
Thermal Resistance, Junction-to-Ambient (Note 2)	R _{θJA}	41.67	°C/W

Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-30	-33	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-30V, V _{GS} =0V	-	-	-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.5	-3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-10A	-	11.5	15	mΩ
		V _{GS} =-4.5V, I _D =-7A	-	18	25	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-10V, I _D =-10A	-	20	-	S
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, F=1.0MHz	-	1750	-	PF
Output Capacitance	C _{oss}		-	215	-	PF
Reverse Transfer Capacitance	C _{rss}		-	180	-	PF
Turn-on Delay Time	t _{d(on)}	V _{DD} =-15V, I _D =-10A, V _{GS} =-10V, R _{GEN} =1Ω	-	9	-	nS
Turn-on Rise Time	t _r		-	8	-	nS
Turn-Off Delay Time	t _{d(off)}		-	28	-	nS
Turn-Off Fall Time	t _f		-	10	-	nS
Total Gate Charge	Q _g	V _{DS} =-15V, I _D =-10A, V _{GS} =-10V	-	24	-	nC
Gate-Source Charge	Q _{gs}		-	3.5	-	nC
Gate-Drain Charge	Q _{gd}		-	6	-	nC
Diode Forward Current ^(Note 2)	I _s		-	-	-12	A
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V, I _s =-12A	-	-	-1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: T_j=25°C, V_{DD}=-15V, V_G=10V, L=0.5mH, R_g=25Ω, I_{AS}=-34A

Typical Electrical and Thermal Characteristics

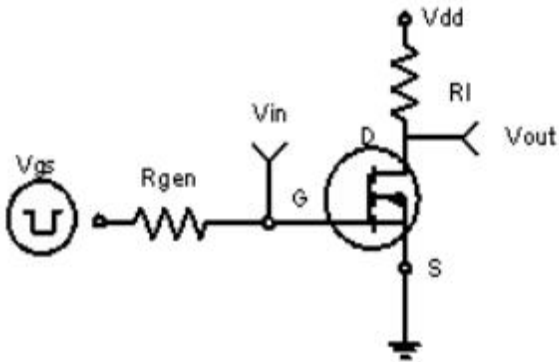


Figure 1: Switching Test Circuit

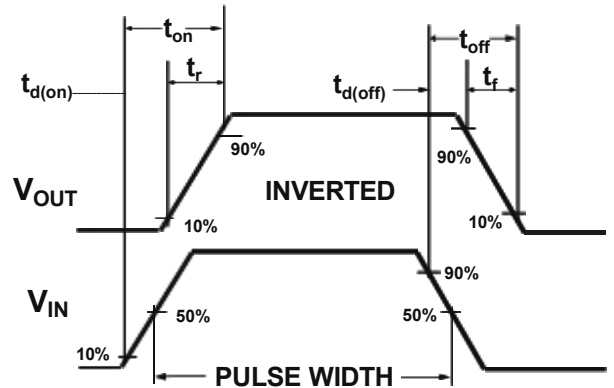
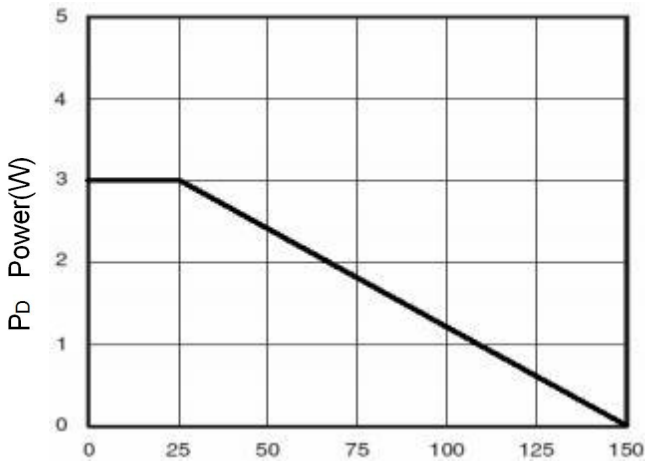
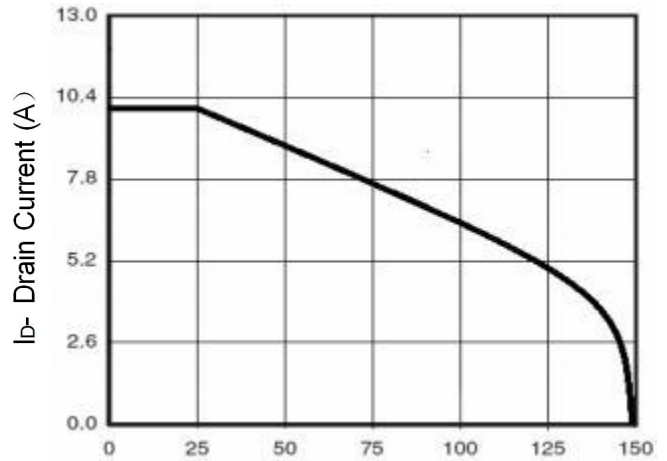


Figure 2: Switching Waveforms



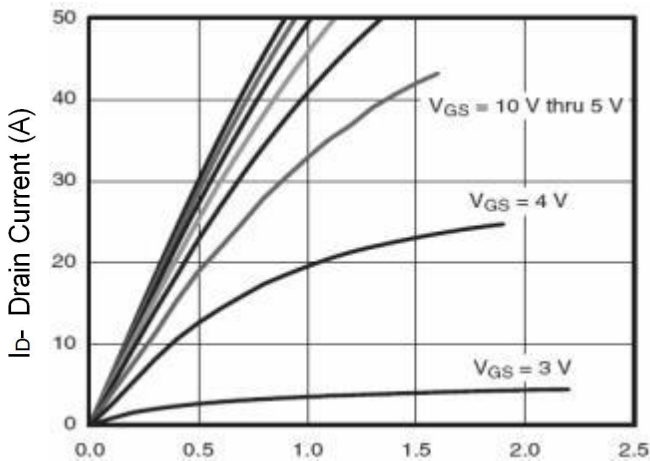
T_J-Junction Temperature(°C)

Figure 3 Power Dissipation



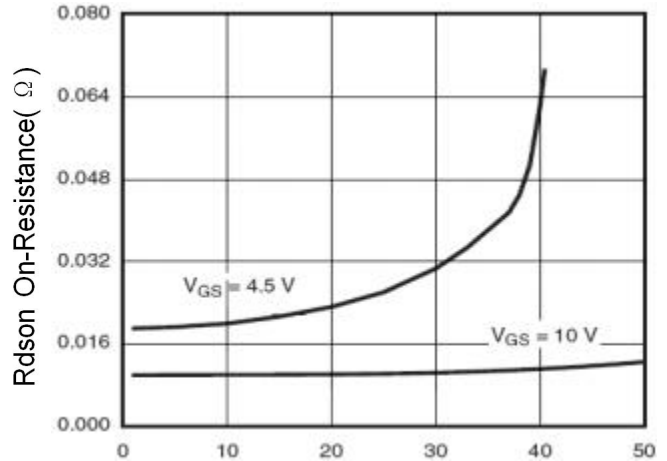
T_J-Junction Temperature(°C)

Figure 4 Drain Current



V_{ds} Drain-Source Voltage (V)

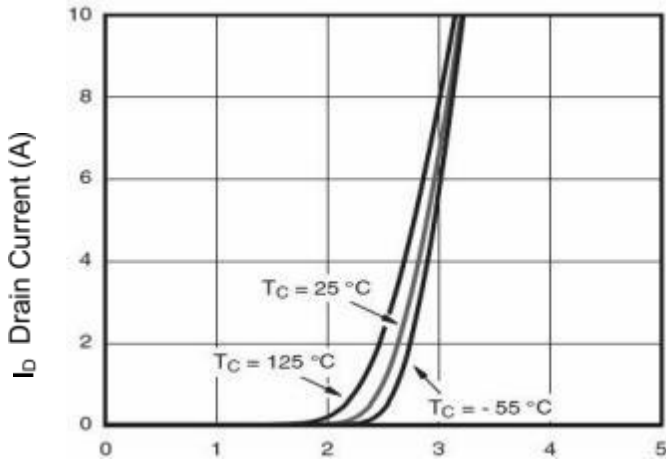
Figure 5 Output Characteristics



I_D- Drain Current (A)

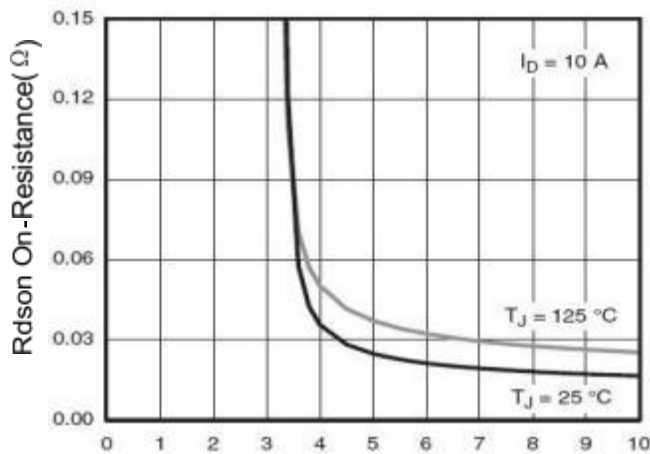
Figure 6 Drain-Source On-Resistance

Figure 5 Output Characteristics



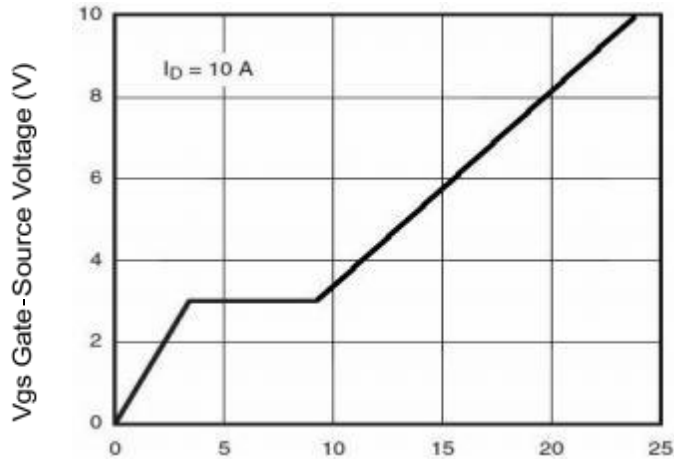
V_{GS} Gate-Source Voltage (V)

Figure 7 Transfer Characteristics



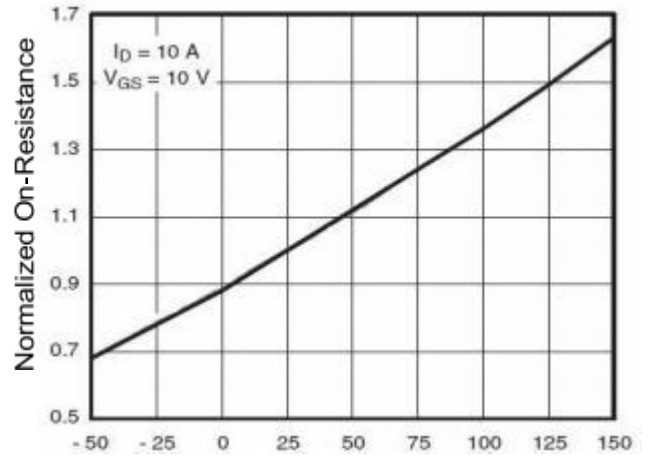
V_{GS} Gate-Source Voltage (V)

Figure 9 Rdson vs Vgs



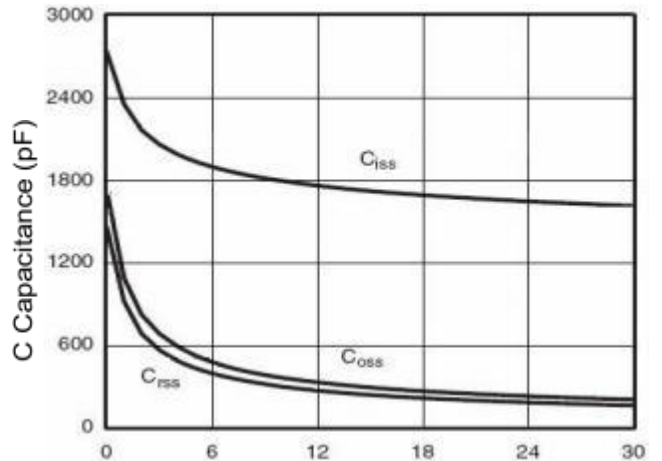
Q_g Gate Charge (nC)

Figure 11 Gate Charge



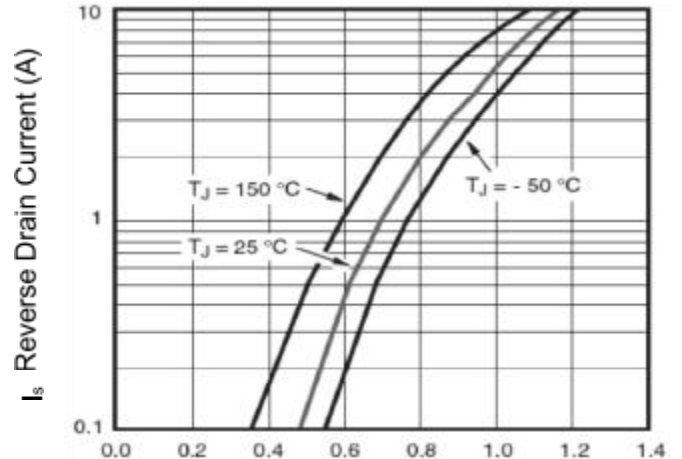
T_J -Junction Temperature ($^\circ\text{C}$)

Figure 8 Drain-Source On-Resistance



V_{DS} Drain-Source Voltage (V)

Figure 10 Capacitance vs Vds



V_{SD} Source-Drain Voltage (V)

Figure 12 Source- Drain Diode Forward

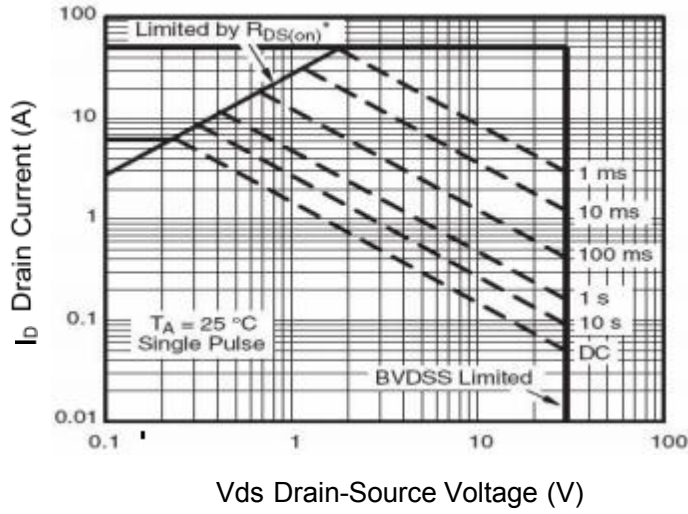


Figure 13 Safe Operation Area

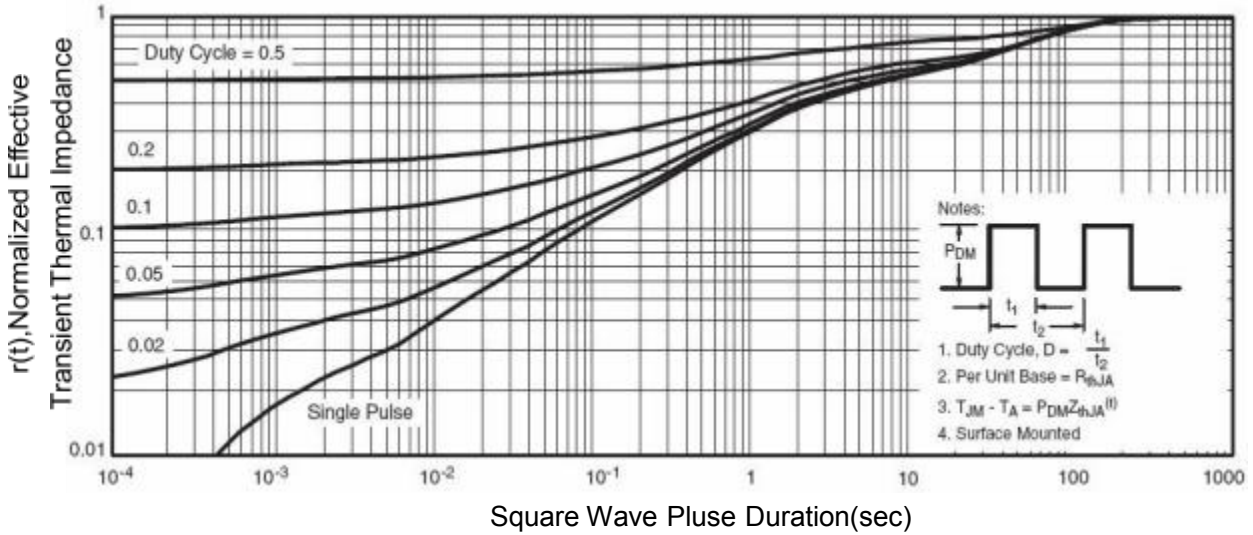
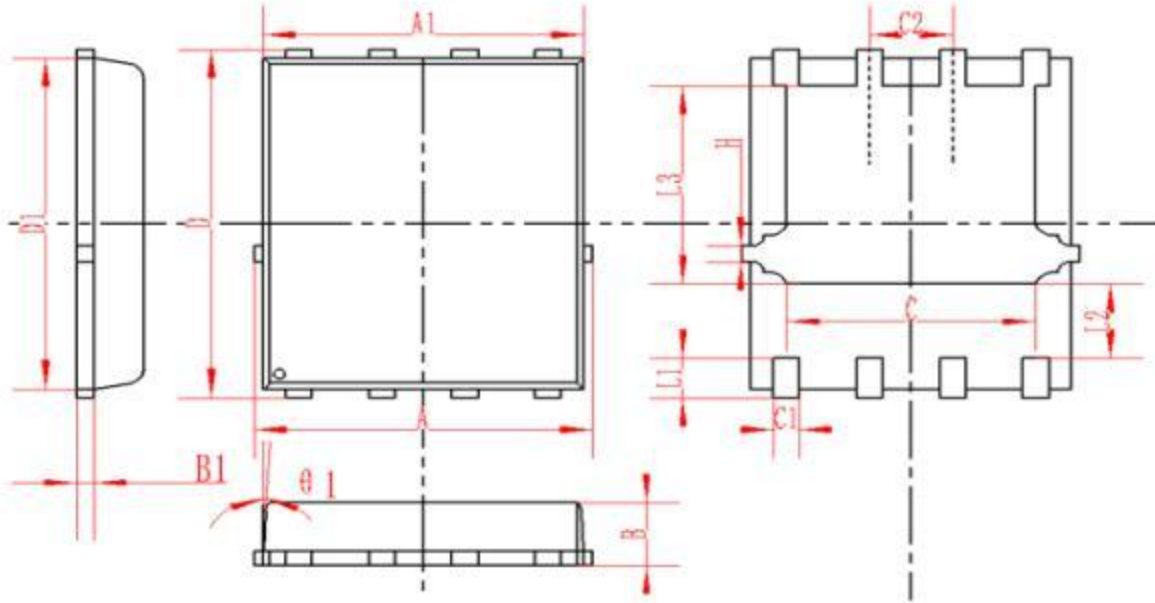


Figure 14 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
theta 1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010

REEL SPECIFICATION

P/N	PKG	QTY
MSK50P03NF	DFN5X6-8L	5000

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