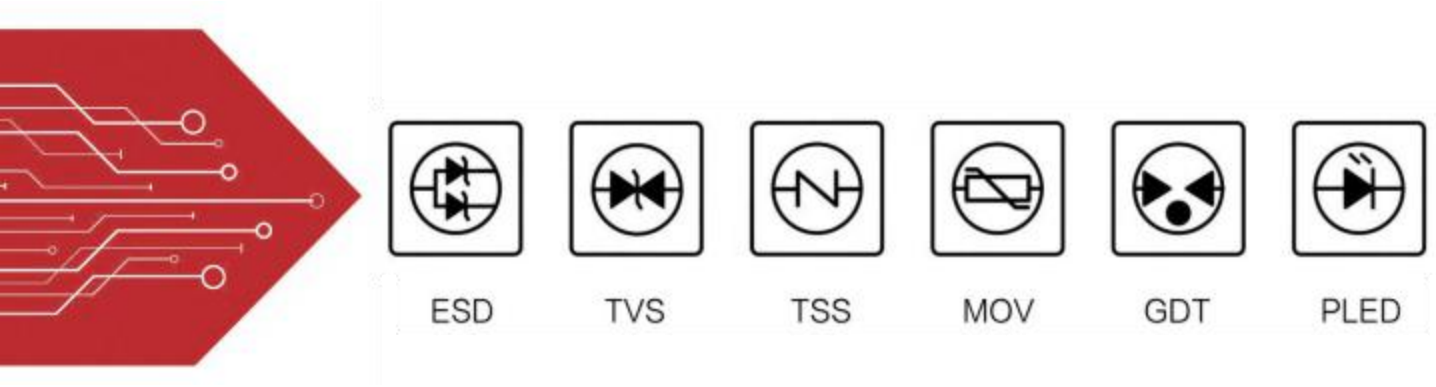
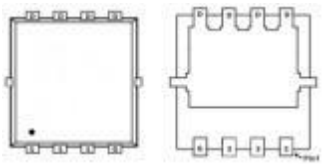
MSKSEMI
SEMICONDUCTOR



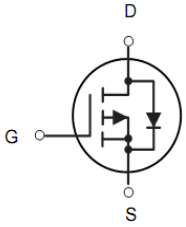
Product data sheet

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 aload switch or in PWM applications.



DFN5X6-8L



P-Channel MOSFET

General Features

V_{DS} = -30V,I_D = -50A

$R_{DS(ON)}$ < 18mΩ @ V_{GS}=-4.5V

$R_{DS(ON)}$ < 13mΩ @ V_{GS}=-10V

High Power and current handing capability

Lead free product is acquired

Surface mount package

Application

PWM applications

Load switch

Power management

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	VDS	-30	V
Gate-Source Voltage	VGS	±20	V
Drain Current-Continuous (T_C=25℃)	I_D	-50	A
Drain Current-Continuous (T_C=100℃)		-24	
Drain Current-Pulsed (Note 1)	IDM	-80	A
Maximum Power Dissipation (T_C=25℃)	P_D	3	W
Maximum Power Dissipation (T_C=100℃)		1.3	
Single pulse avalanche energy (Note 5)	EAS	231	mJ
Operating Junction and Storage Temperature Range	TJ,TSTG	-55 To 150	℃
Thermal Resistance,Junction-to-Ambient (Note 2)	RθJA	41.67	℃/W

Electrical Characteristics (T_A=25℃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	IDSS	V_{DS}=-30V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	IGSS	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	V_{DS}=V_{GS},I_D=-250μA	-1	-1.5	-3	V
Drain-Source On-State Resistance	RDS(ON)	V_{GS}=-10V, I_D=-10A	-	11.5	15	mΩ
		V_{GS}=-4.5V, I_D=-7A	-	18	25	mΩ
Forward Transconductance	gFS	V_{DS}=-10V,I_D=-10A	-	20	-	S
Input Capacitance	C_{lss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	1750	-	PF
Output Capacitance	Coss		-	215	-	PF
Reverse Transfer Capacitance	C_{rss}		-	180	-	PF
Turn-on Delay Time	td(on)	V_{DD}=-15V, ID=-10A, V_{GS}=-10V,R_{GEN}=1Ω	-	9	-	nS
Turn-on Rise Time	t_r		-	8	-	nS
Turn-Off Delay Time	td(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)	VSD	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: Tj=25℃,V_{DD}=-15V,V_G=10V,L=0.5mH,Rg=25Ω, I_{AS}=-34A

Typical Electrical and Thermal Characteristics

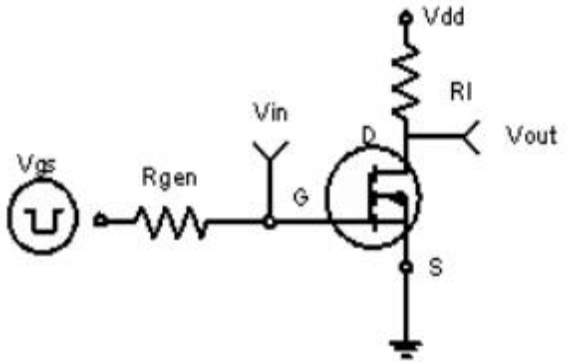


Figure 1:Switching Test Circuit

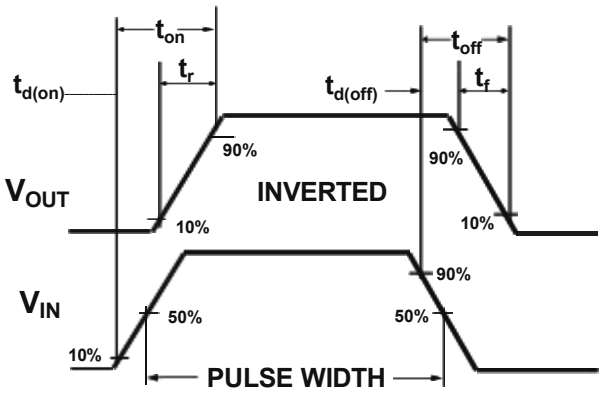
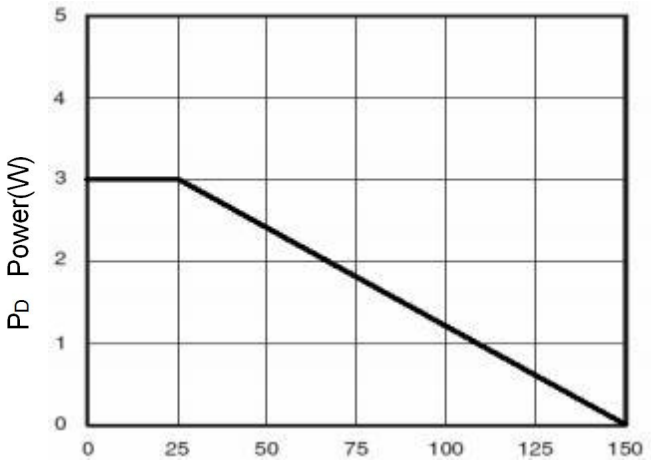
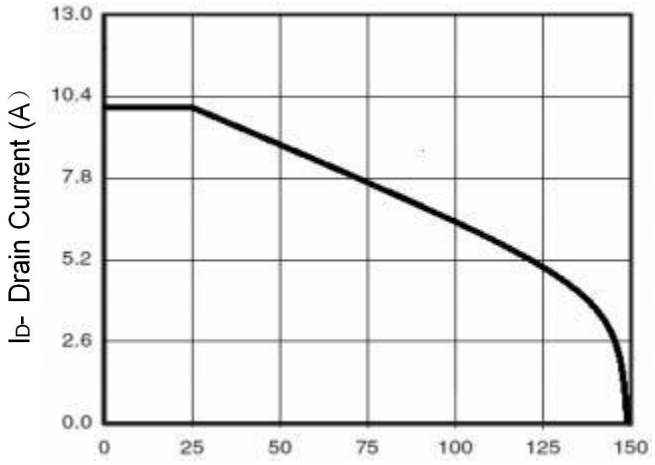


Figure 2:Switching Waveforms



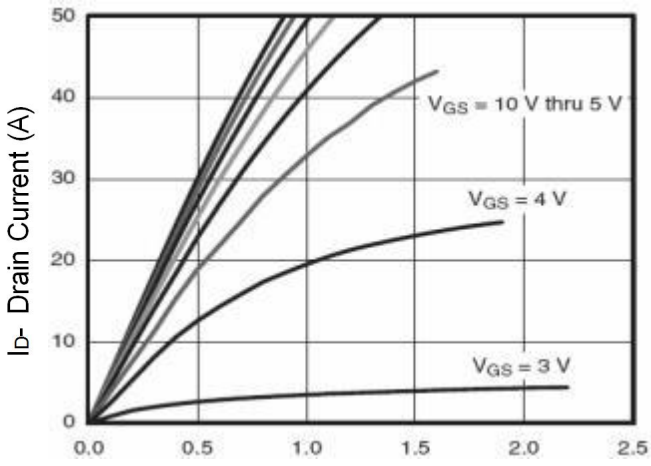
TJ-Junction Temperature(℃)

Figure 3 Power Dissipation



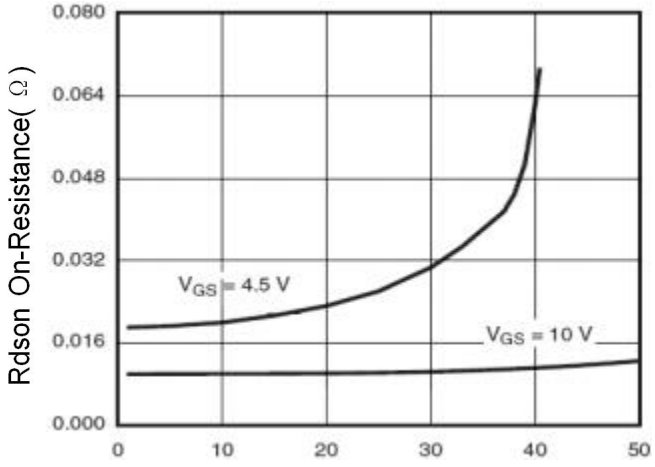
TJ-Junction Temperature(℃)

Figure 4 Drain Current



Vds Drain-Source Voltage (V)

Figure 5 Output Characteristics



ID- Drain Current (A)

Figure 6 Drain-Source On-Resistance

Figure 5 Output Characteristics

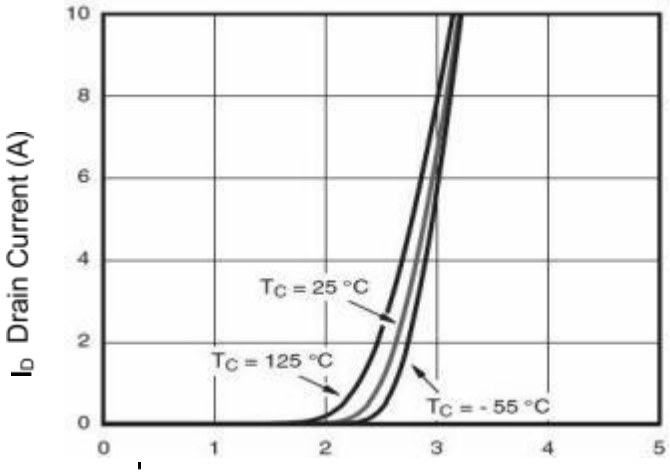


Figure 7 Transfer Characteristics

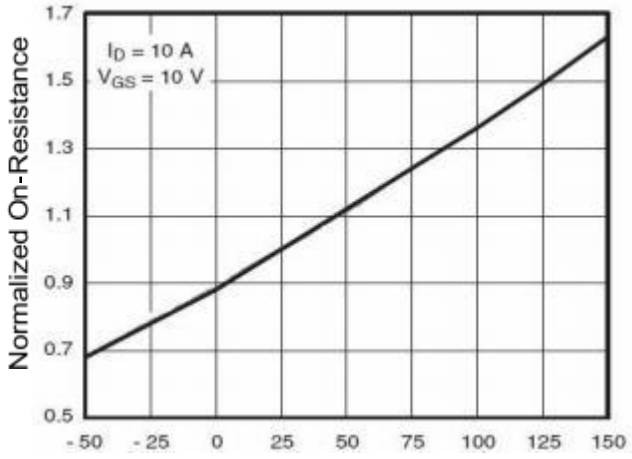


Figure 8 Drain-Source On-Resistance

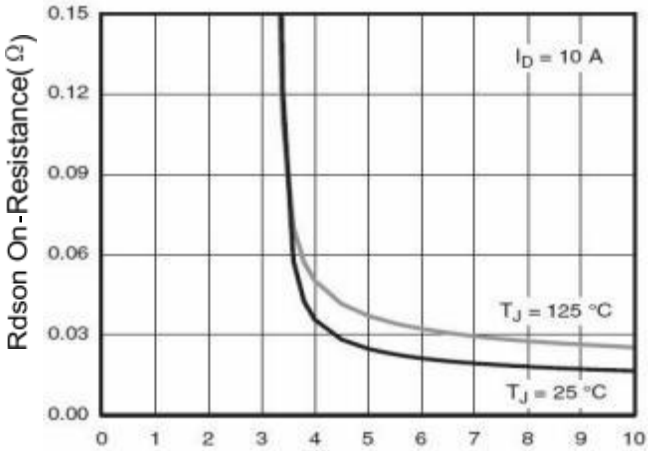


Figure 9 Rdson vs Vgs

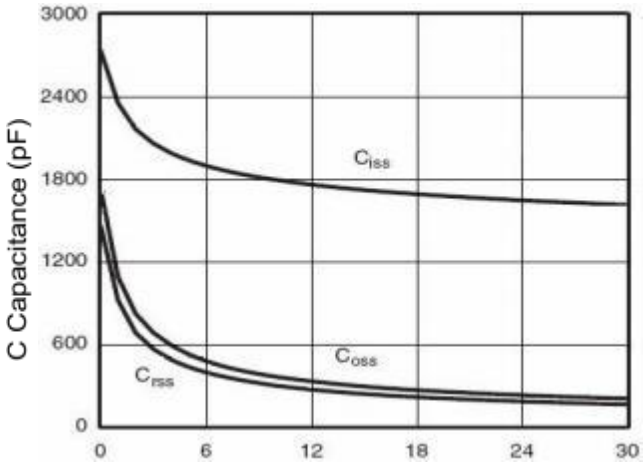


Figure 10 Capacitance vs Vds

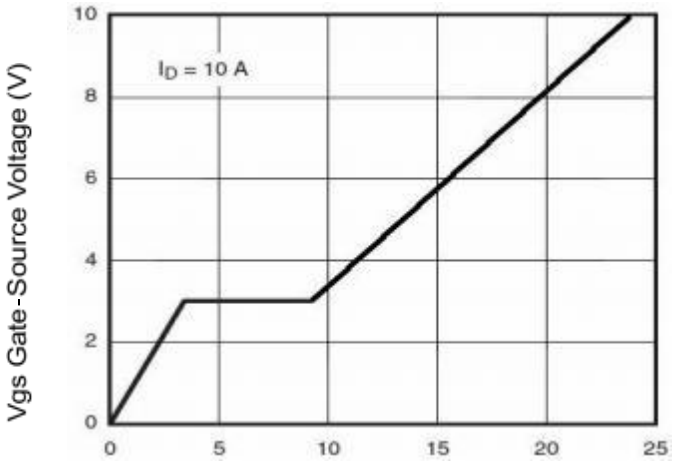


Figure 11 Gate Charge

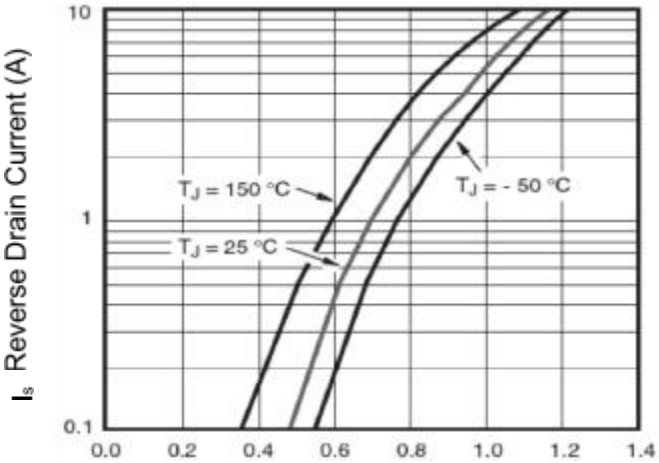
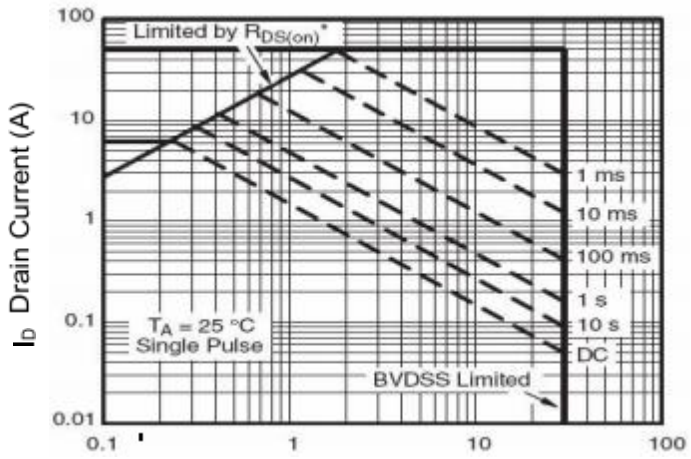
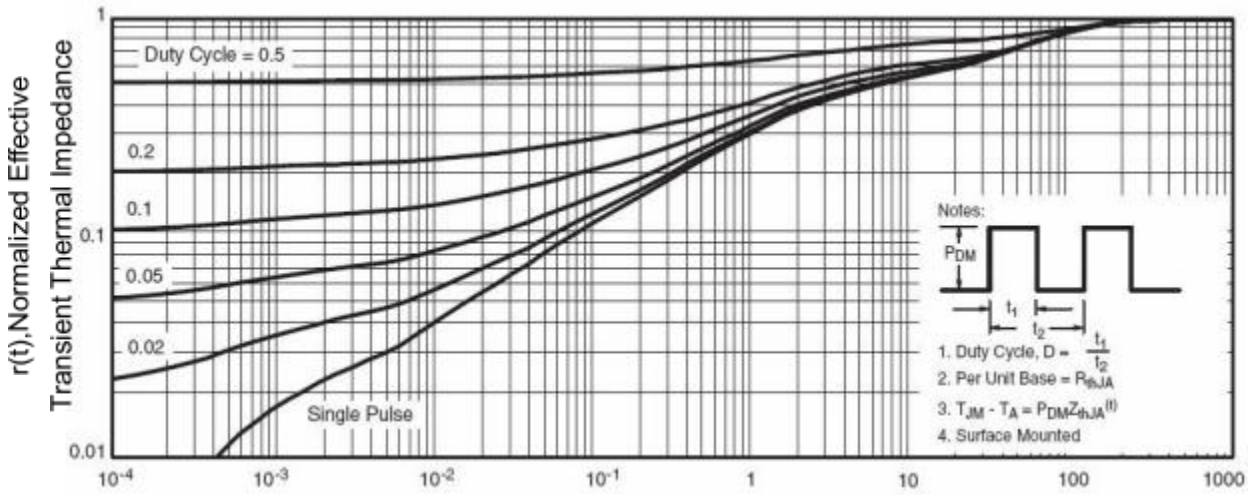


Figure 12 Source- Drain Diode Forward



Vds Drain-Source Voltage (V)

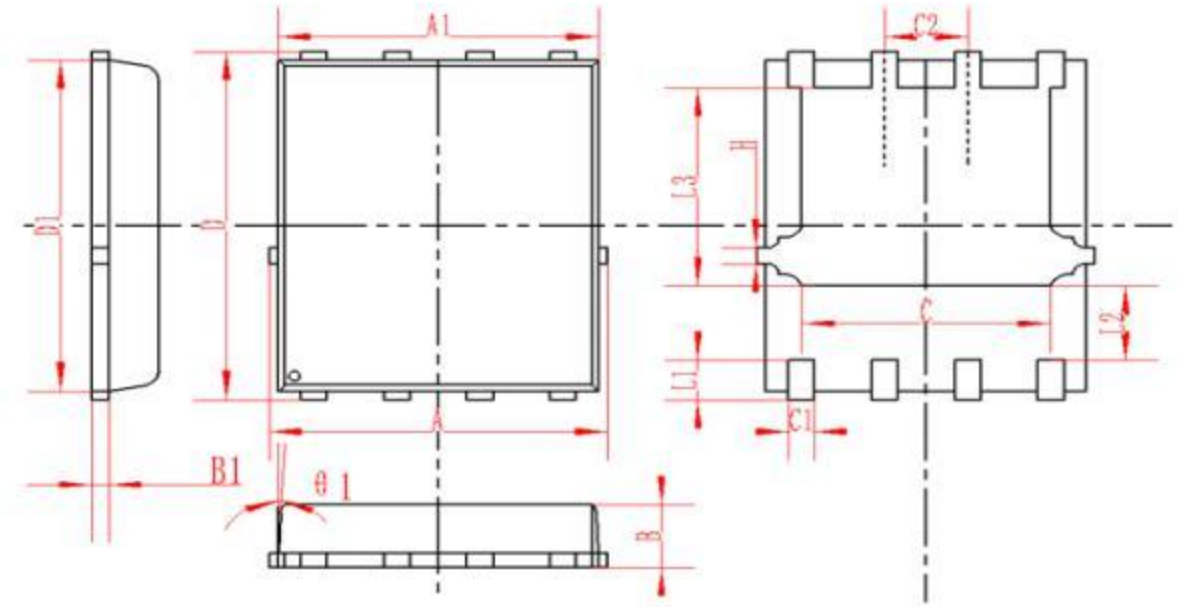
Figure 13 Safe Operation Area



Square Wave Pluse Duration(sec)

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		
θ1	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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