SamHop Microelectronics Corp.

SP3903

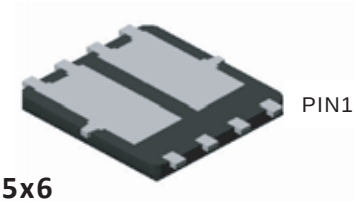
Ver 1.4

Dual N-Channel Enhancement Mode Field Effect Transistor

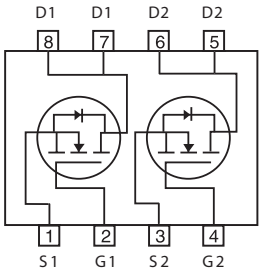
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
30V	7.5A	22 @ VGS=10V
		32 @ VGS=4.5V

FEATURES

- Super high dense cell design for low $R_{DS(ON)}$.
- Rugged and reliable.
- Suface Mount Package.



PDFN 5x6



ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise noted)

Symbol	Parameter		Limit	Units
V_{DS}	Drain-Source Voltage		30	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Drain Current-Continuous	T_A=25°C	7.5 [a]	A
		T_A=70°C	6 [a]	A
		T_C=25°C	21.5 [e]	A
		T_C=100°C	13.6 [e]	A
I_{DM}	-Pulsed [b]		31	A
E_{AS}	Single Pulse Avalanche Energy [d]		49	mJ
P_D	Maximum Power Dissipation	T_A=25°C	2.5 [a]	W
		T_A=70°C	1.6 [a]	W
		T_C=25°C	20.8	W
		T_C=100°C	8.3	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		-55 to 150	°C

THERMAL CHARACTERISTICS

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	6	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient [a]	50	°C/W

ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V , V_{GS}=0V			1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS}= ±20V , V_{DS}=0V			±100	nA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=250uA	1.4	1.7	2.3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V , I_D=3.75A		16	22	m ohm
		V_{GS}=4.5V , I_D=3.1A		23	32	m ohm
g_{FS}	Forward Transconductance	V_{DS}=5V , I_D=3.75A		13		S
DYNAMIC CHARACTERISTICS [c]						
C_{ISS}	Input Capacitance	V_{DS}=15V,V_{GS}=0V f=1.0MHz		360		pF
C_{OSS}	Output Capacitance			90		pF
C_{RSS}	Reverse Transfer Capacitance			70		pF
SWITCHING CHARACTERISTICS [c]						
$t_{D(ON)}$	Turn-On Delay Time	V_{DD}=15V I_D=1A V_{GS}=10V R_{GEN}=6 ohm		10		ns
t_r	Rise Time			12.6		ns
$t_{D(OFF)}$	Turn-Off Delay Time			17		ns
t_f	Fall Time			8.3		ns
Q_g	Total Gate Charge	V_{DS}=15V,I_D=3.75A,V_{GS}=10V		7		nC
		V_{DS}=15V,I_D=3.75A,V_{GS}=4.5V		4		nC
Q_{gs}	Gate-Source Charge	V_{DS}=15V,I_D=3.75A, V_{GS}=4.5V		1		nC
Q_{gd}	Gate-Drain Charge			2.3		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=2A		0.8	1.2	V

Notes

a.Surface Mounted on FR4 Board,t ≤ 10sec.
b.Pulse Test:Pulse Width ≤ 300us, Duty Cycle ≤ 2%.
c.Guaranteed by design, not subject to production testing.
d.Starting T_J=25°C,L=0.5mH,V_{DD} = 20V.(See Figure13)
e.Drain current limited by maximum junction temperature.

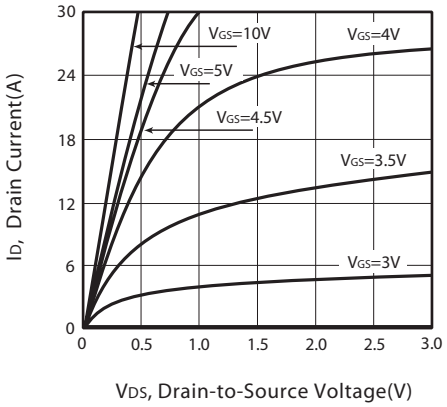


Figure 1. Output Characteristics

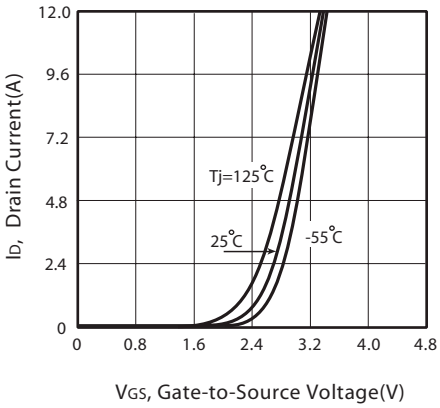


Figure 2. Transfer Characteristics

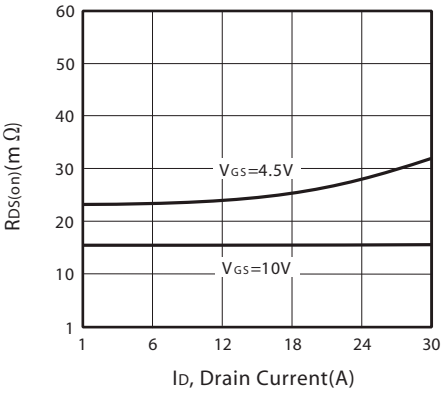


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

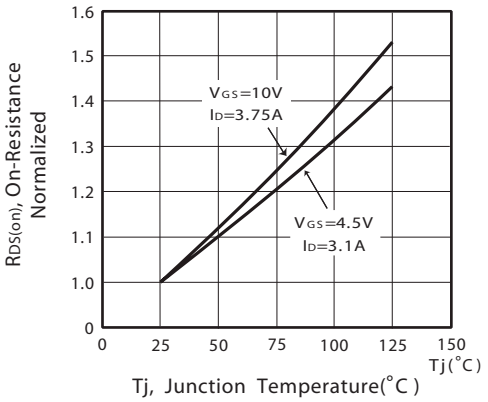


Figure 4. On-Resistance Variation with Drain Current and Temperature

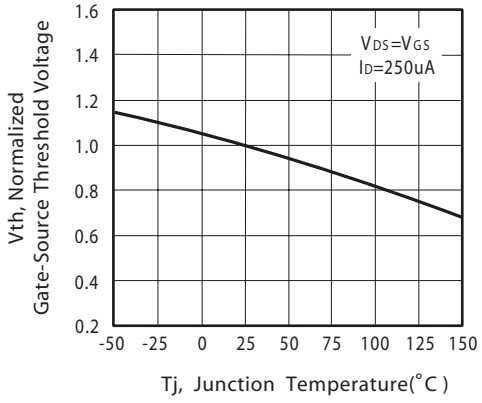


Figure 5. Gate Threshold Variation with Temperature

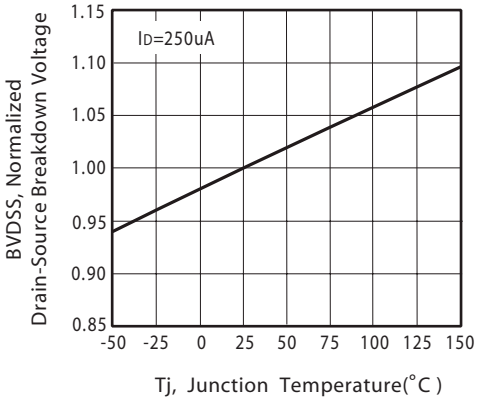


Figure 6. Breakdown Voltage Variation with Temperature

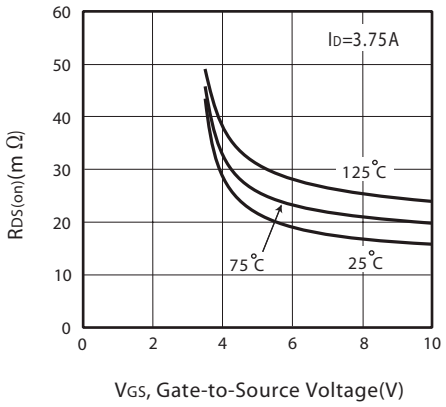


Figure 7. On-Resistance vs. Gate-Source Voltage

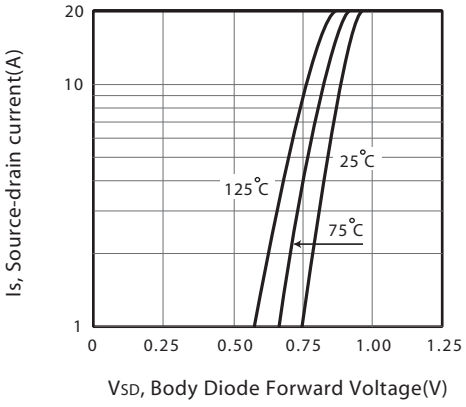


Figure 8. Body Diode Forward Voltage Variation with Source Current

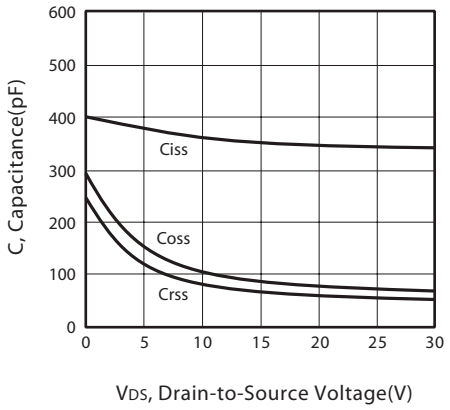


Figure 9. Capacitance

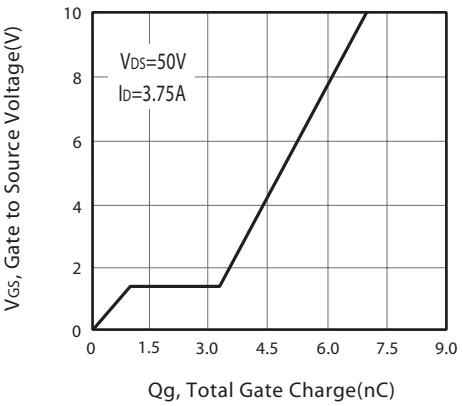


Figure 10. Gate Charge

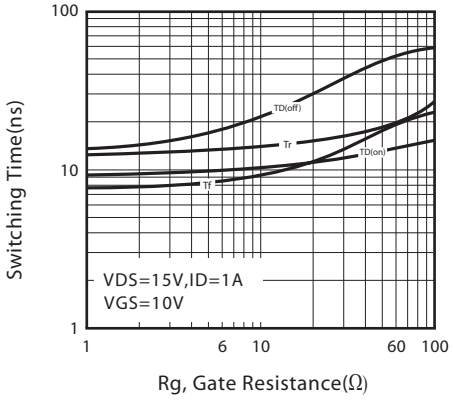


Figure 11. switching characteristics

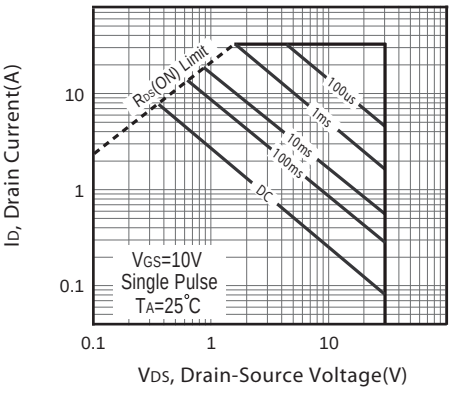
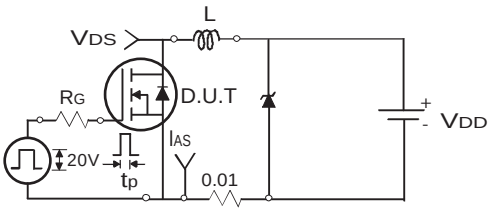
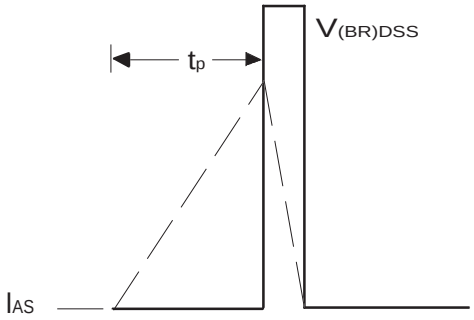


Figure 12. Maximum Safe Operating Area



Uncamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

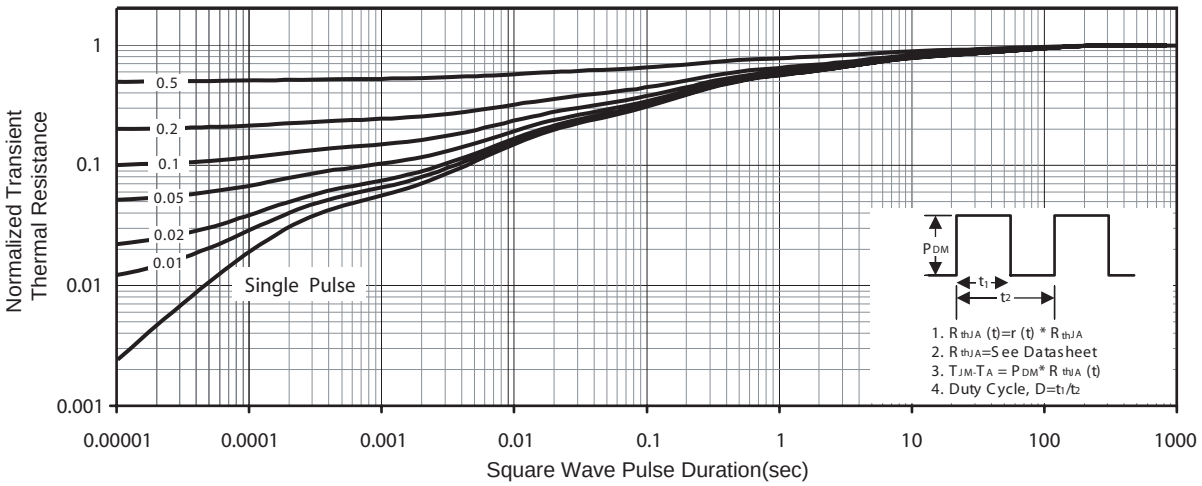
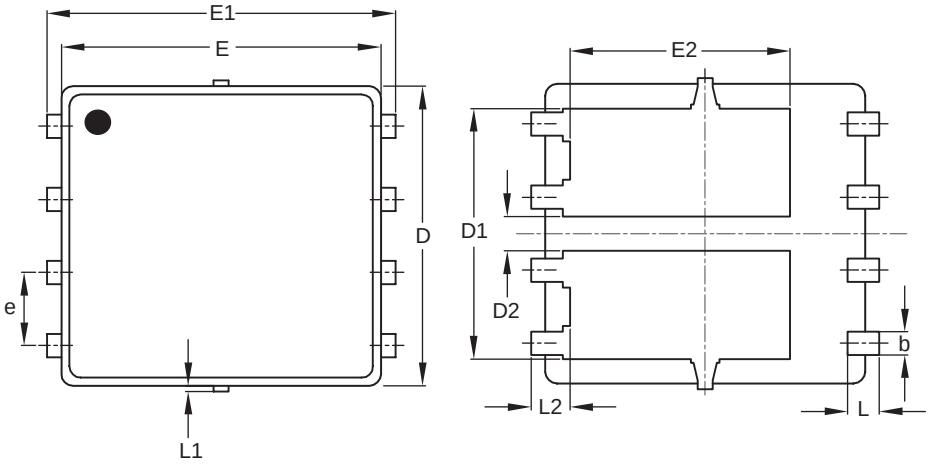


Figure 14. Normalized Thermal Transient Impedance Curve

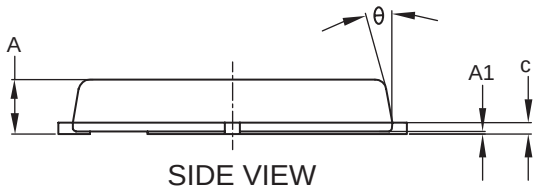
PACKAGE OUTLINE DIMENSIONS

PDFN 5x6-8L



TOP VIEW

BOTTOM VIEW



SIDE VIEW

SYMBOLS	MILLIMETERS		
	MIN	NOM	MAX
A	0.80	0.90	1.00
A1	0.00	—	0.05
b	0.30	0.40	0.50
c	0.15	0.20	0.25
D		5.20 BSC	
D1		4.35 BSC	
D2	0.50	0.60	0.75
E		5.55 BSC	
E1		6.05 BSC	
E2		3.82 BSC	
e		1.27 BSC	
L	0.45	0.55	0.65
L1	0.00	—	0.15
L2		0.68 REF	
θ	0°	—	10°

TOP MARKING DEFINITION

PDFN 5x6-8L