SamHop Microelectronics Corp.

SP3900

Ver 1.1

Dual N-Channel Enhancement Mode Field Effect Transistor

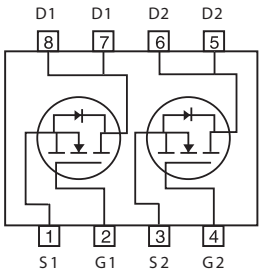
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
30V	4.5A	42 @ VGS=10V
		74 @ VGS=4.5V

FEATURES

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

DFN 3x3

PIN1



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 [a]	T_A=25°C	4.5	A
		T_A=70°C	3.6	A
I_{DM}	-Pulsed [b]		30	A
E_{AS}	Single Pulse Avalanche Energy [d]		16	mJ
P_D	Maximum Power Dissipation [a]	T_A=25°C	1.47	W
		T_A=70°C	0.94	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		-55 to 150	°C

THERMAL CHARACTERISTICS

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	85	°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	2.1	3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V , I_D=2.25A		34	42	m ohm
		V_{GS}=4.5V , I_D=1.7A		55	74	m ohm
g_{FS}	Forward Transconductance	V_{DS}=10V , I_D=2.25A		9		S
DYNAMIC CHARACTERISTICS [c]						
C_{ISS}	Input Capacitance	V_{DS}=10V,V_{GS}=0V f=1.0MHz		380		pF
C_{OSS}	Output Capacitance			63		pF
C_{RSS}	Reverse Transfer Capacitance			46		pF
SWITCHING CHARACTERISTICS [c]						
$t_{D(ON)}$	Turn-On Delay Time	V_{DD}=15V I_D=1A V_{GS}=10V R_{GEN}= 6 ohm		11		ns
t_r	Rise Time			11		ns
$t_{D(OFF)}$	Turn-Off Delay Time			17		ns
t_f	Fall Time			4.6		ns
Q_g	Total Gate Charge	V_{DS}=15V,I_D=2.25A,V_{GS}=10V		6		nC
		V_{DS}=15V,I_D=2.25,V_{GS}=4.5V		3.2		nC
Q_{gs}	Gate-Source Charge	V_{DS}=15V,I_D=2.25A, V_{GS}=10V		1.2		nC
Q_{gd}	Gate-Drain Charge			1.7		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=1A		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)

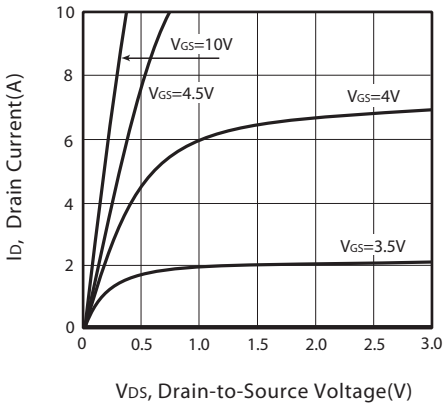


Figure 1. Output Characteristics

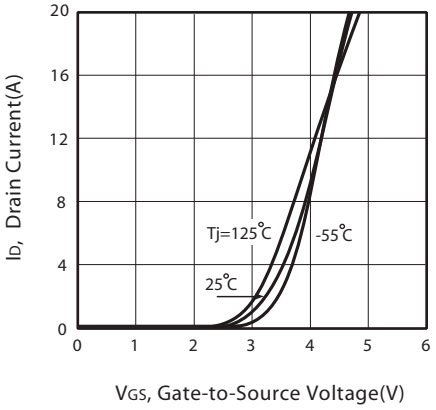


Figure 2. Transfer Characteristics

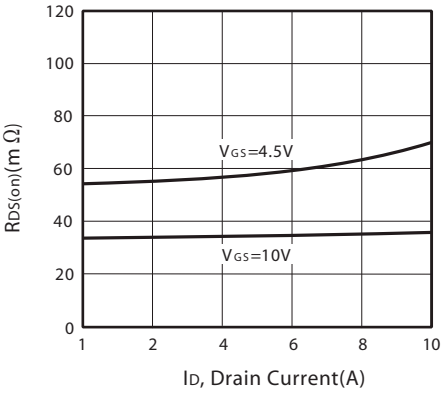


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

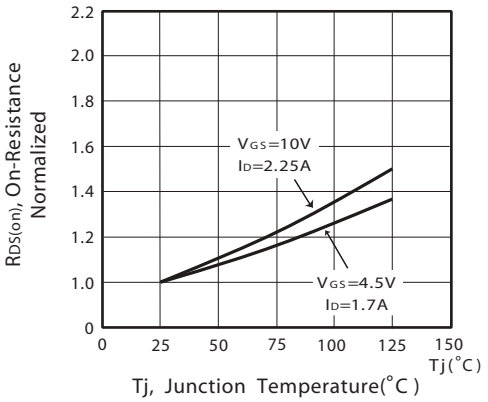


Figure 4. On-Resistance Variation with Drain Current and Temperature

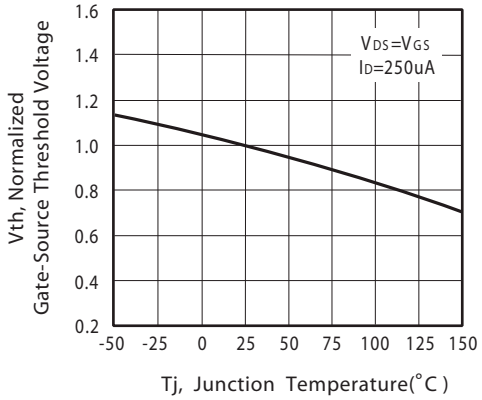


Figure 5. Gate Threshold Variation with Temperature

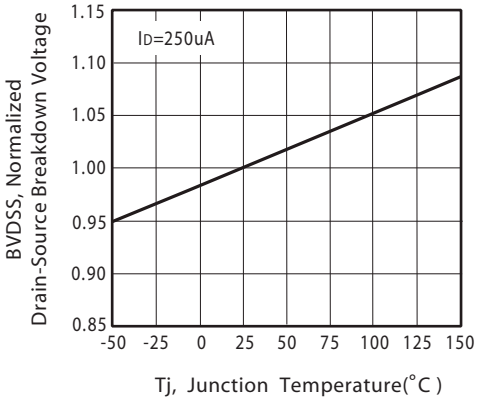


Figure 6. Breakdown Voltage Variation with Temperature

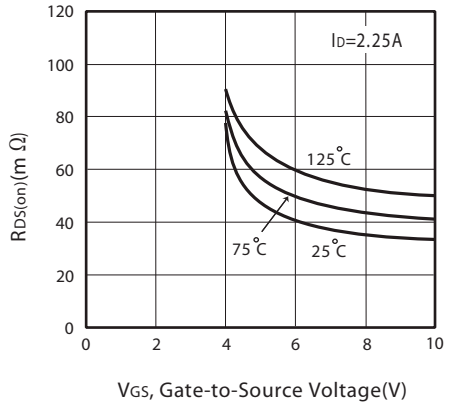


Figure 7. On-Resistance vs. Gate-Source Voltage

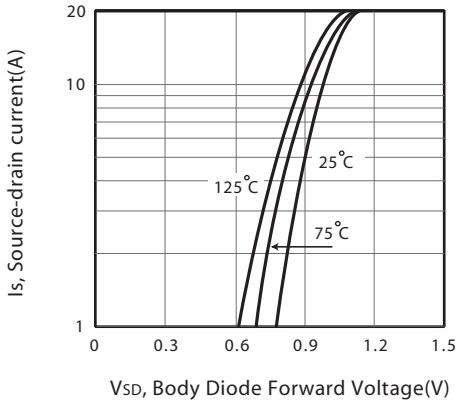


Figure 8. Body Diode Forward Voltage Variation with Source Current

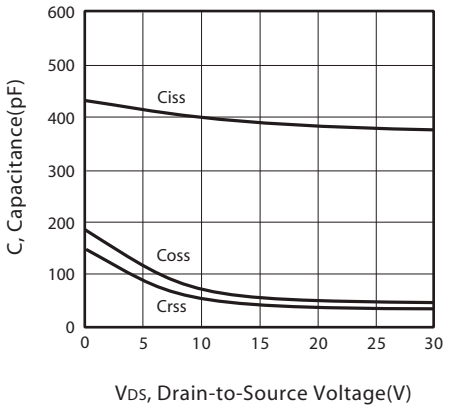


Figure 9. Capacitance

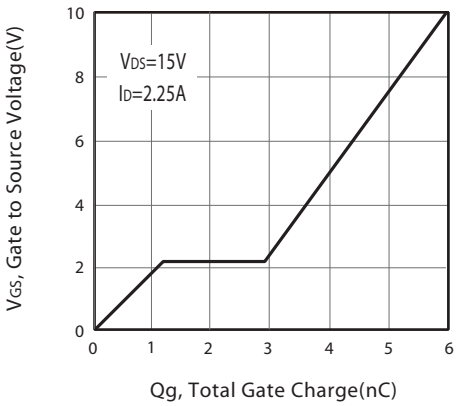


Figure 10. Gate Charge

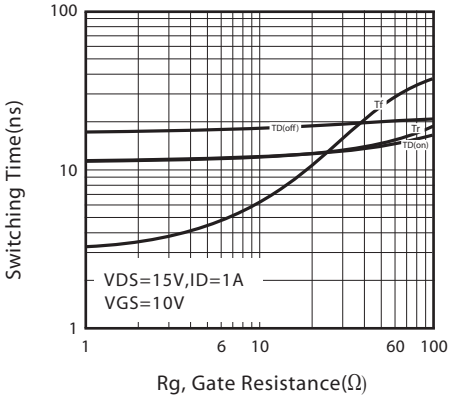


Figure 11. switching characteristics

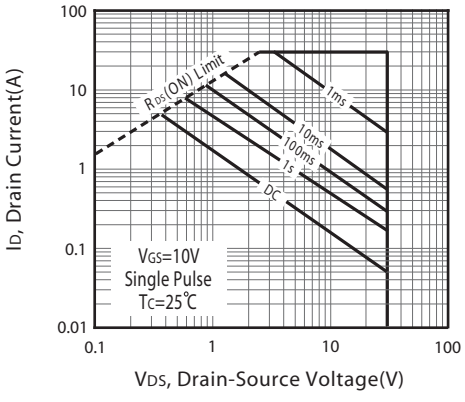
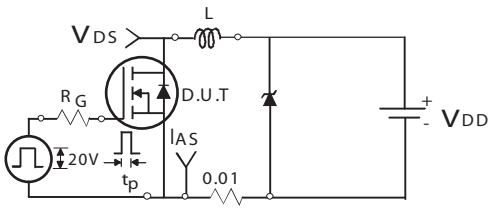
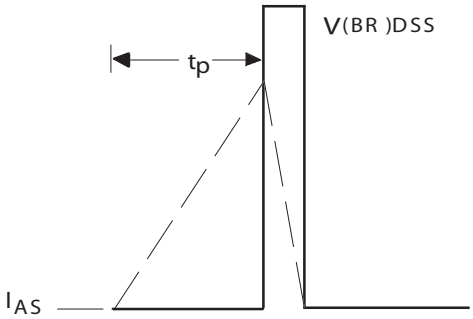


Figure 12. Maximum Safe Operating Area



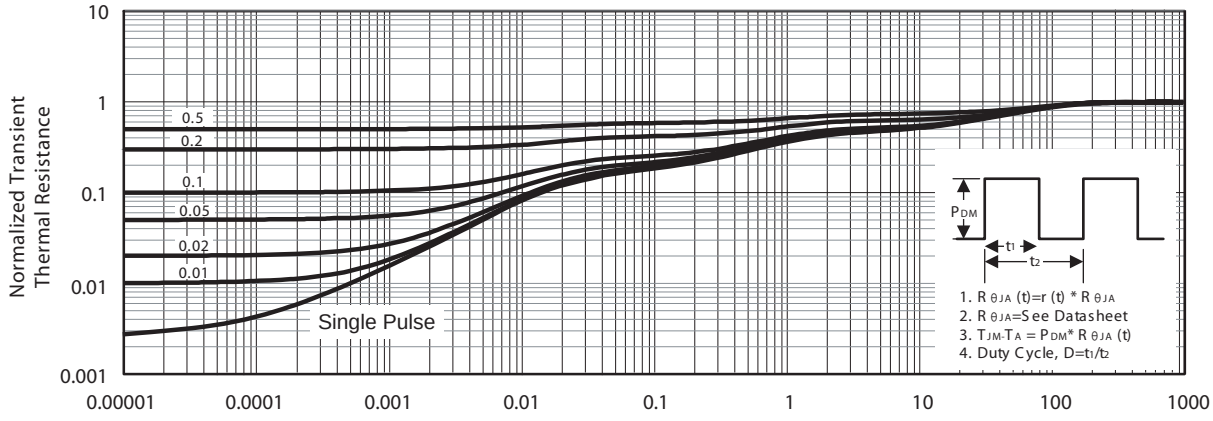
Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

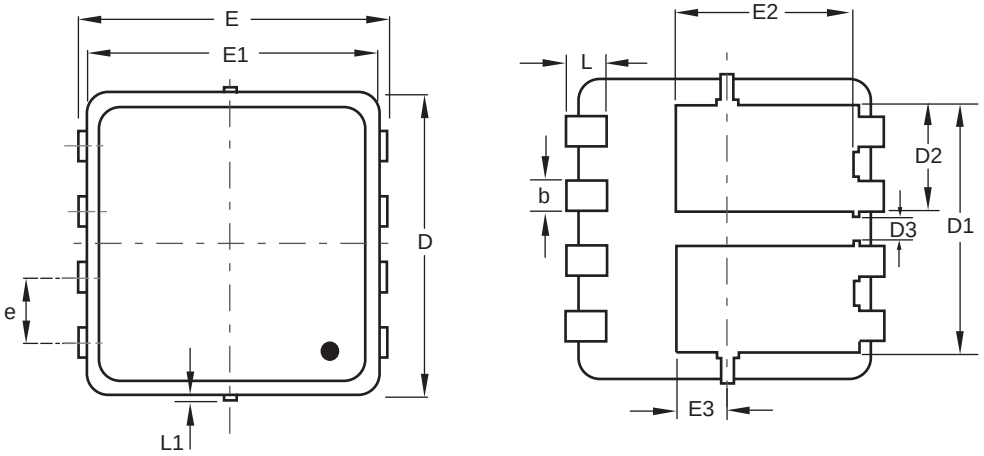
Figure 13b.



Normalized Thermal Transient Impedance Curve

PACKAGE OUTLINE DIMENSIONS

DFN 3x3-8L



SYMBOLS	MILLIMETERS		
	MIN	NOM	MAX
A	0.70	0.80	0.90
A1	0.00	—	0.05
b	0.24	0.30	0.35
c	0.10	0.152	0.25
D		3.00 BSC	
D1		2.475 BSC	
D2		1.063 BSC	
D3		0.225 BSC	
E		3.20 BSC	
E1		3.00 BSC	
E2		1.813 BSC	
E3		0.525 BSC	
e		0.65 BSC	
L	0.30	0.40	0.50
L1	0.00	—	0.100
θ	0°	10°	12°

TOP MARKING DEFINITION

DFN 3x3