SamHop Microelectronics Corp.

SP4401

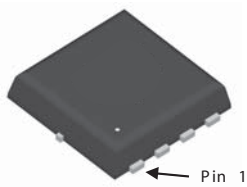
Ver 1.0

P-Channel Enhancement Mode Field Effect Transistor

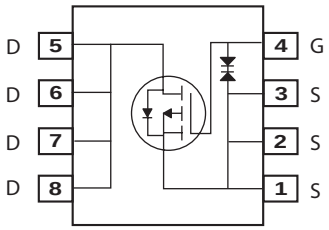
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
-30V	-8A	12.5 @ VGS=-10V
		18 @ VGS=-4.5V

FEATURES

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



TSON 3.3 x 3.3



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 c]	T_A=25°C	-8	A
		T_A=70°C	-6.4	A
I_{DM}	-Pulsed [c]		-46	A
E_{AS}	Single Pulse Avalanche Energy [d]		30	mJ
P_D	Maximum Power Dissipation [a]	T_A=25°C	1.67	W
		T_A=70°C	1.07	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	75	°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			±10	uA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=-250uA	-1.0	-1.6	-3.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-10V , I_D=-4A		10	12.5	m ohm
		V_{GS}=-4.5V , I_D=-3A		13	18	m ohm
g_{FS}	Forward Transconductance	V_{DS}=-10V , I_D=-4A		24		S
DYNAMIC CHARACTERISTICS [b]						
C_{ISS}	Input Capacitance	V_{DS}=-15V,V_{GS}=0V f=1.0MHz		3545		pF
C_{OSS}	Output Capacitance			394		pF
C_{RSS}	Reverse Transfer Capacitance			289		pF
SWITCHING CHARACTERISTICS [b]						
$t_{D(ON)}$	Turn-On Delay Time	V_{DD}=-15V I_D=-1A V_{GS}=-10V R_{GEN}= 6 ohm		58		ns
t_r	Rise Time			50		ns
$t_{D(OFF)}$	Turn-Off Delay Time			176		ns
t_f	Fall Time			45		ns
Q_g	Total Gate Charge	V_{DS}=-15V,I_D=-4A,V_{GS}=-10V		59		nC
		V_{DS}=-15V,I_D=-4A,V_{GS}=-4.5V		28		nC
Q_{gs}	Gate-Source Charge	V_{DS}=-15V,I_D=-4A, V_{GS}=-10V		5		nC
Q_{gd}	Gate-Drain Charge			14		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=-1A		-0.8	-1.2	V

Notes

a.Surface Mounted on FR4 Board of 1 $inch^2$, 1oz.
b.Guaranteed by design, not subject to production testing.
c.Drain current limited by maximum junction temperature.
d.Starting T_J=25°C,L=0.5mH,V_{DD} = 20V.(See Figure13)

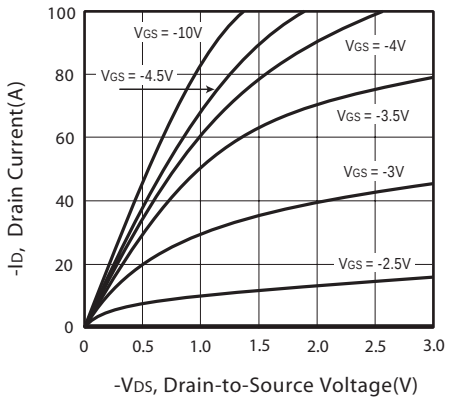


Figure 1. Output Characteristics

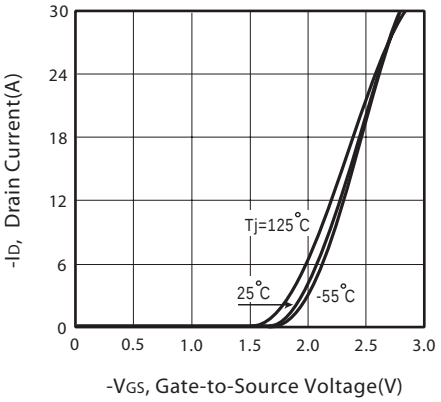


Figure 2. Transfer Characteristics

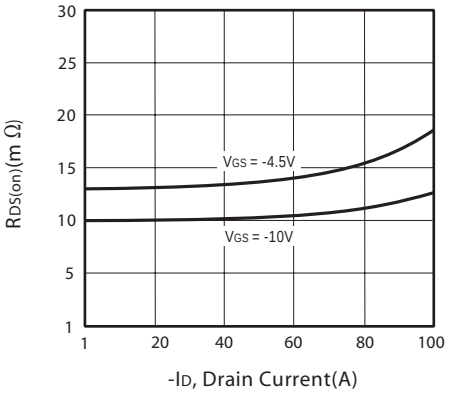


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

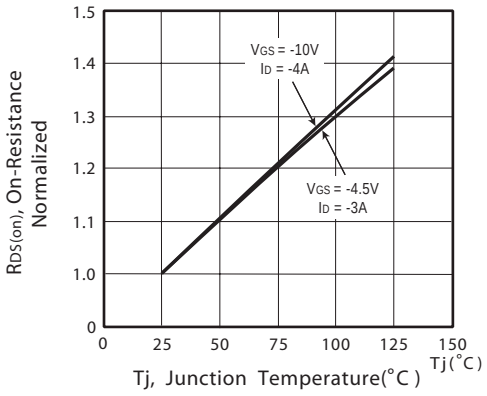


Figure 4. On-Resistance Variation with Drain Current and Temperature

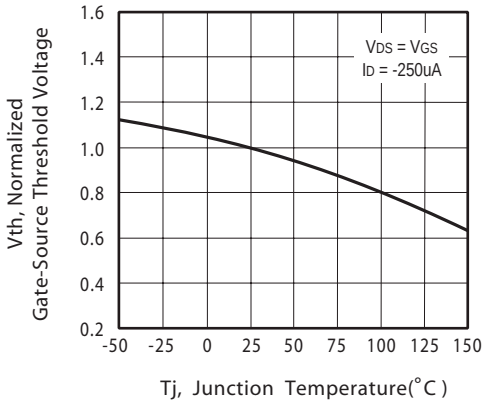


Figure 5. Gate Threshold Variation with Temperature

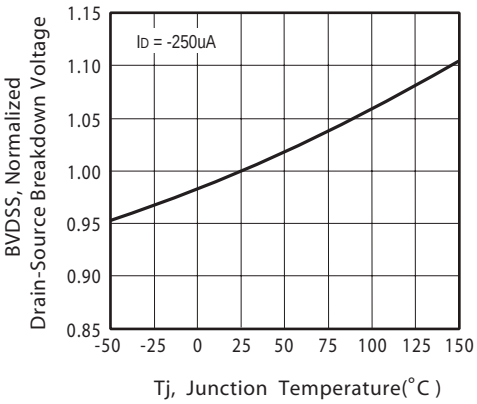


Figure 6. Breakdown Voltage Variation with Temperature

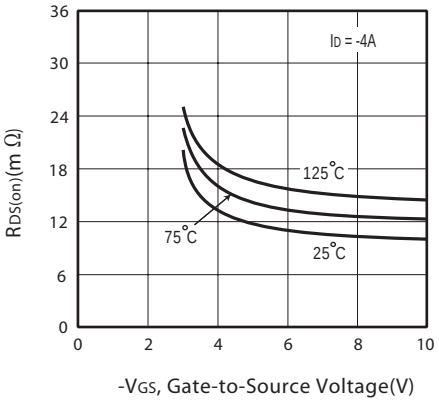


Figure 7. On-Resistance vs. Gate-Source Voltage

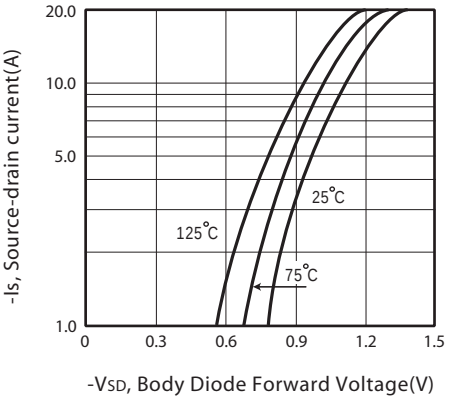


Figure 8. Body Diode Forward Voltage Variation with Source Current

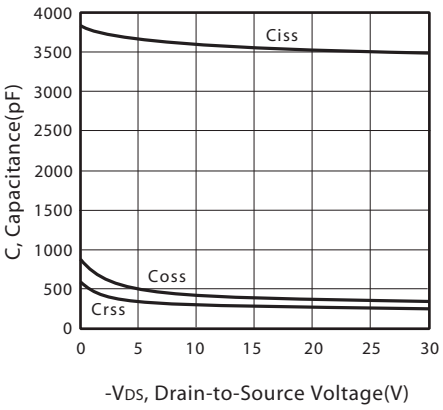


Figure 9. Capacitance

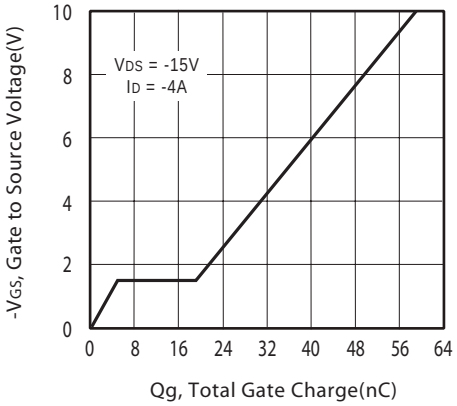


Figure 10. Gate Charge

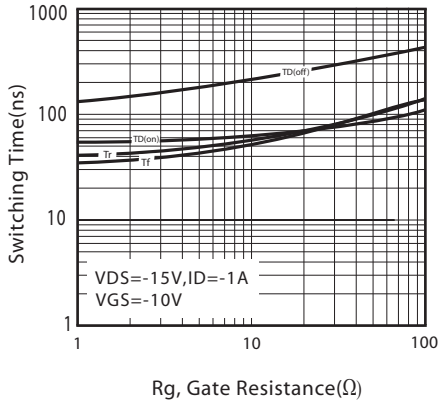


Figure 11. switching characteristics

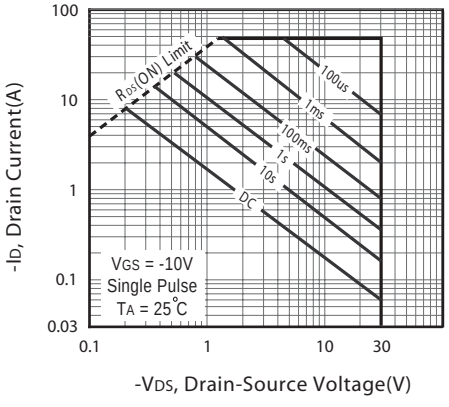
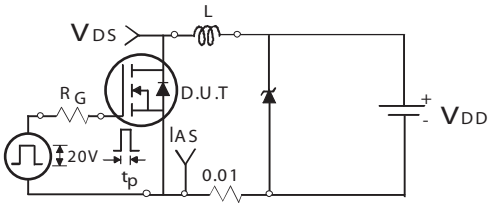
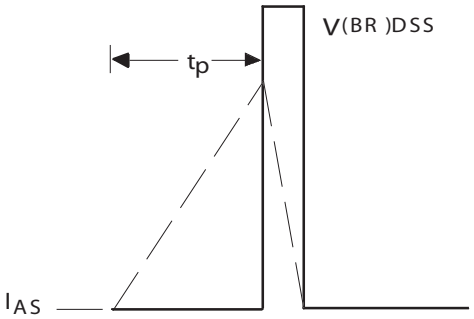


Figure 12. Maximum Safe Operating Area



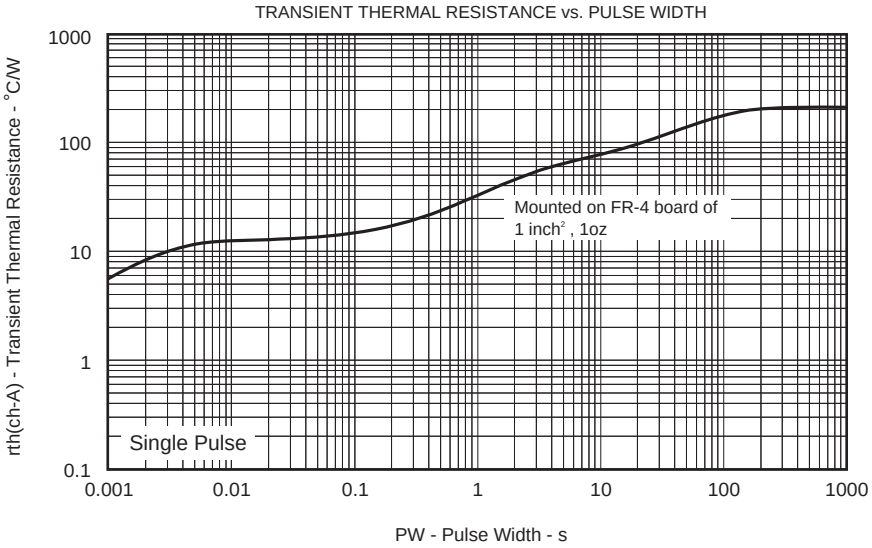
Unclamped Inductive Test Circuit

Figure 13a.



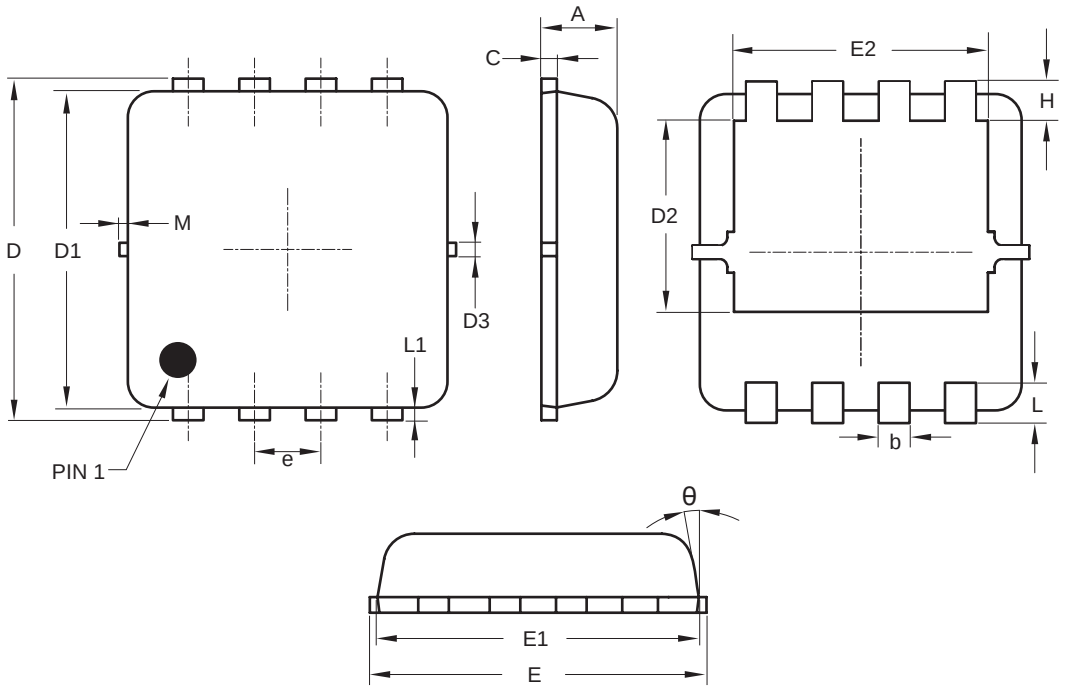
Unclamped Inductive Waveforms

Figure 13b.



PACKAGE OUTLINE DIMENSIONS

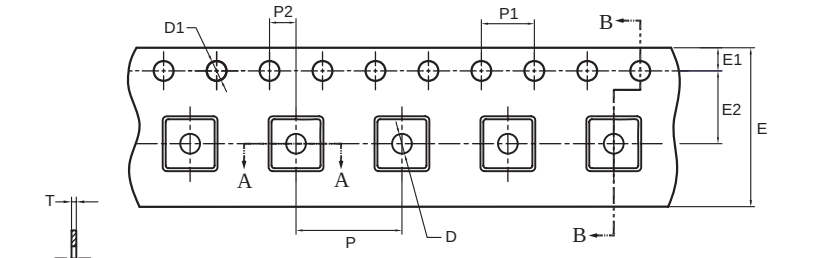
TSON 3.3 x 3.3

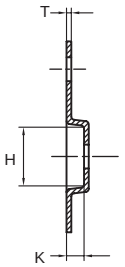


SYMBOLS	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
C	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	—	0.13	—
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65 BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	—	0.13	—
M	—	—	0.15
θ	—	10°	12°

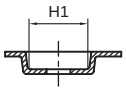
TSON 3.3 x 3.3 Tape and Reel Data

TSON 3.3 x 3.3 Tape

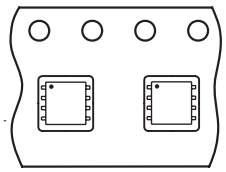




SECTION B-B



SECTION A-A

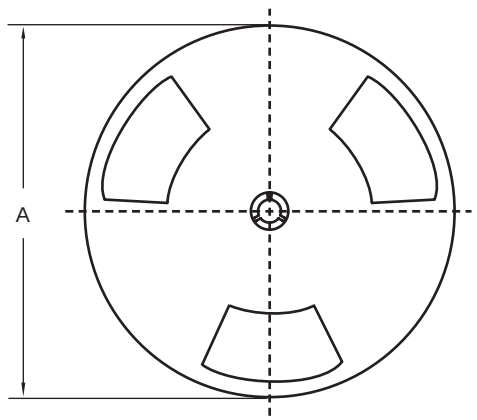


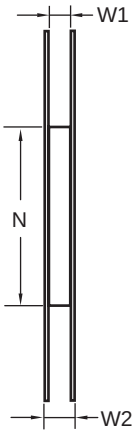
FEEDING DIRECTION

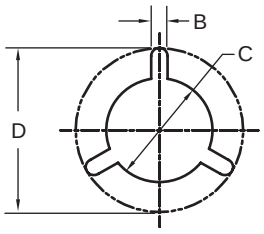
unit:㎜

PACKAGE	D	D1	E	E1	E2	H	H1	K	P	P1	P2	T
S mini 8	ϕ1.50 (MIN)	ϕ1.50 +0.10 - 0.00	12.0 +0.30 - 0.10	1.75 ±0.10	5.50 ±0.05	3.70 ±0.10	3.70 ±0.10	1.10 ±0.10	8.0 ±0.10	4.0 ±0.10	2.0 ±0.05	0.3 ±0.05

TSON 3.3 x 3.3 Reel







UNIT:㎜

TAPE SIZE	REEL SIZE	A	B	C	D	N	W1	W2
12 ㎜	13 "	330 ± 1.0	1.5 $^{+0.5}_{-0.2}$	ϕ13.0 $^{+0.5}_{-0.2}$	20.2(ref.)	178 $^{+0.0}_{-2.0}$	12.4 $^{+2.0}_{-0.0}$	18.4(ref.)

TOP MARKING DEFINITION

TSON 3.3 x 3.3