SamHop Microelectronics Corp.

STP652F

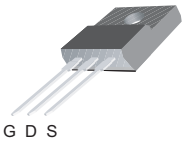
Ver 1.1

N-Channel Logic Level Enhancement Mode Field Effect Transistor

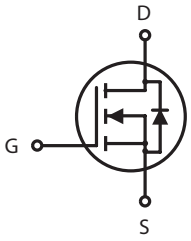
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Typ
60V	29A	22 @ VGS=10V

FEATURES

- Super high dense cell design for extremely low RDS(ON).
- High power and current handling capability.
- TO-220F package.



STF SERIES
TO-220F



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

Symbol	Parameter		Limit	Units
V_{DS}	Drain-Source Voltage		60	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Drain Current-Continuous [a]	T_C=25°C	29	A
		T_C=70°C	24	A
I_{DM}	-Pulsed [b]		90	A
E_{AS}	Avalanche Energy [d]		110	mJ
P_D	Maximum Power Dissipation [a]	T_C=25°C	46	W
		T_C=70°C	32	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		-55 to 175	°C

THERMAL CHARACTERISTICS

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	3.25	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

ELECTRICAL CHARACTERISTICS (T_C=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	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=48V , 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	1.7	2.2	3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V , I_D=14.5A		22	28	m ohm
		V_{GS}=4.5V , I_D=11A		29	39	m ohm
g_{FS}	Forward Transconductance	V_{DS}=10V , I_D=14.5A		33		S
DYNAMIC CHARACTERISTICS [c]						
C_{ISS}	Input Capacitance	V_{DS}=30V,V_{GS}=0V f=1.0MHz		1800		pF
C_{OSS}	Output Capacitance			133		pF
C_{RSS}	Reverse Transfer Capacitance			102		pF
SWITCHING CHARACTERISTICS [c]						
$t_{D(ON)}$	Turn-On DelayTime	V_{DD}=30V I_D=1A V_{GS}=10V R_{GEN}=6 ohm		35.5		ns
t_r	Rise Time			30		ns
$t_{D(OFF)}$	Turn-Off DelayTime			61		ns
tf	Fall Time			12.5		ns
Q_g	Total Gate Charge	V_{DS}=30V,I_D=14.5A,V_{GS}=10V		28		nC
		V_{DS}=30V,I_D=14.5A,V_{GS}=4.5V		14		nC
Q_{gs}	Gate-Source Charge	V_{DS}=30V,I_D=14.5A, V_{GS}=10V		3.5		nC
Q_{gd}	Gate-Drain Charge			7		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=5A		0.79	1.3	V
trr	Reverse Recovery Time	V_{GS}=0V,I_S=50A, dI_F / dt = 100A/us		49		ns
Qrr	Reverse Recovery Charge			54		nC

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} = 30V.(See Figure13)

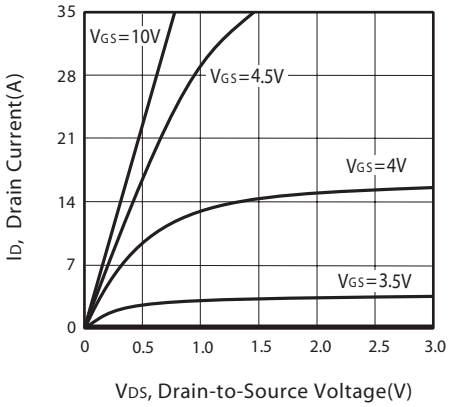


Figure 1. Output Characteristics

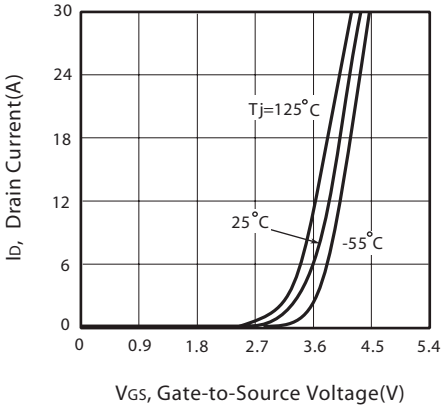


Figure 2. Transfer Characteristics

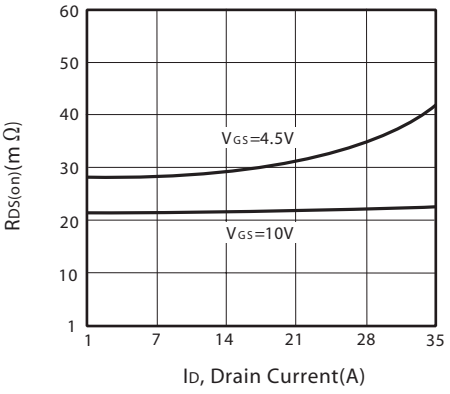


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

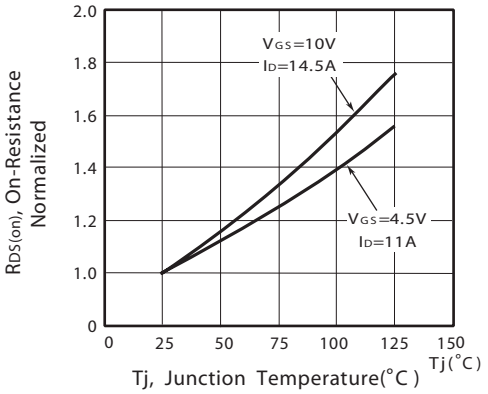


Figure 4. On-Resistance Variation with Drain Current and Temperature

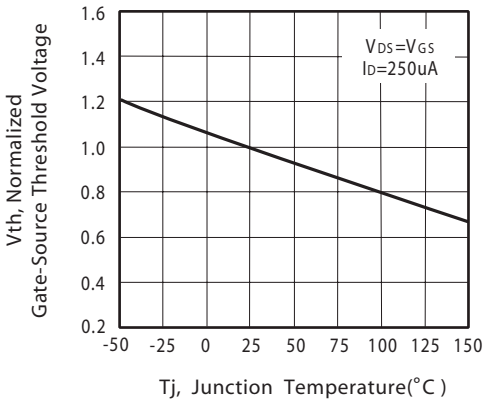


Figure 5. Gate Threshold Variation with Temperature

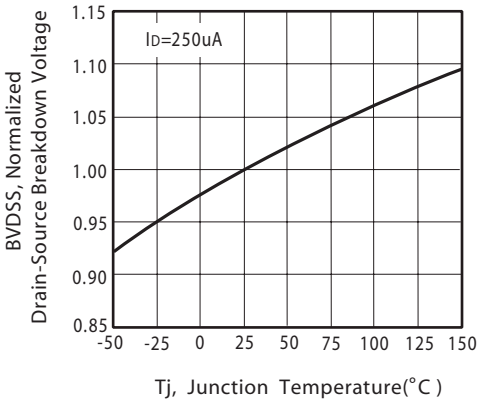


Figure 6. Breakdown Voltage Variation with Temperature

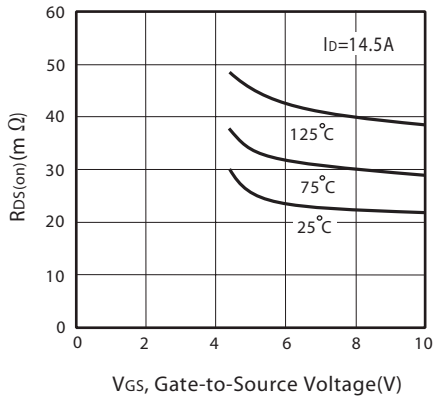


Figure 7. On-Resistance vs. Gate-Source Voltage

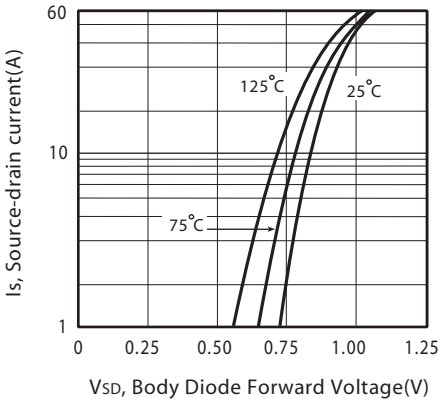


Figure 8. Body Diode Forward Voltage Variation with Source Current

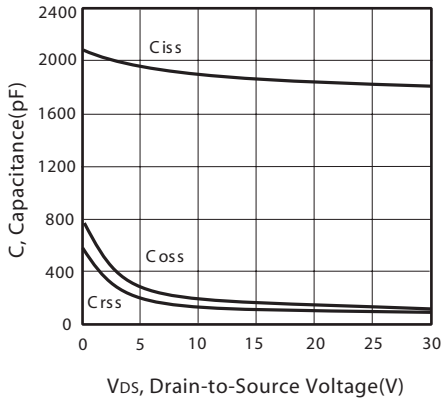


Figure 9. Capacitance

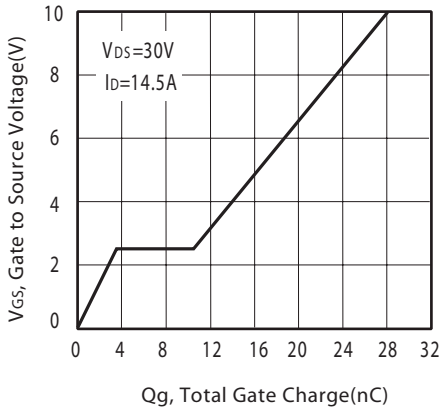


Figure 10. Gate Charge

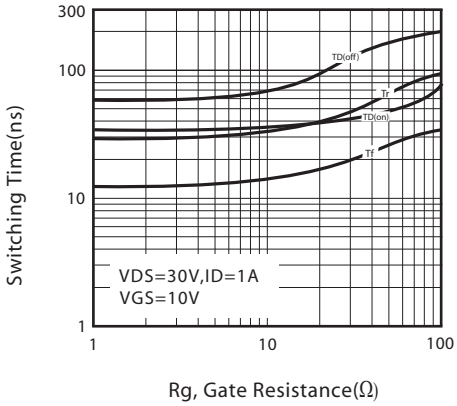


Figure 11. switching characteristics

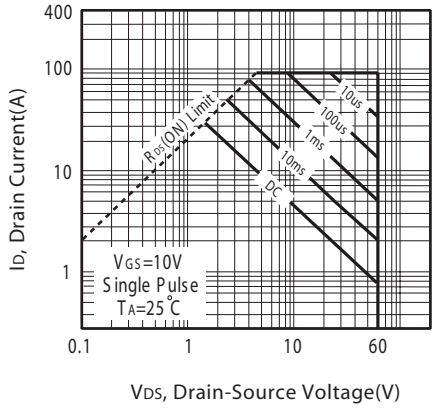
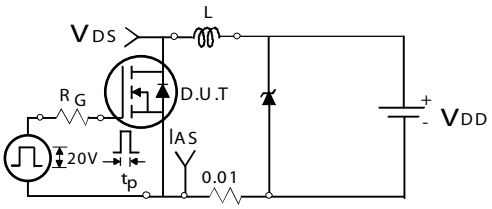
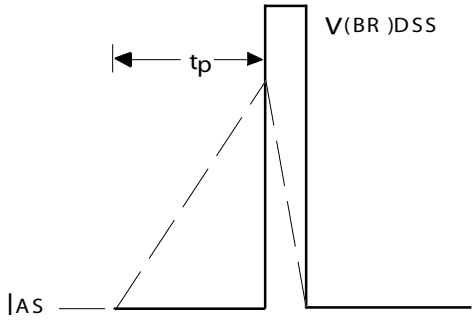


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

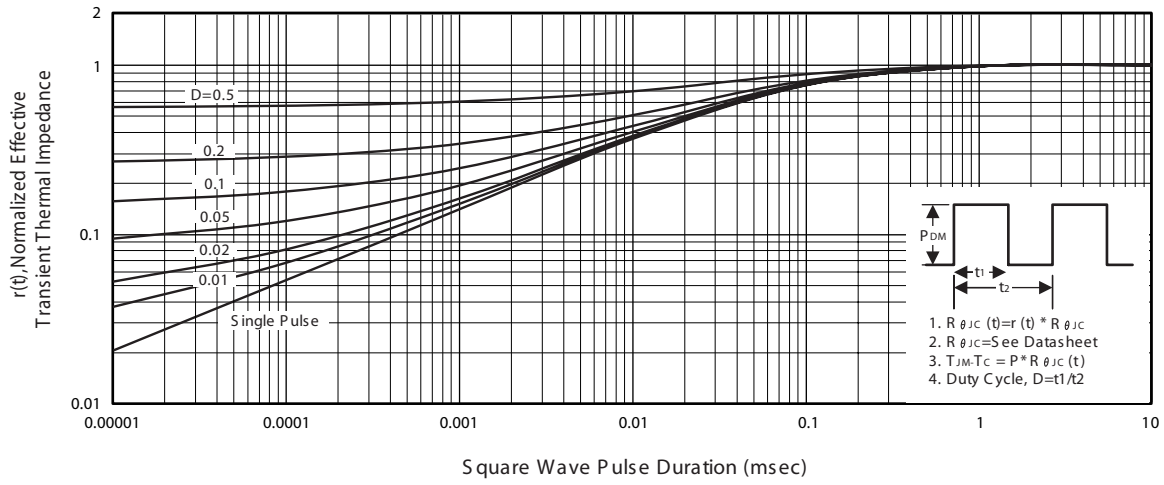
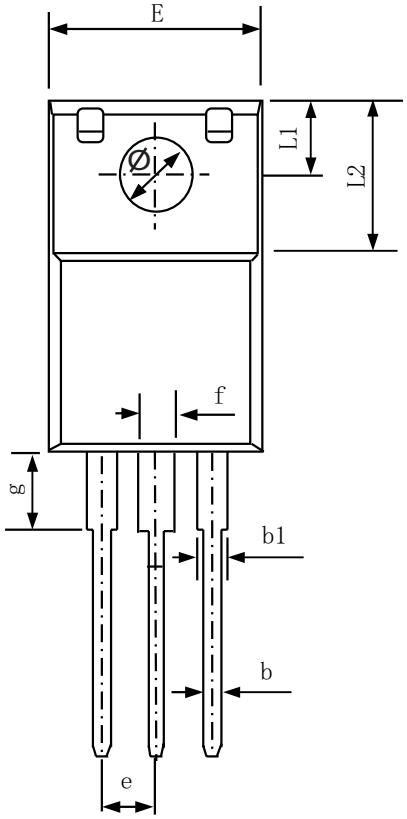
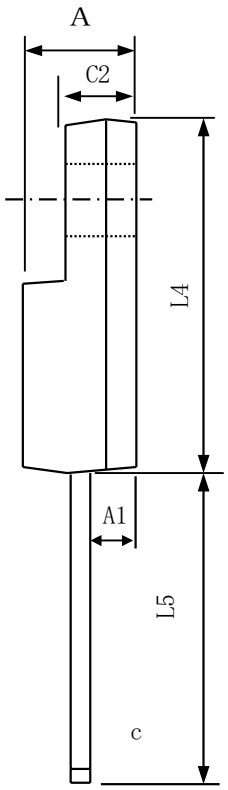


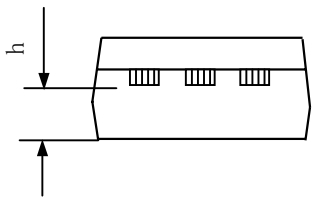
Figure 14. Normalized Thermal Transient Impedance Curve

PACKAGE OUTLINE DIMENSIONS

TO-220F

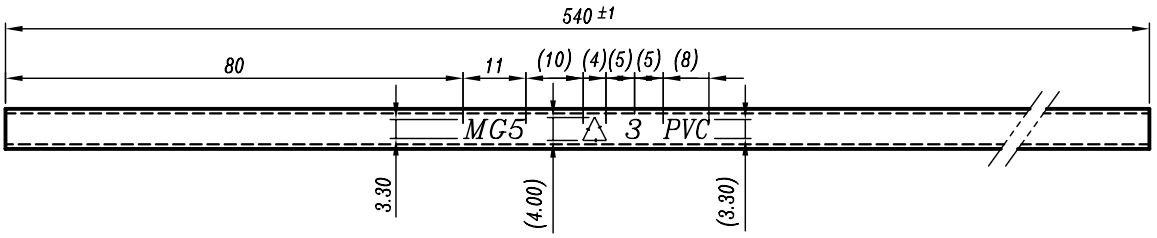




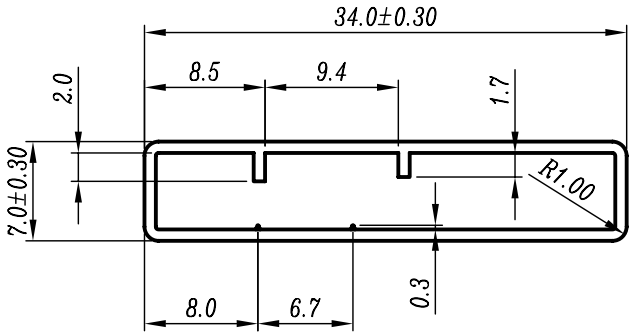


SYMBOLS	MILLIMETERS	
	MIN	MAX
A	4.20	4.80
A1	1.95	2.85
b	0.56	1.05
b1	0.90	1.50
c	0.55	0.80
c2	2.50	3.10
E	9.70	10.30
L1	3.20	3.80
L2	6.90	7.50
L4	15.60	16.40
L5	13.50	14.50
Ø	3.20	
e	2.55	
f	1.30	1.90
g	3.40	3.80
h	2.10	2.70

TO-220F Tube



t=0.8 ±0.15



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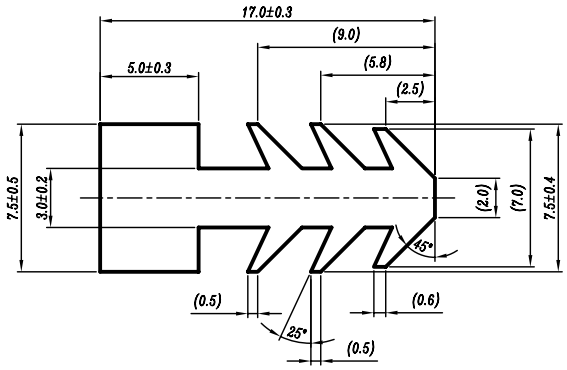

L=8.0 $^{+0.5}_{-1}$