SamHop Microelectronics Corp.

STP10N03

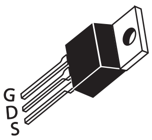
Ver 1.0

N-Channel Logic Level Enhancement Mode Field Effect Transistor

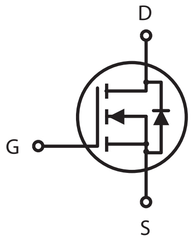
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
100V	120A	4.0 @ VGS=10V

FEATURES

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



STP SERIES
TO-220



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

Symbol	Parameter		Limit	Units
V_{DS}	Drain-Source Voltage		100	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Drain Current-Continuous [b]	T_C=25°C	120	A
		T_C=100°C	76	A
I_{DM}	-Pulsed [b]		480	A
E_{AS}	Single Pulse Avalanche Energy [c]		300	mJ
P_D	Maximum Power Dissipation	T_C=25°C	227	W
		T_C=100°C	91	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	0.55	°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	100			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=80V , 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	2	3	4	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V , I_D=50A		3.3	4.0	m ohm
g_{FS}	Forward Transconductance	V_{DS}=10V , I_D=20A		47		S
DYNAMIC CHARACTERISTICS [a]						
C_{ISS}	Input Capacitance	V_{DS}=50V,V_{GS}=0V f=1.0MHz		6900		pF
C_{OSS}	Output Capacitance			1250		pF
C_{RSS}	Reverse Transfer Capacitance			47		pF
SWITCHING CHARACTERISTICS [a]						
$t_{D(ON)}$	Turn-On DelayTime	V_{DD}=50V I_D=1A V_{GS}=10V R_{GEN}= 2.5 ohm		48		ns
tr	Rise Time			56		ns
$t_{D(OFF)}$	Turn-Off DelayTime			75		ns
tf	Fall Time			33		ns
Q_g	Total Gate Charge	V_{DS}=50V,I_D=20A,V_{GS}=10V		117		nC
Q_{gs}	Gate-Source Charge	V_{DS}=50V,I_D=20A, V_{GS}=10V		40		nC
Q_{gd}	Gate-Drain Charge			37		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=50A		0.85	1.3	V

Notes

a.Guaranteed by design, not subject to production testing.
b.Drain current limited by maximum junction temperature.
c.Starting T_J=25°C,L=0.5mH,V_{DD} = 50V.(See Figure10)
d.Mounted on FR4 Board of 1 inch^2 , 2oz.

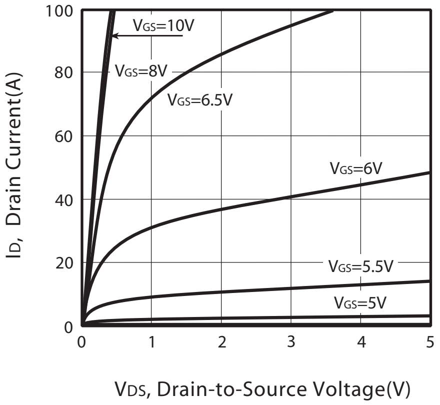


Figure 1. Output Characteristics

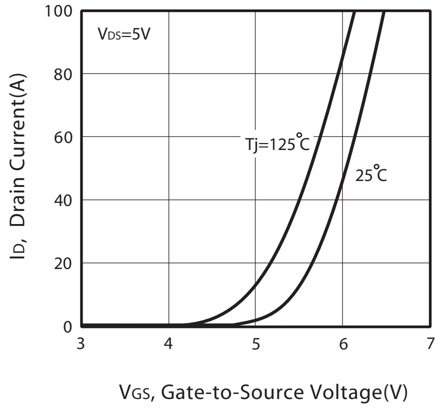


Figure 2. Transfer Characteristics

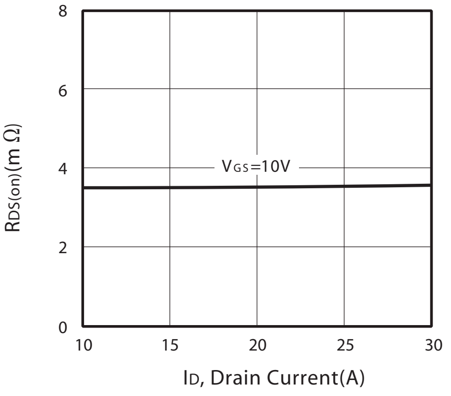


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

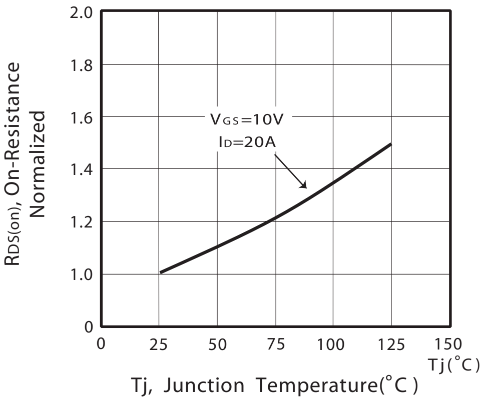


Figure 4. On-Resistance Variation with Drain Current and Temperature

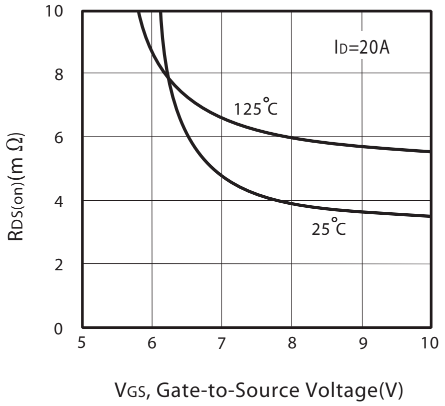


Figure 5. On-Resistance vs. Gate-Source Voltage

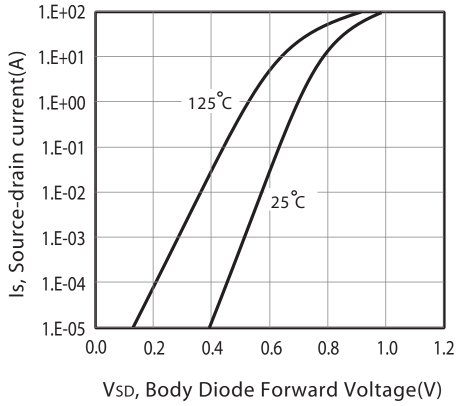


Figure 6. Body Diode Forward Voltage Variation with Source Current

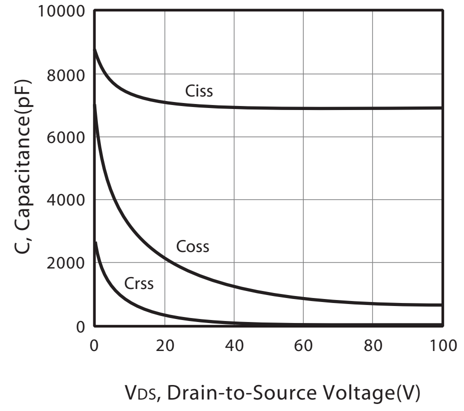


Figure 7. Capacitance

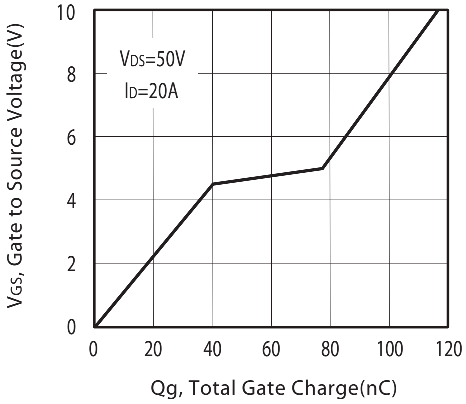


Figure 8. Gate Charge

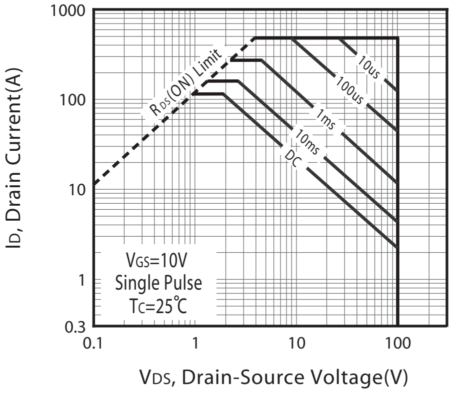
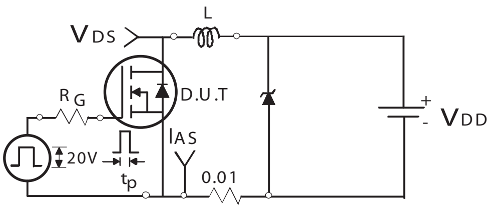
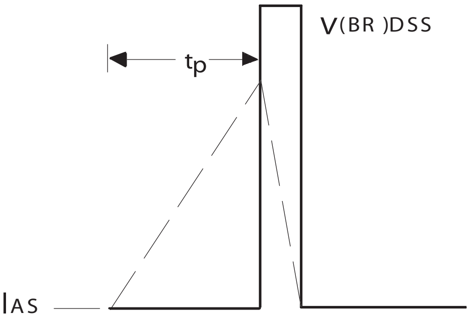


Figure 9. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 10a.



Unclamped Inductive Waveforms

Figure 10b.

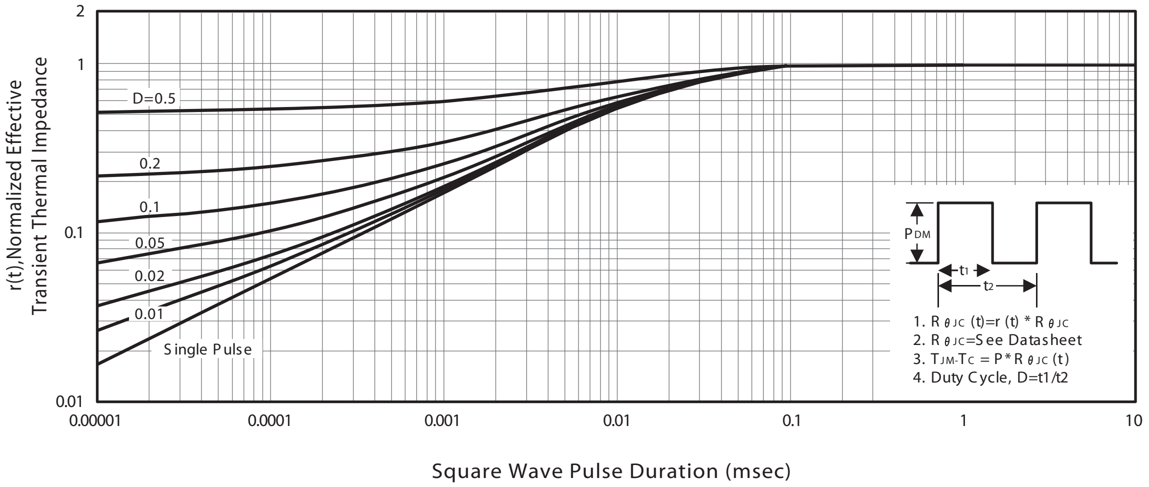
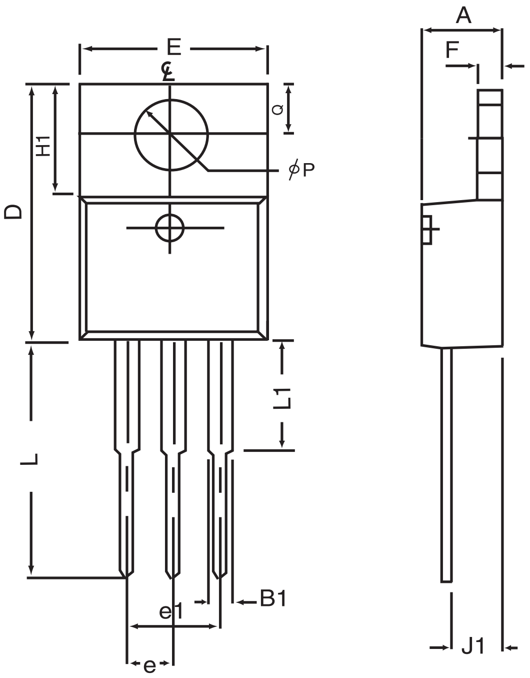


Figure 11. Normalized Thermal Transient Impedance Curve

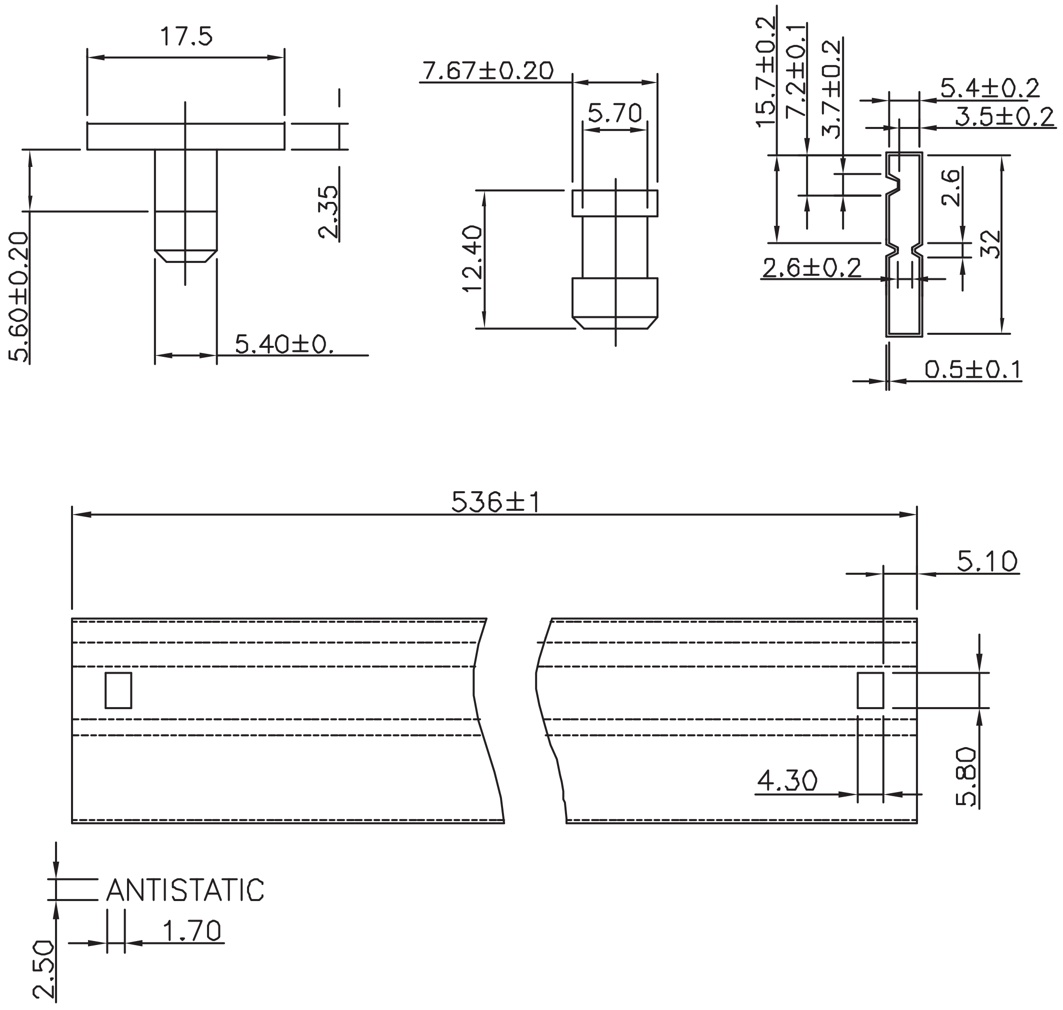
PACKAGE OUTLINE DIMENSIONS

TO-220



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	4.80	0.170	0.189
B1	1.27	1.65	0.050	0.630
D	14.6	16.00	0.575	0.610
E	9.70	10.41	0.382	0.410
e	2.34	2.74	0.092	0.108
e1	4.68	5.48	0.184	0.216
F	1.14	1.40	0.045	0.055
H1	5.97	6.73	0.235	0.265
J1	2.20	2.79	0.087	0.110
L	12.88	14.22	0.507	0.560
L1	3.00	6.35	0.120	0.250
φP	3.50	3.94	0.138	0.155
Q	2.54	3.05	0.100	0.120

TO-220 Tube


17.5
2.35
5.60±0.20
5.40±0.
7.67±0.20
5.70
12.40
15.7±0.2
7.2±0.1
3.7±0.2
5.4±0.2
3.5±0.2
2.6
32
2.6±0.2
0.5±0.1
536±1
5.10
4.30
5.80
ANTISTATIC
1.70
2.50

TOP MARKING DEFINITION

TO-220