SamHop Microelectronics Corp.

STB/P438A

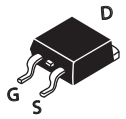
Ver 1.0

N-Channel Logic Level Enhancement Mode Field Effect Transistor

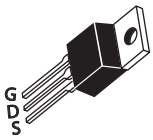
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
40V	60A	8.5 @ VGS=10V
		11 @ VGS=4.5V

FEATURES

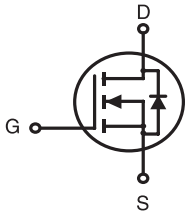
- Super high dense cell design for extremely low RDS(ON).
- High power and current handling capability.
- TO-220 & TO-263 package.



STB SERIES
TO-263(DD-PAK)



STP SERIES
TO-220



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

Symbol	Parameter		Limit	Units
V_{DS}	Drain-Source Voltage		40	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Drain Current-Continuous [a]	T_C=25°C	60	A
		T_C=70°C	48	A
I_{DM}	-Pulsed [b]		177	A
E_{AS}	Single Pulse Avalanche Energy [d]		196	mJ
P_D	Maximum Power Dissipation [a]	T_C=25°C	62.5	W
		T_C=70°C	40	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 [a]	2	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient [a]	50	°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	40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=32V , V_{GS}=0V			1	A
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	1.8	3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V , I_D=30A		6.8	8.5	m ohm
		V_{GS}=4.5V , I_D=26A		8.1	11	m ohm
g_{FS}	Forward Transconductance	V_{DS}=10V , I_D=30A		69		S
DYNAMIC CHARACTERISTICS [c]						
C_{ISS}	Input Capacitance	V_{DS}=20V,V_{GS}=0V f=1.0MHz		1540		pF
C_{OSS}	Output Capacitance			248		pF
C_{RSS}	Reverse Transfer Capacitance			180		pF
SWITCHING CHARACTERISTICS [c]						
$t_{D(ON)}$	Turn-On DelayTime	V_{DD}=20V I_D=1A V_{GS}=10V R_{GEN}=6 ohm		28		ns
t_r	Rise Time			31		ns
$t_{D(OFF)}$	Turn-Off DelayTime			62		ns
t_f	Fall Time			36		ns
Q_g	Total Gate Charge	V_{DS}=20V,I_D=25A,V_{GS}=10V		26.5		nC
		V_{DS}=20V,I_D=25A,V_{GS}=4.5V		12.5		nC
Q_{gs}	Gate-Source Charge	V_{DS}=20V,I_D=25A, V_{GS}=10V		2.8		nC
Q_{gd}	Gate-Drain Charge			7.8		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=2A		0.77	1.3	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,VDD=20V,L=0.5mH.(See Figure13)

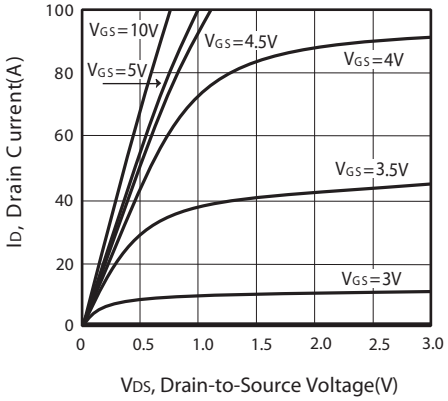


Figure 1. Output Characteristics

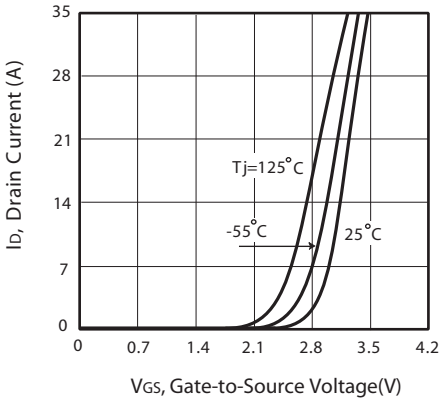


Figure 2. Transfer Characteristics

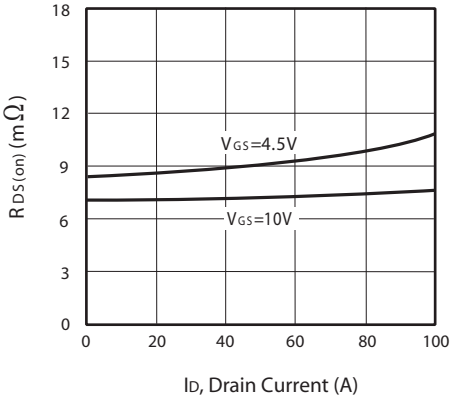


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

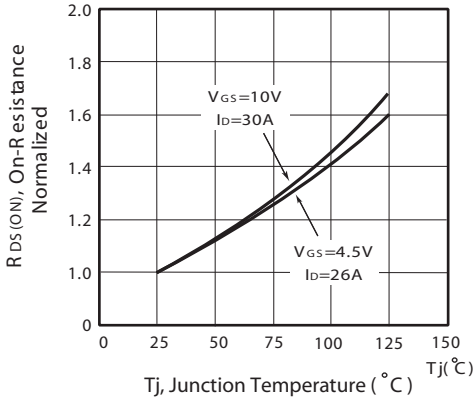


Figure 4. On-Resistance Variation with Drain Current and Temperature

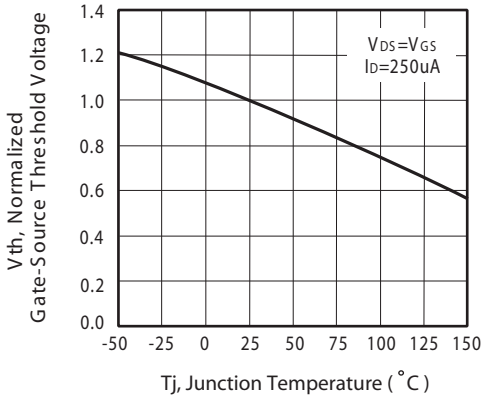


Figure 5. Gate Threshold Variation with Temperature

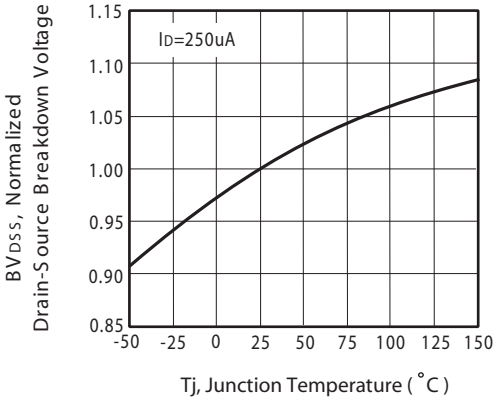


Figure 6. Breakdown Voltage Variation with Temperature

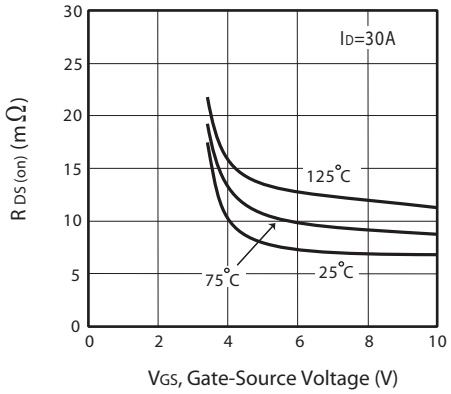


Figure 7. On-Resistance vs. Gate-Source Voltage

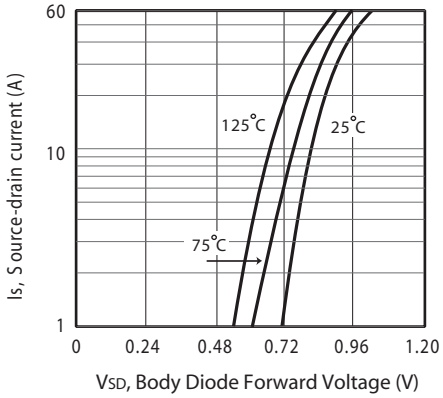


Figure 8. Body Diode Forward Voltage Variation with Source Current

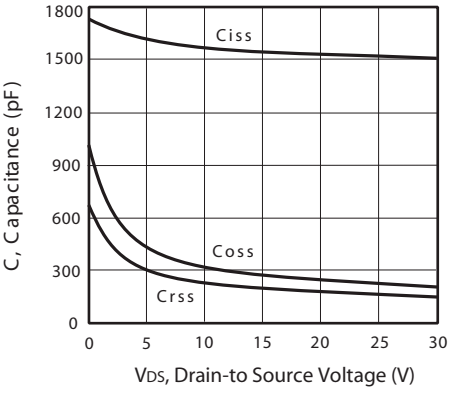


Figure 9. Capacitance

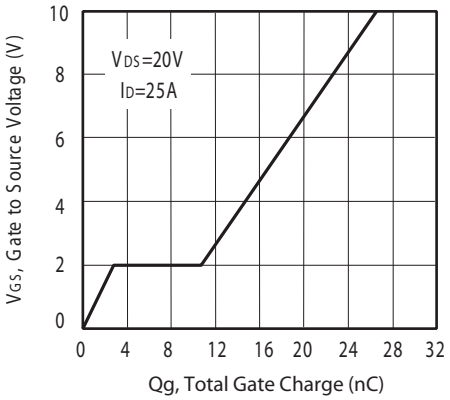


Figure 10. Gate Charge

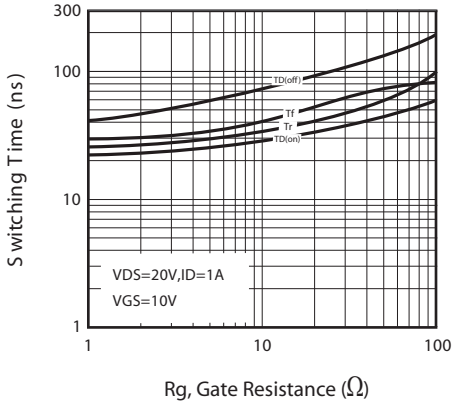


Figure 11. Switching Characteristics

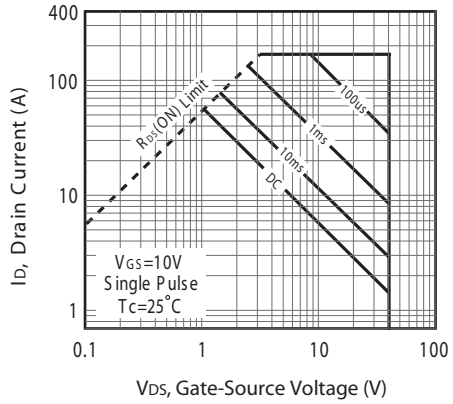
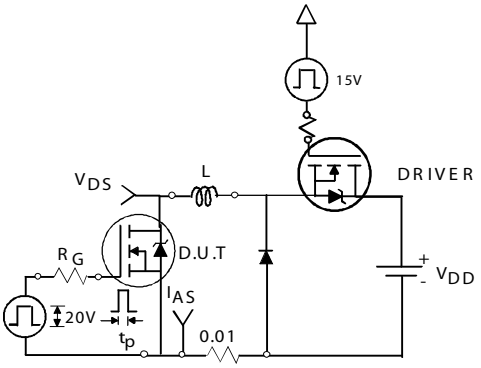
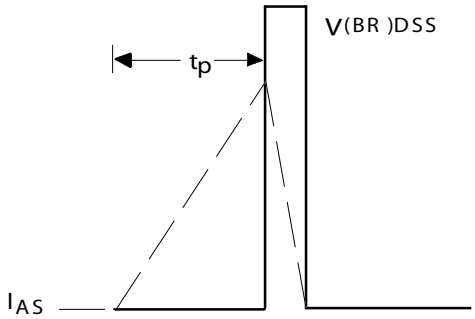


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

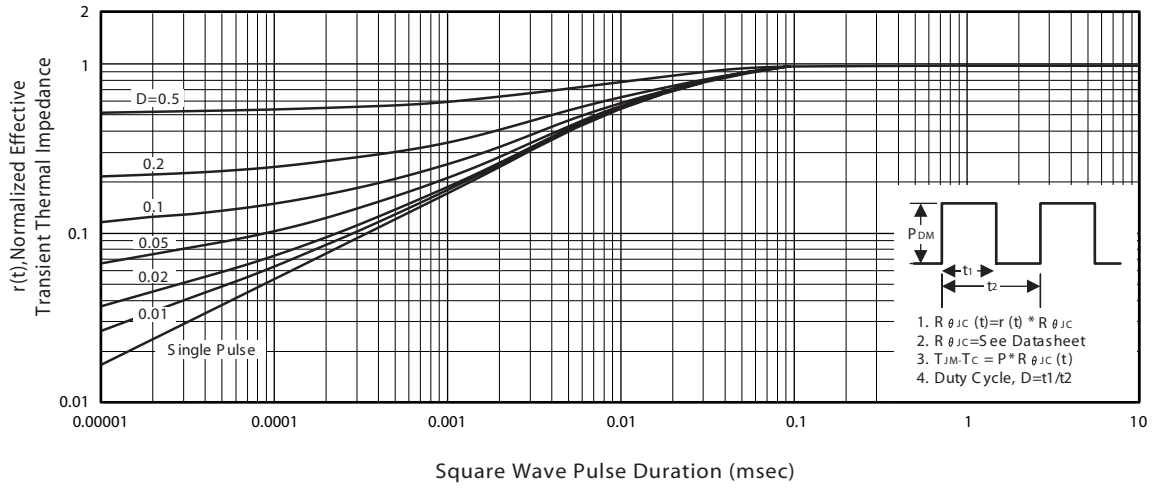
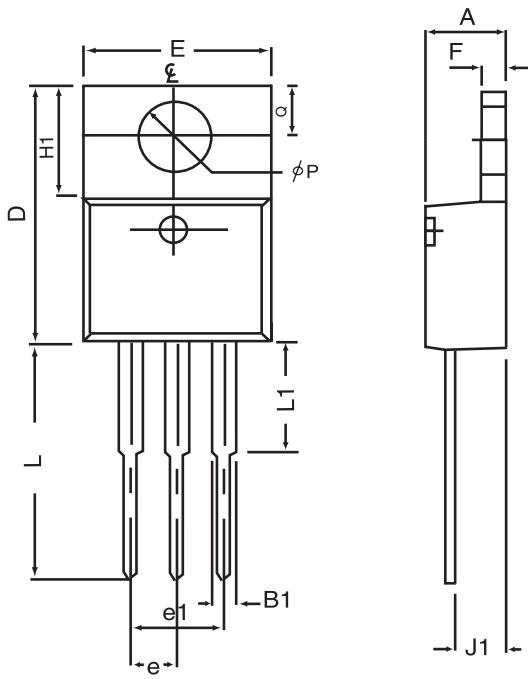


Figure 14. Normalized Thermal Transient Impedance Curve

PACKAGE OUTLINE DIMENSIONS

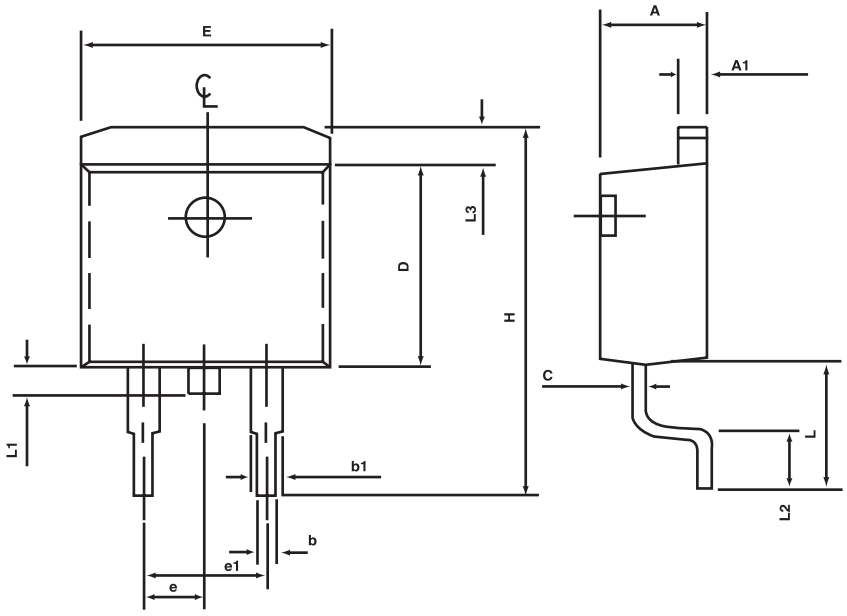
TO-220



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

PACKAGE OUTLINE DIMENSIONS

TO-263AB



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.70	0.169	0.185
A1	1.22	1.32	0.048	0.055
b	0.69	0.94	0.027	0.037
b1	1.22	1.40	0.048	0.055
C	0.36	0.56	0.014	0.022
D	8.64	9.652	0.340	0.380
E	9.70	10.54	0.382	0.415
e	2.29	2.79	0.090	0.110
e1	4.83	5.33	0.190	0.210
H	14.60	15.78	0.575	0.625
L	4.70	5.84	0.185	0.230
L1	1.20	1.778	0.047	0.070
L2	2.24	2.84	0.088	0.111
L3	1.40 MAX		0.055 MAX	

TO-220/263AB Tube