SamHop Microelectronics Corp.

STB820S
STP820S

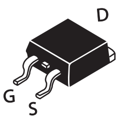
Ver 1.0

N-Channel Logic Level Enhancement Mode Field Effect Transistor

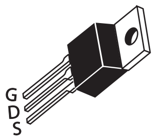
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Typ
75V	54A	15 @ VGS=10V
		18 @ VGS=4.5V

FEATURES

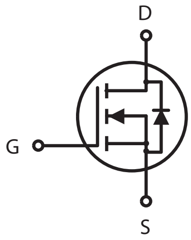
- Super high dense cell design for extremely low RDS(ON).
- High power and current handling capability.
- TO-220 & TO-263 package.



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		75	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Drain Current-Continuous [c]	T_C=25°C	54	A
		T_C=70°C	45	A
I_{DM}	-Pulsed [a c]		159	A
E_{AS}	Single Pulse Avalanche Energy [d]		121	mJ
P_D	Maximum Power Dissipation	T_C=25°C	100	W
		T_C=70°C	70	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	1.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

Jun,08,2015

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	75			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V , 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	1.0	1.8	3.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V , I_D=27A		15	19	m ohm
		V_{GS}=4.5V , I_D=25A		18	24	m ohm
g_{FS}	Forward Transconductance	V_{DS}=10V , I_D=27A		48		S
DYNAMIC CHARACTERISTICS [b]						
C_{ISS}	Input Capacitance	V_{DS}=25V,V_{GS}=0V f=1.0MHz		1152		pF
C_{OSS}	Output Capacitance			182		pF
C_{RSS}	Reverse Transfer Capacitance			122		pF
SWITCHING CHARACTERISTICS [b]						
$t_{D(ON)}$	Turn-On DelayTime	V_{DD}=37.5V I_D=1A V_{GS}=10V R_{GEN}= 6 ohm		15		ns
t_r	Rise Time			30		ns
$t_{D(OFF)}$	Turn-Off DelayTime			51		ns
t_f	Fall Time			19		ns
Q_g	Total Gate Charge	V_{DS}=37.5V,I_D=26A,V_{GS}=10V		18.5		nC
		V_{DS}=37.5V,I_D=26A,V_{GS}=4.5V		11		nC
Q_{gs}	Gate-Source Charge	V_{DS}=37.5V,I_D=26A, V_{GS}=10V		1.8		nC
Q_{gd}	Gate-Drain Charge			6.5		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=6A		0.77	1.3	V

Notes

a.Pulse Test:Pulse Width ≤ 10us, Duty Cycle ≤ 1%.
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} = 40V.
e.Mounted on FR4 Board of 1 inch^2 , 2oz.

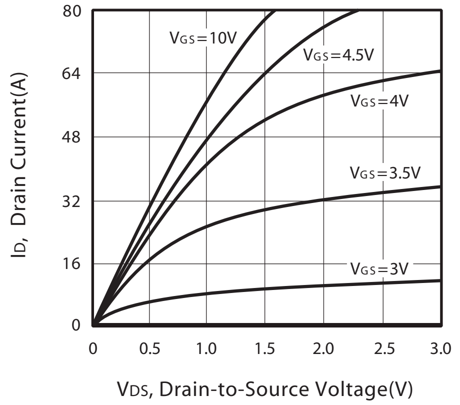


Figure 1. Output Characteristics

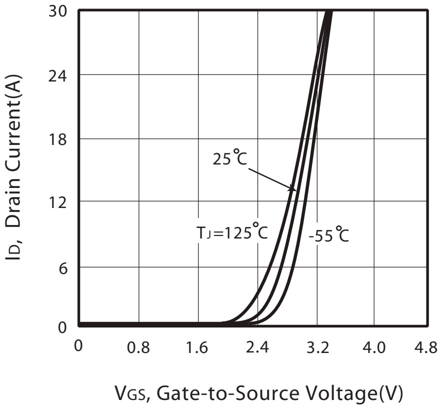


Figure 2. Transfer Characteristics

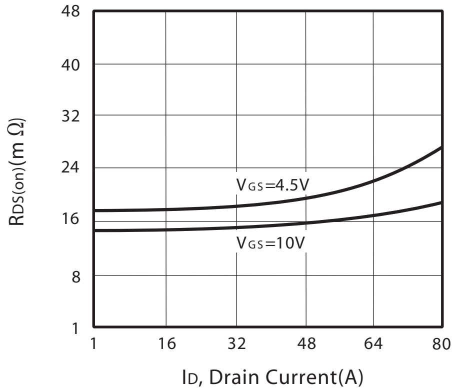


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

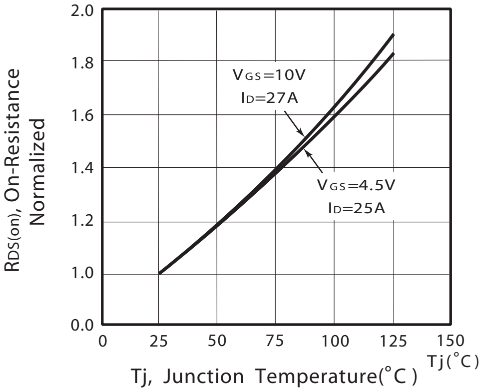


Figure 4. On-Resistance Variation with Drain Current and Temperature

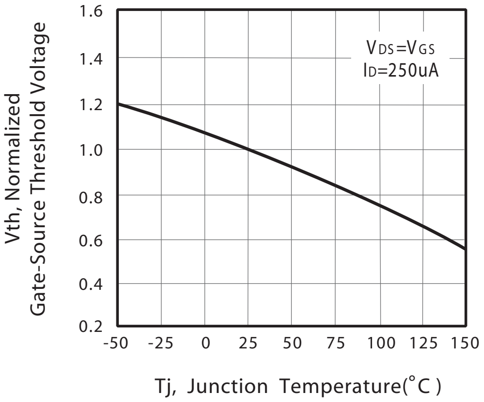


Figure 5. Gate Threshold Variation with Temperature

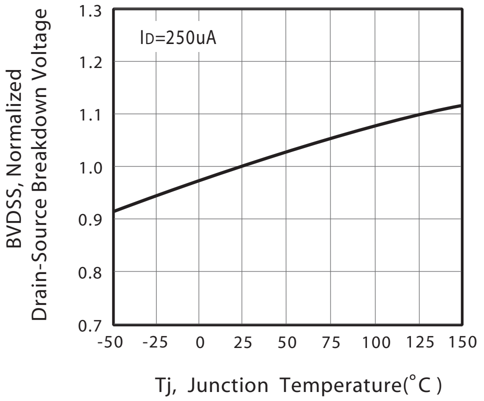


Figure 6. Breakdown Voltage Variation with Temperature

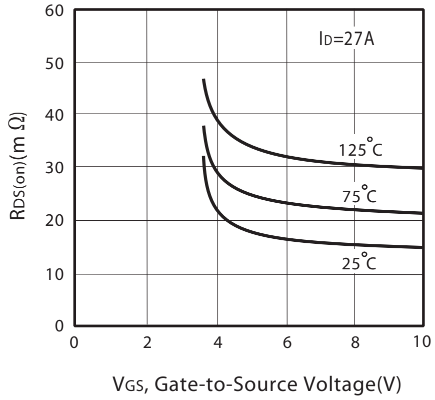


Figure 7. On-Resistance vs. Gate-Source Voltage

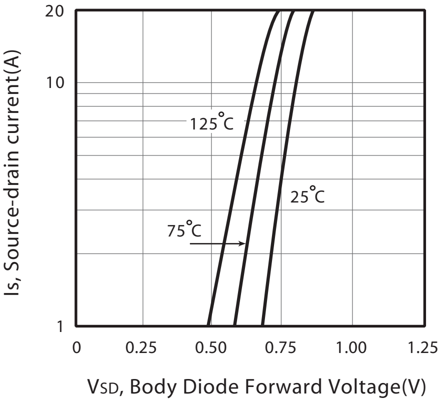


Figure 8. Body Diode Forward Voltage Variation with Source Current

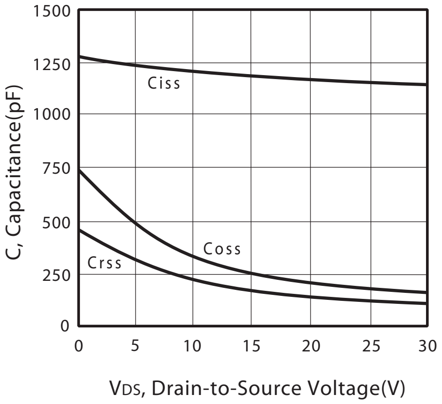


Figure 9. Capacitance

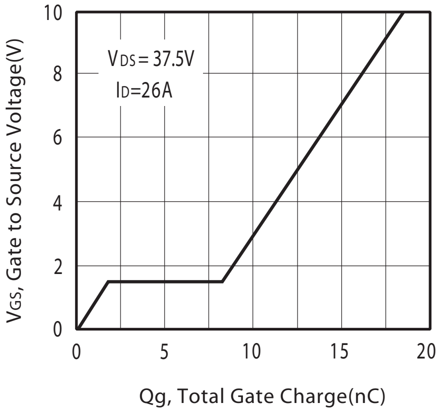


Figure 10. Gate Charge

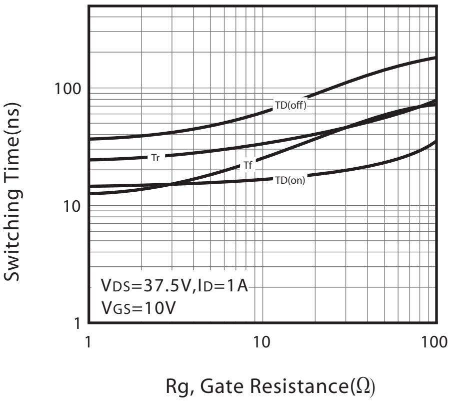


Figure 11. switching characteristics

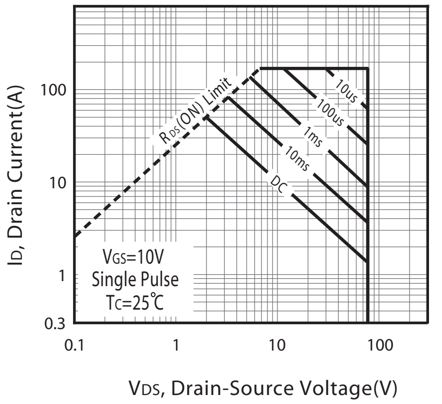
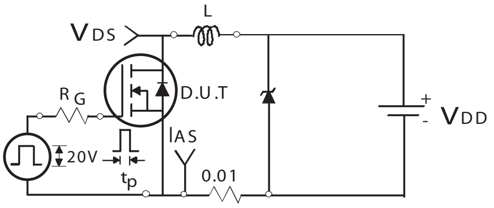
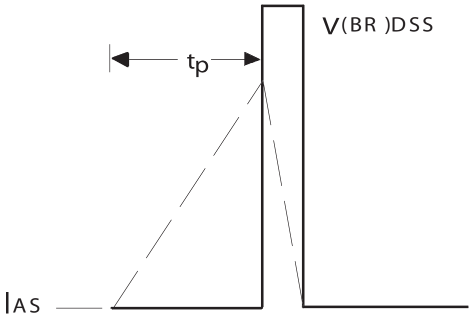


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

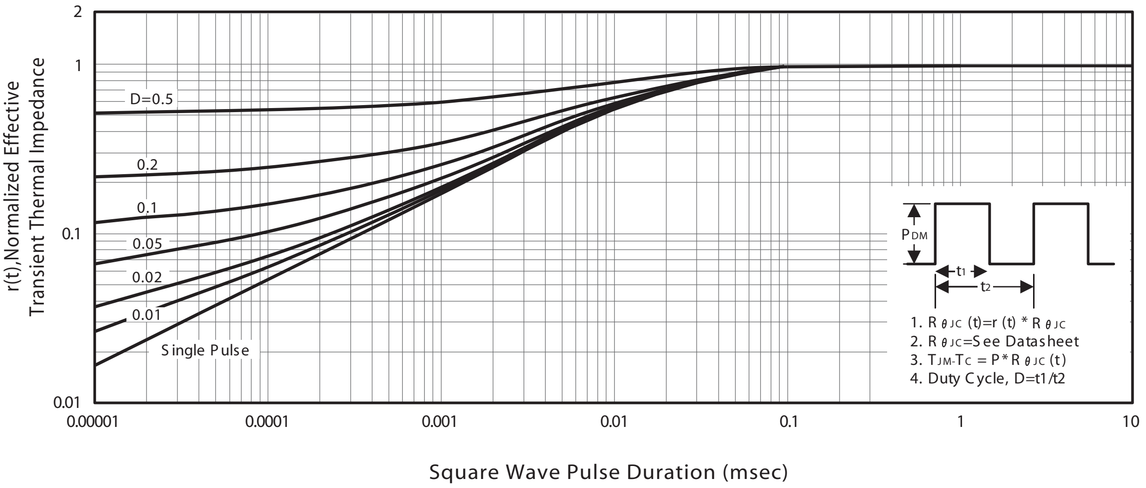
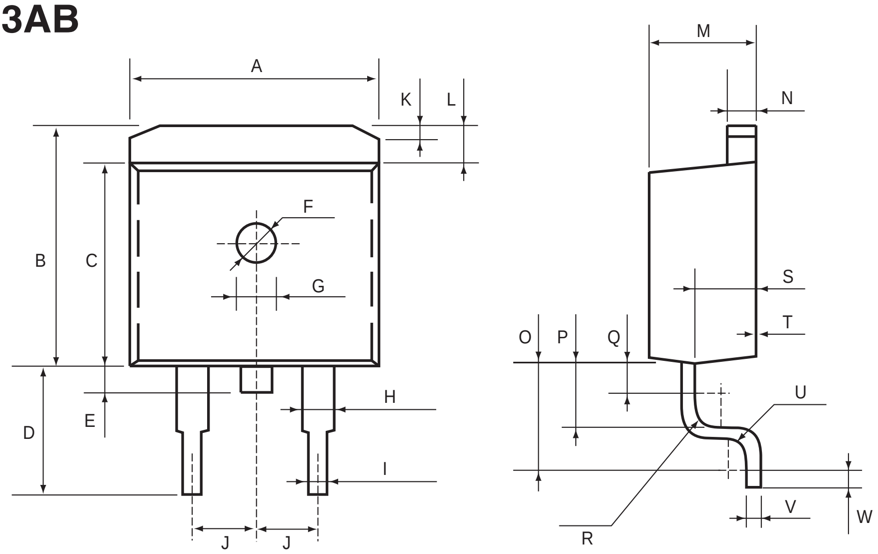


Figure 14. Normalized Thermal Transient Impedance Curve

PACKAGE OUTLINE DIMENSIONS

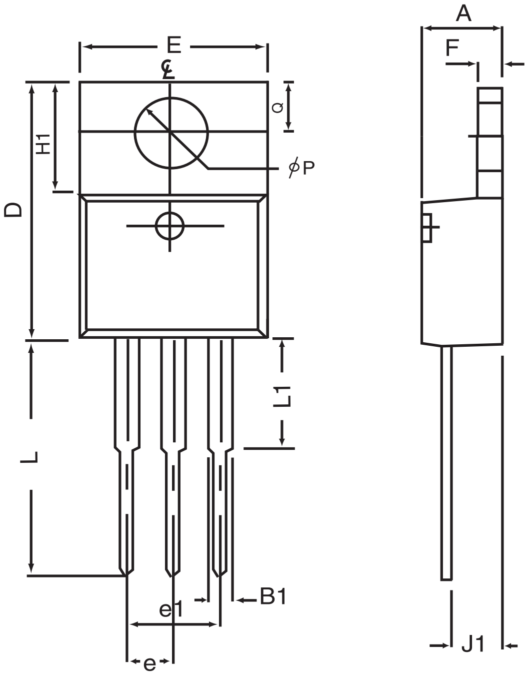
TO-263AB



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.9	10.5	0.390	0.413
B	9.5	10.3	0.374	0.406
C	8.3	8.9	0.327	0.350
D	4.7	5.5	0.185	0.217
E	1.5		0.059	
F	ϕ1.6		ϕ0.063	
G	1.0	1.4	0.039	0.055
H	1.07	1.47	0.042	0.058
I	0.76	1.06	0.030	0.042
J	2.04	3.04	0.080	0.120
K	0.2	0.6	0.0079	0.024
L	1.4		0.055	
M	4.24	4.64	0.167	0.183
N	1.15	1.45	0.045	0.057
O	3.25	3.75	0.128	0.148
P	2.3		0.091	
Q	1.6		0.063	
R	R0.4	R1.0	R0.0158	R0.0394
S	2.7 MAX		0.106 MAX	
T	0.0	0.3	0.0000	0.0118
U	R0.4	R1.0	R0.0158	R0.0394
V	0.3	0.5	0.0118	0.0197
W	1.2 min		0.047 min	

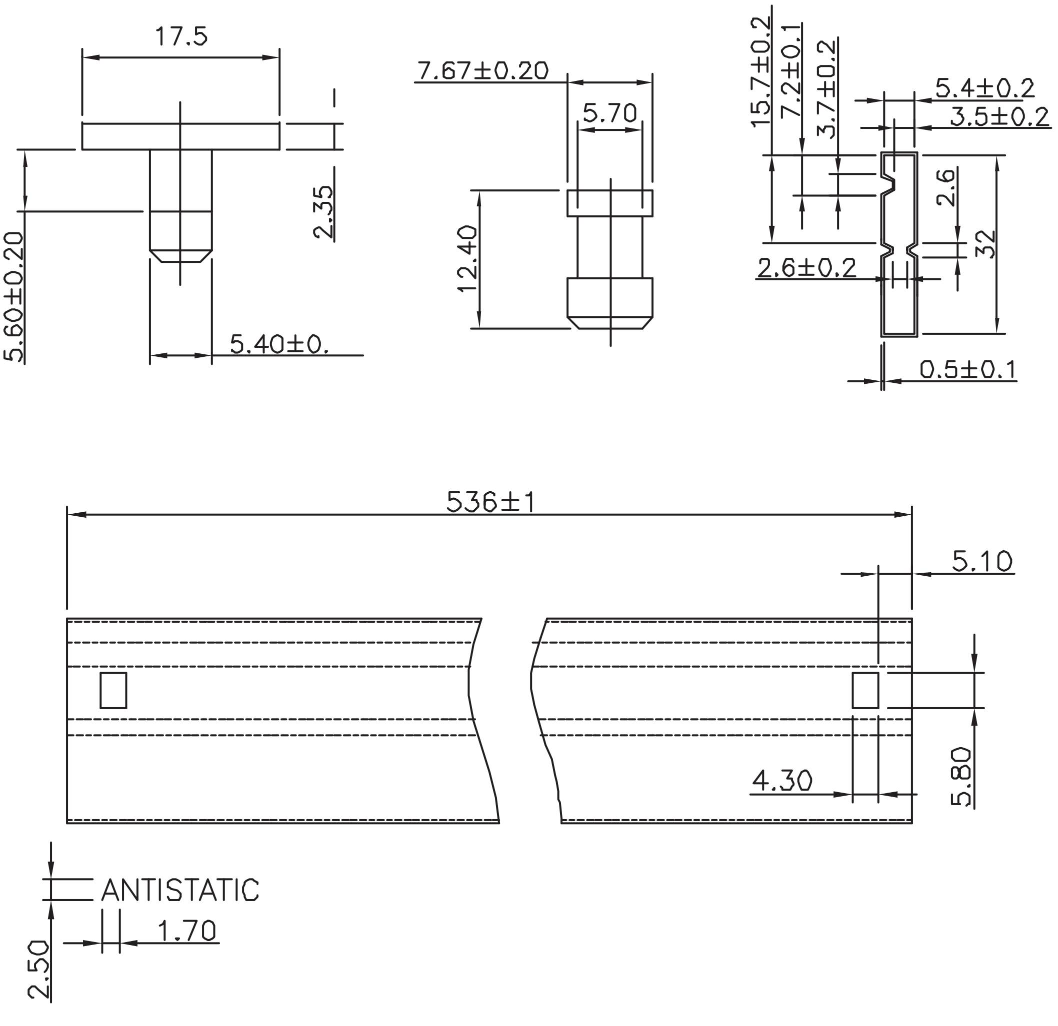
PACKAGE OUTLINE DIMENSIONS

TO-220



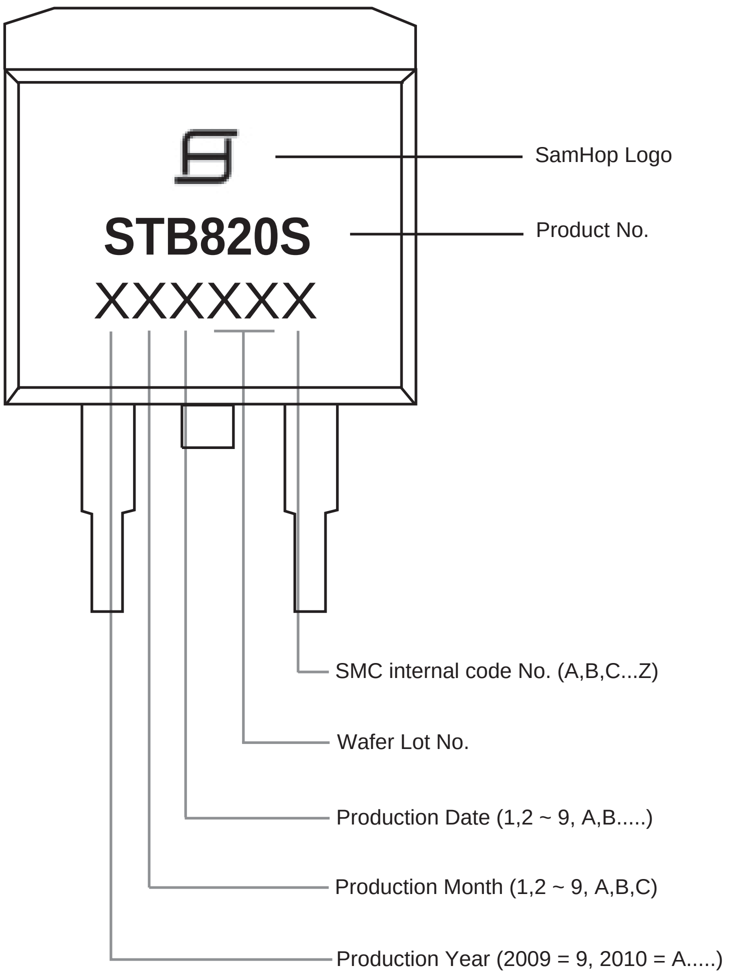
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	4.80	0.170	0.189
B1	1.27	1.65	0.050	0.630
D	14.6	16.00	0.575	0.610
E	9.70	10.41	0.382	0.410
e	2.34	2.74	0.092	0.108
e1	4.68	5.48	0.184	0.216
F	1.14	1.40	0.045	0.055
H1	5.97	6.73	0.235	0.265
J1	2.20	2.79	0.087	0.110
L	12.88	14.22	0.507	0.560
L1	3.00	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-220/263AB Tube



TOP MARKING DEFINITION

TO-263



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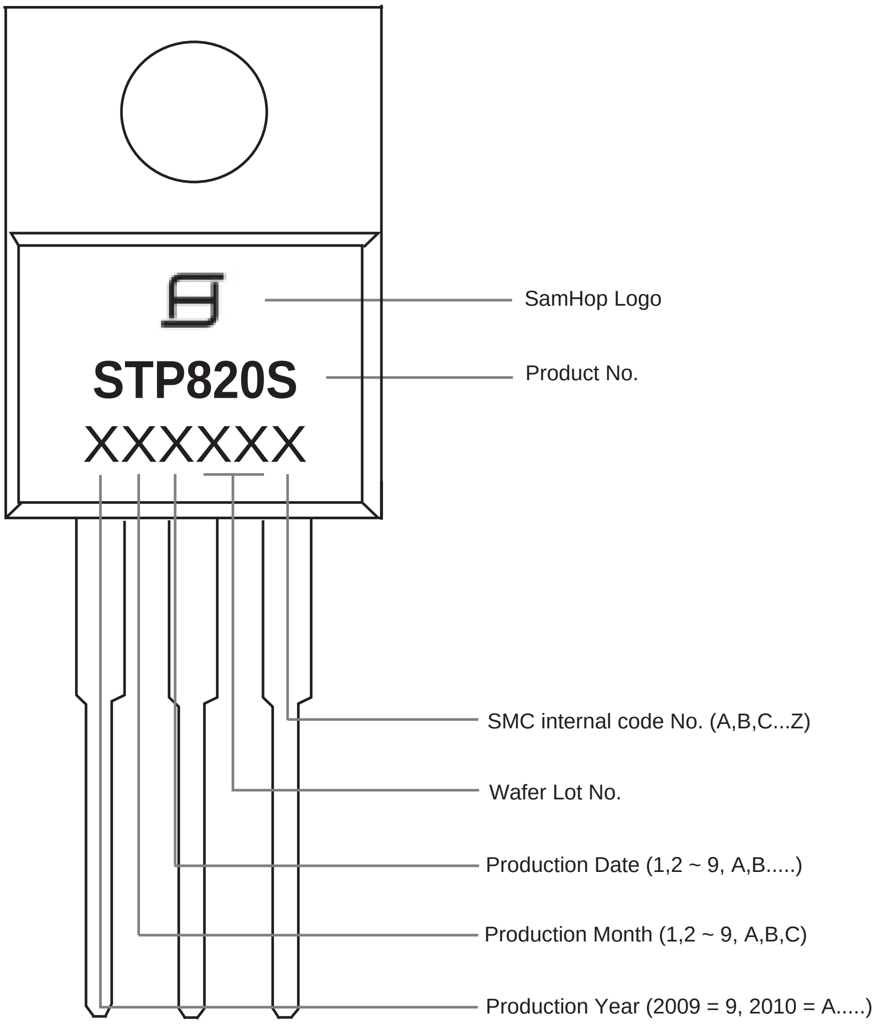
TO-220



SamHop Logo

Product No.

SMC internal code No. (A,B,C...Z)

Wafer Lot No.

Production Date (1,2 ~ 9, A,B.....)

Production Month (1,2 ~ 9, A,B,C)

Production Year (2009 = 9, 2010 = A.....)