



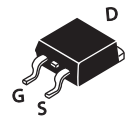
N-Channel Logic Level Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

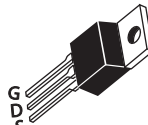
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Typ
75V	54A	15 @ V _{GS} =10V
		18 @ V _{GS} =4.5V

FEATURES

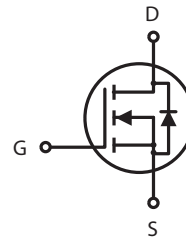
- Super high dense cell design for extremely low R_{DS(ON)}.
- High power and current handling capability.
- TO-220 & TO-263 package.



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	Tc=25°C	54	A
		Tc=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	Tc=25°C	100	W
		Tc=70°C	70	W
T _J , T _{STG}	Operating Junction and Storage Temperature Range		-55 to 175	°C

THERMAL CHARACTERISTICS

R _{θJC}	Thermal Resistance, Junction-to-Case	1.5	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

STB820S

STP820S

Ver 1.0

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.						

Jun,08,2015

STB820S STP820S

Ver 1.0

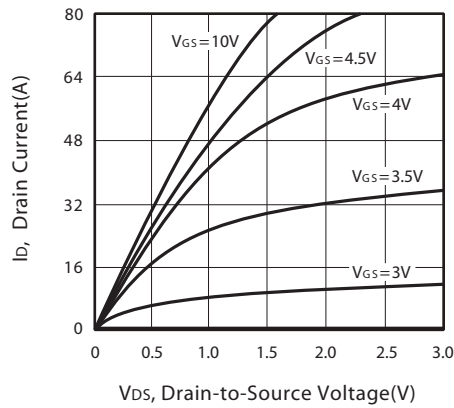


Figure 1. Output Characteristics

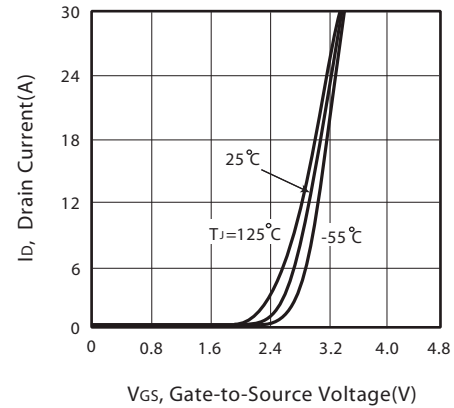


Figure 2. Transfer Characteristics

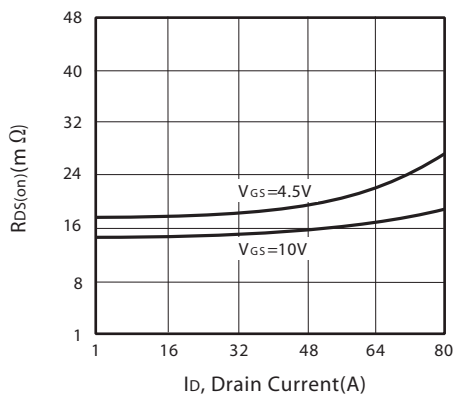


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

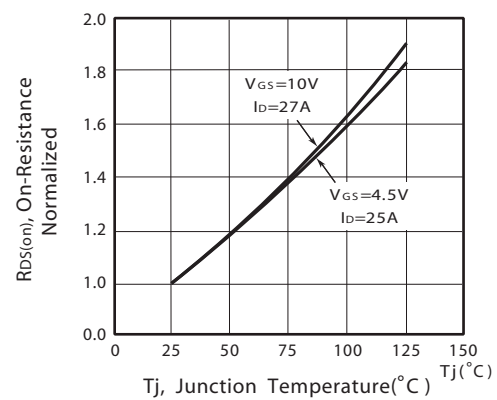


Figure 4. On-Resistance Variation with Drain Current and Temperature

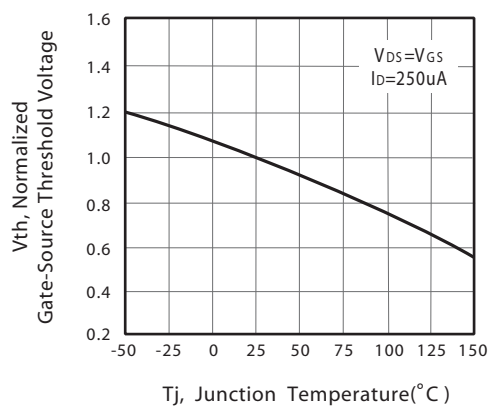


Figure 5. Gate Threshold Variation with Temperature

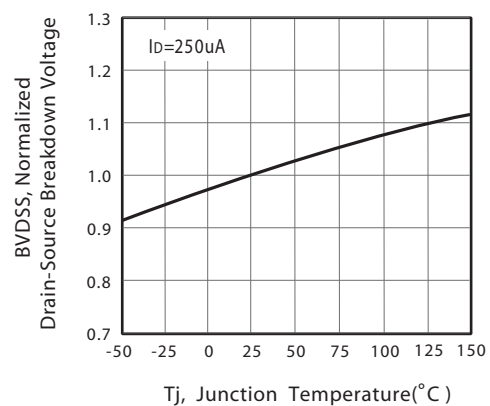


Figure 6. Breakdown Voltage Variation with Temperature

Jun,08,2015

STB820S

STP820S

Ver 1.0

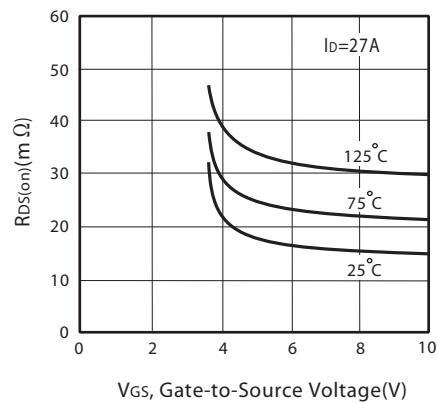


Figure 7. On-Resistance vs. Gate-Source Voltage

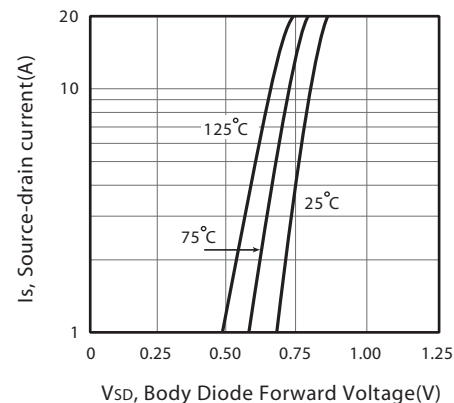


Figure 8. Body Diode Forward Voltage Variation with Source Current

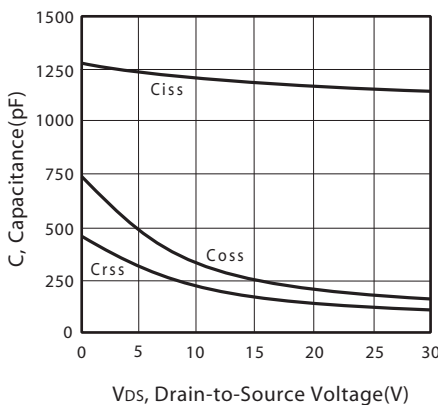


Figure 9. Capacitance

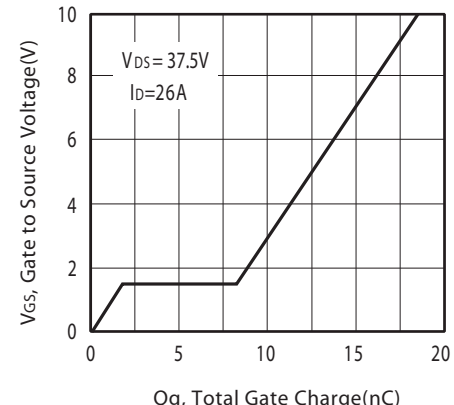


Figure 10. Gate Charge

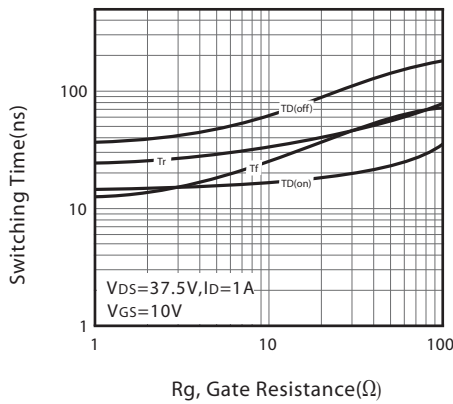


Figure 11. switching characteristics

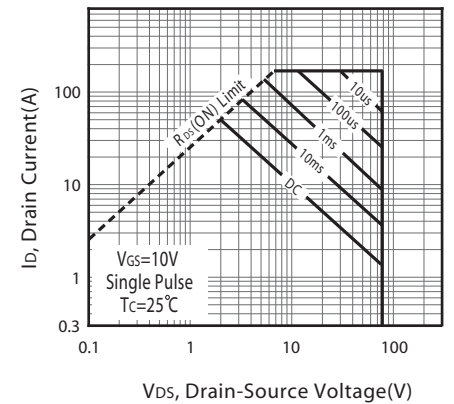


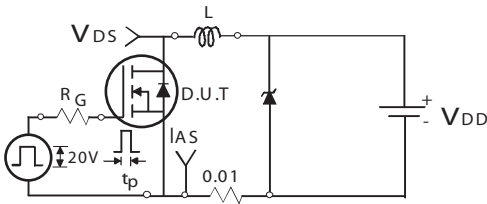
Figure 12. Maximum Safe Operating Area

Jun,08,2015

STB820S

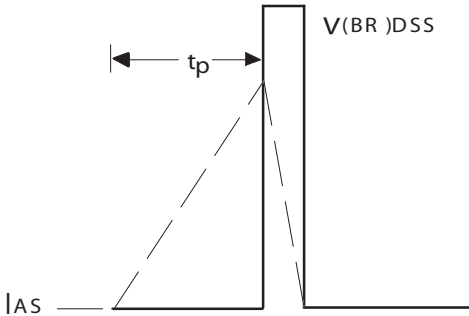
STP820S

Ver 1.0



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

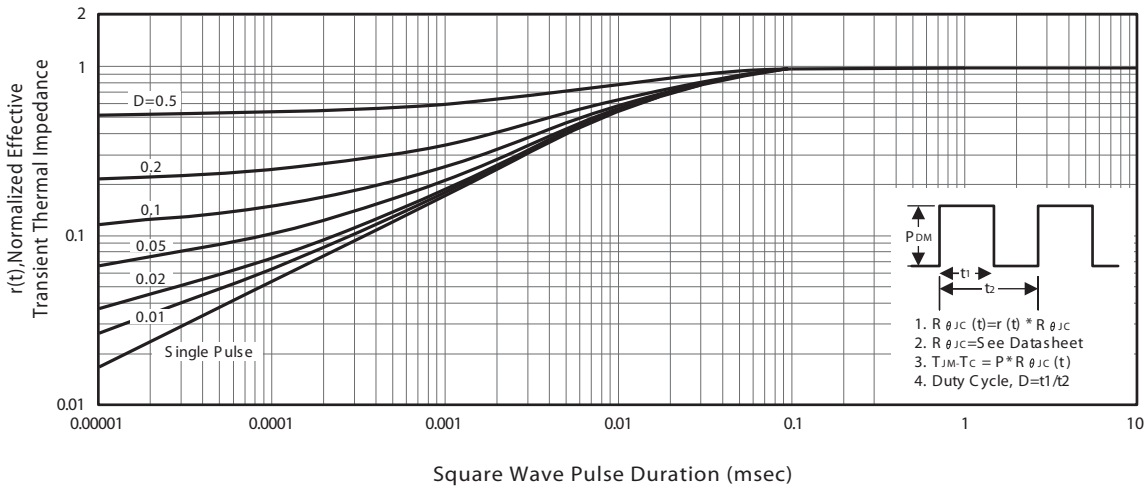


Figure 14. Normalized Thermal Transient Impedance Curve

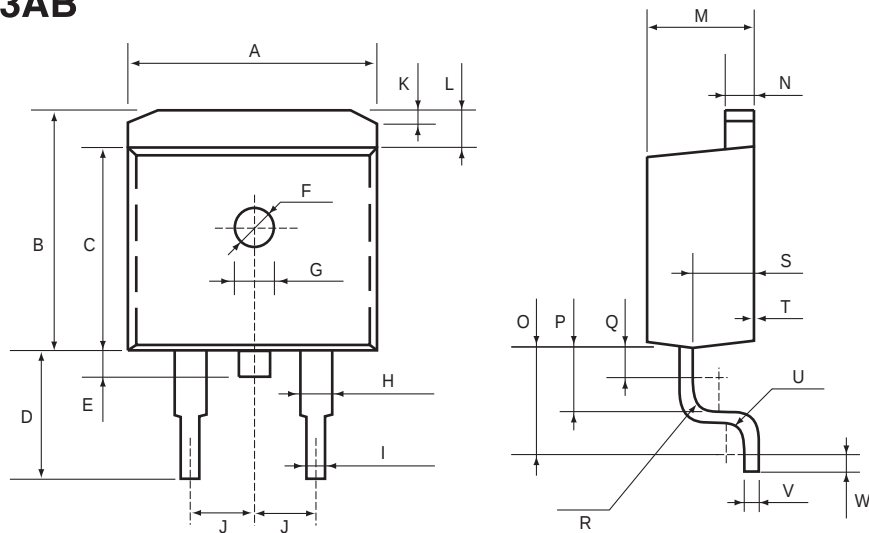
STB820S

STP820S

Ver 1.0

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	ϕ 1.6		ϕ 0.063	
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	

Jun,08,2015

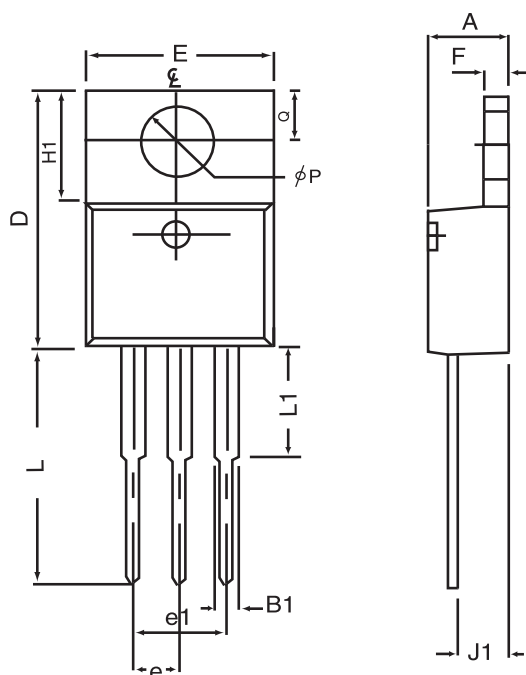
STB820S

STP820S

Ver 1.0

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	0.063
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

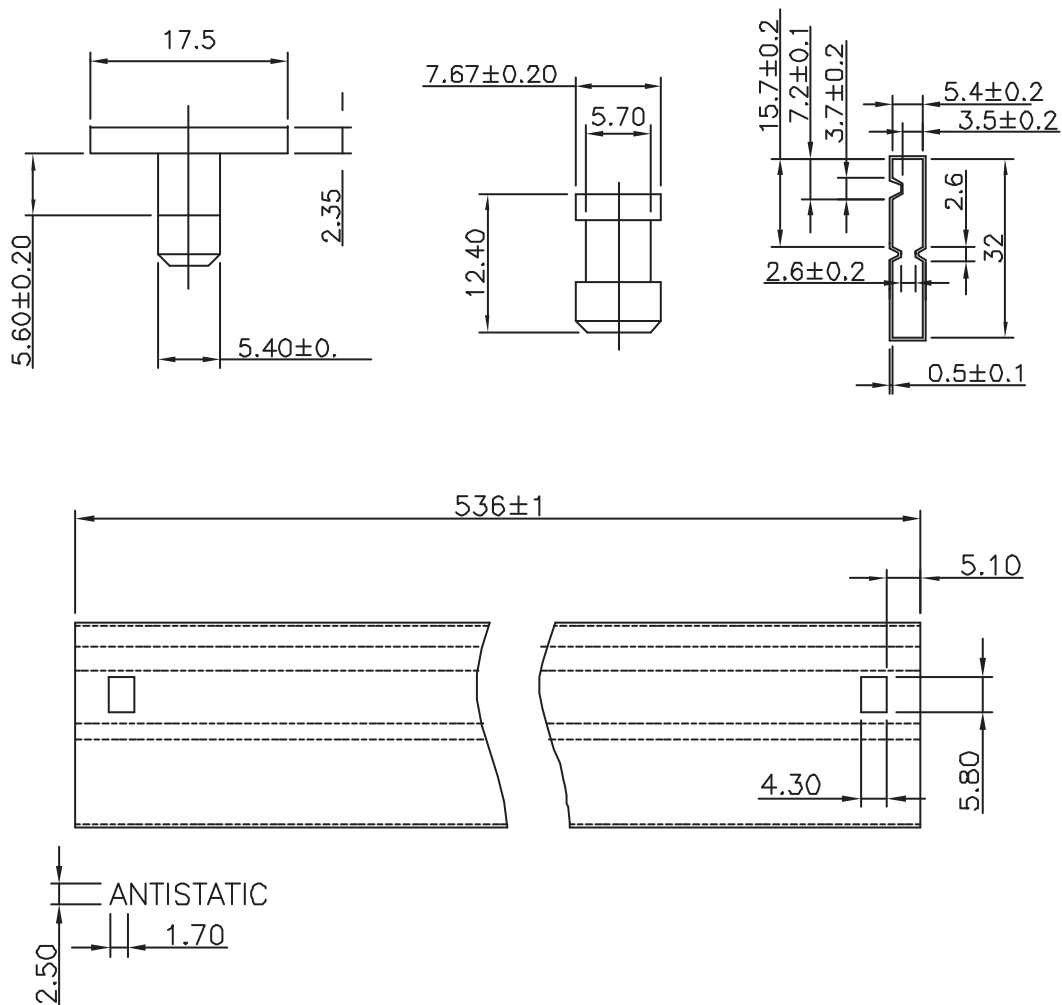
Jun,08,2015

STB820S

STP820S

Ver 1.0

TO-220/263AB Tube



Jun,08,2015

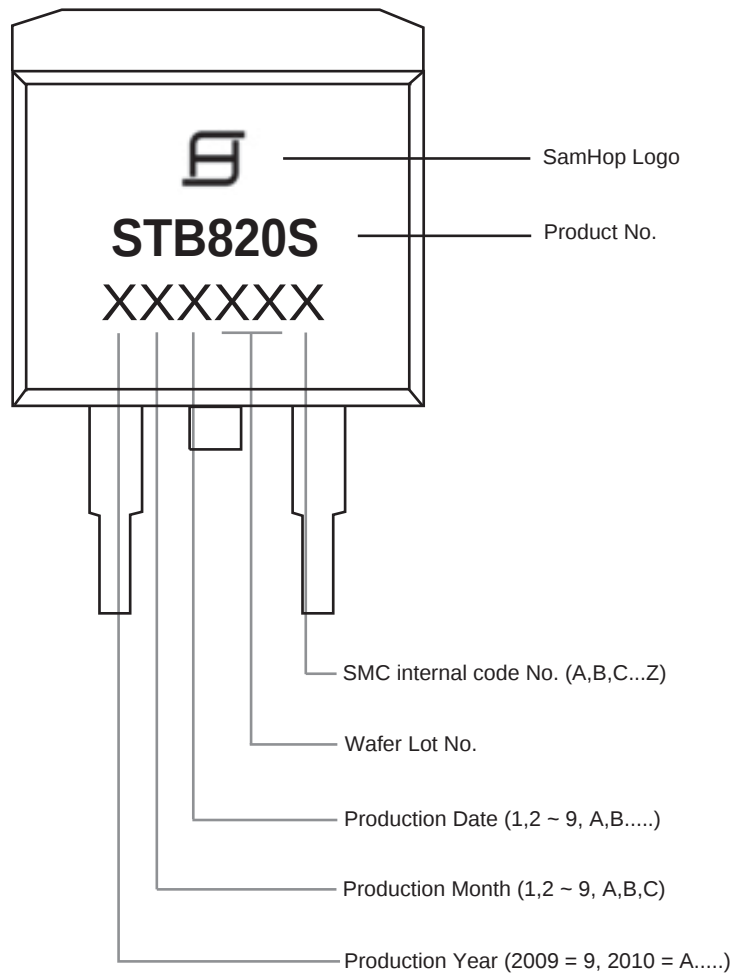
STB820S

STP820S

Ver 1.0

TOP MARKING DEFINITION

TO-263



Jun,08,2015

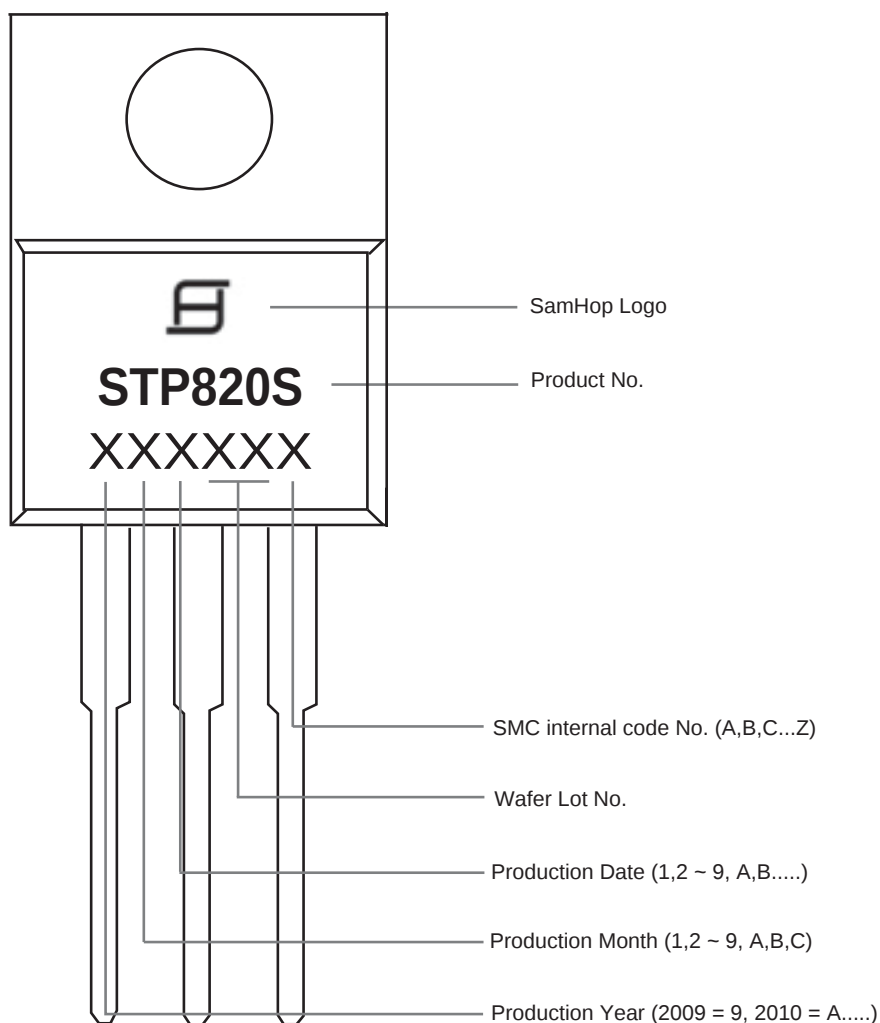
STB820S

STP820S

Ver 1.0

TOP MARKING DEFINITION

TO-220



Jun,08,2015