



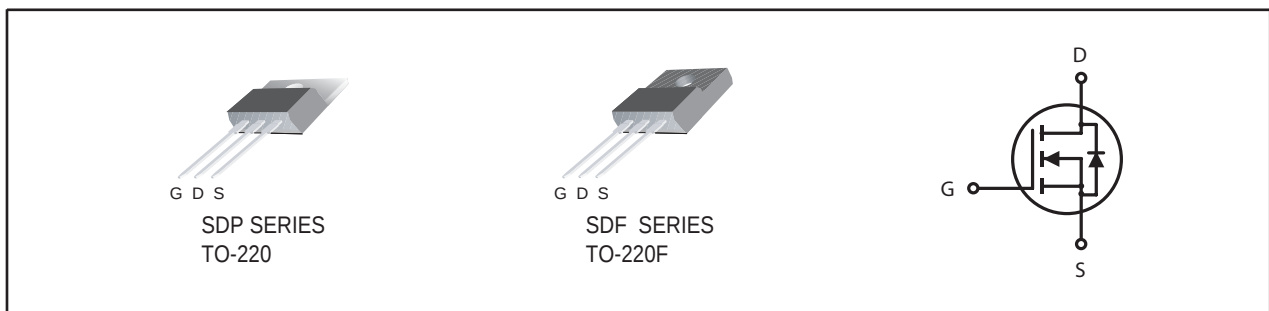
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(ON)} (Ω) Typ
500V	8A	0.7 @ V _{GS} =10V

FEATURES

- Super high dense cell design for low R_{DS(ON)}.
- Rugged and reliable.
- TO-220 and TO-220F Package.



ORDERING INFORMATION

Ordering Code	Package	Marking Code	Delivery Mode	RoHS Status
SDP08N50HZ	TO-220	SDP08N50	Tube	Halogen Free
SDP08N50PZ	TO-220	08N50	Tube	Pb Free
SDF08N50HZ	TO-220F	SDF08N50	Tube	Halogen Free
SDF08N50PZ	TO-220F	08N50	Tube	Pb Free

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

Symbol	Parameter	SDP08N50	SDF08N50	Units
V _{DS}	Drain-Source Voltage	500		V
V _{GS}	Gate-Source Voltage	±30	±30	V
I _D	Drain Current-Continuous ^a	T _C =25°C	8	A
		T _C =100°C	5.7	A
I _{DM}	-Pulsed ^a	24	24	A
E _{AS}	Single Pulse Avalanche Energy ^c	225		mJ
P _D	Maximum Power Dissipation	T _C =25°C	75	W
		T _C =100°C	37.5	W
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 to 175		°C

THERMAL CHARACTERISTICS

R _{θJC}	Thermal Resistance, Junction-to-Case	2	6	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	62.5	62.5	°C/W

SDP08N50

SDF08N50

Ver 2.4

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	500			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =400V , V _{GS} =0V			1	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±30V , 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 =4A		0.7	0.9	ohm
g _{FS}	Forward Transconductance	V _{DS} =20V , I _D =4A		6.2		S
DYNAMIC CHARACTERISTICS ^c						
C _{ISS}	Input Capacitance	V _{DS} =25V,V _{GS} =0V f=1.0MHz		835		pF
C _{OSS}	Output Capacitance			94		pF
C _{RSS}	Reverse Transfer Capacitance			9		pF
SWITCHING CHARACTERISTICS ^c						
t _{D(ON)}	Turn-On Delay Time	V _{DD} =250V I _D =1A V _{GS} =10V R _{GEN} = 6 ohm		30		ns
t _r	Rise Time			17		ns
t _{D(OFF)}	Turn-Off Delay Time			33		ns
t _f	Fall Time			14		ns
Q _g	Total Gate Charge	V _{DS} =250V,I _D =1A,V _{GS} =10V		11		nC
Q _{gs}	Gate-Source Charge	V _{DS} =250V,I _D =1A, V _{GS} =10V		2.5		nC
Q _{gd}	Gate-Drain Charge			4		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V _{SD}	Diode Forward Voltage	V _{GS} =0V,I _S =3A		0.79	1.4	V
Notes						
a.Drain current limited by maximum junction temperatrue.						
b.Guaranteed by design, not subject to production testing.						
c.Starting T _J =25 ^o C,L=50mH,V _{DD} = 50V.(See Figure12)						

Dec,24,2013

SDP08N50

SDF08N50

Ver 2.4

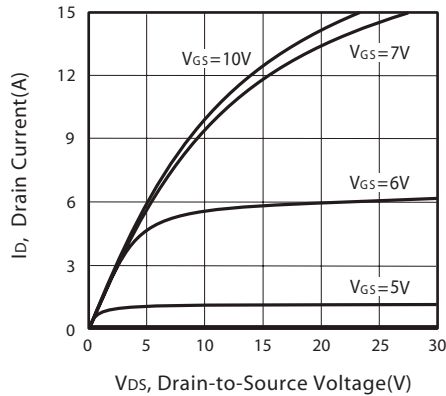


Figure 1. Output Characteristics

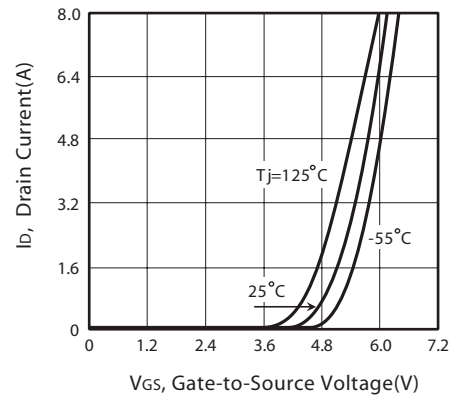


Figure 2. Transfer Characteristics

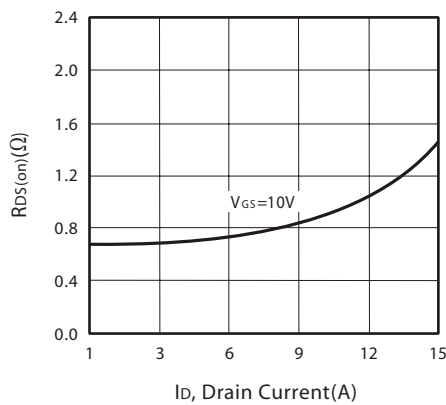


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

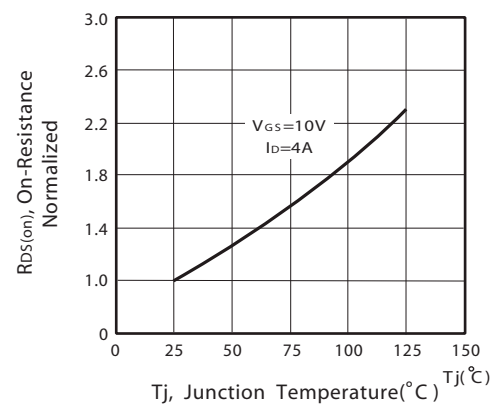


Figure 4. On-Resistance Variation with Drain Current and Temperature

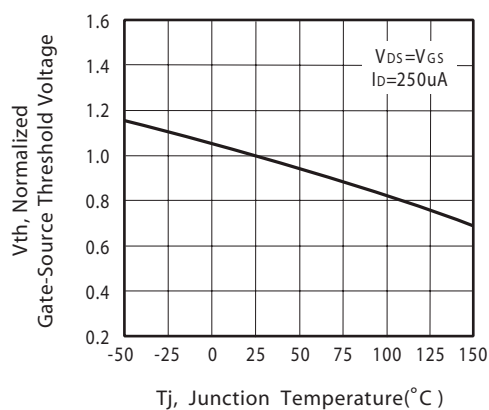


Figure 5. Gate Threshold Variation with Temperature

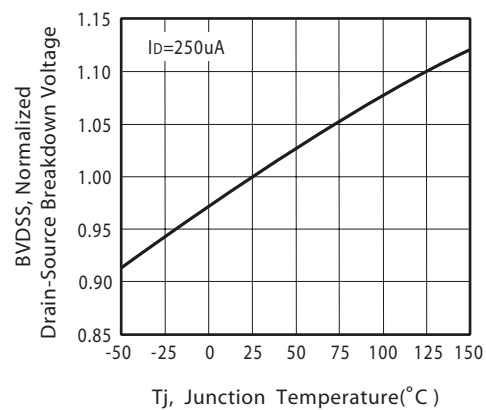


Figure 6. Breakdown Voltage Variation with Temperature

Dec,24,2013

SDP08N50

SDF08N50

Ver 2.4

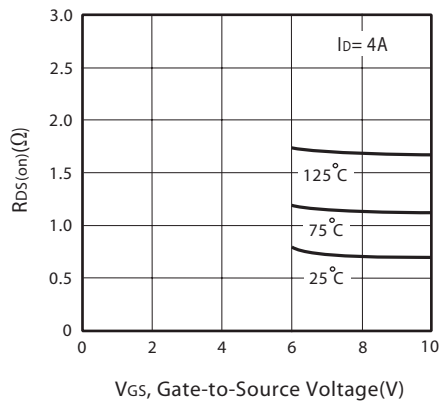


Figure 7. On-Resistance vs. Gate-Source Voltage

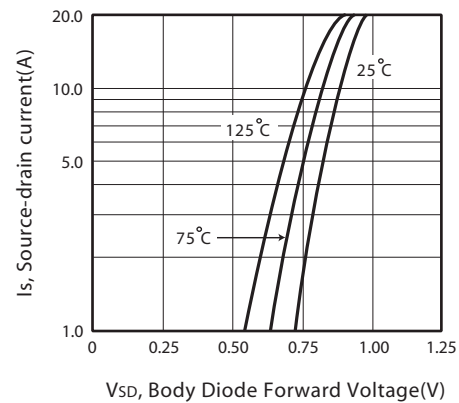


Figure 8. Body Diode Forward Voltage Variation with Source Current

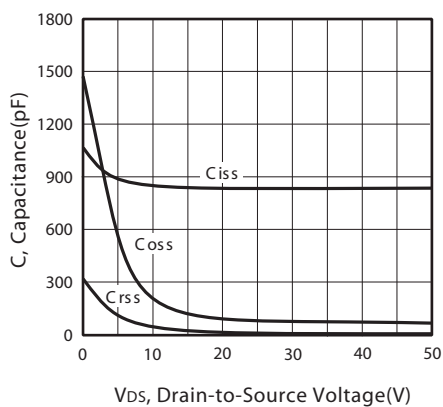


Figure 9. Capacitance

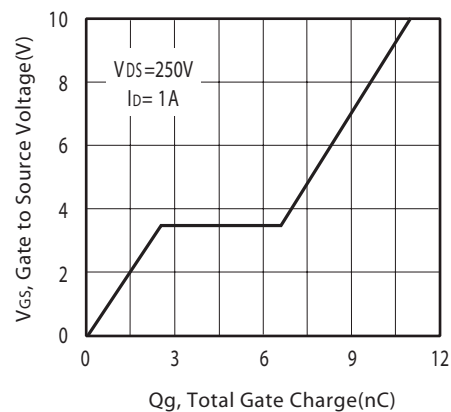


Figure 10. Gate Charge

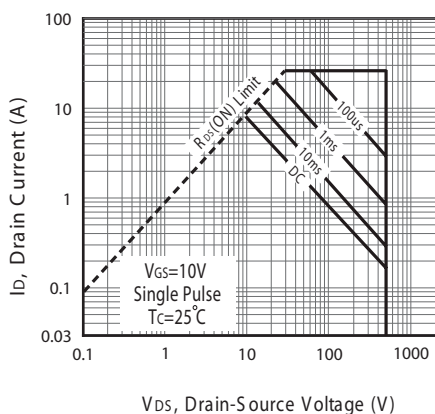


Figure 11a. Maximum Safe Operating Area for SDP08N50

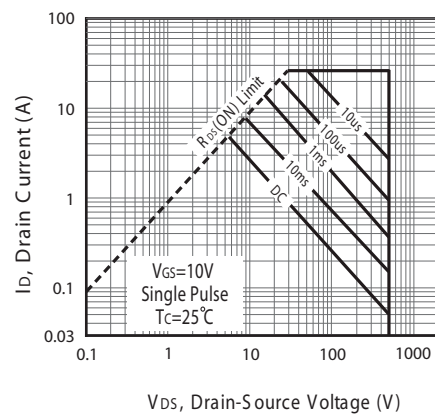


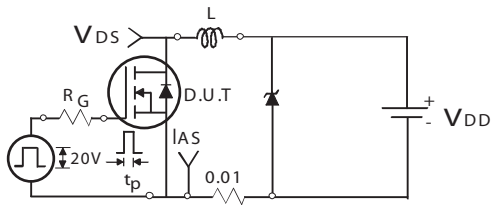
Figure 11b. Maximum Safe Operating Area for SDF08N50

Dec,24,2013

SDP08N50

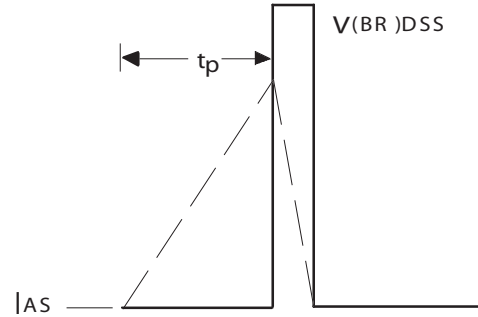
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Ver 2.4



Unclamped Inductive Test Circuit

Figure 12a.



Unclamped Inductive Waveforms

Figure 12b.

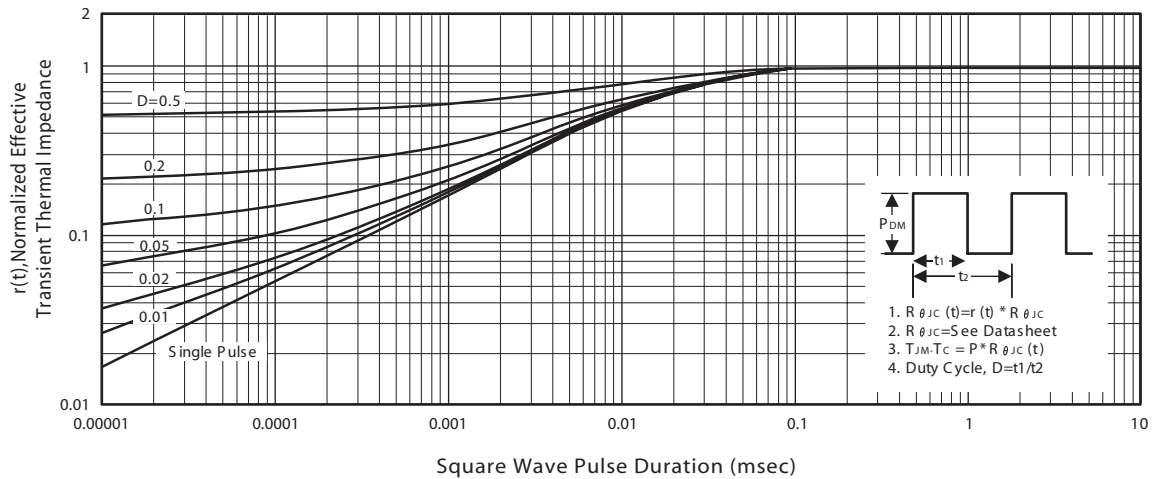


Figure 13a. Normalized Thermal Transient Impedance Curve for SDP08N50

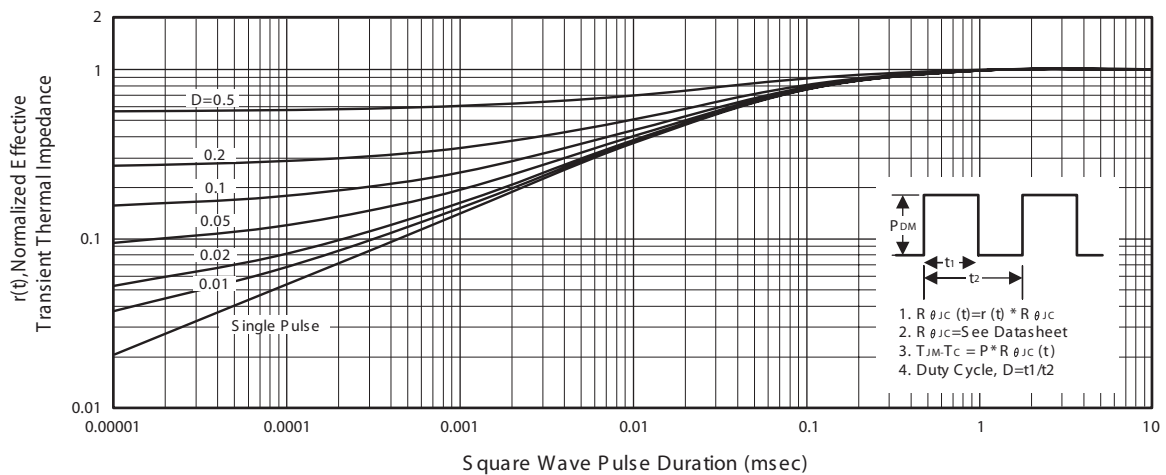


Figure 13b. Normalized Thermal Transient Impedance Curve for SDF08N50

Dec,24,2013

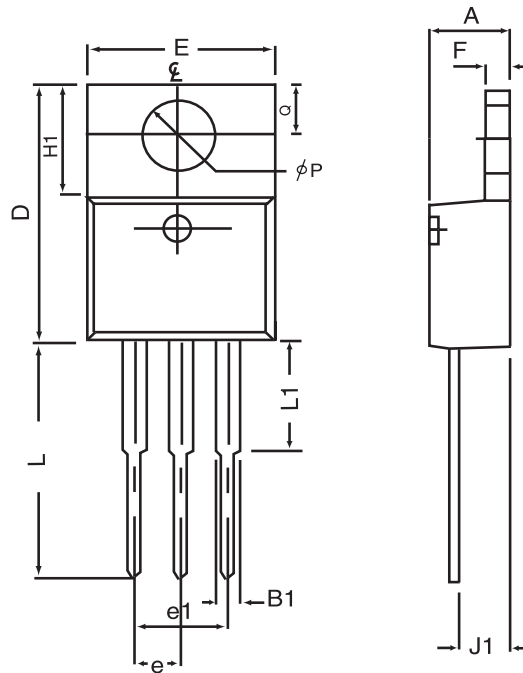
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SDF08N50

Ver 2.4

PACKAGE OUTLINE DIMENSIONS

TO-220



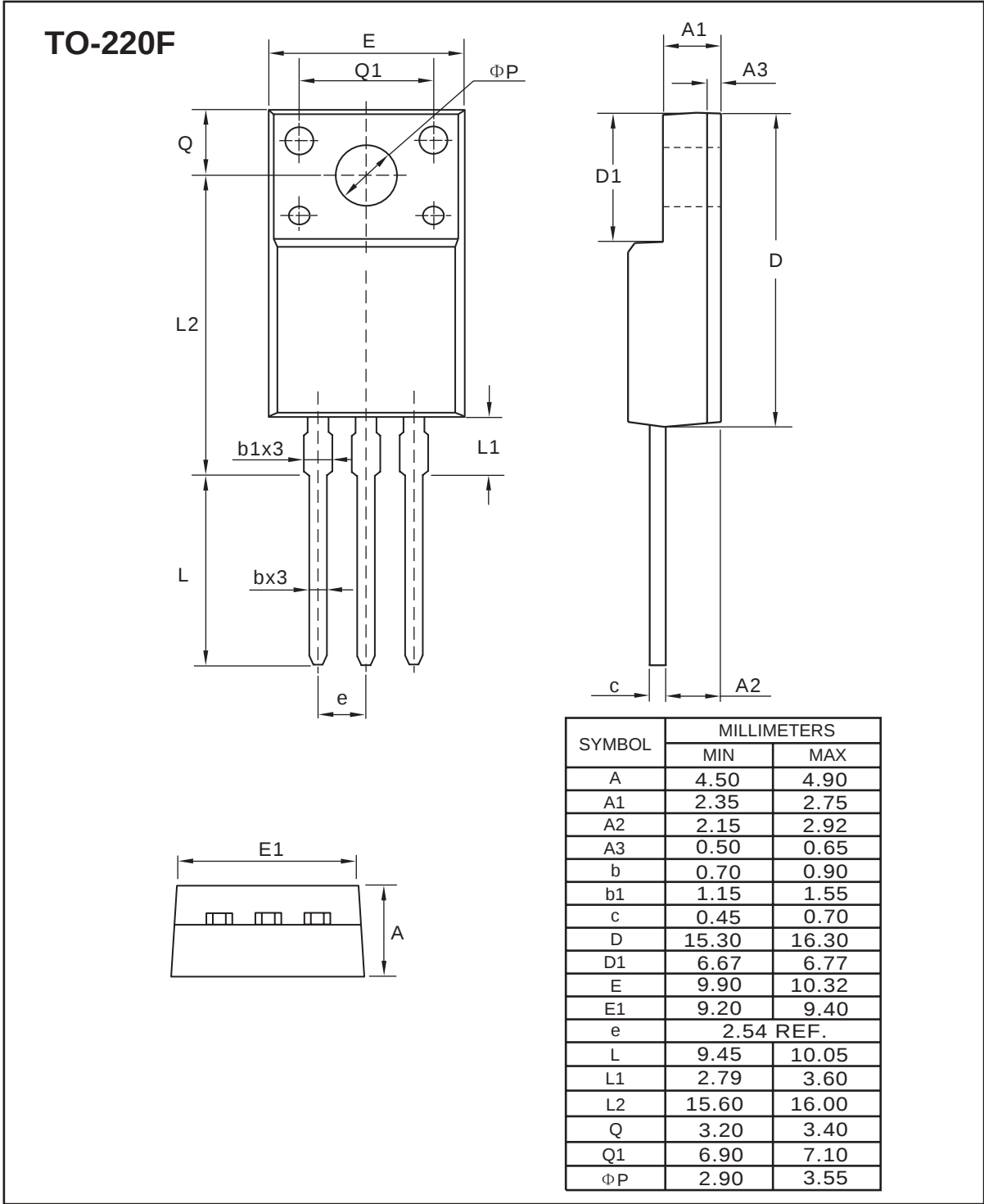
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	4.80	0.170	0.189
B1	1.27	1.65	0.050	0.0630
D	14.6	16.00	0.575	0.610
E	9.70	10.41	0.382	0.410
e	2.34	2.74	0.092	0.108
e1	4.68	5.48	0.184	0.216
F	1.14	1.40	0.045	0.055
H1	5.97	6.73	0.235	0.265
J1	2.20	2.79	0.087	0.110
L	12.88	14.22	0.507	0.560
L1	3.00	6.35	0.120	0.250
ϕP	3.50	3.94	0.138	0.155
Q	2.54	3.05	0.100	0.120

Dec,24,2013

SDP08N50
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Ver 2.4

PACKAGE OUTLINE DIMENSIONS



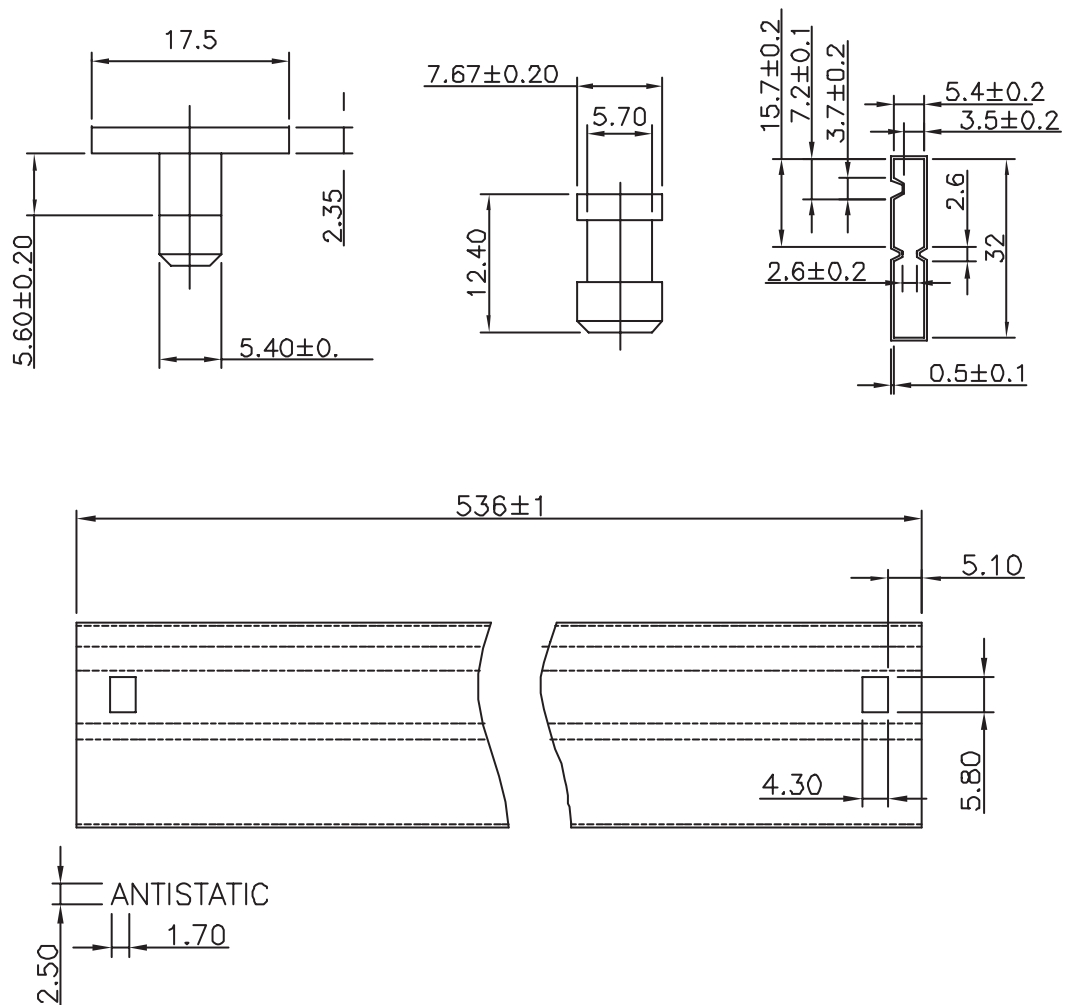
Dec,24,2013

SDP08N50

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Ver 2.4

TO-220 Tube



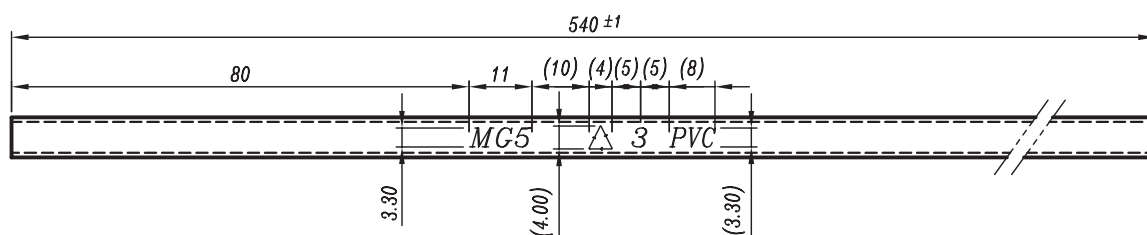
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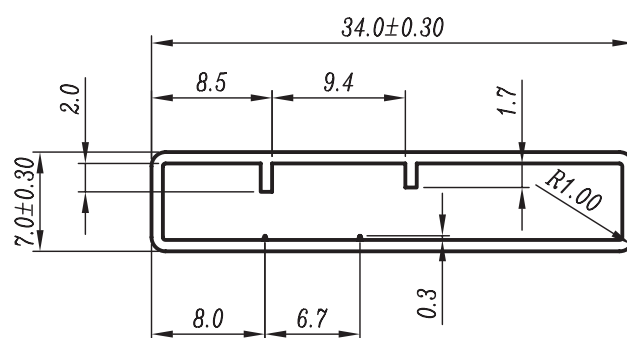
SDF08N50

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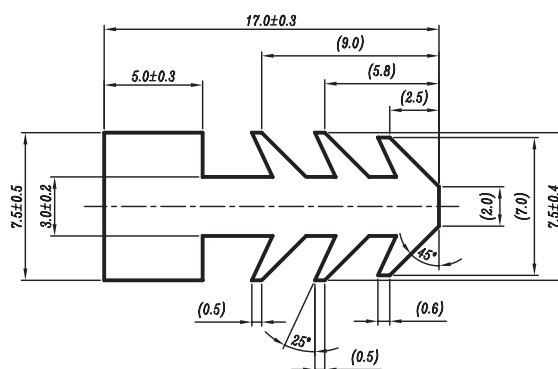
TO-220F Tube



$$t = 0.8 \pm 0.15$$



$$SCALE = 2/1$$



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

Dec,24,2013

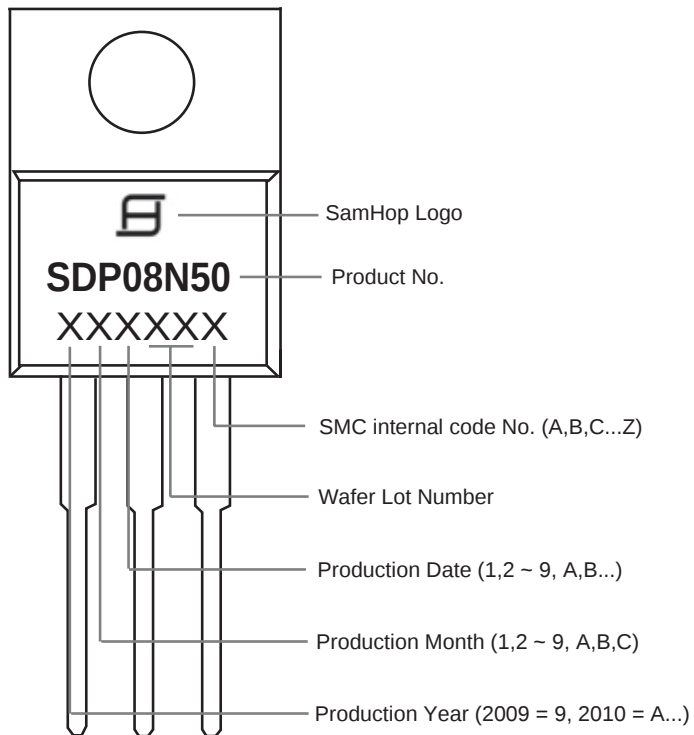
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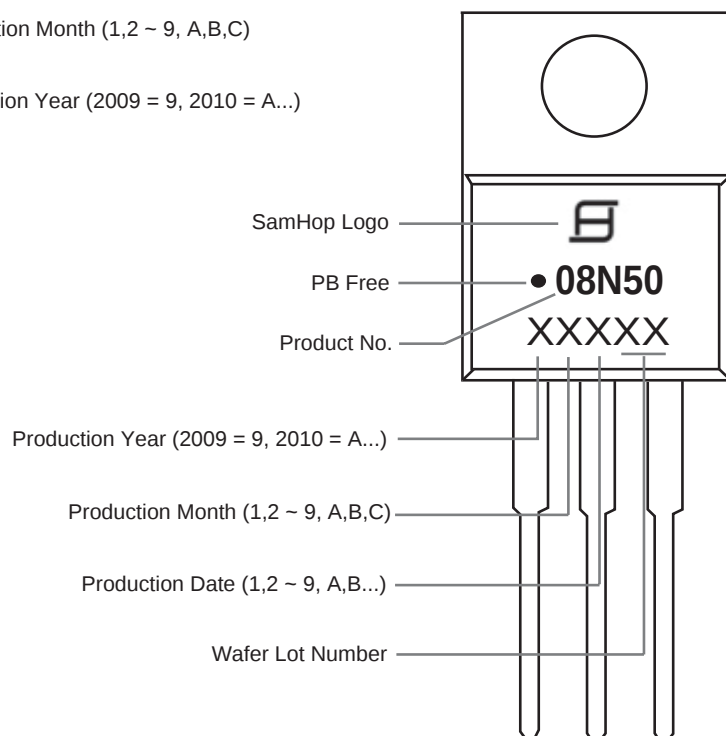
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TOP MARKING DEFINITION

TO-220 (Halogen Free)



TO-220 (Pb Free)



Dec,24,2013

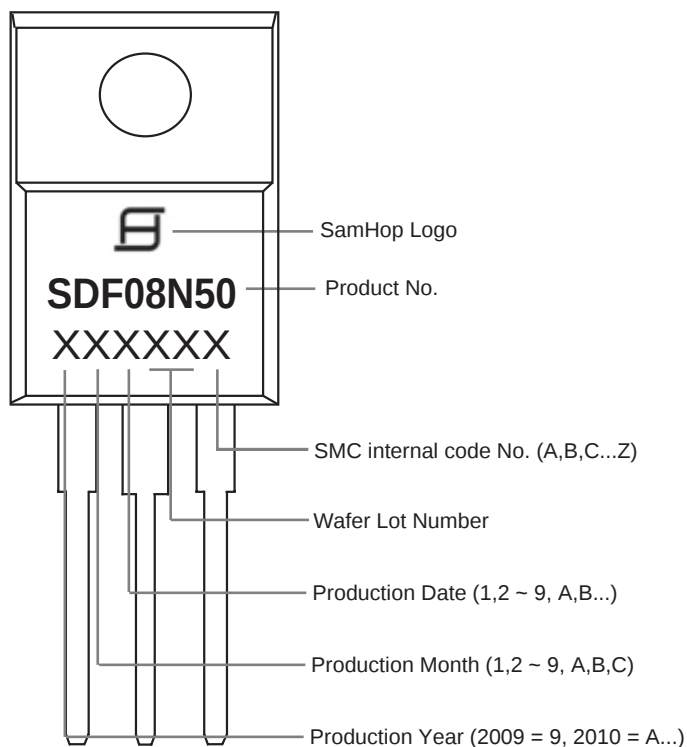
SDP08N50

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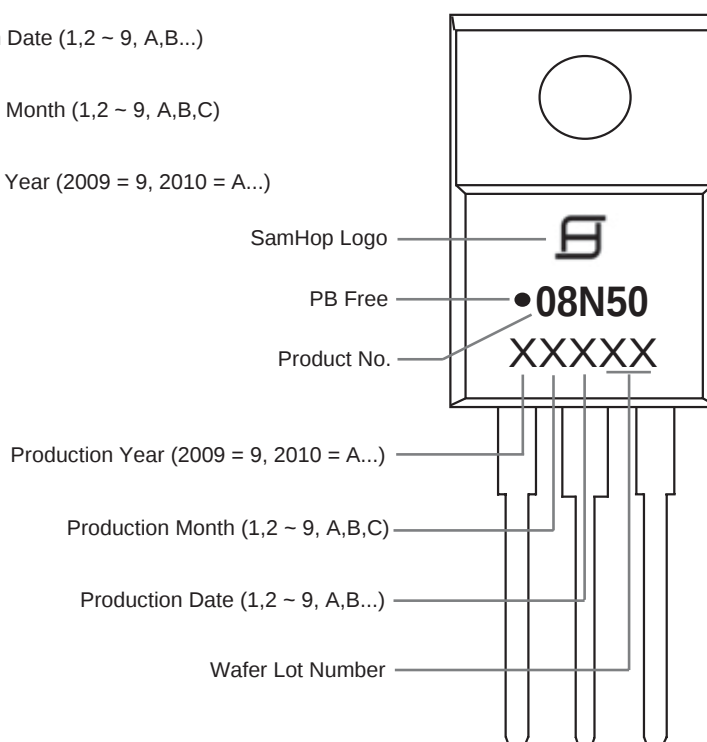
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TOP MARKING DEFINITION

TO-220F (Halogen Free)



TO-220F (Pb Free)



Dec,24,2013