



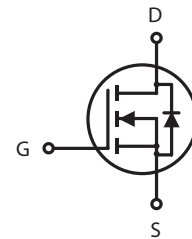
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(ON)} (Ω) Typ
500V	7A	0.76 @ 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
SDP07N50HZ	TO-220	SDP07N50	Tube	Halogen Free
SDP07N50PZ	TO-220	07N50	Tube	Pb Free
SDF07N50HZ	TO-220F	SDF07N50	Tube	Halogen Free
SDF07N50PZ	TO-220F	07N50	Tube	Pb Free

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

Symbol	Parameter		SDP07N50	SDF07N50	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	7	7	A
		T _C =100°C	4.9	4.9	A
I _{DM}	-Pulsed ^a		20	20	A
E _{AS}	Single Pulse Avalanche Energy ^c		6		mJ
P _D	Maximum Power Dissipation	T _C =25°C	88	29	W
		T _C =100°C	44	15	W
T _J , T _{STG}	Operating Junction and Storage Temperature Range		-55 to 175		°C

THERMAL CHARACTERISTICS

R _{θJC}	Thermal Resistance, Junction-to-Case	1.7	5.1	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	62.5	62.5	°C/W

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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 =3.5A		0.76	0.93	ohm
g _{FS}	Forward Transconductance	V _{DS} =20V , I _D =3.5A		7.6		S
DYNAMIC CHARACTERISTICS ^b						
C _{iss}	Input Capacitance	V _{DS} =25V,V _{GS} =0V f=1.0MHz		916		pF
C _{oss}	Output Capacitance			104		pF
C _{rss}	Reverse Transfer Capacitance			16		pF
SWITCHING CHARACTERISTICS ^b						
t _{D(ON)}	Turn-On Delay Time	V _{DD} =250V I _D =1A V _{GS} =10V R _{GEN} = 6 ohm		37		ns
t _r	Rise Time			20		ns
t _{D(OFF)}	Turn-Off Delay Time			42		ns
t _f	Fall Time			15		ns
Q _g	Total Gate Charge	V _{DS} =250V,I _D =1A,V _{GS} =10V		21		nC
Q _{gs}	Gate-Source Charge	V _{DS} =250V,I _D =1A, V _{GS} =10V		3.6		nC
Q _{gd}	Gate-Drain Charge			9		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V _{SD}	Diode Forward Voltage	V _{GS} =0V,I _S =4A		0.81	1.4	V

Notes

- a. Drain current limited by maximum junction temperature.
b. Guaranteed by design, not subject to production testing.
c. Starting T_J=25°C, L=0.5mH, V_{DD} = 50V. (See Figure12)

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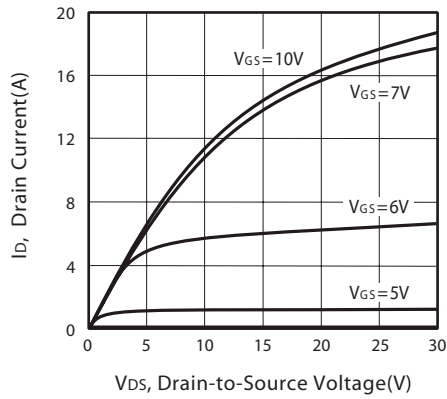


Figure 1. Output Characteristics

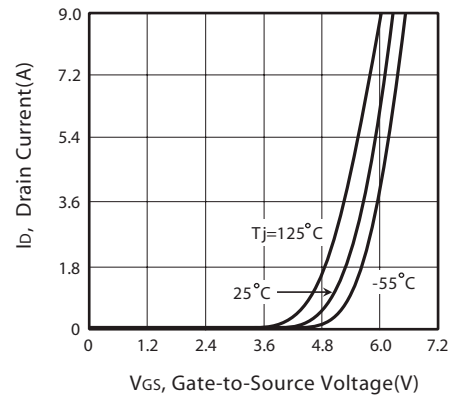


Figure 2. Transfer Characteristics

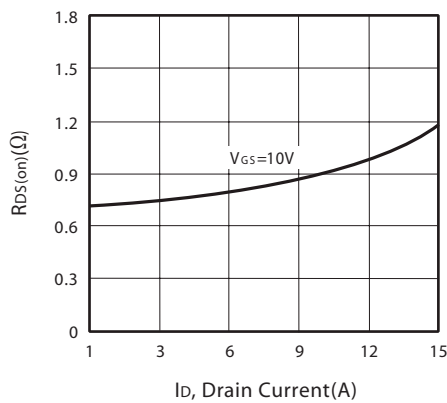


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

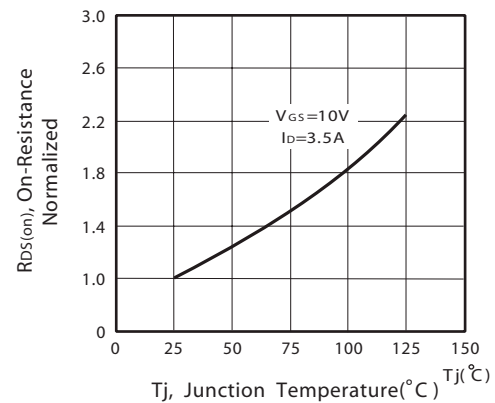


Figure 4. On-Resistance Variation with Drain Current and Temperature

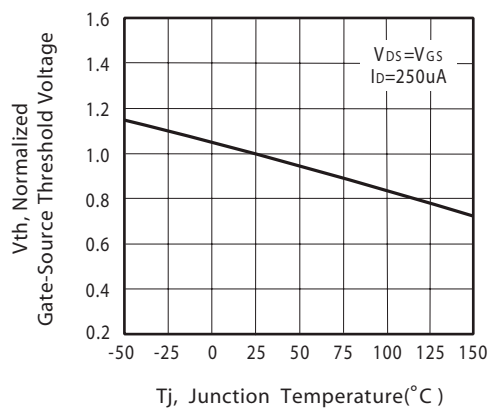


Figure 5. Gate Threshold Variation with Temperature

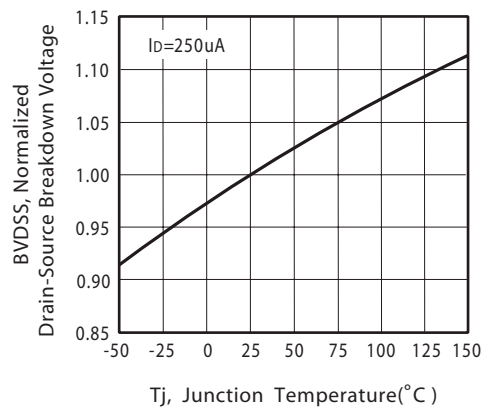


Figure 6. Breakdown Voltage Variation with Temperature

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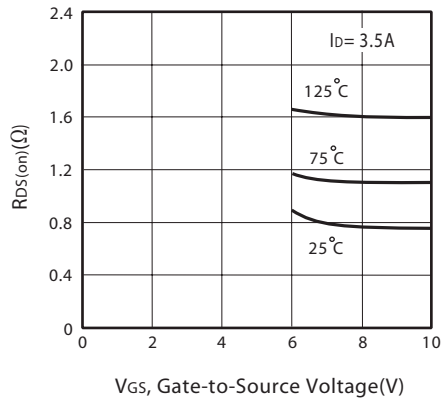


Figure 7. On-Resistance vs. Gate-Source Voltage

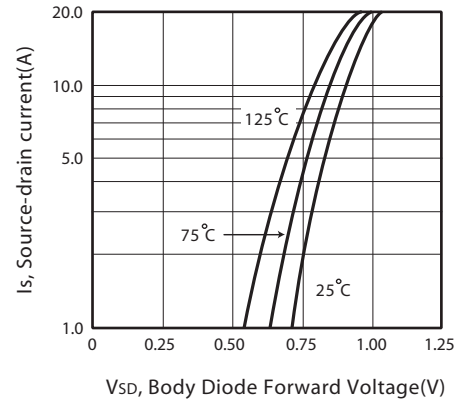


Figure 8. Body Diode Forward Voltage Variation with Source Current

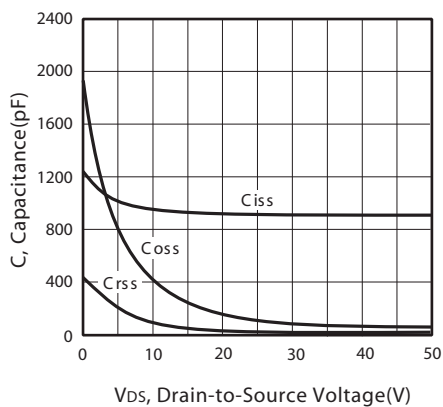


Figure 9. Capacitance

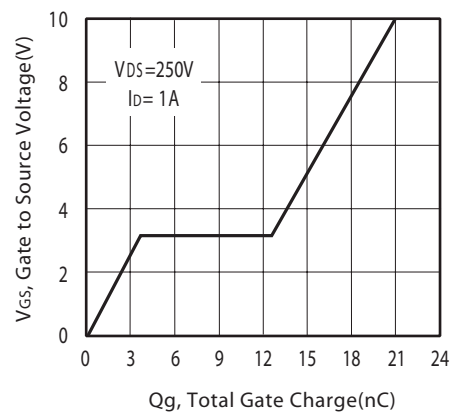


Figure 10. Gate Charge

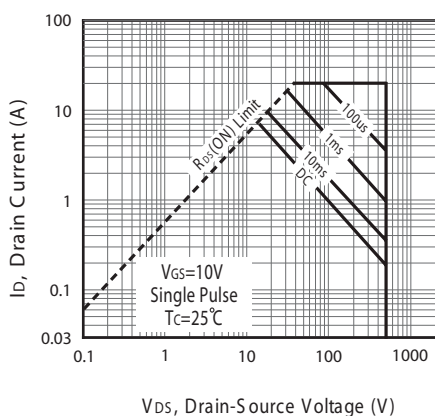


Figure 11a. Maximum Safe Operating Area for SDP07N50

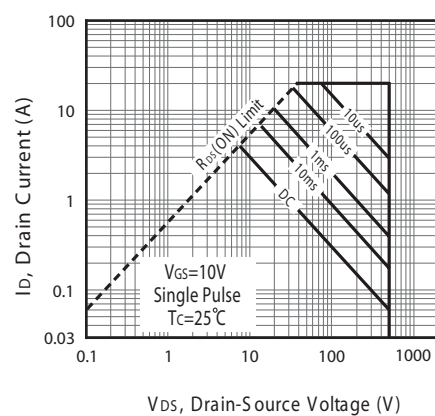


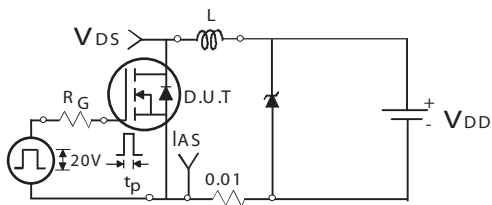
Figure 11b. Maximum Safe Operating Area for SDF07N50

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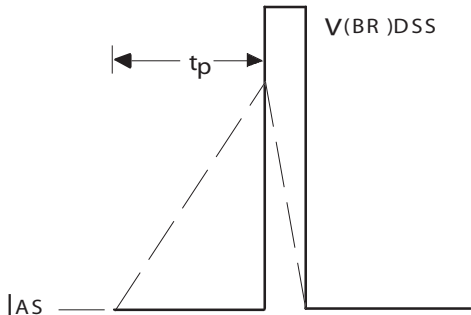
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Unclamped Inductive Test Circuit

Figure 12a.



Unclamped Inductive Waveforms

Figure 12b.

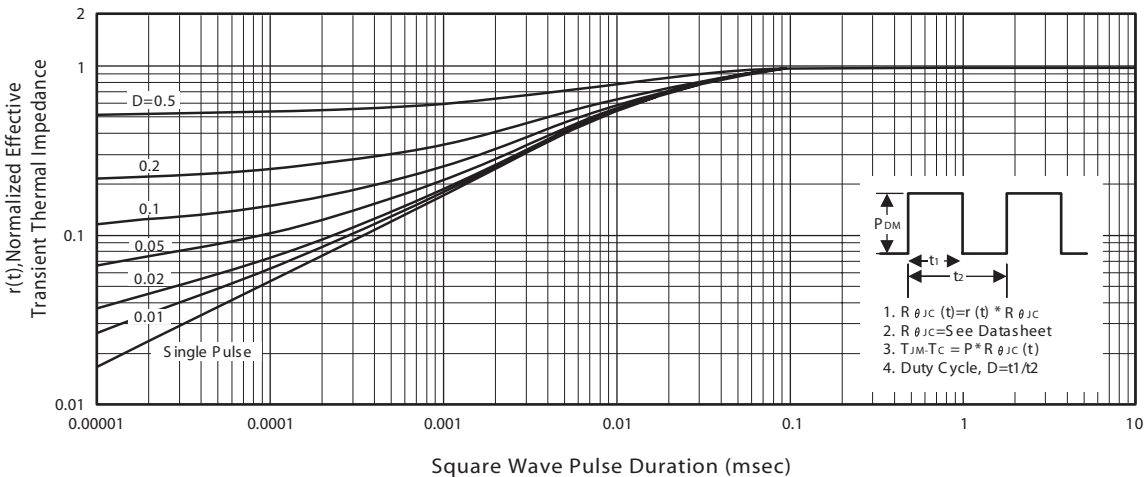


Figure 13a. Normalized Thermal Transient Impedance Curve for SDP07N50

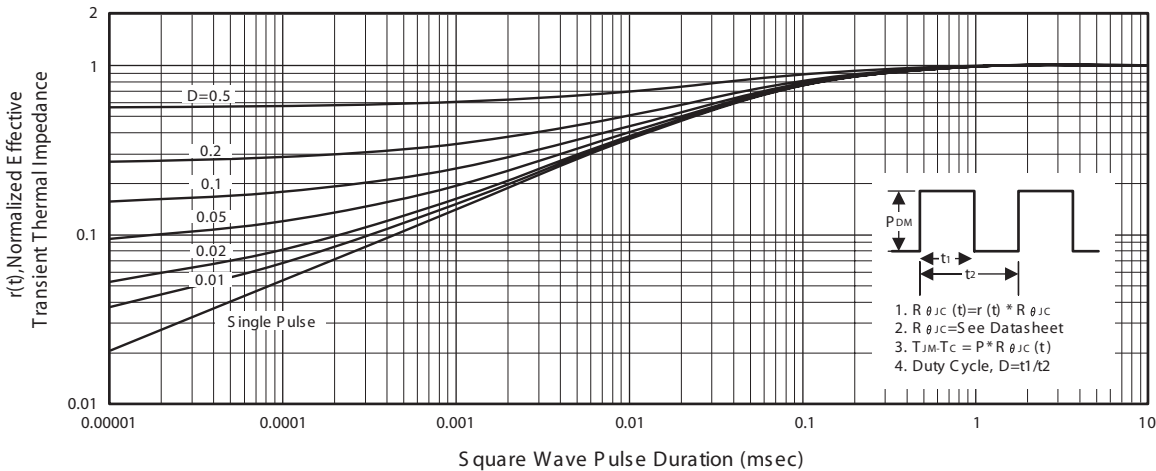


Figure 13b. Normalized Thermal Transient Impedance Curve for SDF07N50

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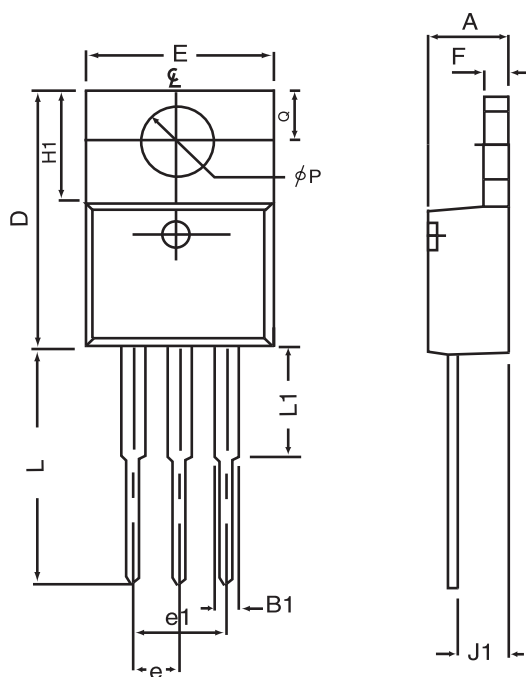
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PACKAGE OUTLINE DIMENSIONS

TO-220



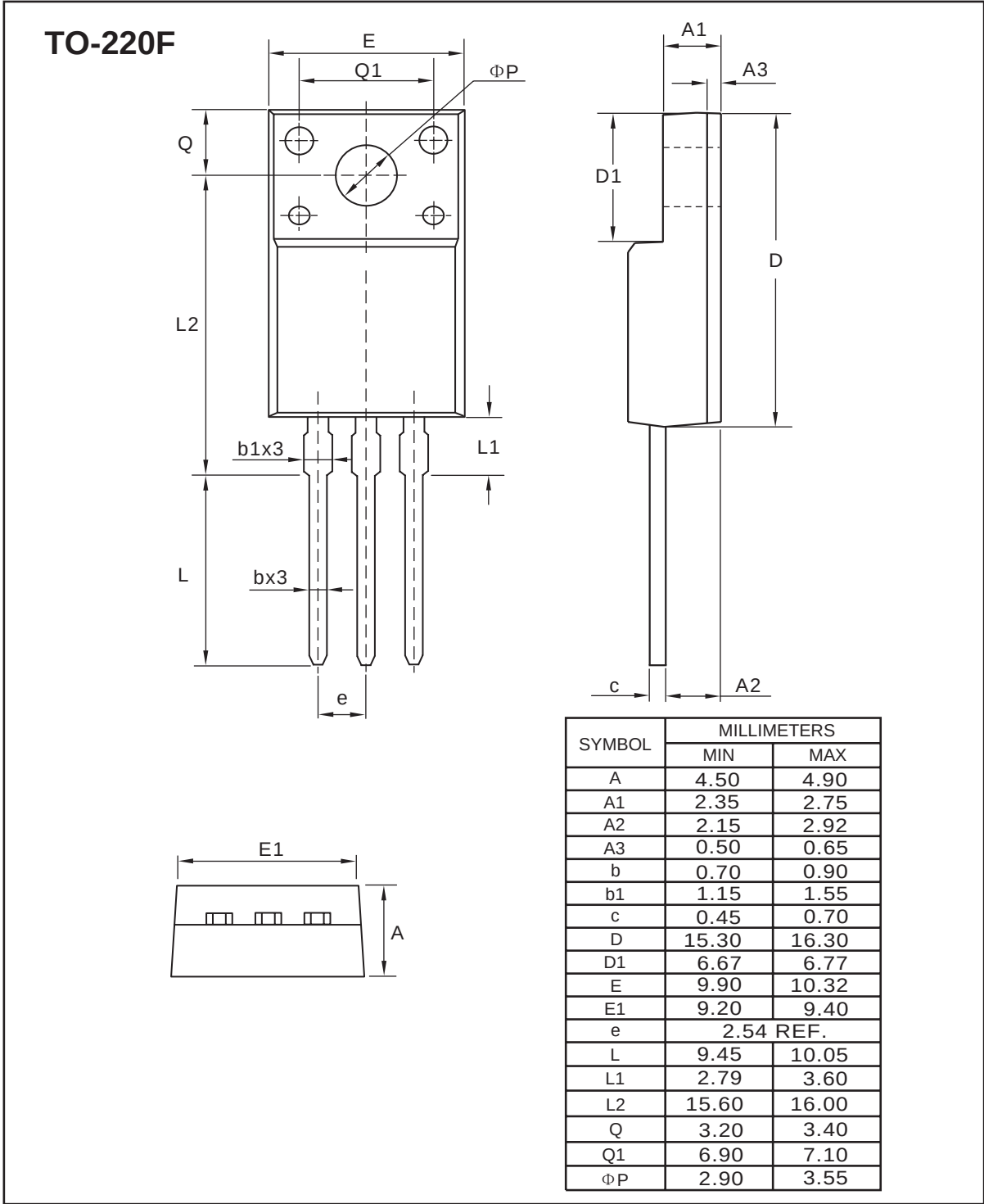
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	4.80	0.170	0.189
B1	1.27	1.65	0.050	0.630
D	14.6	16.00	0.575	0.610
E	9.70	10.41	0.382	0.410
e	2.34	2.74	0.092	0.108
e1	4.68	5.48	0.184	0.216
F	1.14	1.40	0.045	0.055
H1	5.97	6.73	0.235	0.265
J1	2.20	2.79	0.087	0.110
L	12.88	14.22	0.507	0.560
L1	3.00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

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PACKAGE OUTLINE DIMENSIONS



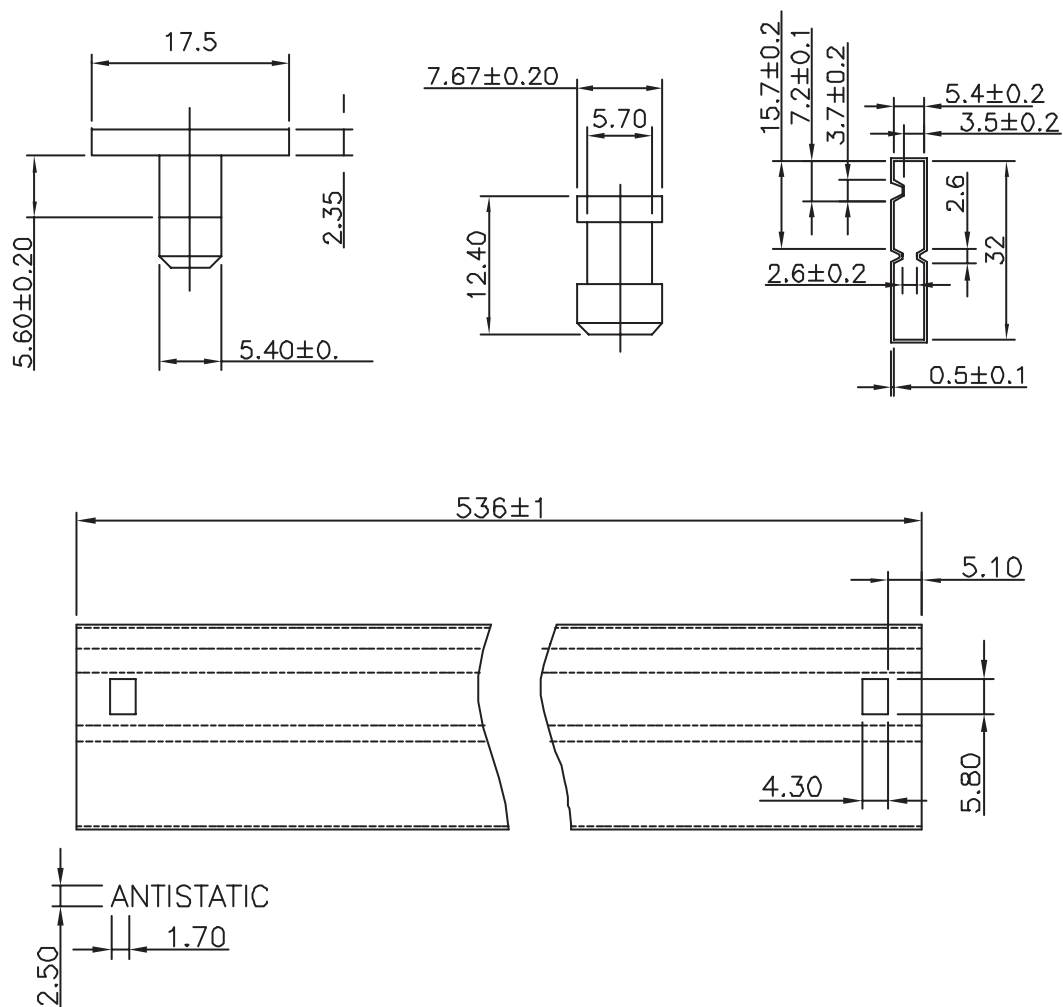
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TO-220 Tube



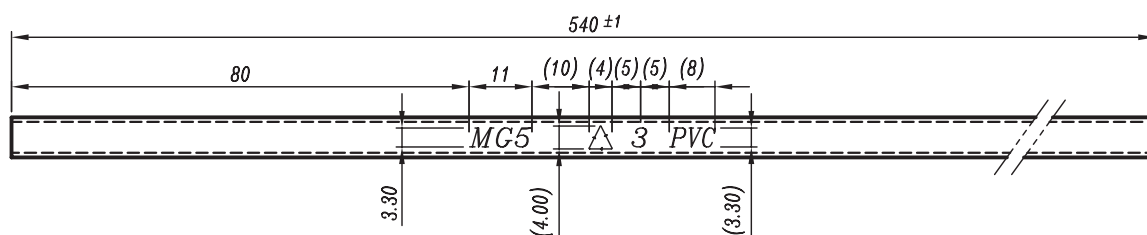
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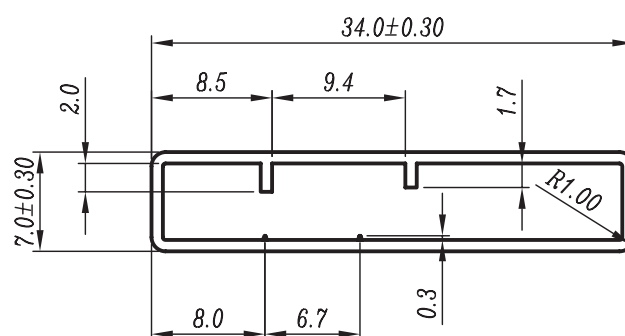
SDF07N50

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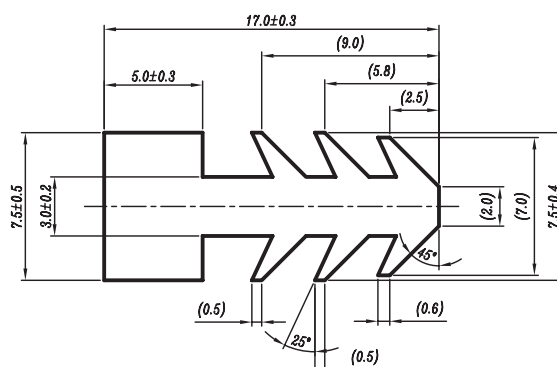
TO-220F Tube



$$t = 0.8 \pm 0.15$$



$$SCALE = 2/1$$



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

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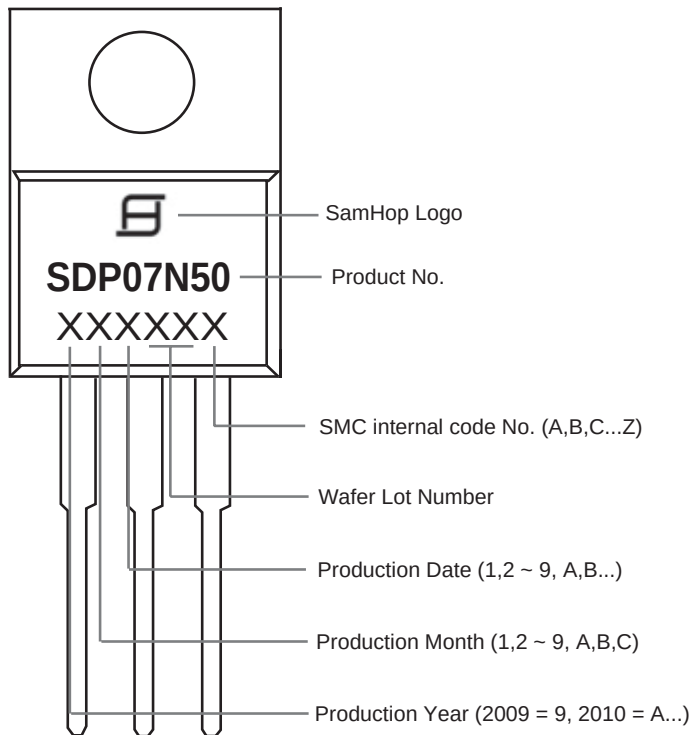
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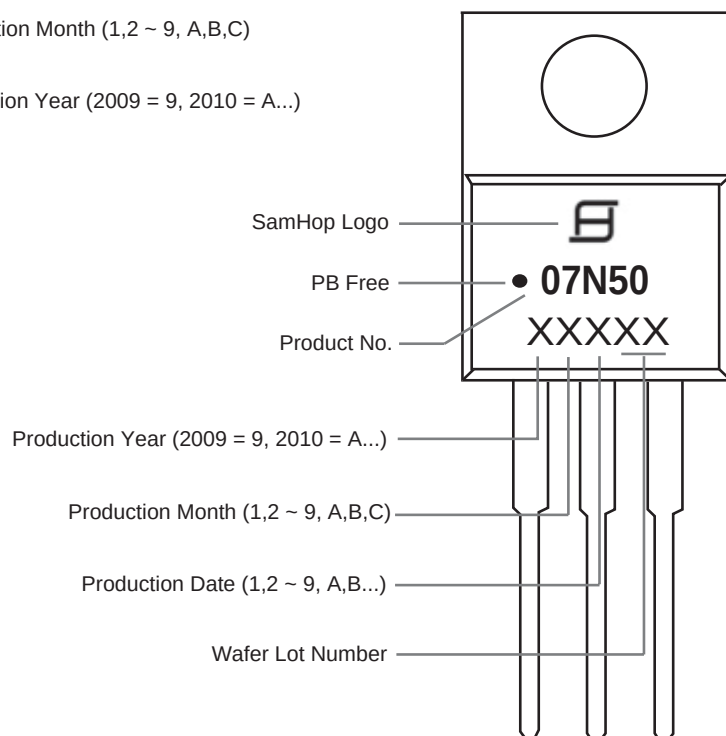
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TOP MARKING DEFINITION

TO-220 (Halogen Free)



TO-220 (Pb Free)



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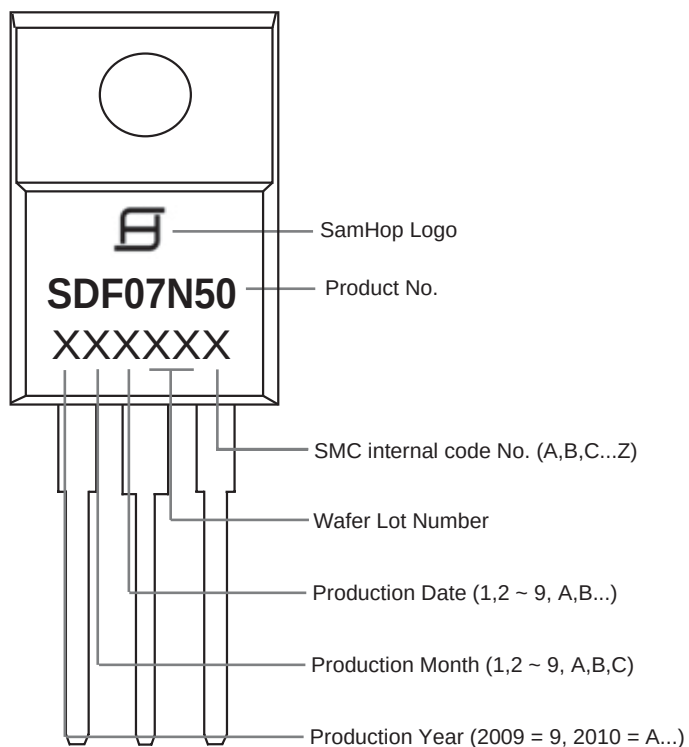
SDP07N50

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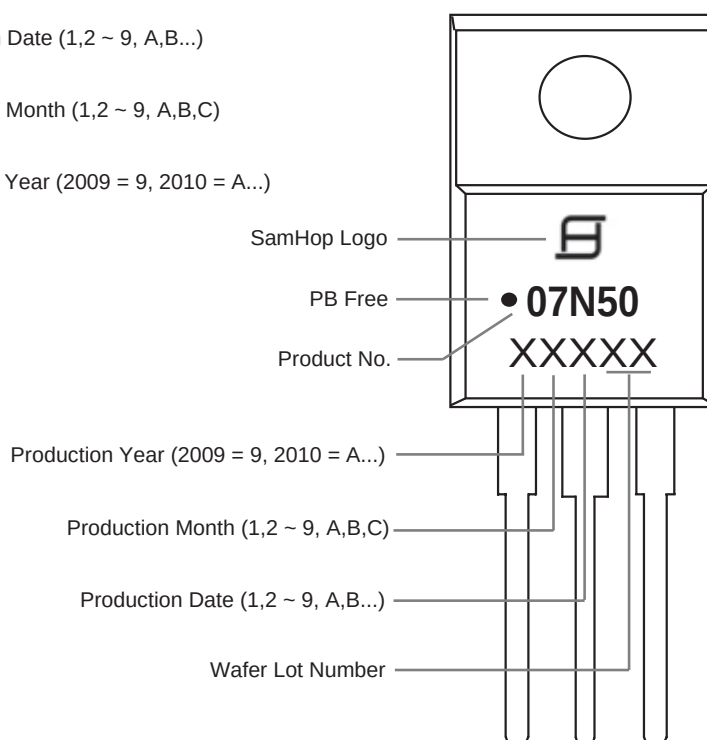
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TOP MARKING DEFINITION

TO-220F (Halogen Free)



TO-220F (Pb Free)



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