



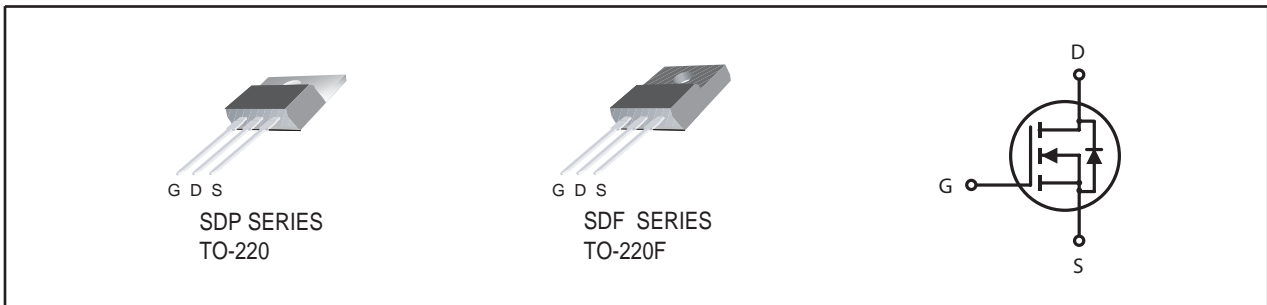
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(ON)} (Ω) Typ
200V	2A	3.0 @ V _{GS} =10V

FEATURES

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



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

Symbol	Parameter	SDP02N20	SDF02N20	Units	
V _{DS}	Drain-Source Voltage	200		V	
V _{GS}	Gate-Source Voltage	±30	±30	V	
I _D	Drain Current-Continuous ^a	T _C =25°C	2	2	A
		T _C =100°C	1.4	1.4	A
I _{DM}	-Pulsed ^a	5.9	5.9	A	
E _{AS}	Single Pulse Avalanche Energy ^c	81		mJ	
P _D	Maximum Power Dissipation	T _C =25°C	75	25	W
		T _C =100°C	37.5	12.5	W
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 to 175		°C	

THERMAL CHARACTERISTICS

Symbol	Parameter	SDP02N20	SDF02N20	Units
R _{θJC}	Thermal Resistance, Junction-to-Case	2	6	°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	200			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =160V , 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 =1A		3.0	3.9	ohm
g _{FS}	Forward Transconductance	V _{DS} =10V , I _D =1A		1.3		S
DYNAMIC CHARACTERISTICS ^b						
C _{ISS}	Input Capacitance	V _{DS} =25V, V _{GS} =0V f=1.0MHz		183		pF
C _{OSS}	Output Capacitance			30		pF
C _{RSS}	Reverse Transfer Capacitance			6		pF
SWITCHING CHARACTERISTICS ^b						
t _{D(ON)}	Turn-On Delay Time	V _{DD} =100V I _D =1A V _{GS} =10V R _{GEN} = 6 ohm		9.5		ns
t _r	Rise Time			10		ns
t _{D(OFF)}	Turn-Off Delay Time			15.4		ns
t _f	Fall Time			5.2		ns
Q _g	Total Gate Charge	V _{DS} =100V, I _D =1A, V _{GS} =10V		2.8		nC
Q _{gs}	Gate-Source Charge	V _{DS} =100V, I _D =1A, V _{GS} =10V		0.95		nC
Q _{gd}	Gate-Drain Charge			0.92		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A		0.82	1.4	V
Notes						
<p>a. Drain current limited by maximum junction temperature.</p> <p>b. Guaranteed by design, not subject to production testing.</p> <p>c. Starting T_J=25°C, L=50mH, V_{DD} = 50V. (See Figure 12)</p>						

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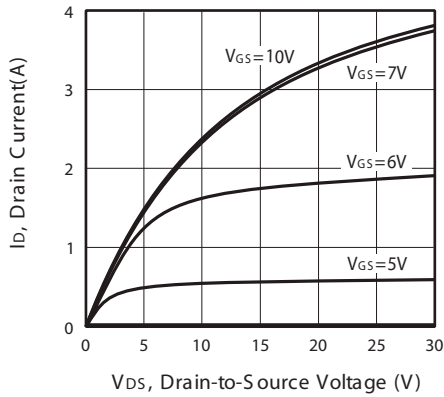


Figure 1. Output Characteristics

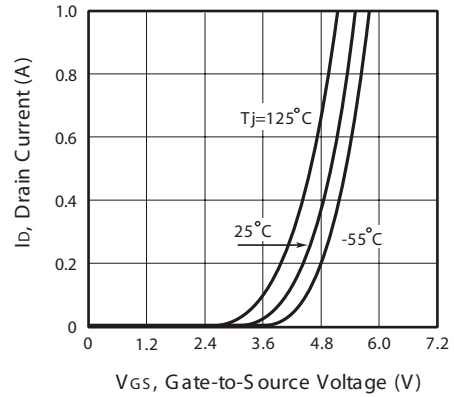


Figure 2. Transfer Characteristics

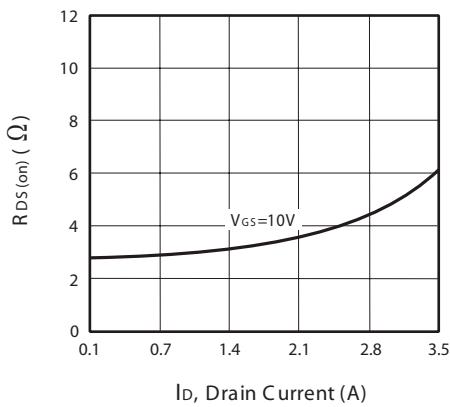


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

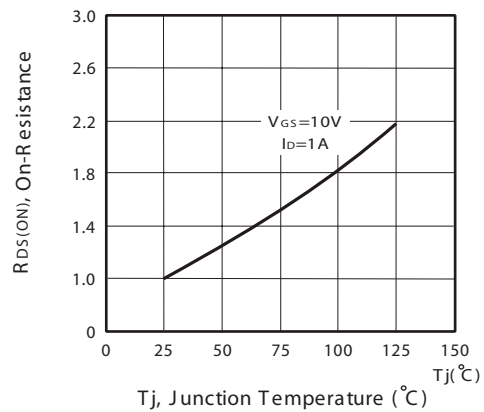


Figure 4. On-Resistance Variation with Drain Current and Temperature

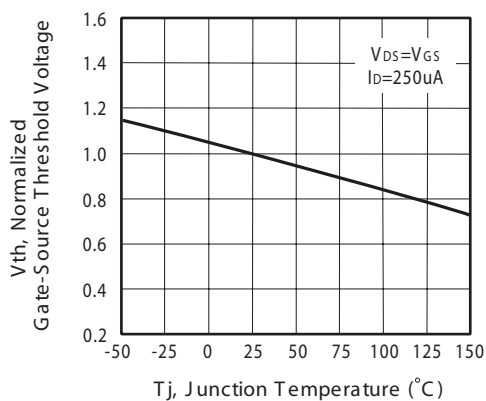


Figure 5. Gate Threshold Variation with Temperature

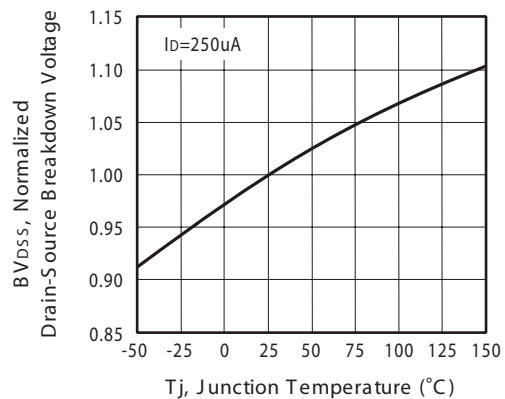


Figure 6. Breakdown Voltage Variation with Temperature

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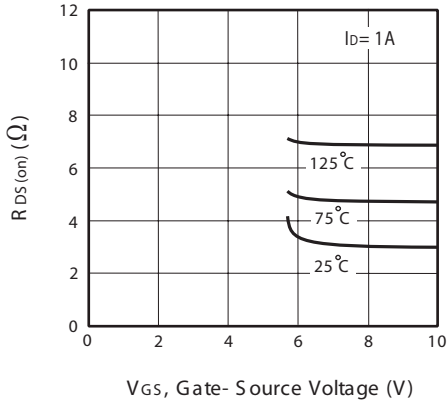


Figure 7. On-Resistance vs. Gate-Source Voltage

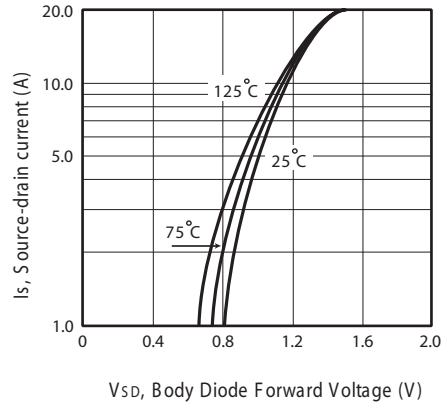


Figure 8. Body Diode Forward Voltage Variation with Source Current

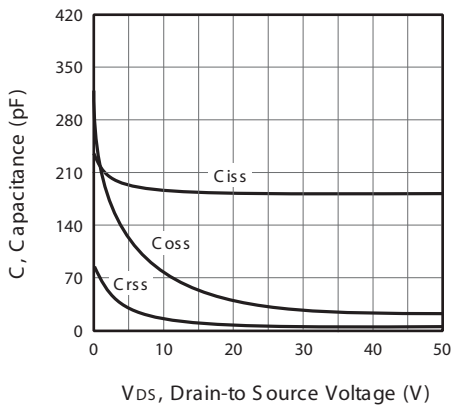


Figure 9. Capacitance

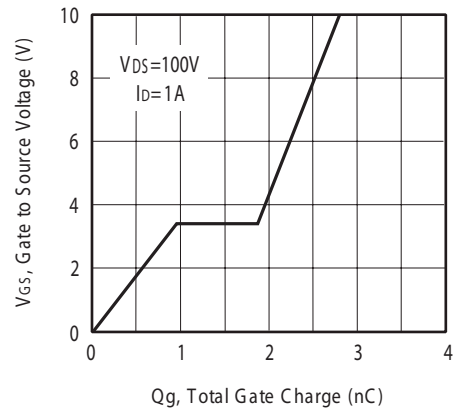


Figure 10. Gate Charge

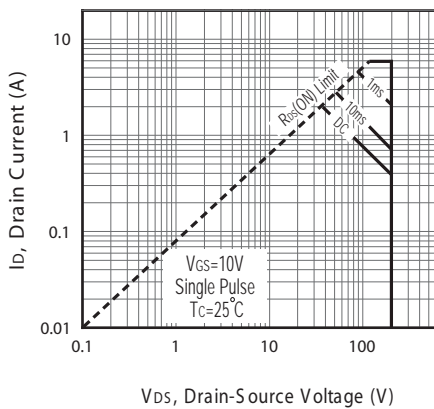


Figure 11a. Maximum Safe Operating Area for SDP02N20

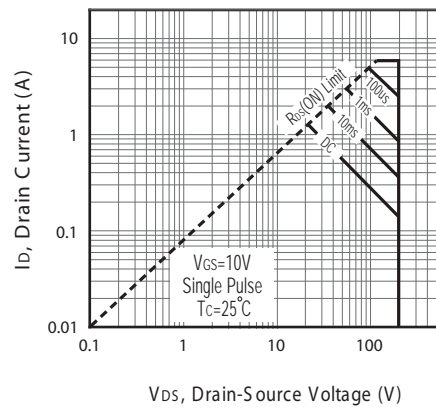


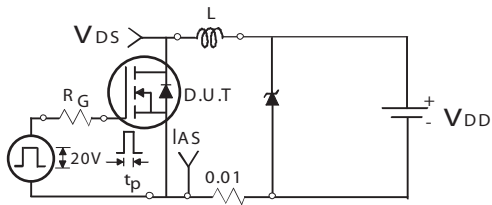
Figure 11b. Maximum Safe Operating Area for SDF02N20

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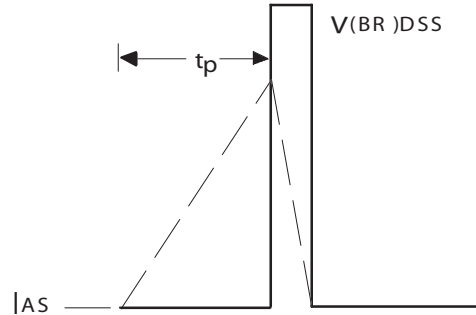
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Unclamped Inductive Test Circuit

Figure 12a.



Unclamped Inductive Waveforms

Figure 12b.

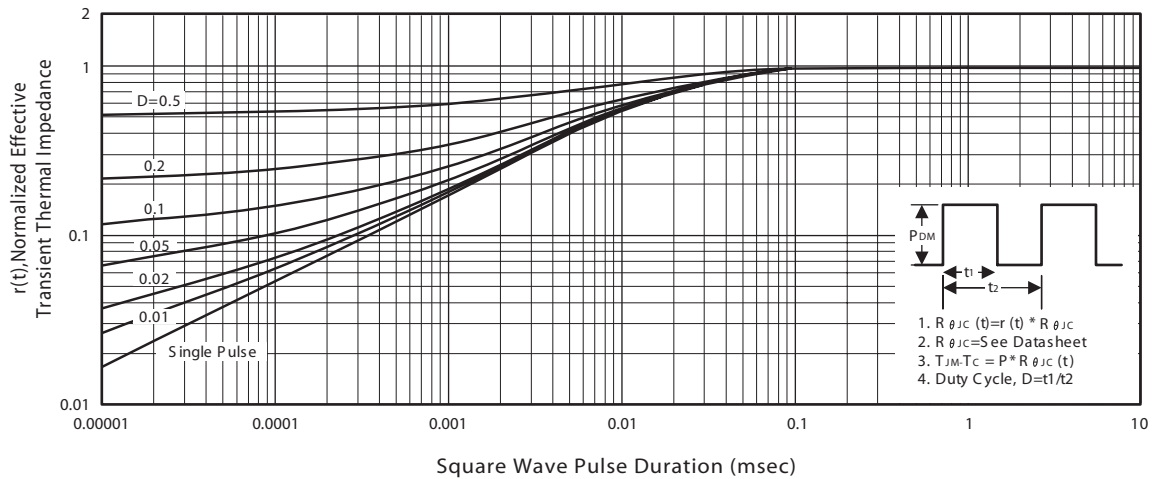


Figure 13a. Normalized Thermal Transient Impedance Curve for SDP02N20

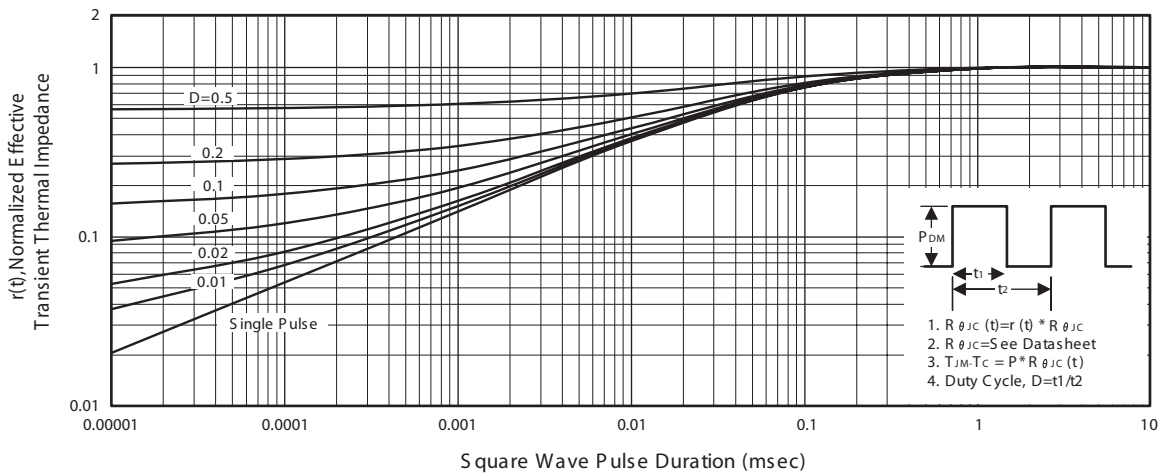


Figure 13b. Normalized Thermal Transient Impedance Curve for SDF02N20

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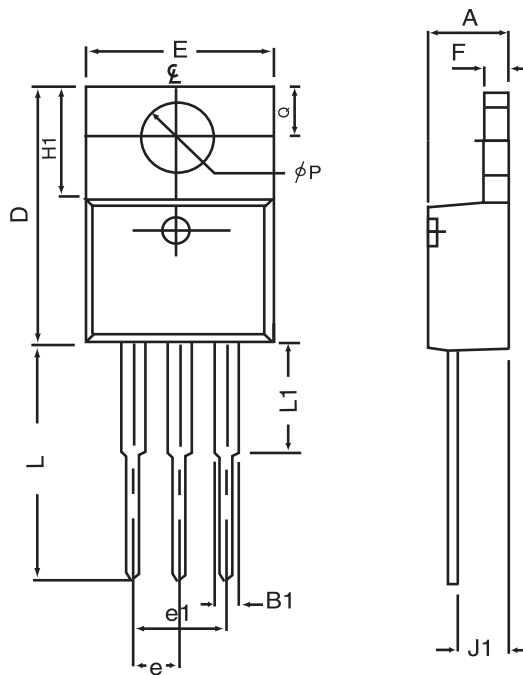
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PACKAGE OUTLINE DIMENSIONS

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

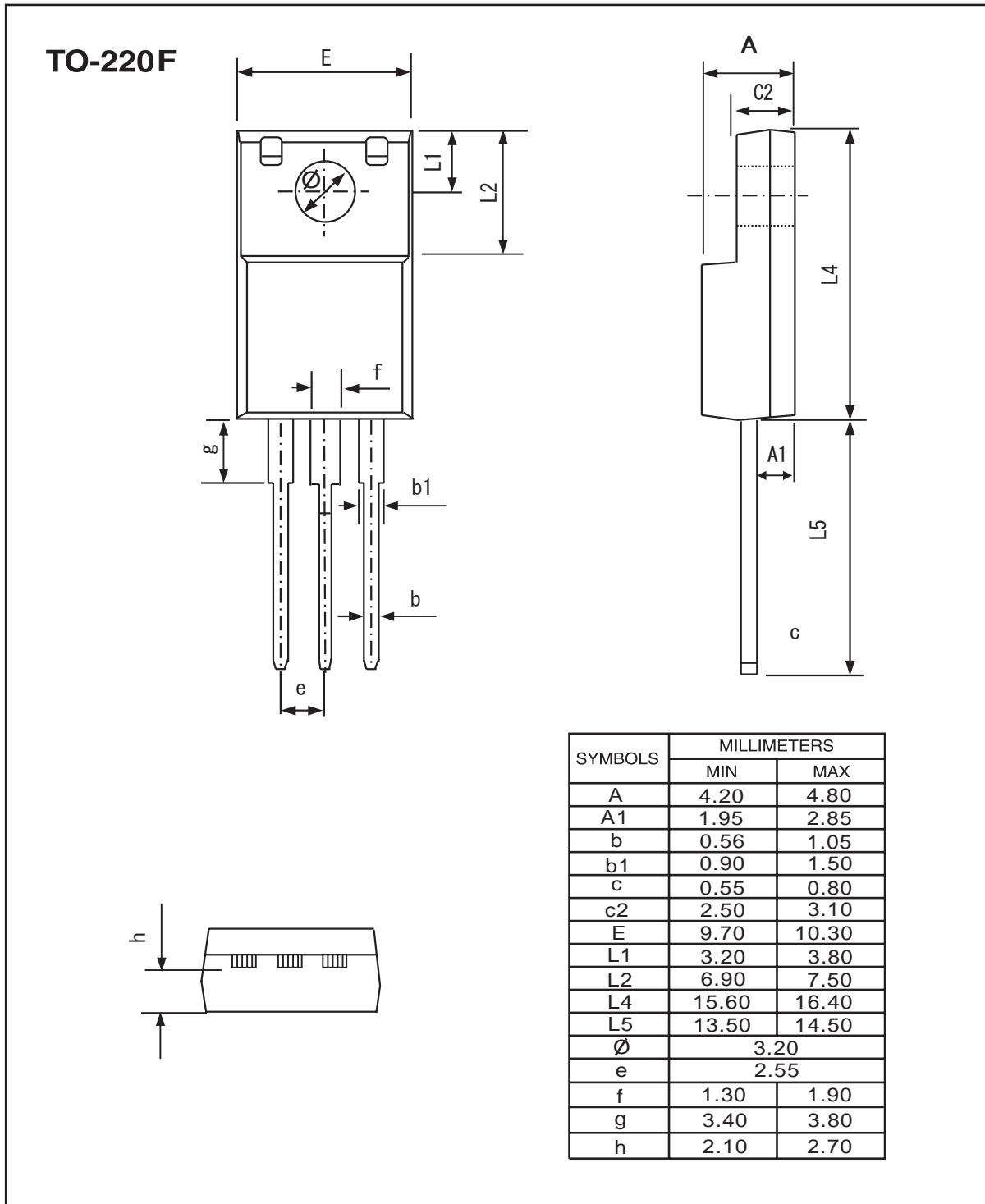
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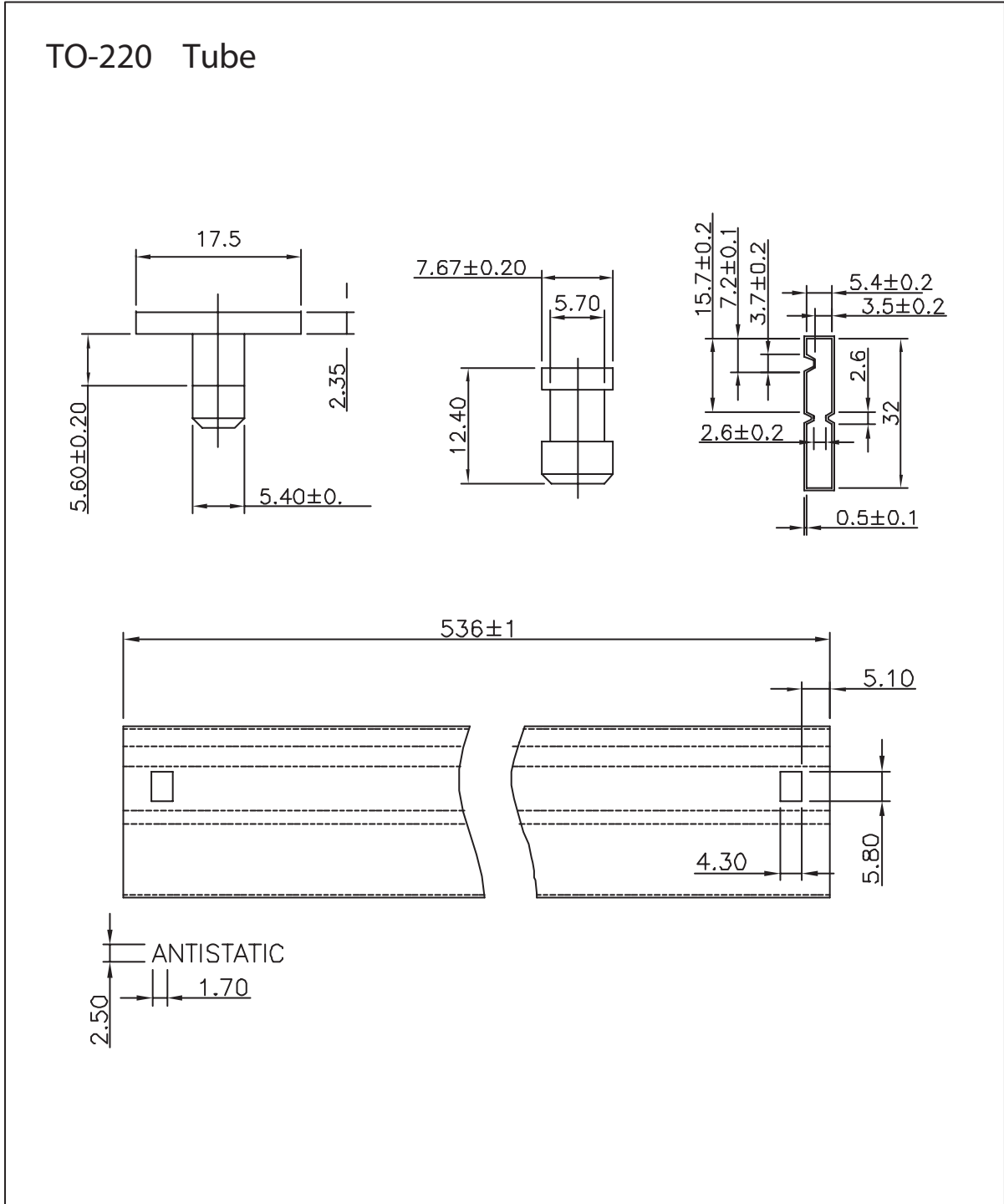


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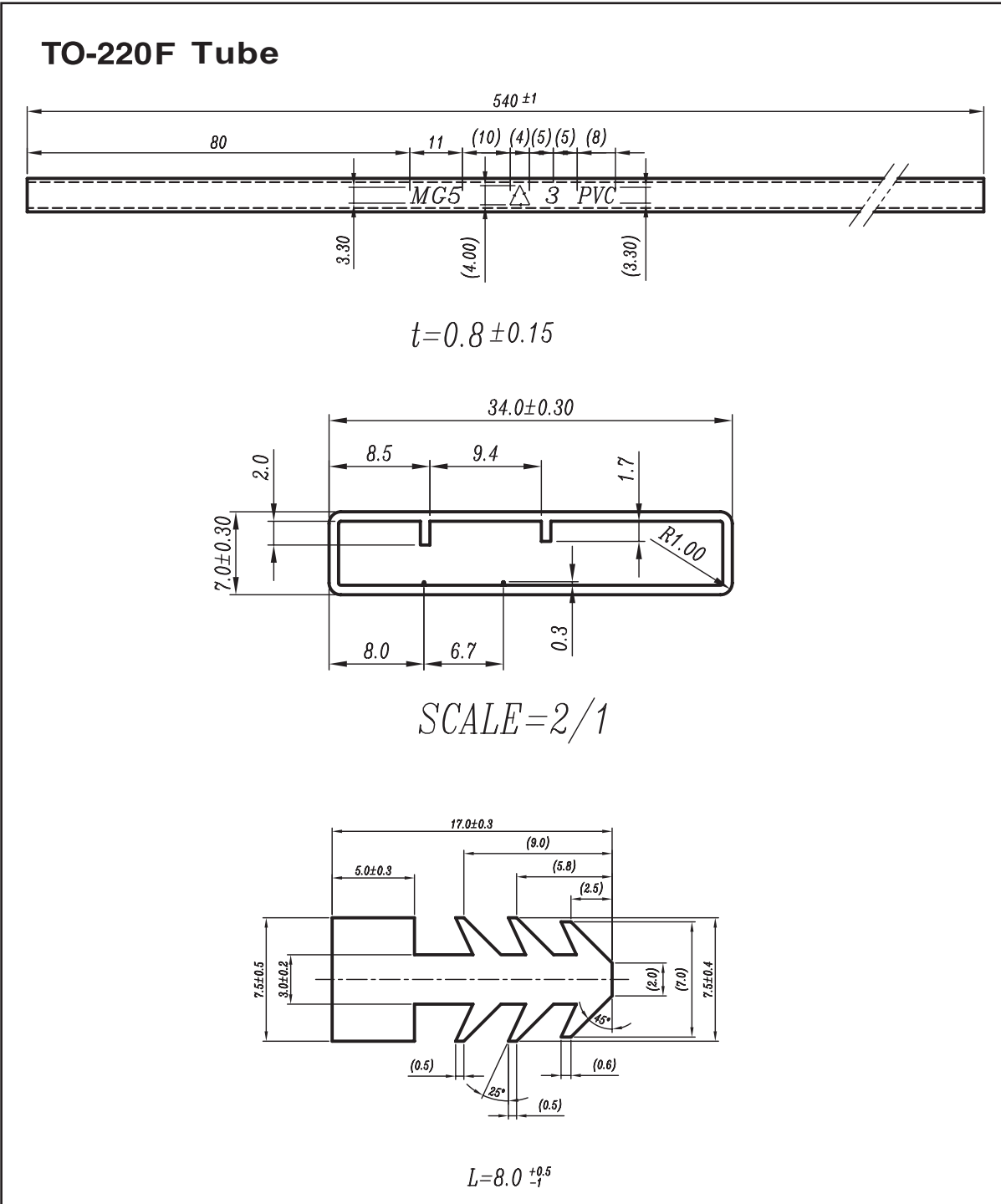
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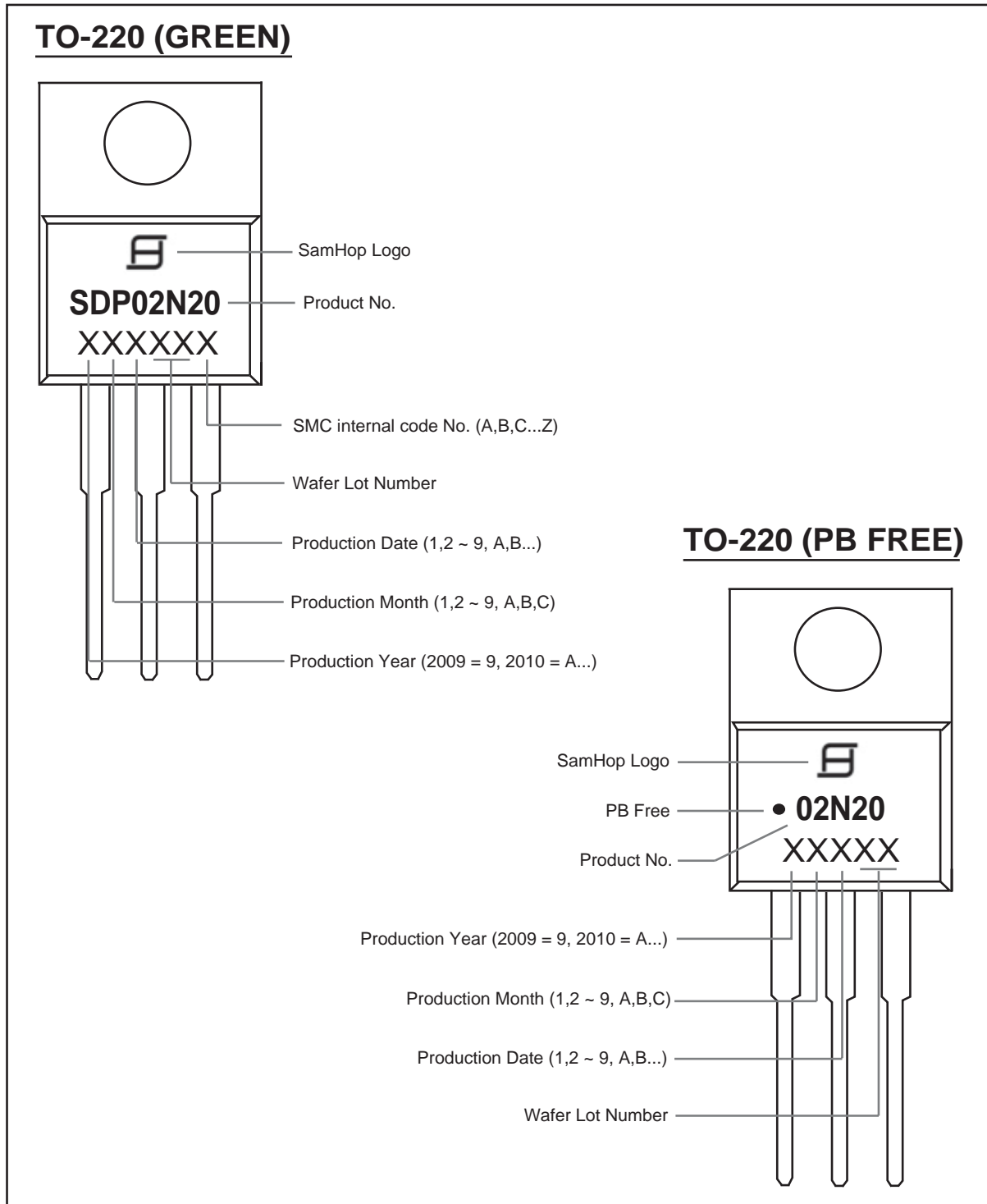
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TOP MARKING DEFINITION



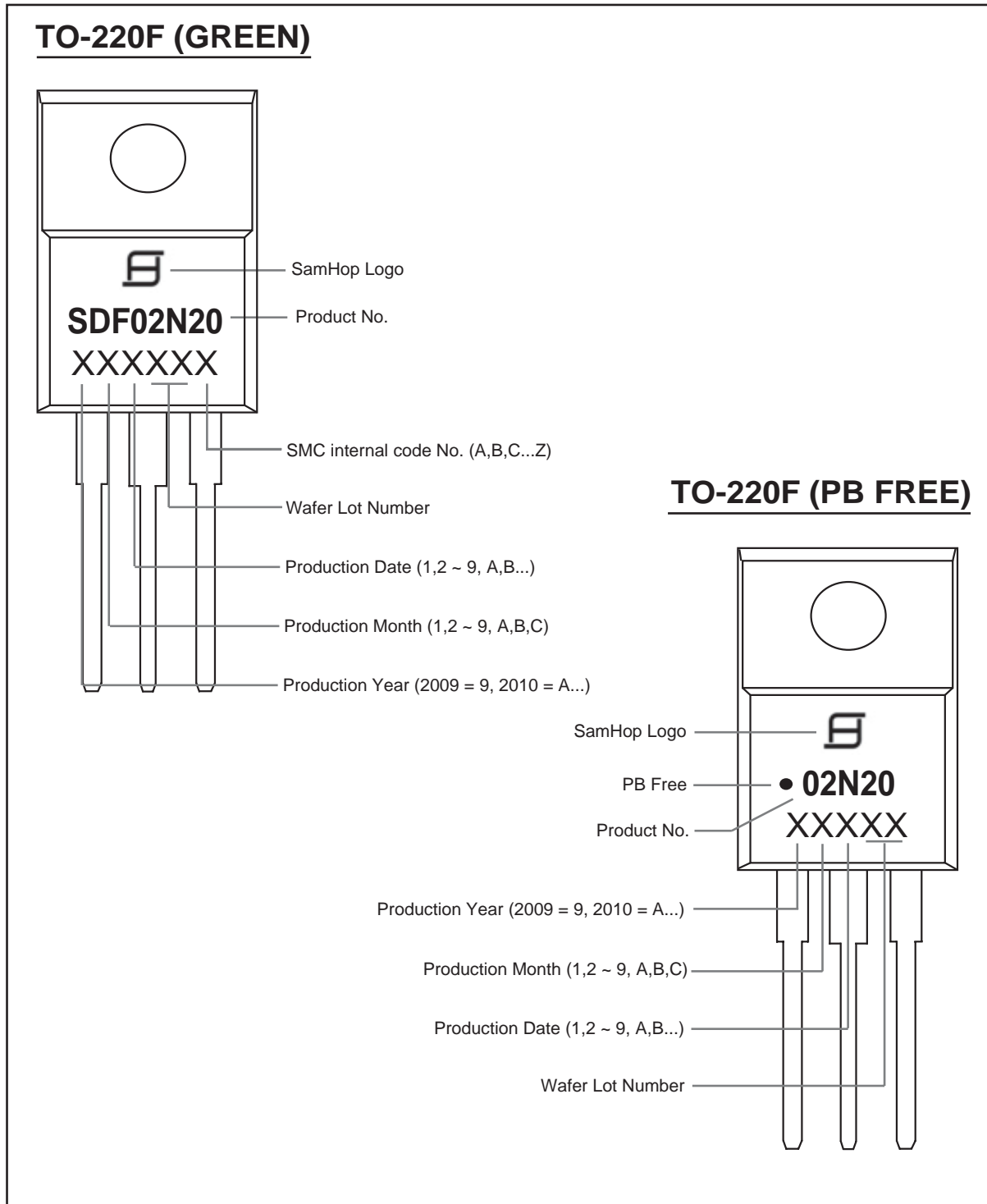
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