



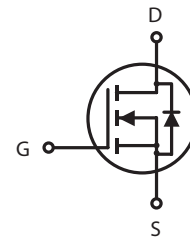
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(ON)} (Ω) Typ
600V	10A	0.62 @ 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
SDP10N60HZ	TO-220	SDP10N60	Tube	Halogen Free
SDP10N60PZ	TO-220	10N60	Tube	Pb Free
SDF10N60HZ	TO-220F	SDF10N60	Tube	Halogen Free
SDF10N60PZ	TO-220F	10N60	Tube	Pb Free

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

Symbol	Parameter	SDP10N60	SDF10N60	Units
V _{DS}	Drain-Source Voltage	600		V
V _{GS}	Gate-Source Voltage	±30	±30	V
I _D	Drain Current-Continuous ^a	T _C =25°C	10	A
		T _C =100°C	6	A
I _{DM}	-Pulsed ^a	40	40	A
E _{AS}	Single Pulse Avalanche Energy ^c	709		mJ
P _D	Maximum Power Dissipation	T _C =25°C	162	W
		T _C =100°C	65	W
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 to 150		°C

THERMAL CHARACTERISTICS

R _{θJC}	Thermal Resistance, Junction-to-Case	0.77	2.4	°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	600			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =480V , 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		4	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V , I _D =5.0A		0.62	0.75	ohm
DYNAMIC CHARACTERISTICS ^b						
C _{ISS}	Input Capacitance	V _{DS} =25V,V _{GS} =0V f=1.0MHz		1650		pF
C _{OSS}	Output Capacitance			165		pF
C _{RSS}	Reverse Transfer Capacitance			18		pF
SWITCHING CHARACTERISTICS ^b						
t _{D(ON)}	Turn-On Delay Time	V _{DD} =300V I _D =1A R _{GEN} = 25 ohm		25		ns
t _r	Rise Time			70		ns
t _{D(OFF)}	Turn-Off Delay Time			140		ns
t _f	Fall Time			80		ns
Q _g	Total Gate Charge	V _{DS} =480V,I _D =1A,V _{GS} =10V		48		nC
Q _{gs}	Gate-Source Charge	V _{DS} =480V,I _D =1A,		7.0		nC
Q _{gd}	Gate-Drain Charge	V _{GS} =10V		18		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V _{SD}	Diode Forward Voltage	V _{GS} =0V,I _S =10A			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=13mH, V_{DD} = 50V.

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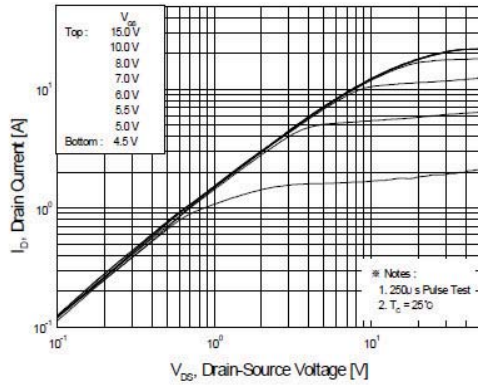


Figure 1. On-Region Characteristics

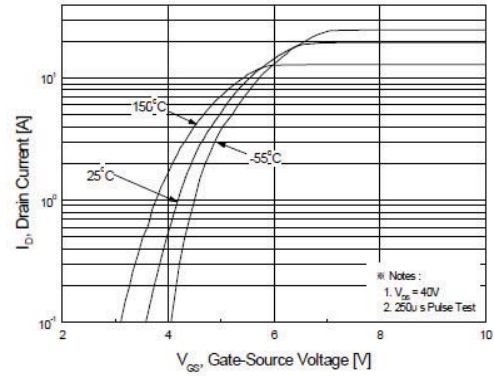


Figure 2. Transfer Characteristics

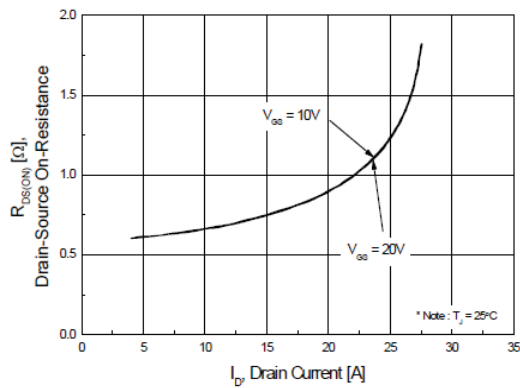


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

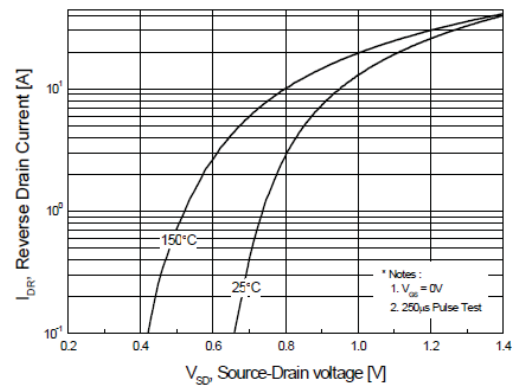


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

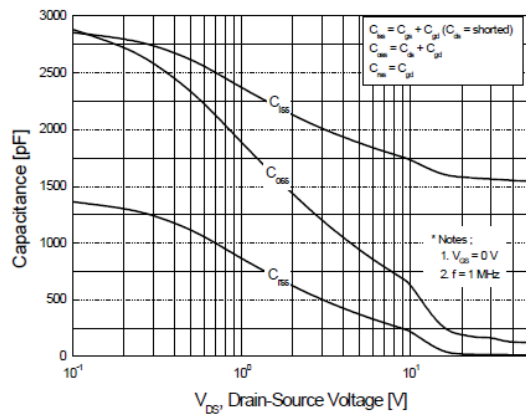


Figure 5. Capacitance Characteristics

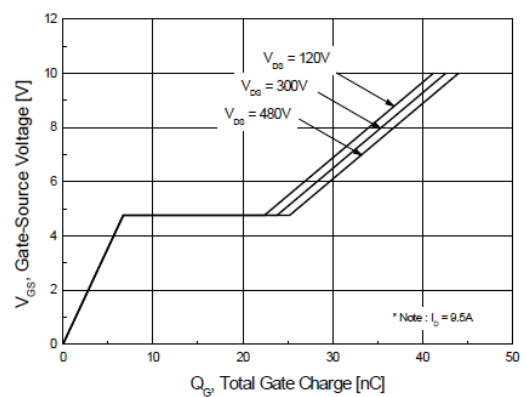


Figure 6. Gate Charge Characteristics

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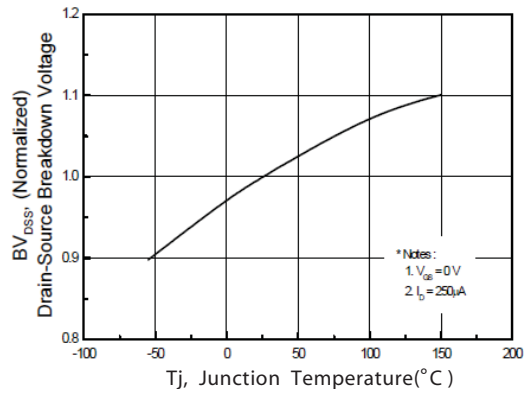


Figure 7. Breakdown Voltage Variation vs Temperature

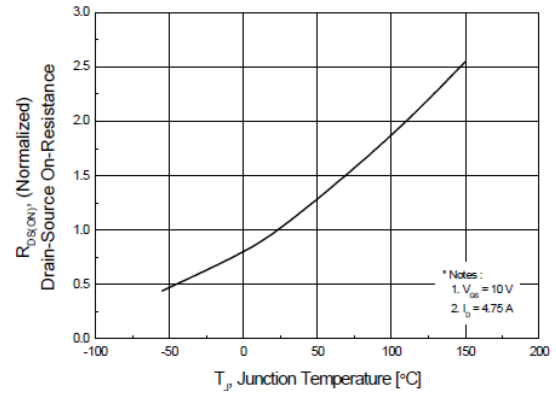


Figure 8. On-Resistance Variation vs Temperature

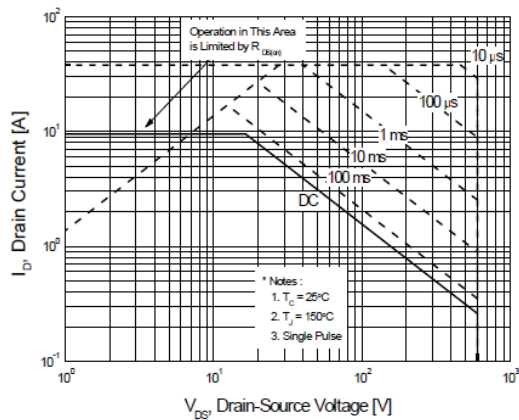


Figure 9-1. Maximum Safe Operating Area for TO220

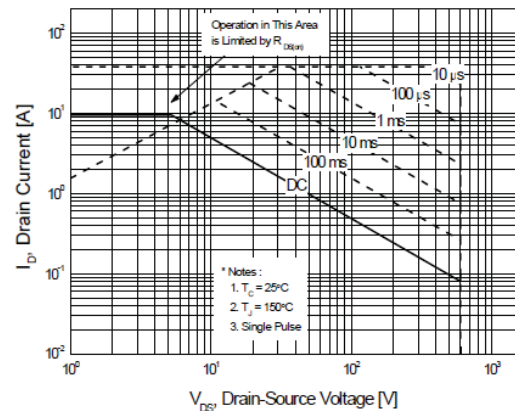


Figure 9-2. Maximum Safe Operating Area for TO220F

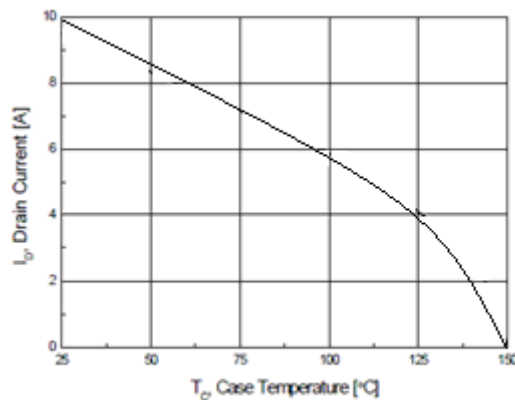


Figure 10. Maximum Drain Current vs Case Temperature

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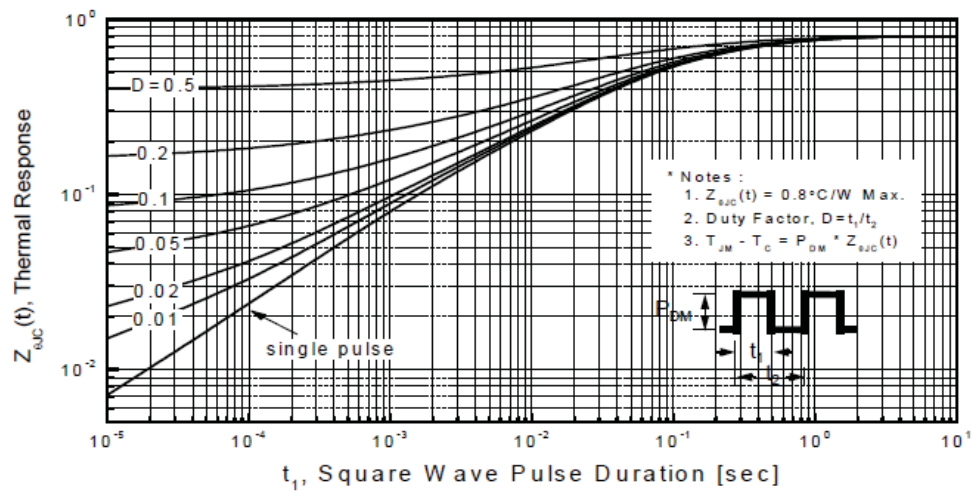


Figure 11-1. Transient Thermal Response Curve for TO220

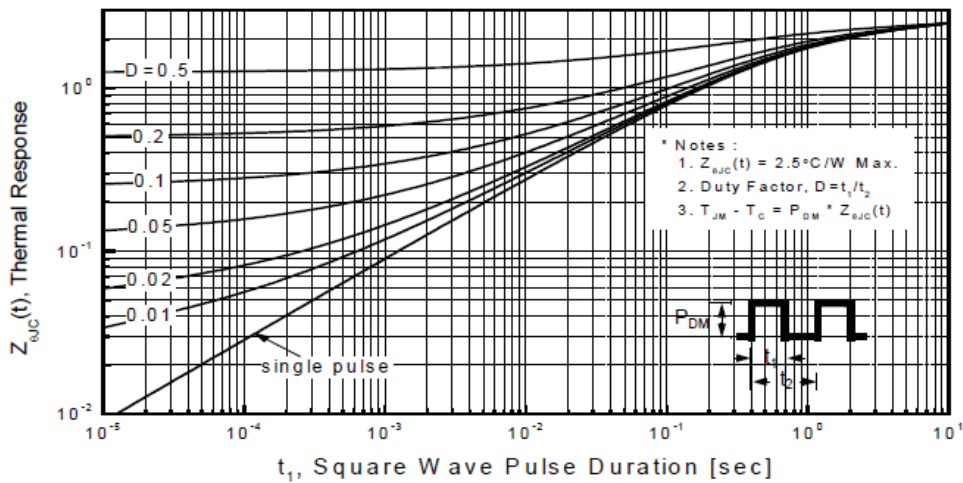


Figure 11-2. Transient Thermal Response Curve for TO220F

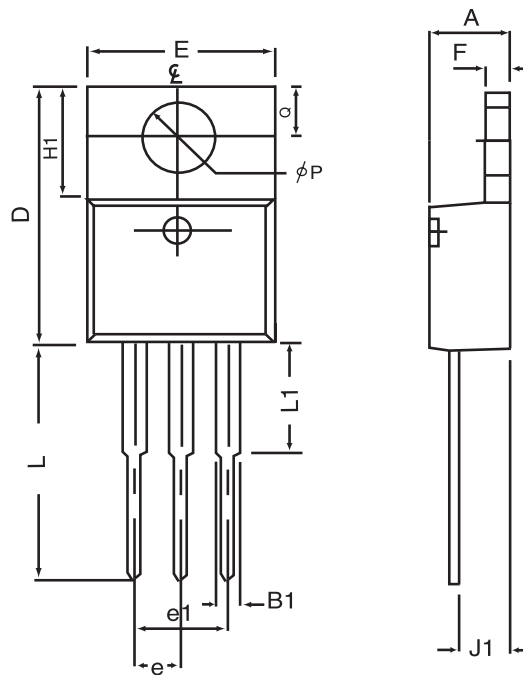
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PACKAGE OUTLINE DIMENSIONS

TO-220



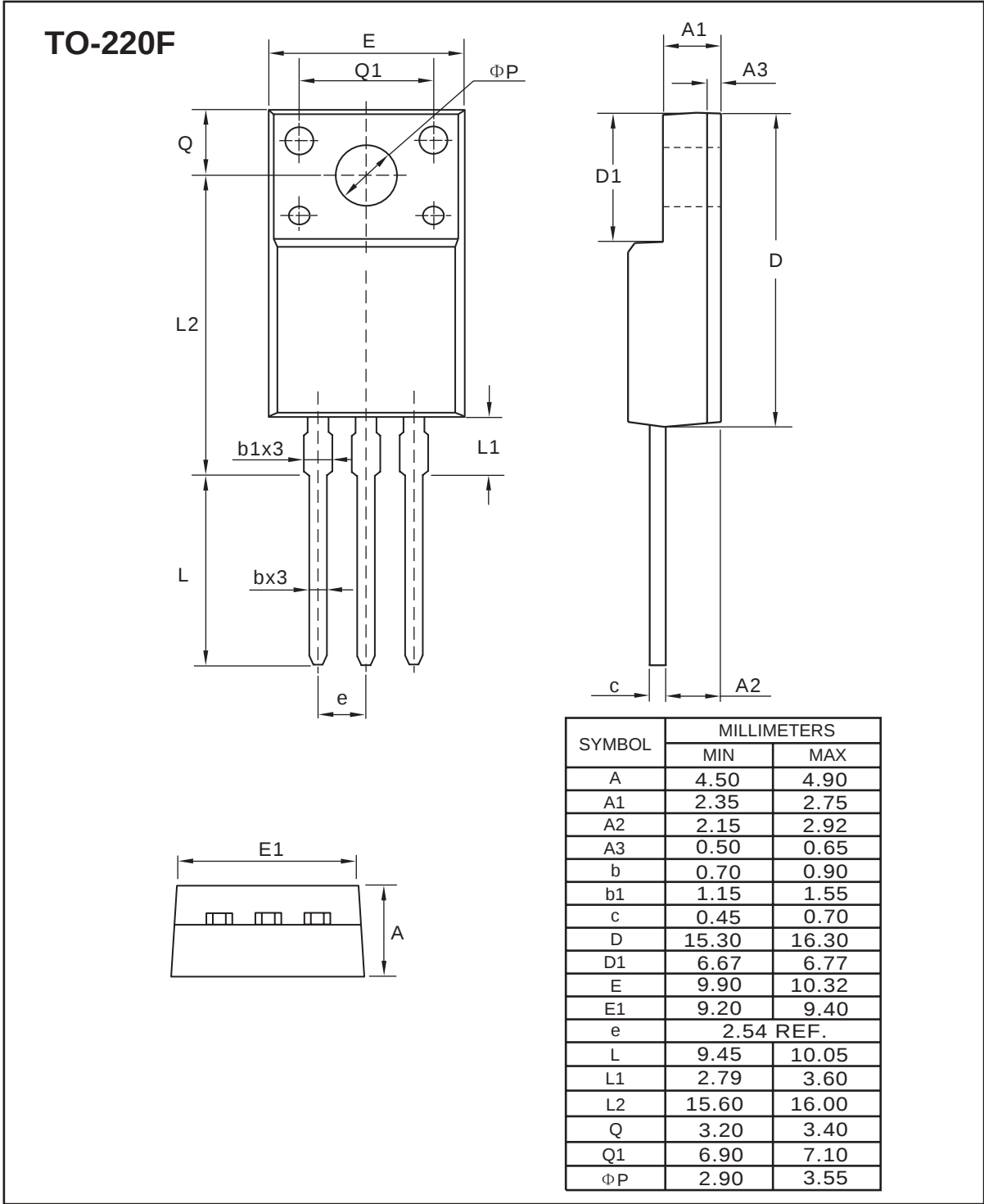
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	4.80	0.170	0.189
B1	1.27	1.65	0.050	0.0630
D	14.6	16.00	0.575	0.610
E	9.70	10.41	0.382	0.410
e	2.34	2.74	0.092	0.108
e1	4.68	5.48	0.184	0.216
F	1.14	1.40	0.045	0.055
H1	5.97	6.73	0.235	0.265
J1	2.20	2.79	0.087	0.110
L	12.88	14.22	0.507	0.560
L1	3.00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

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PACKAGE OUTLINE DIMENSIONS



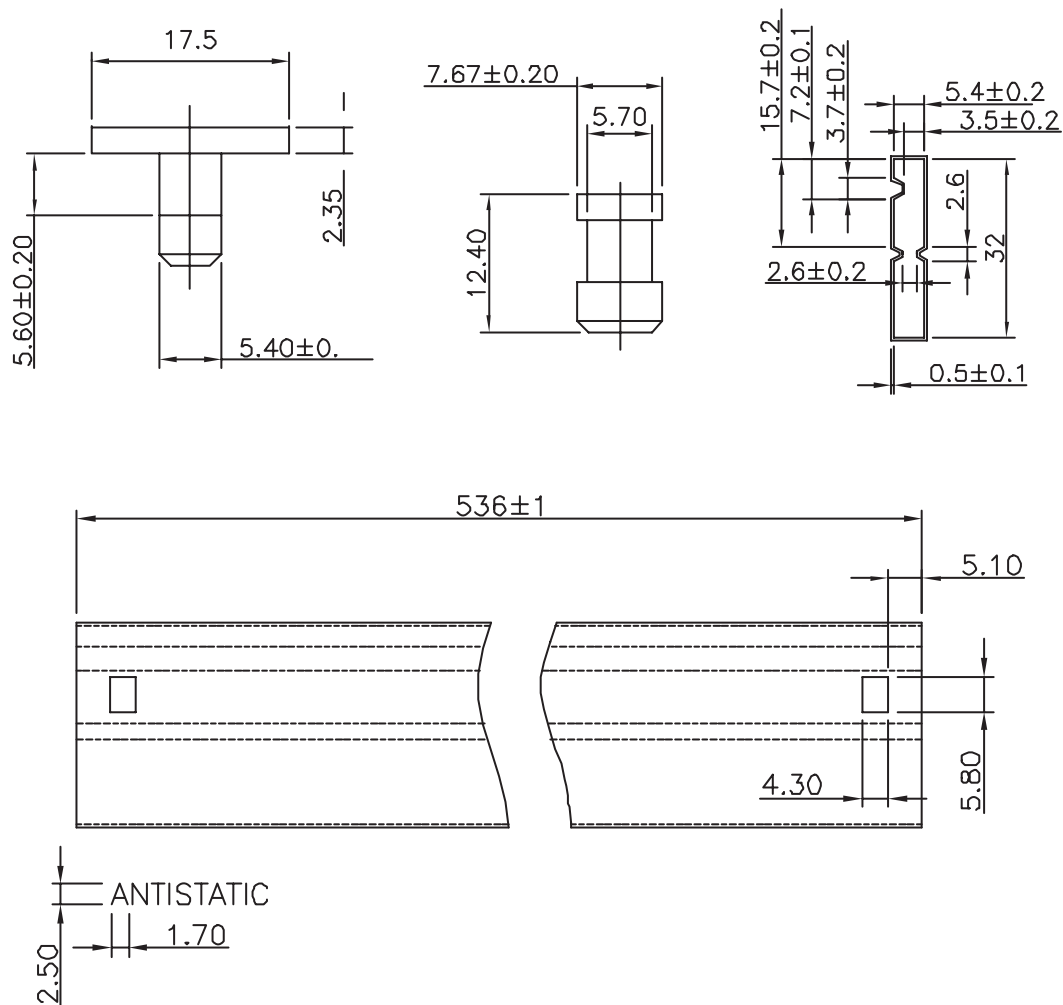
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TO-220 Tube



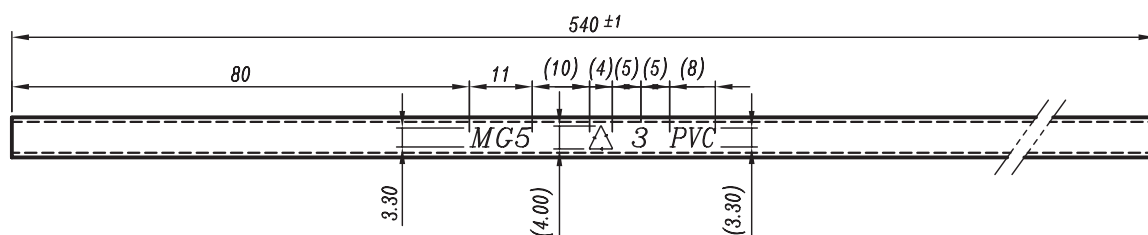
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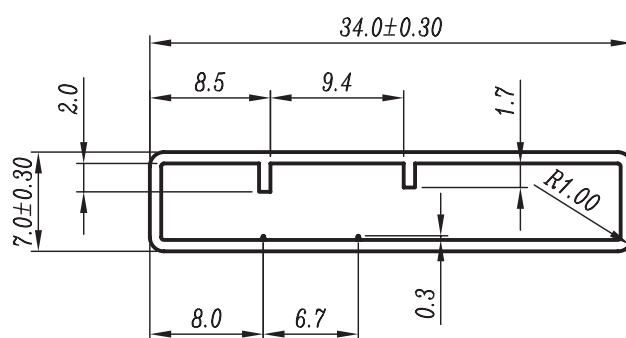
SDF10N60

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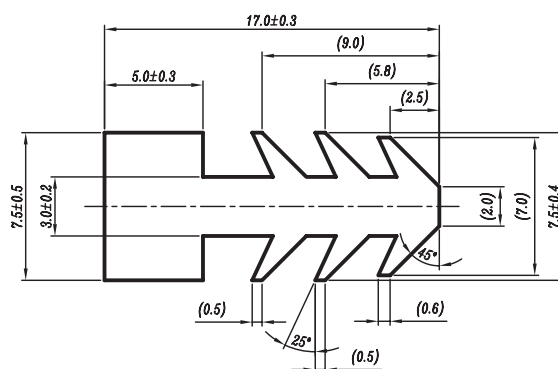
TO-220F Tube



$$t = 0.8 \pm 0.15$$



SCALE = 2/1



$$L = 8.0 \pm 0.5$$

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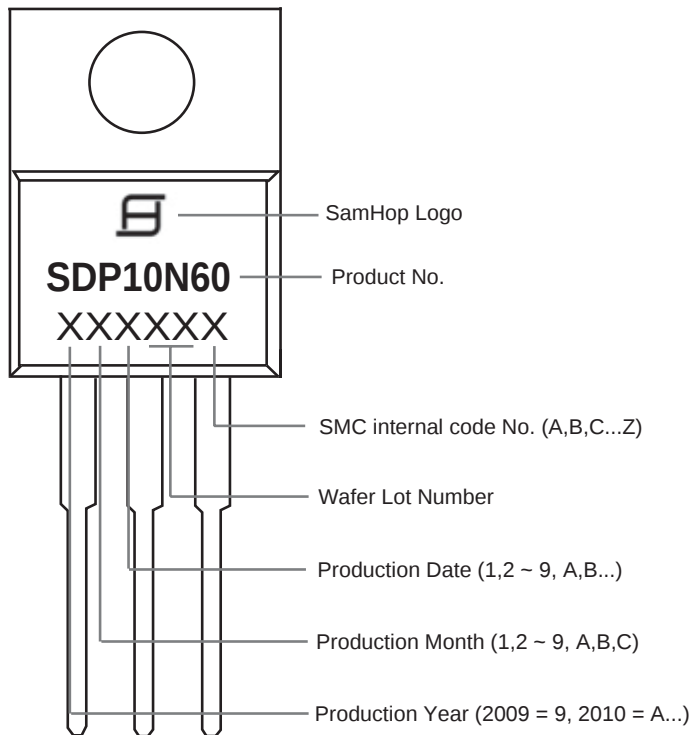
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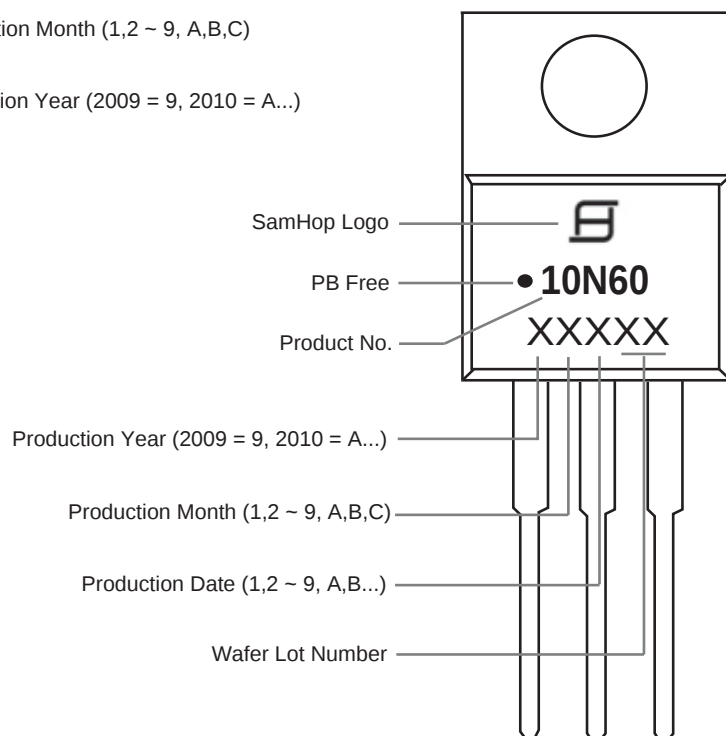
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TOP MARKING DEFINITION

TO-220 (Halogen Free)



TO-220 (Pb Free)



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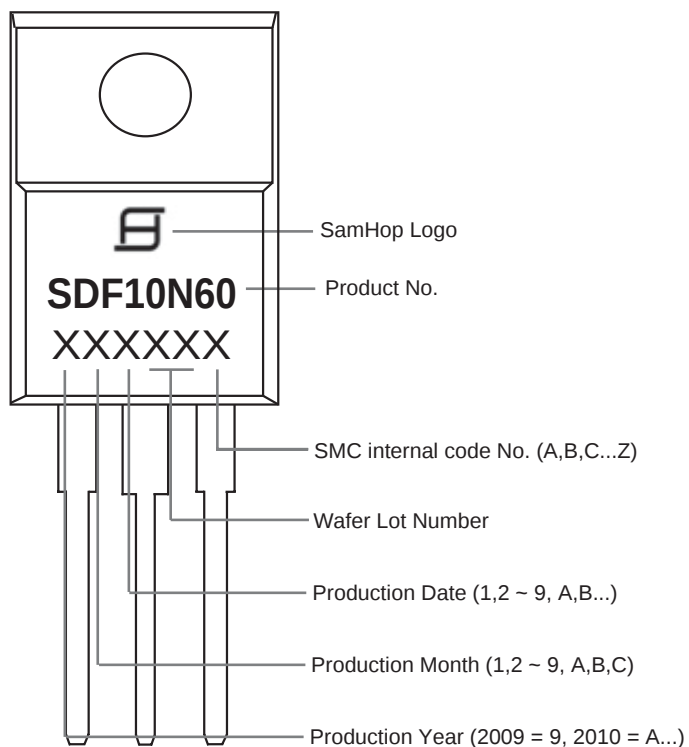
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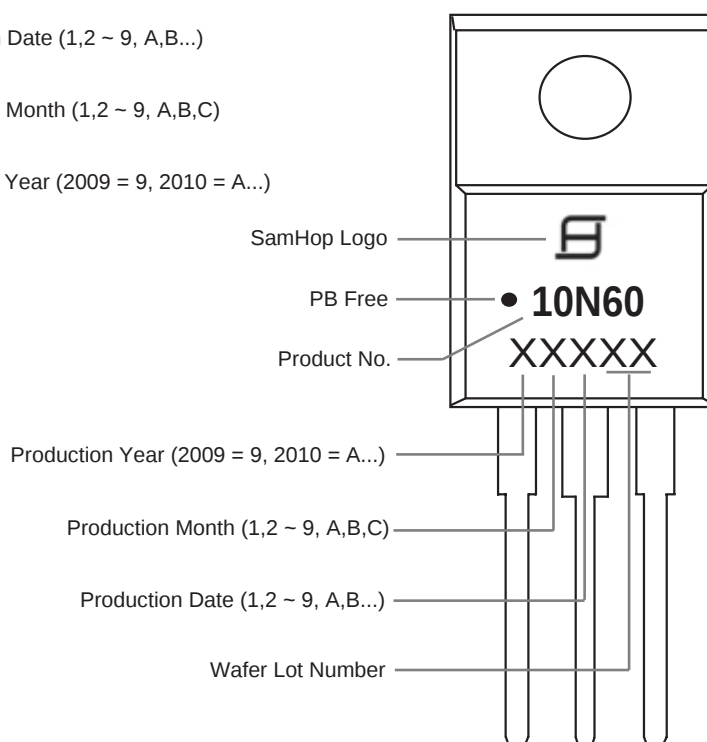
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TOP MARKING DEFINITION

TO-220F (Halogen Free)



TO-220F (Pb Free)



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