SDP18N50
SDF18N50

SamHop Microelectronics Corp.

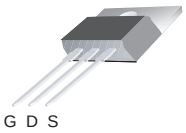
Ver 1.1

N-Channel Enhancement Mode Field Effect Transistor

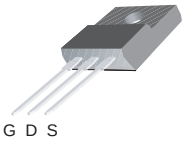
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (Ω) Typ
500V	18A	0.25 @ VGS=10V

FEATURES

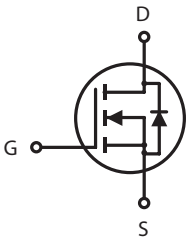
- Super high dense cell design for low $R_{DS(ON)}$.
- Rugged and reliable.
- TO-220 and TO-220F Package.



SDP SERIES
TO-220



SDF SERIES
TO-220F



ORDERING INFORMATION

Ordering Code	Package	Marking Code	Delivery Mode	RoHS Status
SDP18N50HZ	TO-220	SDP18N50	Tube	Halogen Free
SDP18N50PZ	TO-220	18N50	Tube	Pb Free
SDF18N50HZ	TO-220F	SDF18N50	Tube	Halogen Free
SDF18N50PZ	TO-220F	18N50	Tube	Pb Free

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

Symbol	Parameter		SDP18N50	SDF18N50	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	18	18	A
		T_C=100°C	10.8	10.8	A
I_{DM}	-Pulsed [a]		72	72	A
E_{AS}	Single Pulse Avalanche Energy [c]		990		mJ
P_D	Maximum Power Dissipation	T_C=25°C	236	38	W
		T_C=100°C	94	14.1	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		-55 to 150		°C

THERMAL CHARACTERISTICS

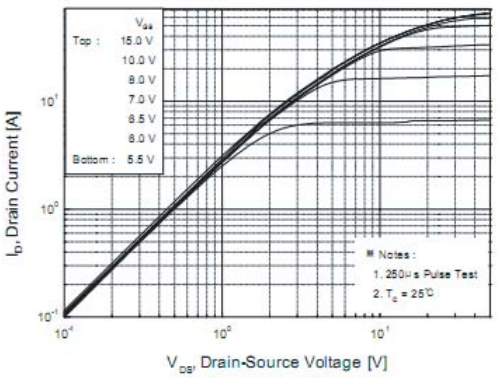
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.53	3.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	62.5	°C/W

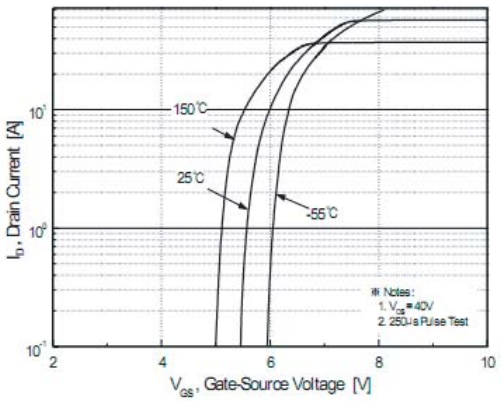
ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

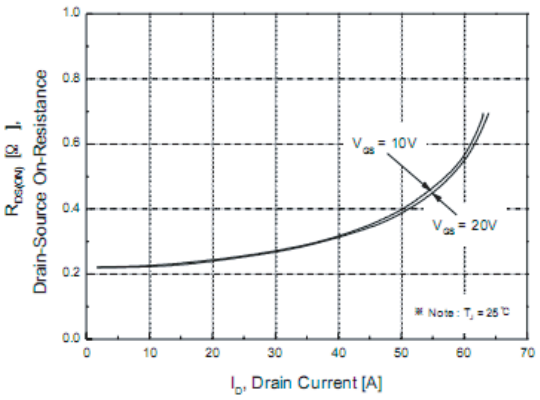
Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	500			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=400V , V_{GS}=0V			1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS}= ±30V , V_{DS}=0V			±100	nA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=250uA	3		5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V , I_D=9.0A		0.25	0.32	ohm
DYNAMIC CHARACTERISTICS [b]						
C_{ISS}	Input Capacitance	V_{DS}=25V,V_{GS}=0V f=1.0MHz		2500		pF
C_{OSS}	Output Capacitance			400		pF
C_{RSS}	Reverse Transfer Capacitance			40		pF
SWITCHING CHARACTERISTICS [b]						
$t_{D(ON)}$	Turn-On Delay Time	V_{DD}=250V I_D=1A R_{GEN}= 25 ohm		70		ns
t_r	Rise Time			190		ns
$t_{D(OFF)}$	Turn-Off Delay Time			100		ns
t_f	Fall Time			100		ns
Q_g	Total Gate Charge	V_{DS}=400V,I_D=1A,V_{GS}=10V		50		nC
Q_{gs}	Gate-Source Charge	V_{DS}=400V,I_D=1A, V_{GS}=10V		14		nC
Q_{gd}	Gate-Drain Charge			22		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=18A			1.5	V

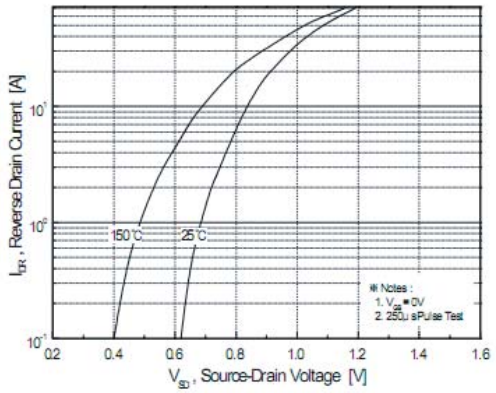
Notes

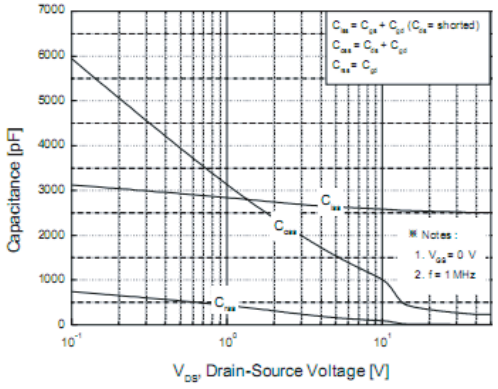
a.Drain current limited by maximum junction temperatrue.
b.Guaranteed by design, not subject to production testing.
c.Starting T_J=25°C,L=5.5mH,V_{DD} = 50V.

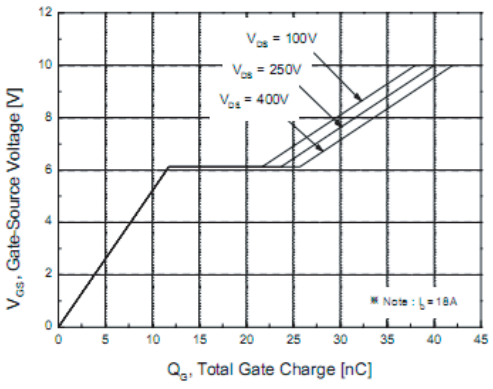

Top : 15.0 V
10.0 V
8.0 V
7.0 V
6.5 V
6.0 V
Bottom : 5.5 V
※ Notes :
1. 250μs Pulse Test
2. T_C = 25℃
I_D, Drain Current [A]
V_DS, Drain-Source Voltage [V]


150℃
25℃
-55℃
※ Notes :
1. V_DS = 40V
2. 250μs Pulse Test
I_D, Drain Current [A]
V_GS, Gate-Source Voltage [V]


V_GS = 10V
V_GS = 20V
※ Note : T_J = 25℃
R_DS(ON) [Ω], Drain-Source On-Resistance
I_D, Drain Current [A]


150℃
25℃
※ Notes :
1. V_GS = 0V
2. 250μs Pulse Test
I_DR, Reverse Drain Current [A]
V_SD, Source-Drain Voltage [V]


C_iss = C_gs + C_gd (C_ds = shorted)
C_oss = C_ds + C_gd
C_rss = C_gd
※ Notes :
1. V_GS = 0 V
2. f = 1 MHz
Capacitance [pF]
V_DS, Drain-Source Voltage [V]


V_DS = 100V
V_DS = 250V
V_DS = 400V
※ Note : I_D = 18A
V_GS, Gate-Source Voltage [V]
Q_G, Total Gate Charge [nC]

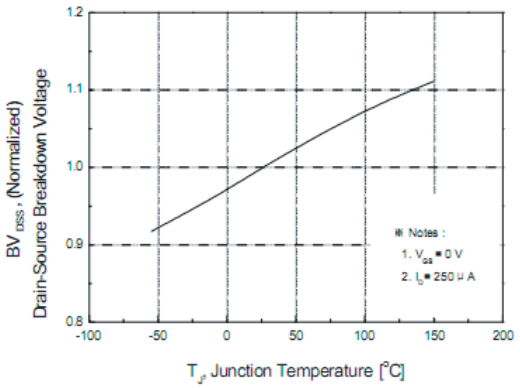


Figure 7. Breakdown Voltage Variation vs Temperature

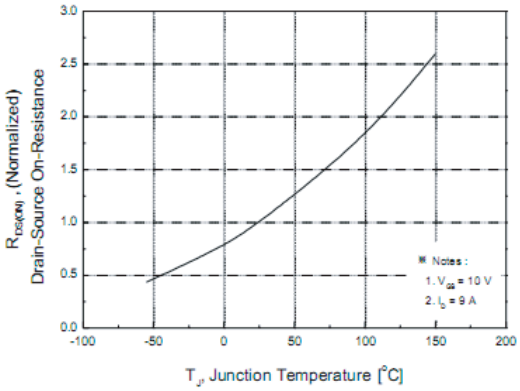


Figure 8. On-Resistance Variation vs Temperature

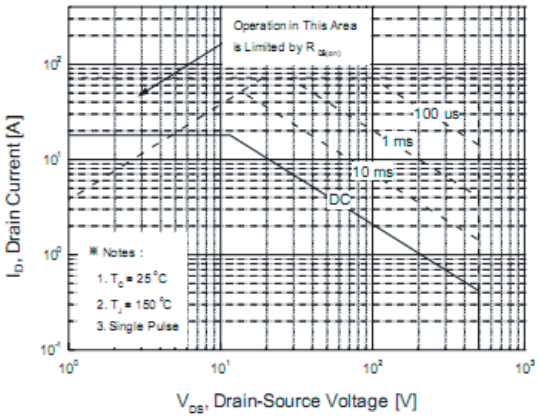


Figure 9-1. Maximum Safe Operating Area for TO220

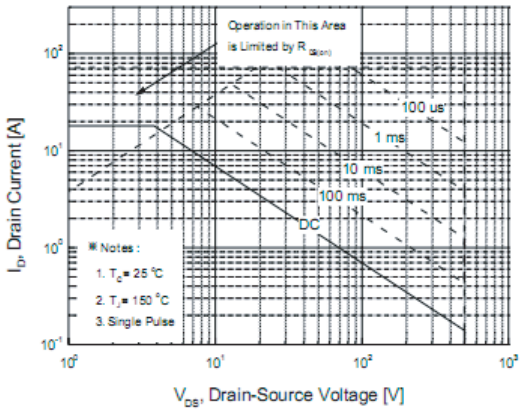


Figure 9-2. Maximum Safe Operating Area for TO220F

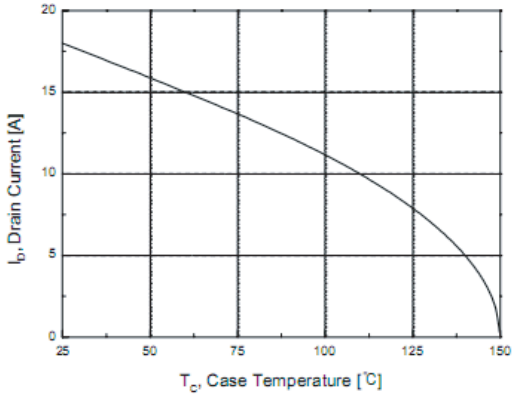


Figure 10-1. Maximum Drain Current vs Case Temperature

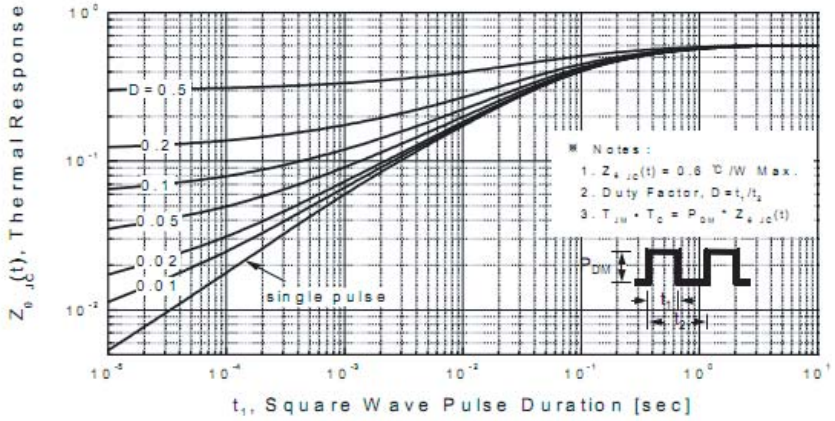


Figure 11-1. Transient Thermal Response Curve for TO220

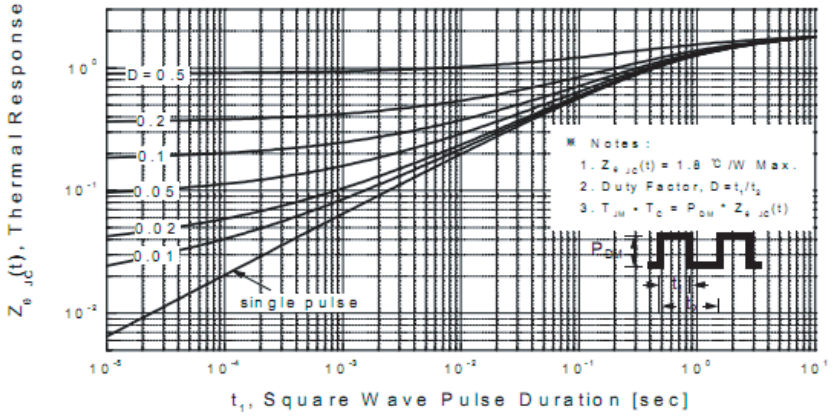
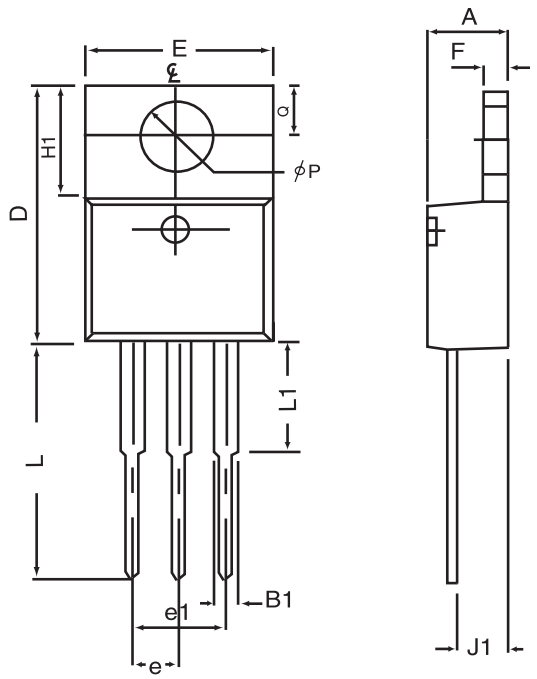


Figure 11-2. Transient Thermal Response Curve for TO220F

PACKAGE OUTLINE DIMENSIONS

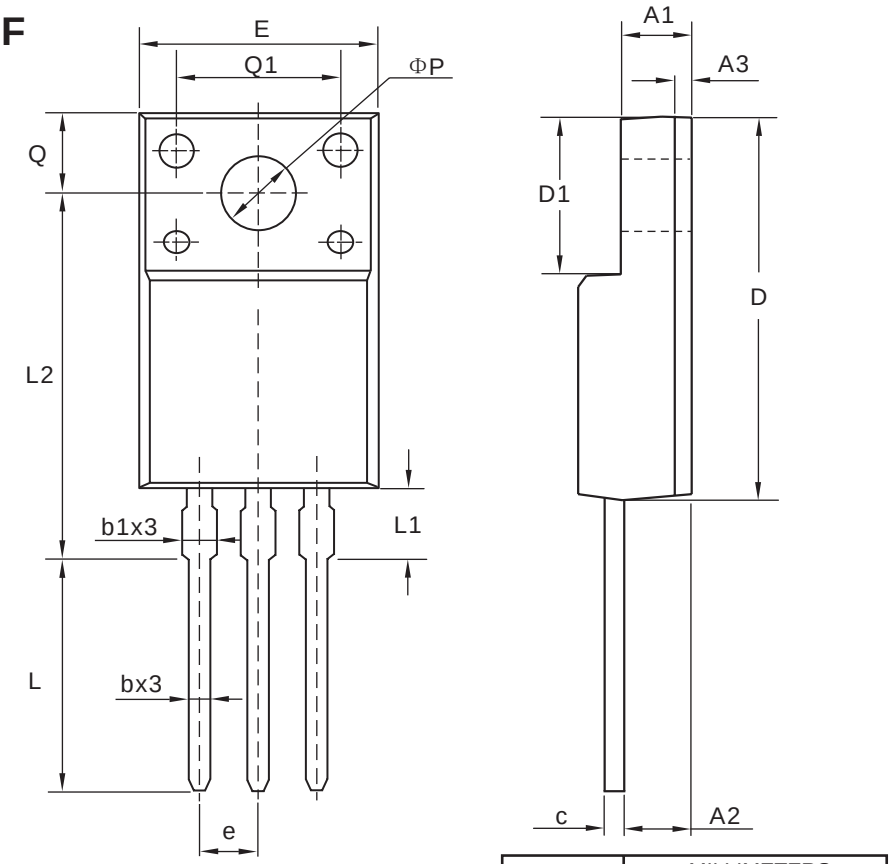
TO-220

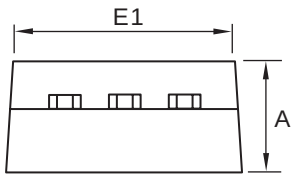


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	4.80	0.170	0.189
B1	1.27	1.65	0.050	0.630
D	14.6	16.00	0.575	0.610
E	9.70	10.41	0.382	0.410
e	2.34	2.74	0.092	0.108
e1	4.68	5.48	0.184	0.216
F	1.14	1.40	0.045	0.055
H1	5.97	6.73	0.235	0.265
J1	2.20	2.79	0.087	0.110
L	12.88	14.22	0.507	0.560
L1	3.00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

PACKAGE OUTLINE DIMENSIONS

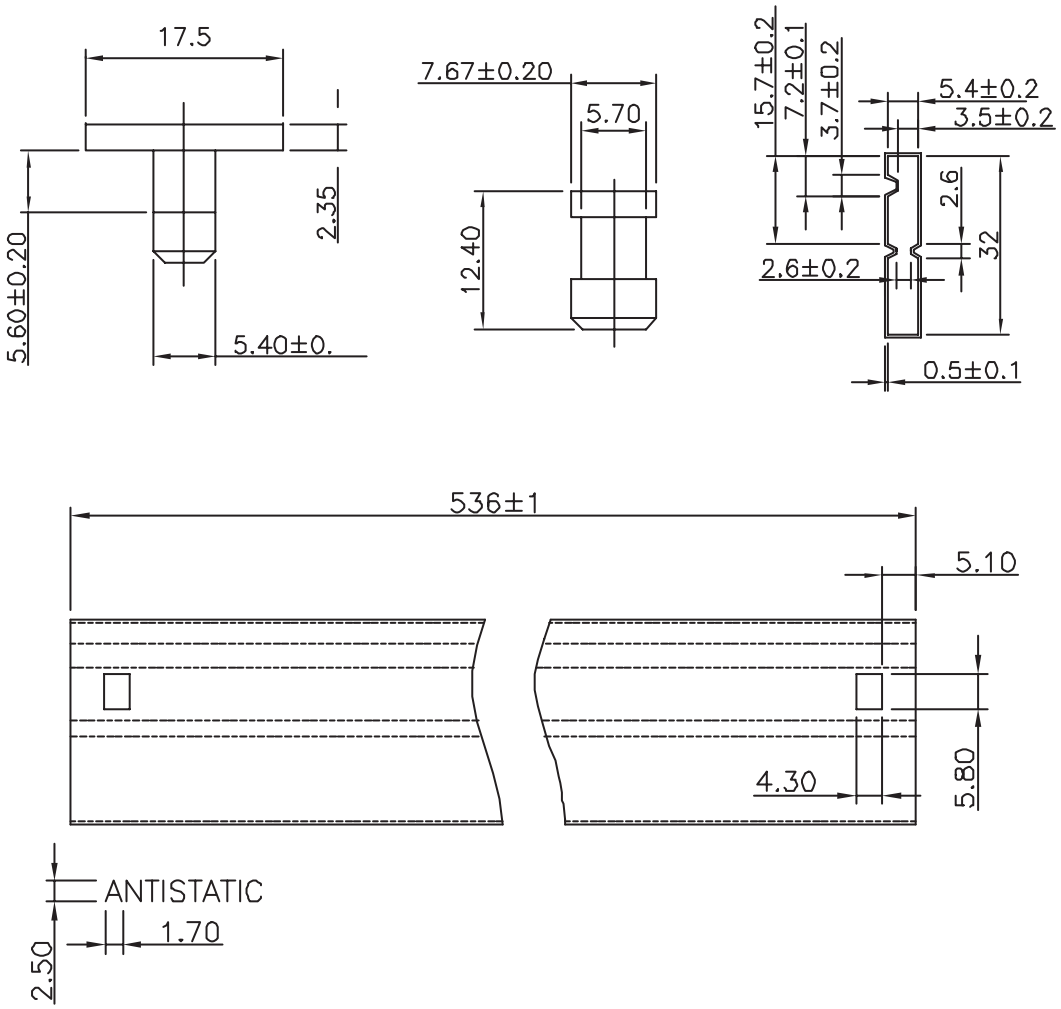
TO-220F



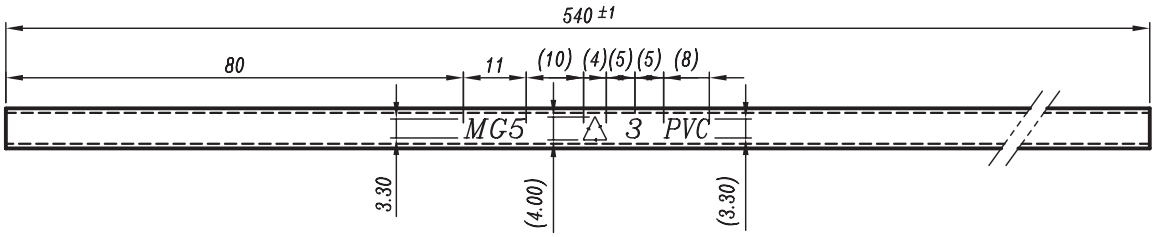


SYMBOL	MILLIMETERS	
	MIN	MAX
A	4.50	4.90
A1	2.35	2.75
A2	2.15	2.92
A3	0.50	0.65
b	0.70	0.90
b1	1.15	1.55
c	0.45	0.70
D	15.30	16.30
D1	6.67	6.77
E	9.90	10.32
E1	9.20	9.40
e	2.54 REF.	
L	9.45	10.05
L1	2.79	3.60
L2	15.60	16.00
Q	3.20	3.40
Q1	6.90	7.10
ΦP	2.90	3.55

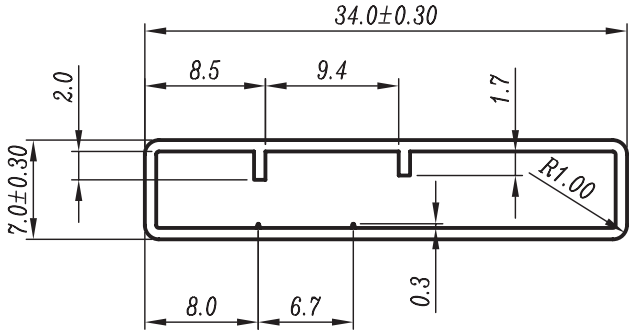
TO-220 Tube


17.5
2.35
5.60±0.20
5.40±0.
7.67±0.20
5.70
12.40
15.7±0.2
7.2±0.1
3.7±0.2
5.4±0.2
3.5±0.2
2.6
32
2.6±0.2
0.5±0.1
536±1
5.10
4.30
5.80
ANTISTATIC
1.70
2.50

TO-220F Tube



$t=0.8\pm0.15$



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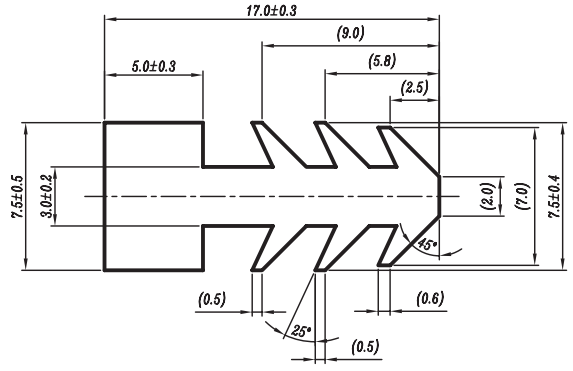
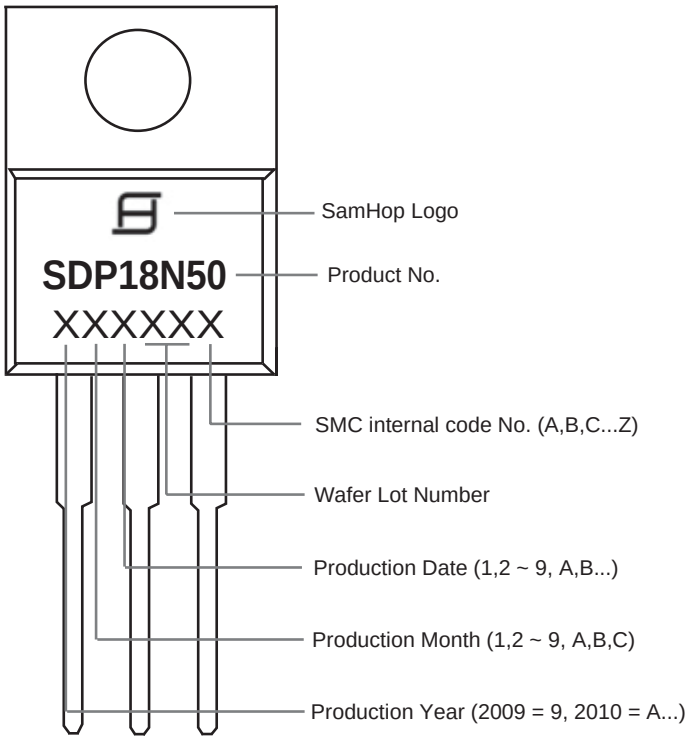


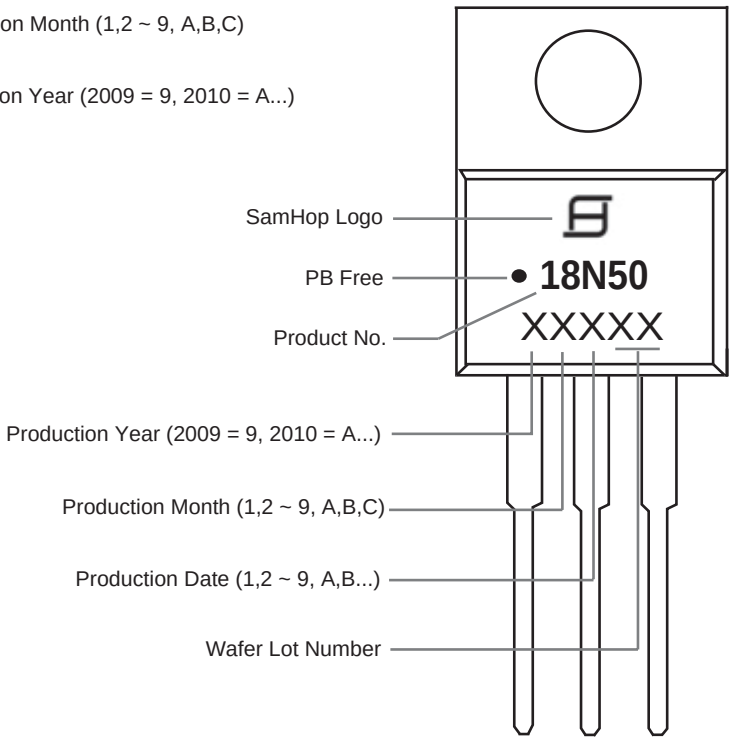
$L=8.0\ ^{+0.5}_{-1}$

TOP MARKING DEFINITION

TO-220 (Halogen Free)

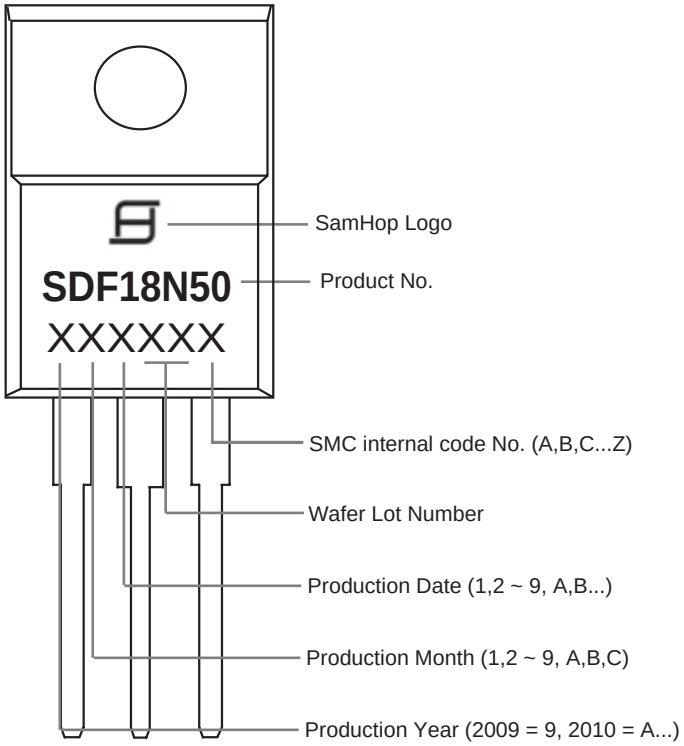


TO-220 (Pb Free)



TOP MARKING DEFINITION

TO-220F (Halogen Free)



TO-220F (Pb Free)