

TN60H20NTF

N-Channel Enhancement Mode Power MOSFET TO-220F

Product Summary

- $V_{DS} = 600V, I_D = 20A$
- $R_{DS(on)} < 0.4\Omega @ V_{GS} = 10V$

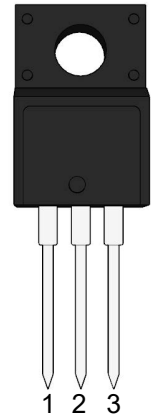
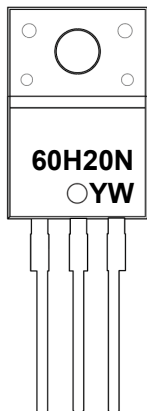
Features

- Advanced Planar Technology
- 100% Avalanche Tested
- RoHS Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

Application

- High Efficiency Switch Mode Power Supplies
- Electronic Lamp Ballasts Based on Half Bridge
- LED Power Supplies

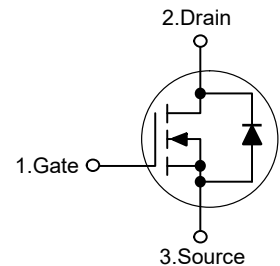
Marking Code



(Top View)

Pin	Description
1	Gate
2	Drain
3	Source

Schematic Diagram



Absolute Maximum Ratings

Ratings at 25°C case temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current-Continuous	I_D	20	A
Drain Current-Pulsed ^{Note1}	I_{DM}	72	A
Maximum Power Dissipation	P_D	40	W
Single Pulse Avalanche Energy ^{Note2}	E_{AS}	884	mJ
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Thermal Characteristics

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.13	°C/W
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Electrical Characteristics

(T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
V _{GS}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 uA	3	--	5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 10A	--	0.30	0.4	Ω
g _{fs}	Forward transfer conductance(note 3)	V _{DS} = 10 V, I _D = 10A (Note 3)	--	11	--	S
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 uA	600	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 600 V, V _{GS} = 0 V	--	--	1	uA
		V _{DS} = 600 V, T _C =125℃	--	--	100	
I _{GSSF}	Gate-Body Leakage Current,Forward	V _{GS} = 30 V, V _{DS} = 0 V	--	--	100	nA
I _{GSSR}	Gate-Body Leakage Current,Reverse	V _{GS} =- 30 V, V _{DS} = 0 V	--	--	-100	nA
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz	--	3944	--	pF
C _{OSS}	Output Capacitance		--	264	--	pF
C _{RSS}	Reverse Transfer Capacitance		--	24	--	pF
Switching Characteristics						
t _{d(on)}	Turn-On Time	V _{DS} = 300 V, I _D = 20A, R _G = 25 Ω (Note 3,4)	--	197	--	ns
t _r	Turn-On Rise Time		--	149	--	ns
t _{d(off)}	Turn-Off Delay Time		--	468	--	ns
t _f	Turn-Off Fall Time		--	83	--	ns
Q _g	Total Gate Charge	V _{DS} = 480 V, I _D = 20A, V _{GS} = 10 V (Note 3,4)	--	57	65	nC
Q _{gs}	Gate-Source Charge		--	23	--	nC
Q _{gd}	Gate-Drain Charge		--	13	--	nC
Source-Drain Diode Maximum Ratings and Characteristics						
I _S	Continuous Source-Drain Diode Forward Current		--	--	20	A
I _{SM}	Pulsed Source-Drain Diode Forward Current		--	--	72	
V _{SD}	Source-Drain Diode Forward Voltage	I _S = 20A, V _{GS} = 0 V	--	--	1.4	V
t _{rr}	Reverse Recovery Time	I _S =20A, V _{GS} = 0 V di _F /dt = 100 A/μs (Note 3,4)	--	435	--	ns
Q _{rr}	Reverse Recovery Charge		--	4.1	--	uC

Note:
1. Repeated rating: Pulse width limited by safe operating area
2. L=5mH, IAS=20A, VDD=50V, RG=25Ω, Starting TJ=25℃
3. Pulse test: Pulse width≤300us, Duty cycle≤2%
4. Essentially independent of operating temperature typical characteristics

Typical Characteristic Curves

Fig. 1 Typical Output Characteristics

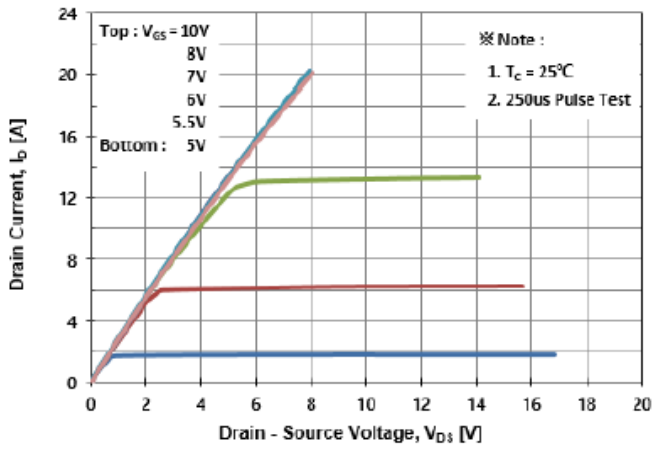


Fig. 2 Typical Output Characteristics

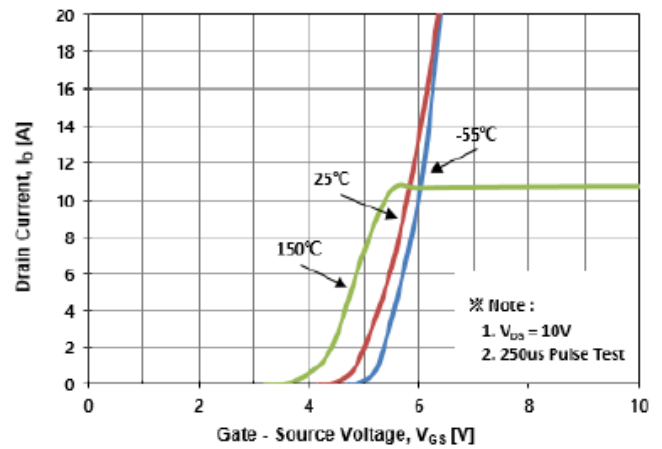


Fig.3 On-Resistance Variation with Drain Current and Gate Voltage

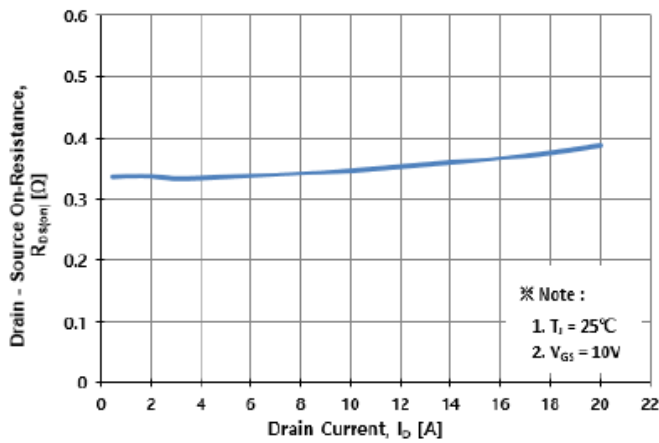


Fig. 4 Body Diode Forward Voltage Variation with Source Current

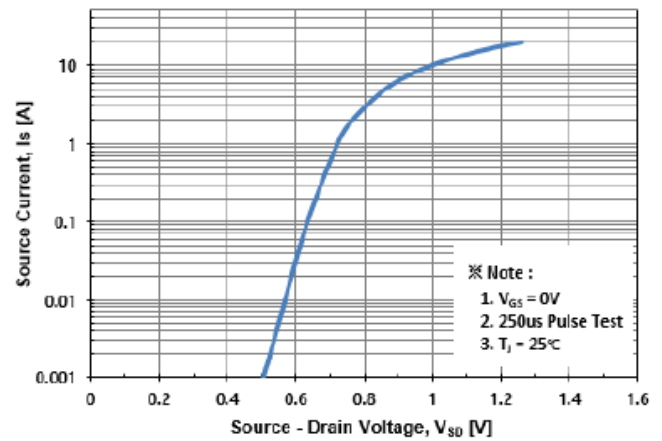


Fig. 5 Typical Capacitance Characteristics

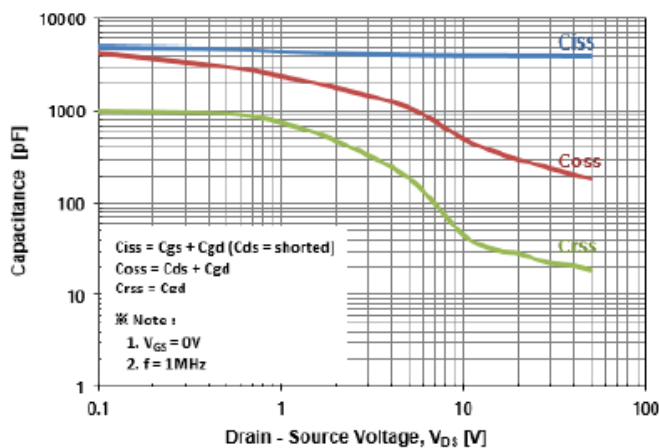


Fig. 6 Typical Total Gate Charge Characteristics

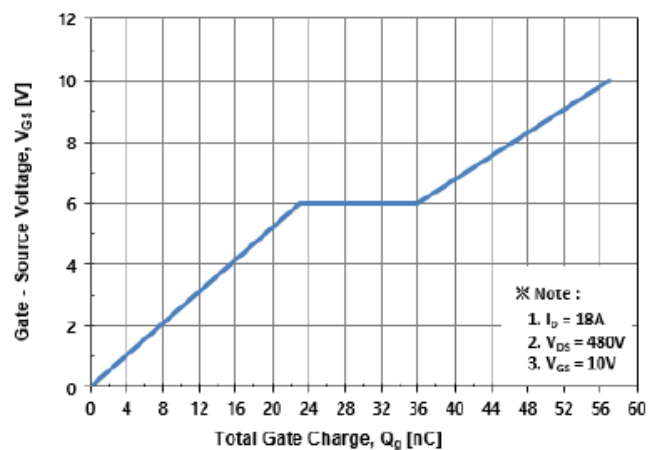


Fig. 7 Breakdown Voltage Variation vs. Temperature

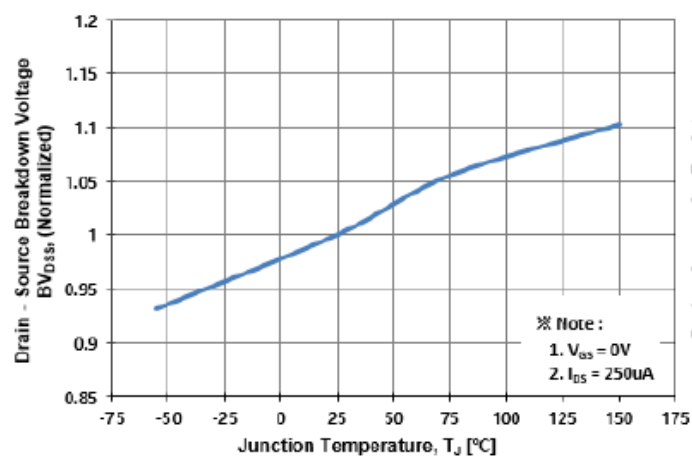


Fig. 8 On-Resistance Variation vs. Temperature

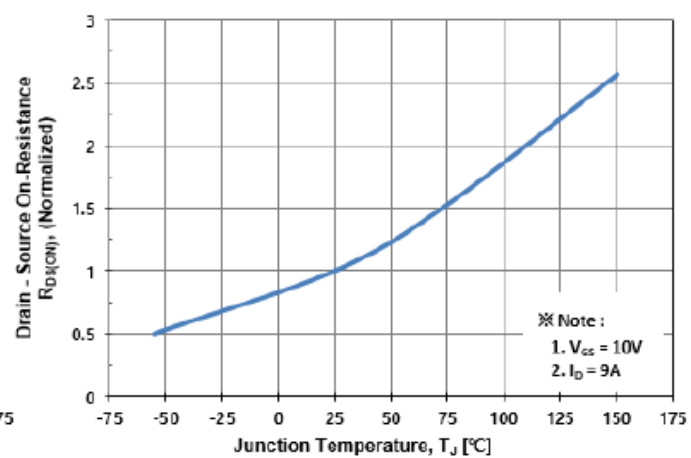


Fig. 9 Maximum Drain Current vs. Case Temperature

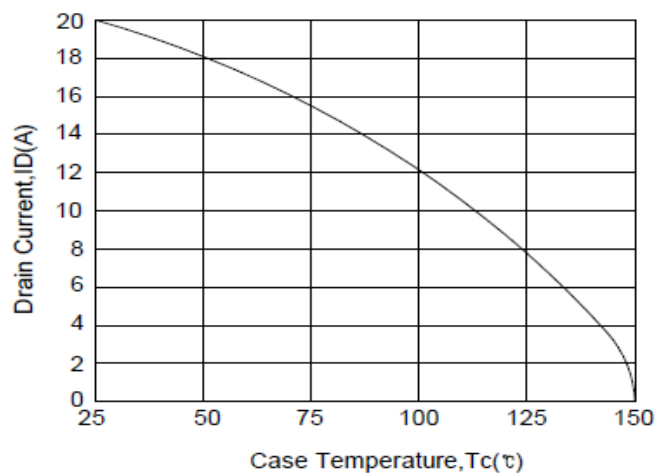


Fig. 10 Maximum Safe Operating Area

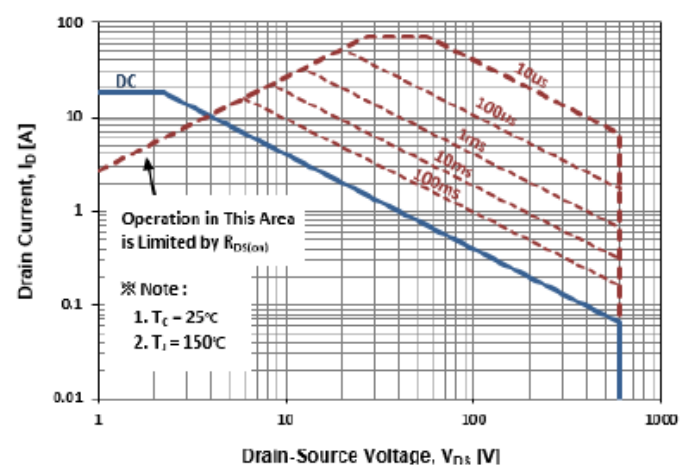
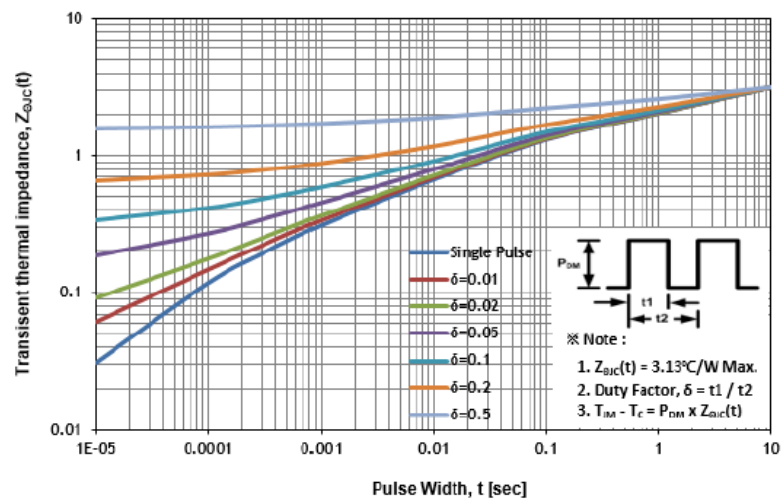


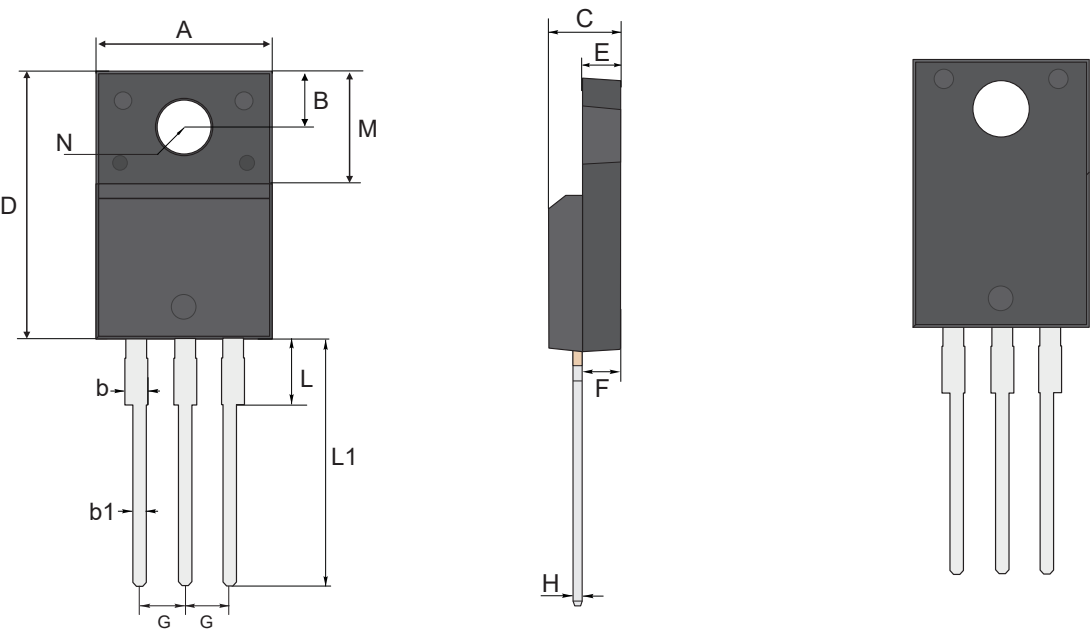
Fig. 11 Transient Thermal Impedance



Package Outline

TO-220F

Dimensions in mm



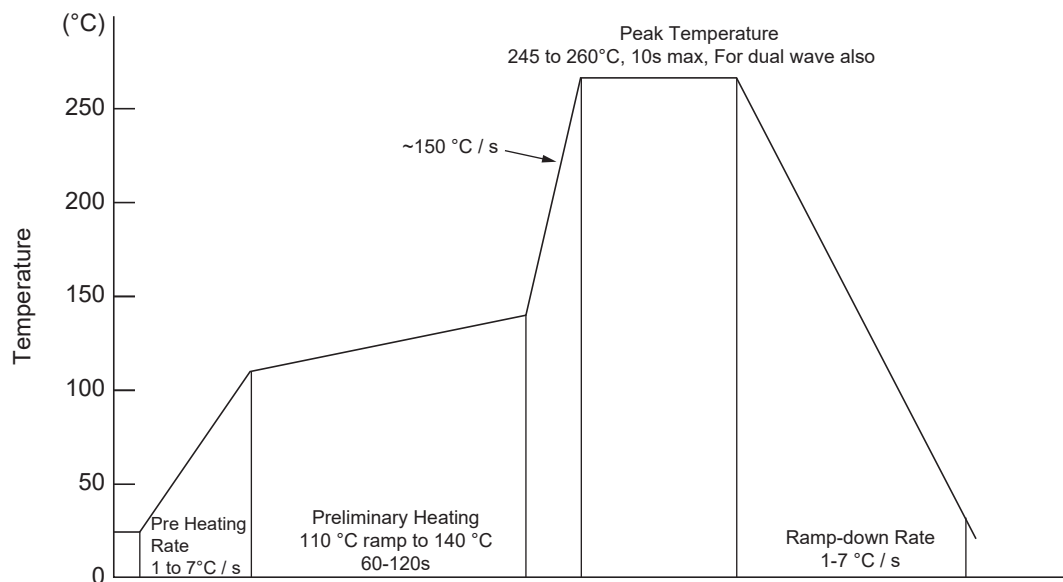
UNIT		A	B	b	b1	C	D	E	F	G	H	L	L1	M	N
mm	max	10.28	3.37	1.44	0.9	4.9	16.07	2.74	2.74	2.64	0.6	2.85	13.7	6.88	3.18 typ.
	typ	10.18	3.27	1.34	0.8	4.7	15.87	2.54	2.54	2.54	0.5	2.65	13.5	6.68	
	min	10.08	3.17	1.24	0.7	4.5	15.67	2.34	2.34	2.44	0.4	2.45	13.3	6.48	
mil	max	405	133	57	35	193	633	108	108	104	24	112	539	271	125 typ.
	typ	401	129	53	31	185	625	100	100	100	20	104	531	263	
	min	397	125	49	28	177	617	92	92	96	16	96	524	255	

Ordering Information

Device	Package	Shipping
TN60H20NTF	TO-220F	50PCS/Tube

Conditions of Soldering and Storage

◆ Wave Soldering



◆ Conditions of hand soldering

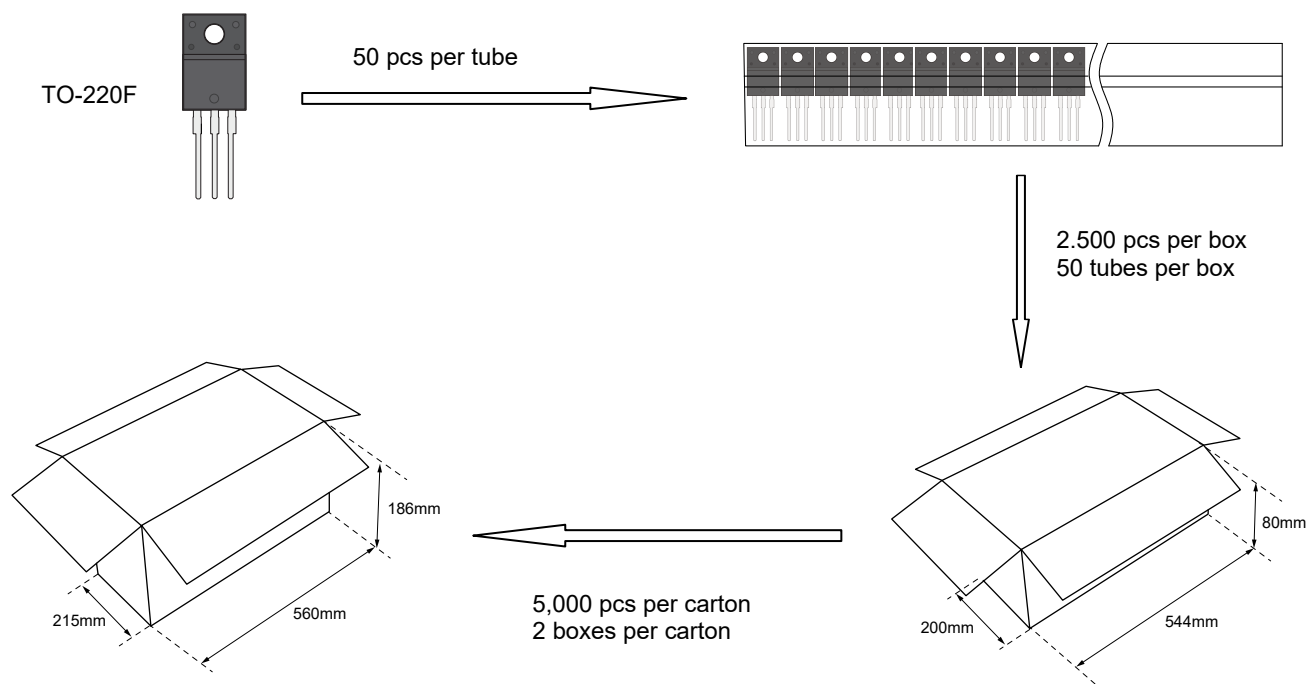
- Temperature: 360°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

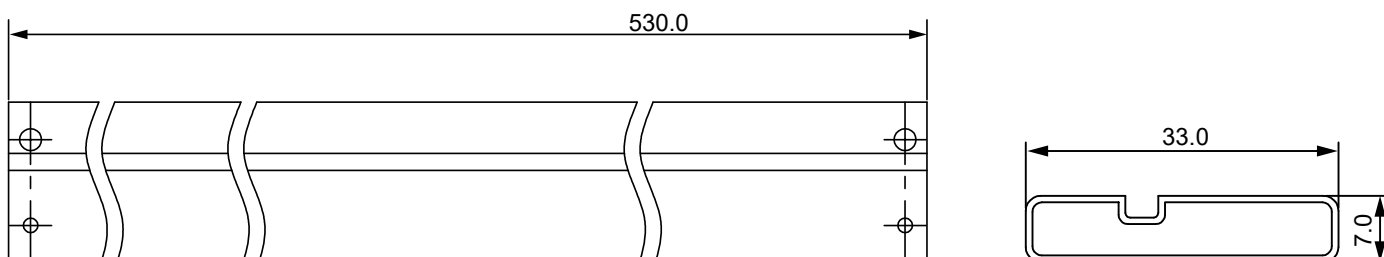
- **Temperature**
5 to 40°C
- **Humidity**
30 to 80% RH
- **Recommended period**
One year after manufacturing

Package Specifications

- The method of packaging



◆ Tube data



Contact Information

TANI website: <http://www.tanisemi.com> Email: tani@tanisemi.com

For additional information, please contact your local Sales Representative.



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