

TN70H15NTF

N-Channel Enhancement Mode Power MOSFET TO-220F

Product Summary

- $V_{DS} = 700V, I_D = 15A$
- $R_{DS(on)} < 0.65\Omega @ V_{GS} = 10V$

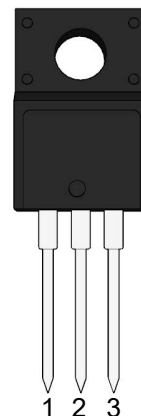
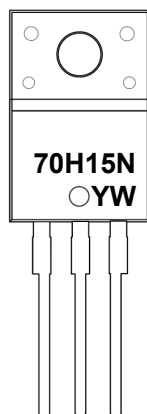
Features

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

Application

- High Efficiency Switch Mode Power Supplies
- Electronic Ballasts
- UPS

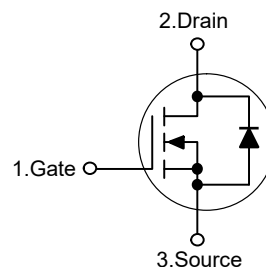
Marking Code



(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}	700	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current-Continuous	I_D	15	A
Drain Current-Pulsed ^{Note1}	I_{DM}	40	A
Maximum Power Dissipation	P_D	50	W
Single Pulse Avalanche Energy ^{Note2}	E_{AS}	245	mJ
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Thermal Characteristics

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.5	°C/W
--------------------------------------	-----------------	-----	------

Electrical Characteristics

(T_J=25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0V, T _J =25°C	600			V
		I _D =250μA, V _{GS} =0V, T _J =150°C		700		
BV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250μA, V _{GS} =0V		0.65		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =600V, V _{GS} =0V			1	μA
		V _{DS} =480V, T _J =125°C			10	
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±30V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =5V, I _D =250μA	3	4	4.5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =6A		0.46	0.55	Ω
g _{FS}	Forward Transconductance	V _{DS} =40V, I _D =6A		20		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.72	1	V
I _S	Maximum Body-Diode Continuous Current				12	A
I _{SM}	Maximum Body-Diode Pulsed Current				48	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1MHz	1400	1751	2100	pF
C _{oss}	Output Capacitance		130	164	200	pF
C _{rss}	Reverse Transfer Capacitance		10	13	16	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	2.5	3.3	5	Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =480V, I _D =15A		40	50	nC
Q _{gs}	Gate Source Charge			9	11	nC
Q _{gd}	Gate Drain Charge			17.9	22	nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =300V, I _D =15A, R _G =25Ω		39	50	ns
t _r	Turn-On Rise Time			70	85	ns
t _{D(off)}	Turn-Off DelayTime			122	150	ns
t _f	Turn-Off Fall Time			74	90	ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =12A, dI/dt=100A/μs, V _{DS} =100V		311	373	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =12A, dI/dt=100A/μs, V _{DS} =100V		5.2	6.2	μC

A. The value of R_{θJA} is measured with the device in a still air environment with T_A=25°C.B. The power dissipation P_D is based on T_{J(MAX)}=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.C. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C, Ratings are based on low frequency and duty cycles to keep initial T_J=25°C.D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=150°C. The SOA curve provides a single pulse rating.G. L=60mH, I_{AS}=5.5A, V_{DD}=150V, R_G=25Ω, Starting T_J=25°C

Typical Characteristic Curves

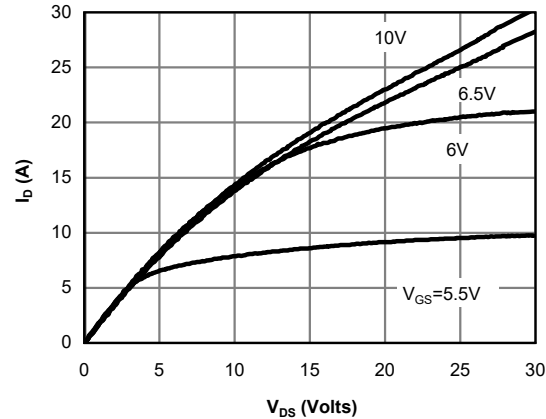


Fig 1: On-Region Characteristics

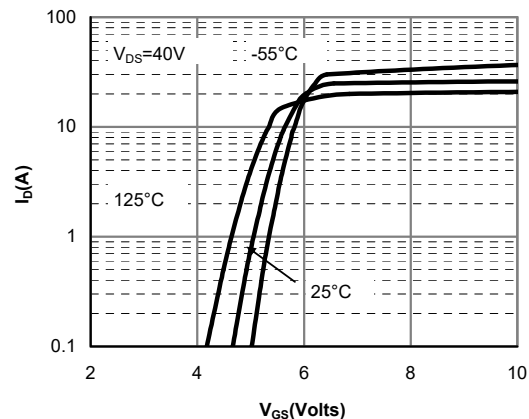


Figure 2: Transfer Characteristics

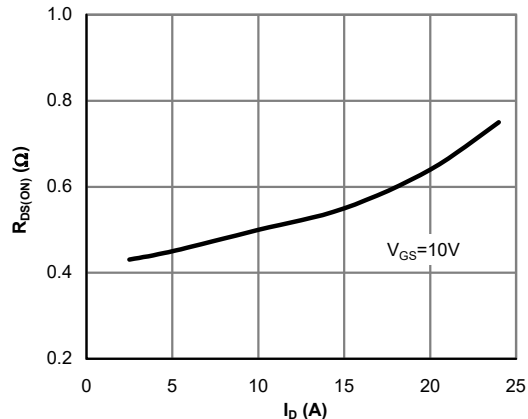


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

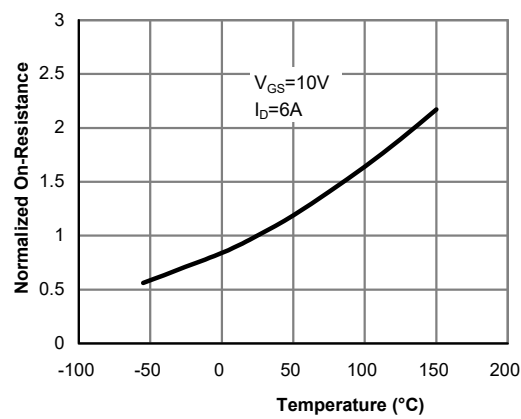


Figure 4: On-Resistance vs. Junction Temperature

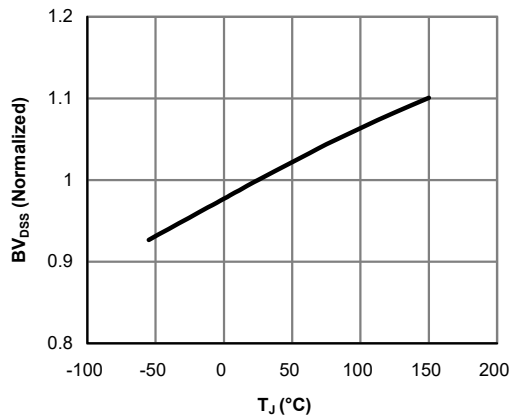


Figure 5: Break Down vs. Junction Temperature

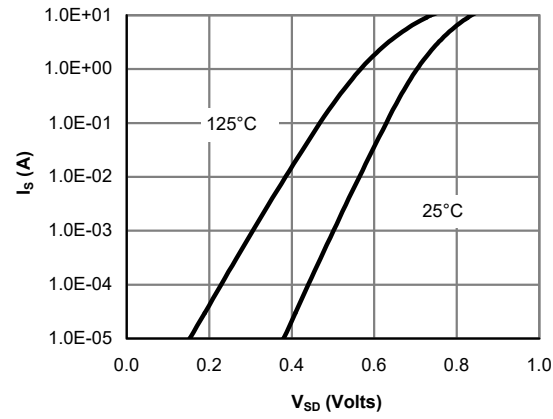


Figure 6: Body-Diode Characteristics (Note E)

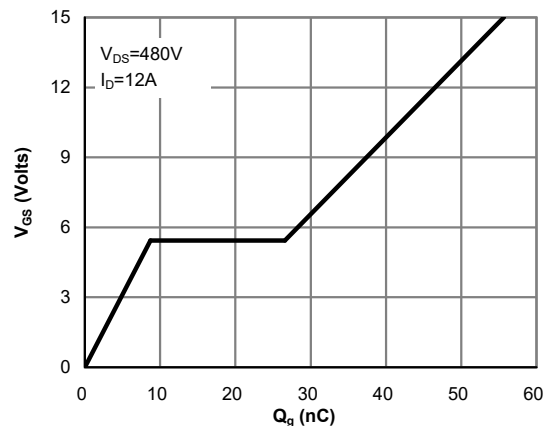


Figure 7: Gate-Charge Characteristics

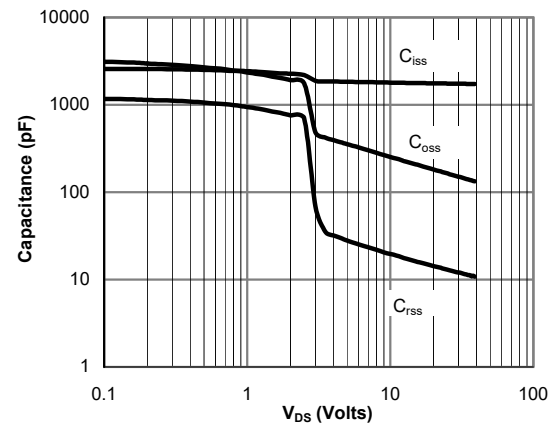


Figure 8: Capacitance Characteristics

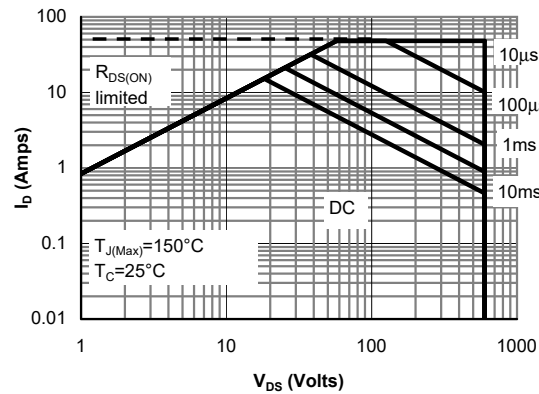


Figure 9: Maximum Forward Biased Safe Operating Area for AOT12N60 (Note F)

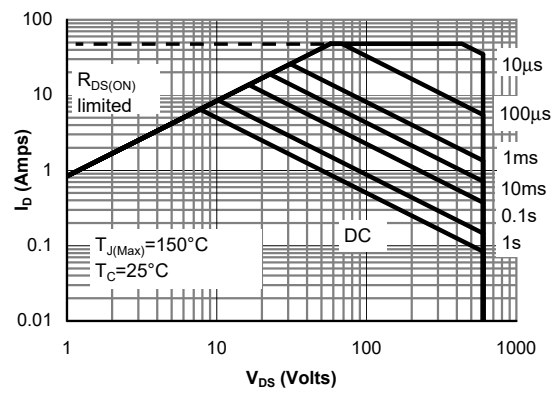


Figure 10: Maximum Forward Biased Safe Operating Area for AOTF12N60 (Note F)

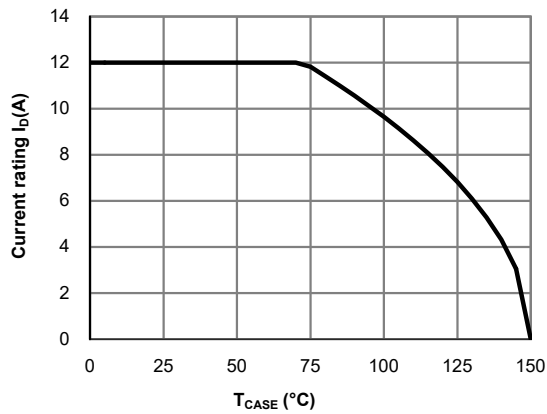


Figure 11: Current De-rating (Note B)

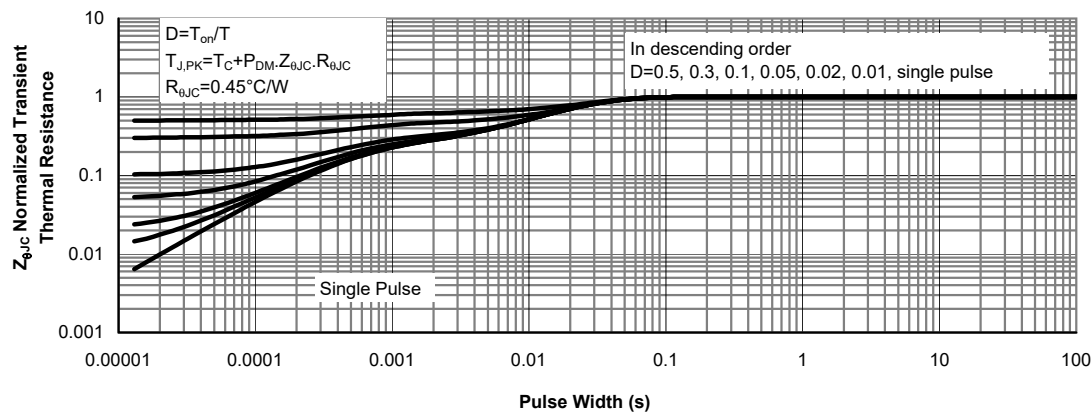


Figure 12: Normalized Maximum Transient Thermal Impedance for AOT12N60 (Note F)

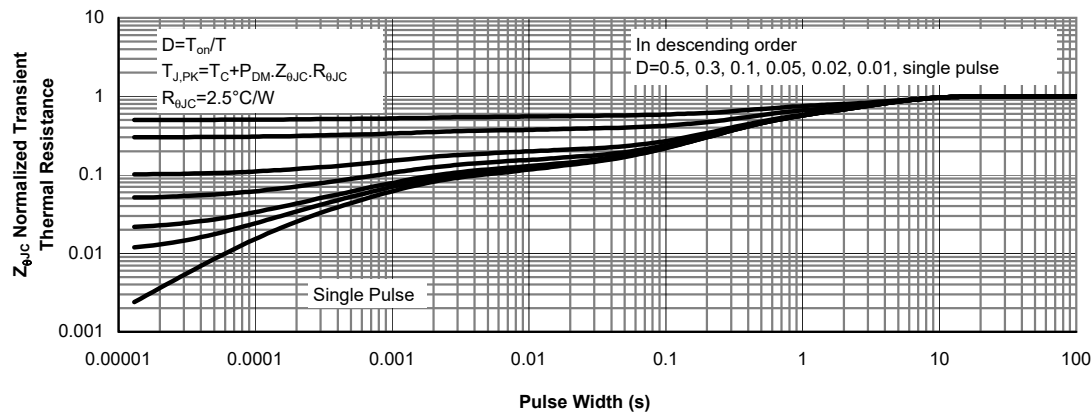
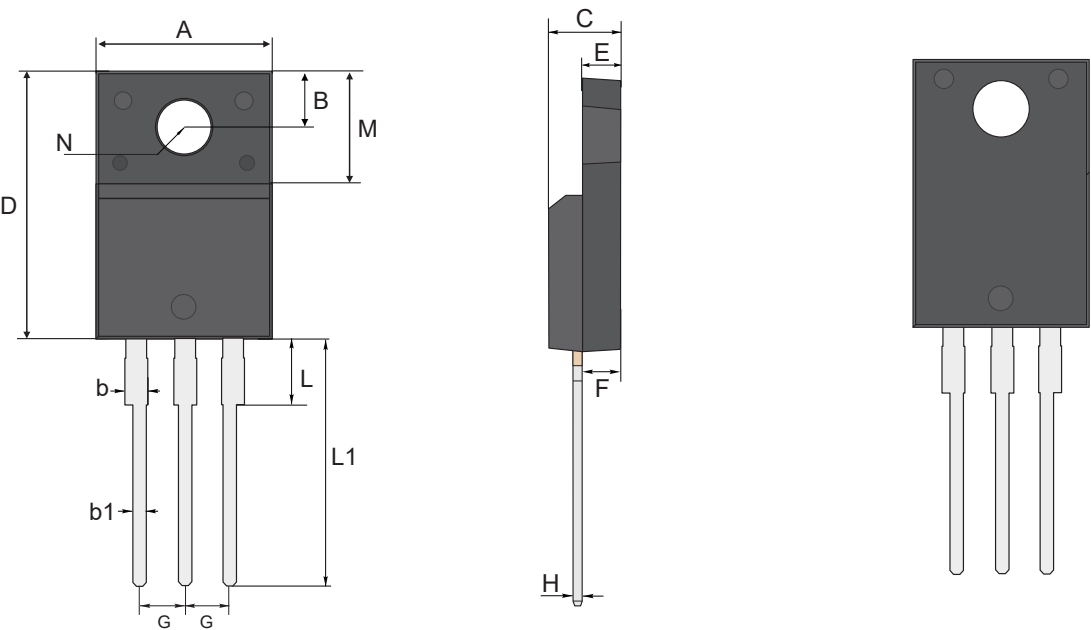


Figure 13: Normalized Maximum Transient Thermal Impedance for AOTF12N60 (Note F)

Package Outline

TO-220F

Dimensions in mm



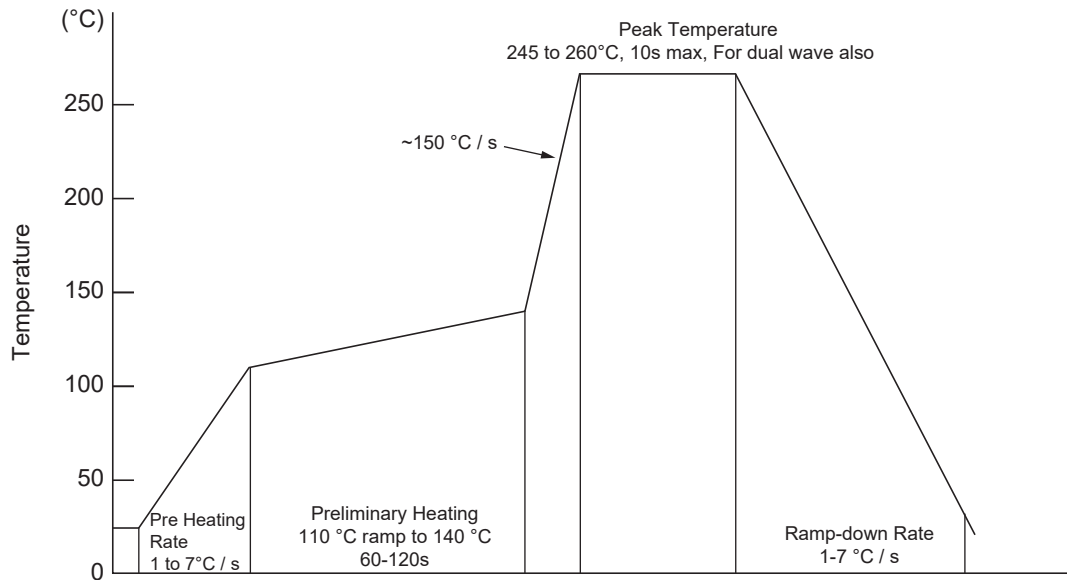
UNIT		A	B	b	b1	C	D	E	F	G	H	L	L1	M	N
mm	max	10.28	3.37	1.44	0.9	4.9	16.07	2.74	2.74	2.64	0.6	2.85	13.7	6.88	3.18 typ.
	typ	10.18	3.27	1.34	0.8	4.7	15.87	2.54	2.54	2.54	0.5	2.65	13.5	6.68	
	min	10.08	3.17	1.24	0.7	4.5	15.67	2.34	2.34	2.44	0.4	2.45	13.3	6.48	
mil	max	405	133	57	35	193	633	108	108	104	24	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
TN70H15NTF	TO-220F	50PCS/Tube

Conditions of Soldering and Storage

◆ Wave Soldering



◆ Conditions of hand soldering

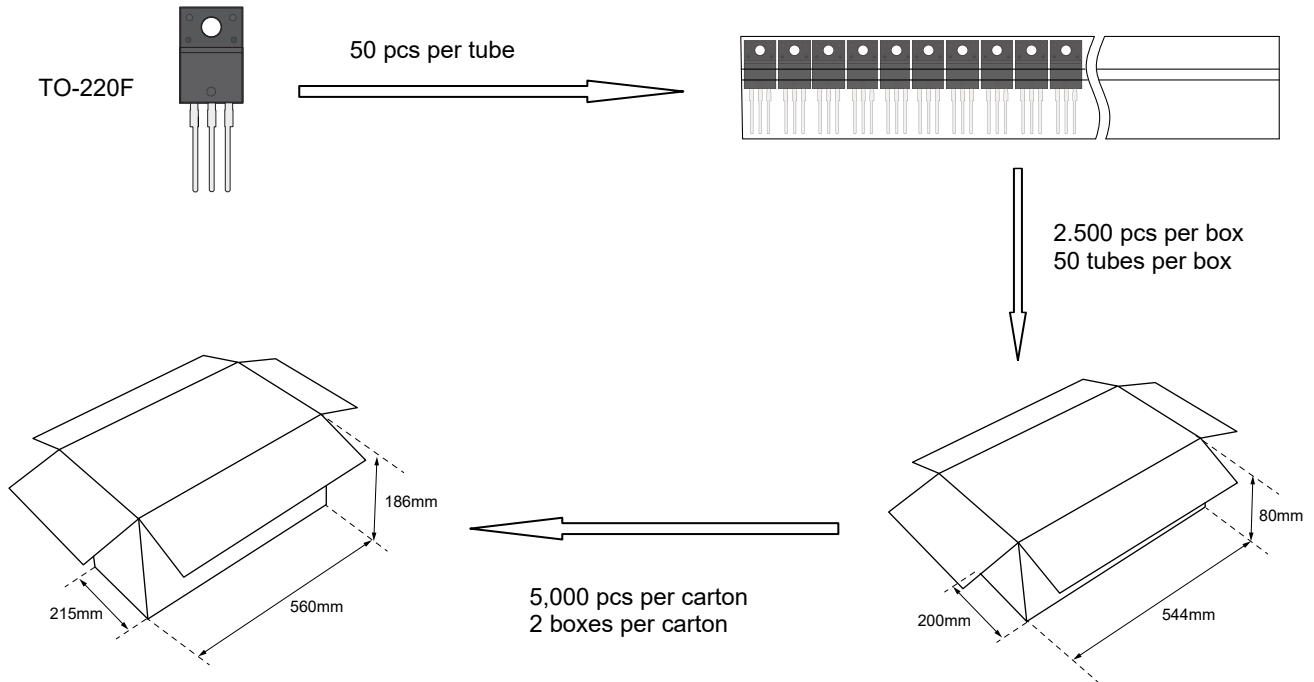
- Temperature: 360°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

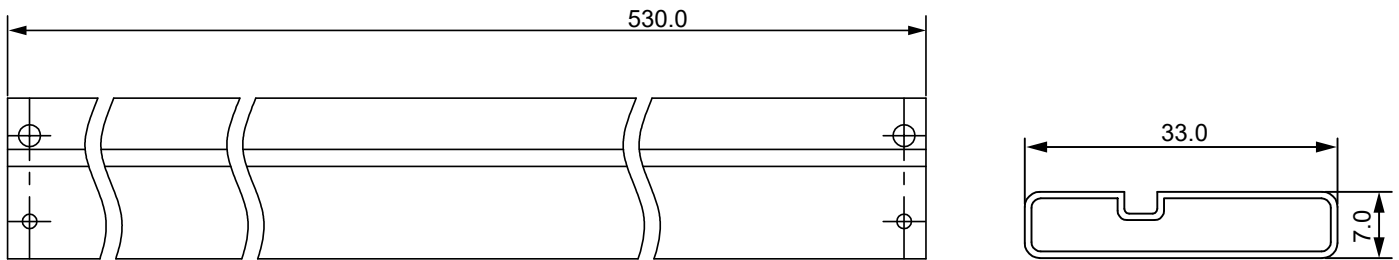
- **Temperature**
5 to 40°C
- **Humidity**
30 to 80% RH
- **Recommended period**
One year after manufacturing

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.



® is registered trademarks of TANI Corporation.

Product Specification Statement

The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. TANI shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and TANI assumes no responsibility for the application of the product. TANI strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, TANI cannot guarantee that the information provided in the product specification is entirely accurate and error-free. TANI shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications.

TANI reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with TANI to ensure that the product specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult TANI in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.

Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.

The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. TANI shall assume no responsibility for any consequences resulting from such usage.

Users should also comply with relevant laws, regulations, policies, and standards when using the product specification. Users are responsible for the risks and liabilities arising from the use of the product specification and must ensure that it is not used for illegal purposes. Additionally, users should respect the intellectual property rights related to the product specification and refrain from infringing upon any third-party legal rights. TANI shall assume no responsibility for any disputes or controversies arising from the above-mentioned issues in any form.