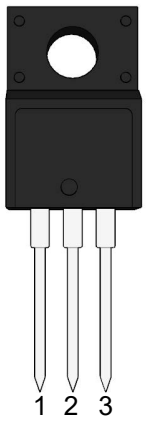
TN80H04NTF

N-Channel Enhancement Mode Power MOSFET

Product Summary

- V_{DS}= 800V,I_D= 4A
- $R_{DS(on)}$< 2.8Ω @V_{GS}= 10V

TO-220F



(Top View)

Pin	Description
1	Gate
2	Drain
3	Source

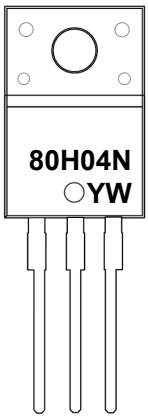
Features

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

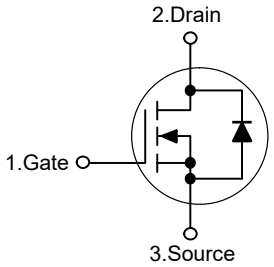
Application

- Uninterruptible Power Supply
- High Frequency Switching Mode Power Supply
- Electronic Ballast

Marking Code



Schematic Diagram



Absolute Maximum Ratings

Ratings at 25℃ case temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	800	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current-Continuous	I_D	4	A
Drain Current-Pulsed Note1	I_{DM}	16	A
Maximum Power Dissipation	P_D	38	W
Single Pulse Avalanche Energy Note2	E_{AS}	150	mJ
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Thermal Characteristics

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	3.75	°C/W

Electrical Characteristics

(T_J=25℃ unless o therwise s pecified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} = 0V,I_D = 250μA	800	-	-	V
$\triangle V_{(BR)DSS}$ /$\triangle T_J$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D = 250μA	-	0.5	-	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 800V, V_{GS} = 0V	-	-	1	μA
		V_{DS} = 700V, T_C = 125℃	-	-	10	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS} = 0V, V_{GS} = ±30V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage note4	V_{DS} = V_{GS}, I_D = 250μA	2	-	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} =10V, I_D = 4A	-	-	2.8	Ω
g_{FS}	Forward Transconductance	V_{DS} =30V, I_D = 4A	-	5.5	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	-	850	-	pF
C_{oss}	Output Capacitance		-	75	-	pF
C_{rss}	Reverse Transfer Capacitance		-	7.5	-	pF
Q_g	Total Gate Charge	V_{DD} = 800V, I_D = 4A, V_{GS} = 10V	-	15.0	-	nC
Q_{gs}	Gate-Source Charge		-	3.50	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	7.50	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 250V, I_D = 4A, R_G = 10Ω, V_{GS} = 10V	-	12.1	-	ns
t_r	Turn-On Rise Time		-	11.5	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	33.3	-	ns
t_f	Turn-Off Fall Time		-	7.33	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	4	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	20	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 5A	-	-	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0V, I_F = 5A, di/dt =100A/μs	-	55	-	ns
Q_{rr}	Reverse Recovery Charge		-	1.5	-	uC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L = 10mH, I_{AS} = 6A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 5A, di/dt ≤ 200A/μs, V_{DD} ≤ B_{VDSS}, Starting T_J = 25°C
4. Pulse width ≤ 300μs; duty cycle ≤ 2%.

Typical Characteristic Curves

Figure 1. Safe operating area for TO-220

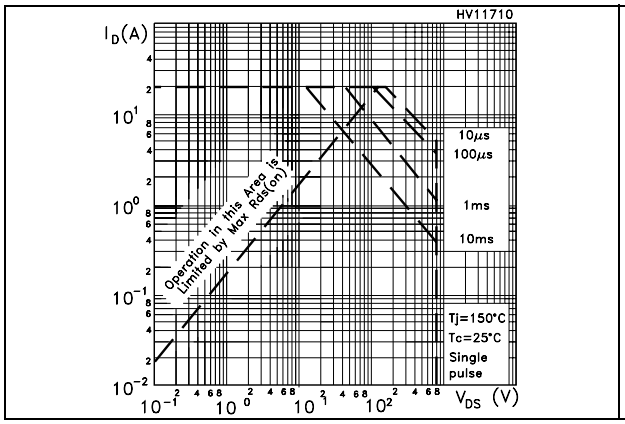


Figure 2. Thermal impedance for TO-220

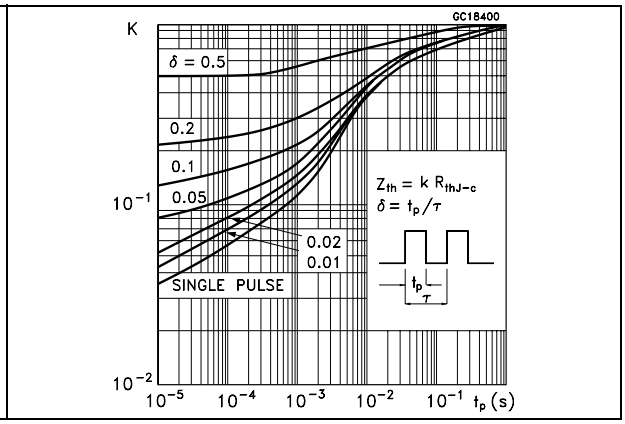


Figure 3. Safe operating area for TO-220FP

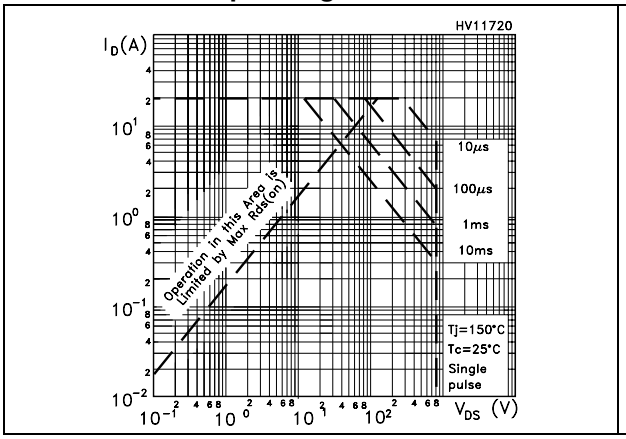


Figure 4. Thermal impedance for TO-220FP

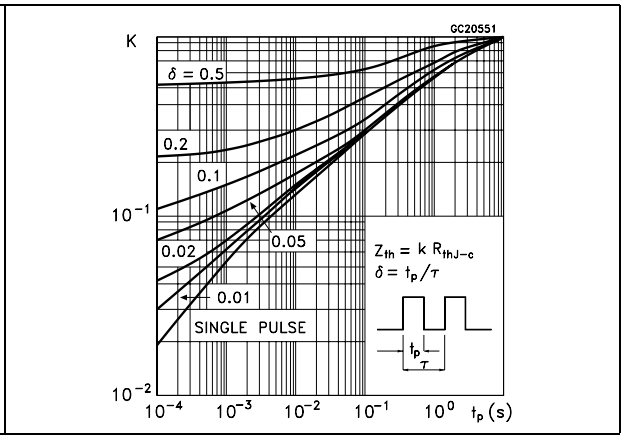


Figure 5. Output characterisics

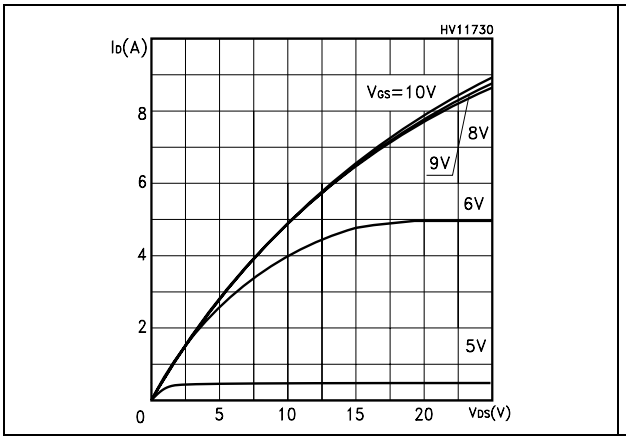


Figure 6. Transfer characteristics

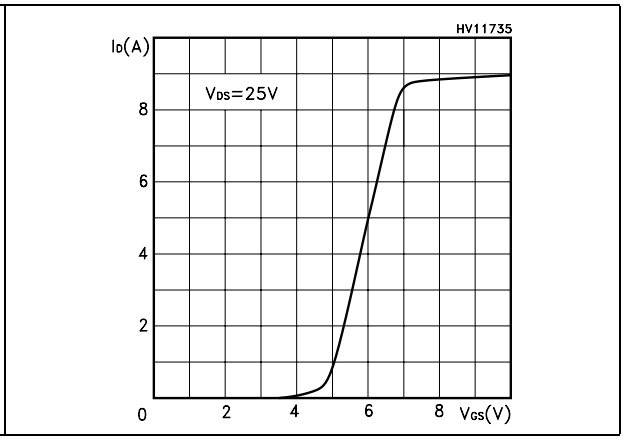


Figure 7. Transconductance

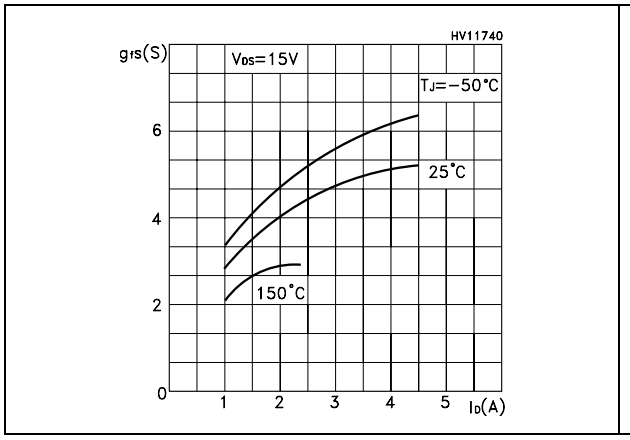


Figure 8. Static drain-source on resistance

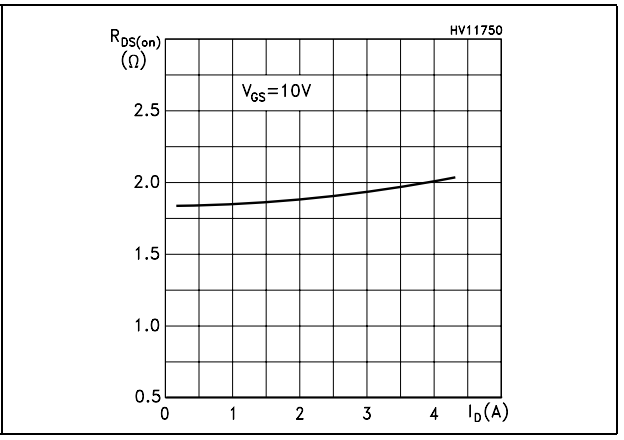


Figure 9. Gate charge vs gate-source voltage

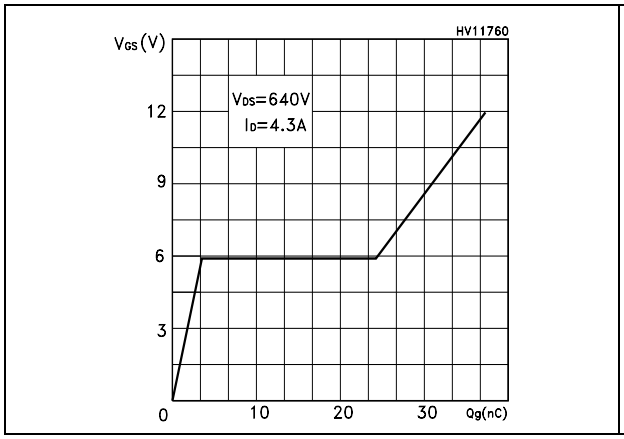


Figure 10. Capacitance variations

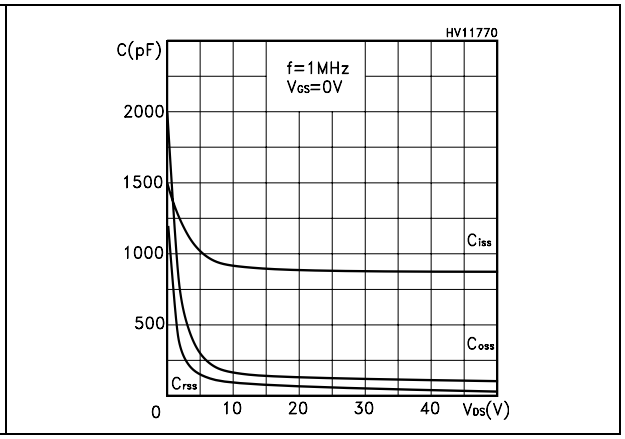


Figure 11. Normalized gate threshold voltage vs temperature

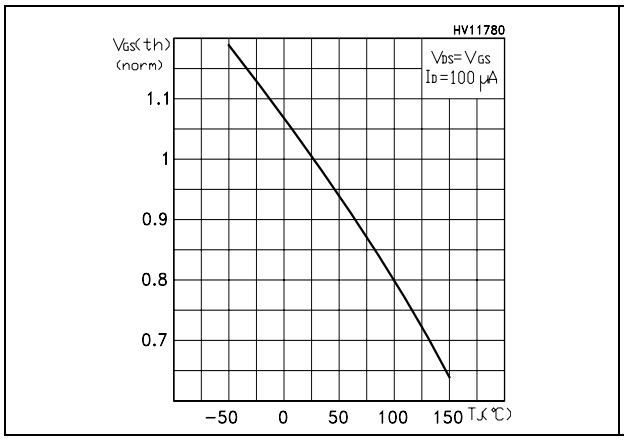


Figure 12. Normalized on resistance vs temperature

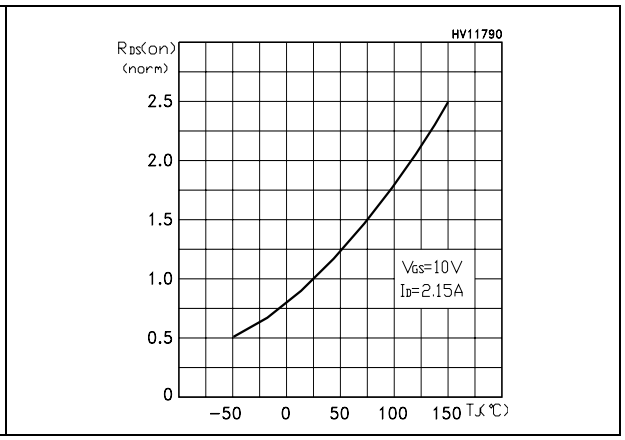


Figure 13. Source-drain diode forward characteristics

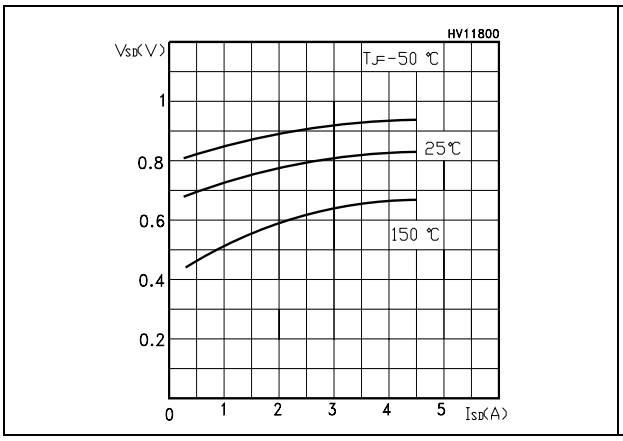


Figure 14. Normalized BVdss vs temperature

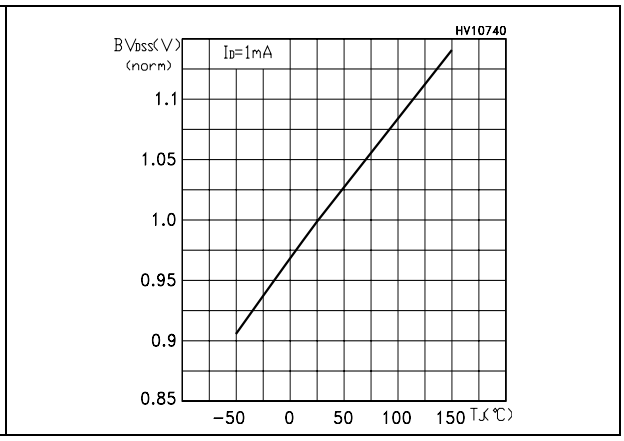
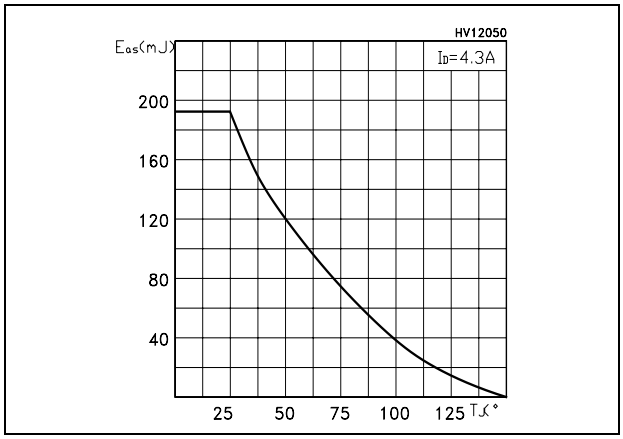


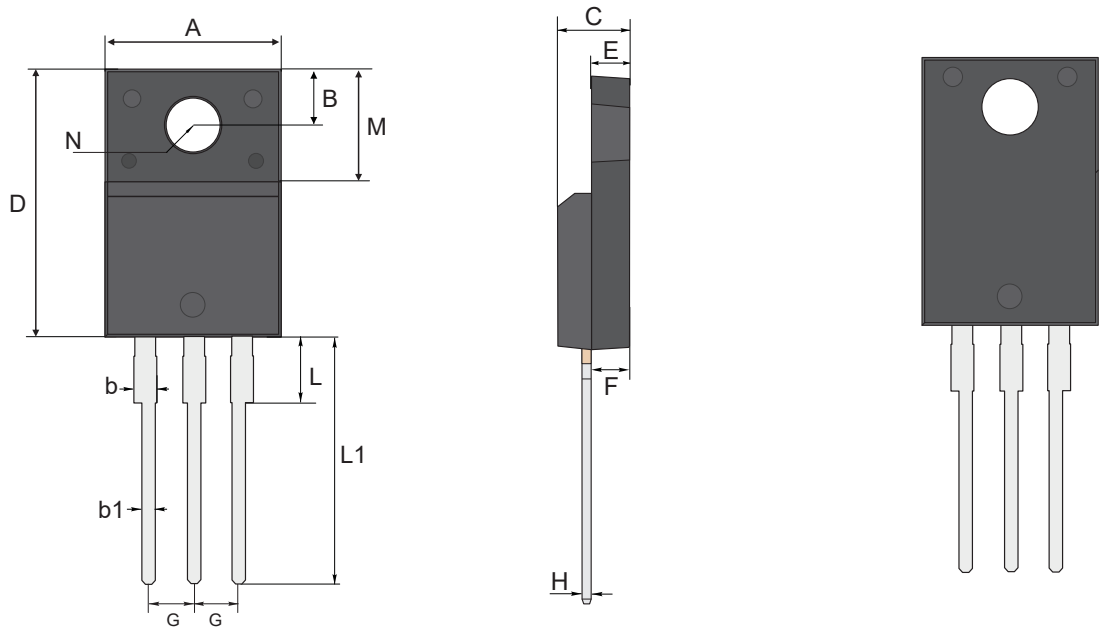
Figure 15. Avalanche energy vs temperature



Package Outline

TO-220F

Dimensions in mm



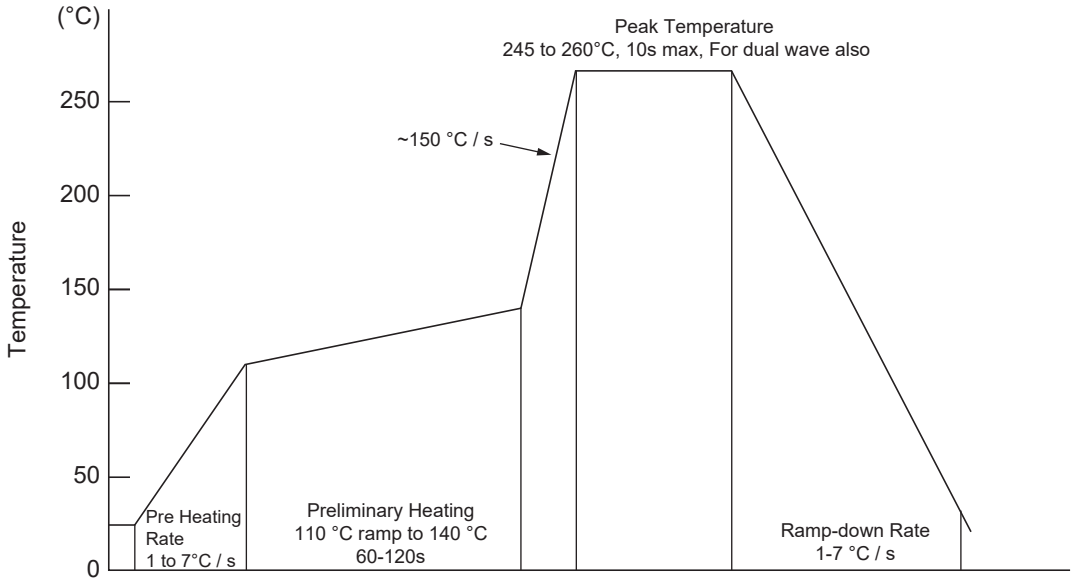
UNIT		A	B	b	b1	C	D	E	F	G	H	L	L1	M	N
mm	max	10.28	3.37	1.44	0.9	4.9	16.07	2.74	2.74	2.64	0.6	2.85	13.7	6.88	3.18 typ.
	typ	10.18	3.27	1.34	0.8	4.7	15.87	2.54	2.54	2.54	0.5	2.65	13.5	6.68	
	min	10.08	3.17	1.24	0.7	4.5	15.67	2.34	2.34	2.44	0.4	2.45	13.3	6.48	
mil	max	405	133	57	35	193	633	108	108	104	24	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
TN80H04NTF	TO-220F	50PCS/Tube

Conditions of Soldering and Storage

◆ Wave Soldering



◆ Conditions of hand soldering

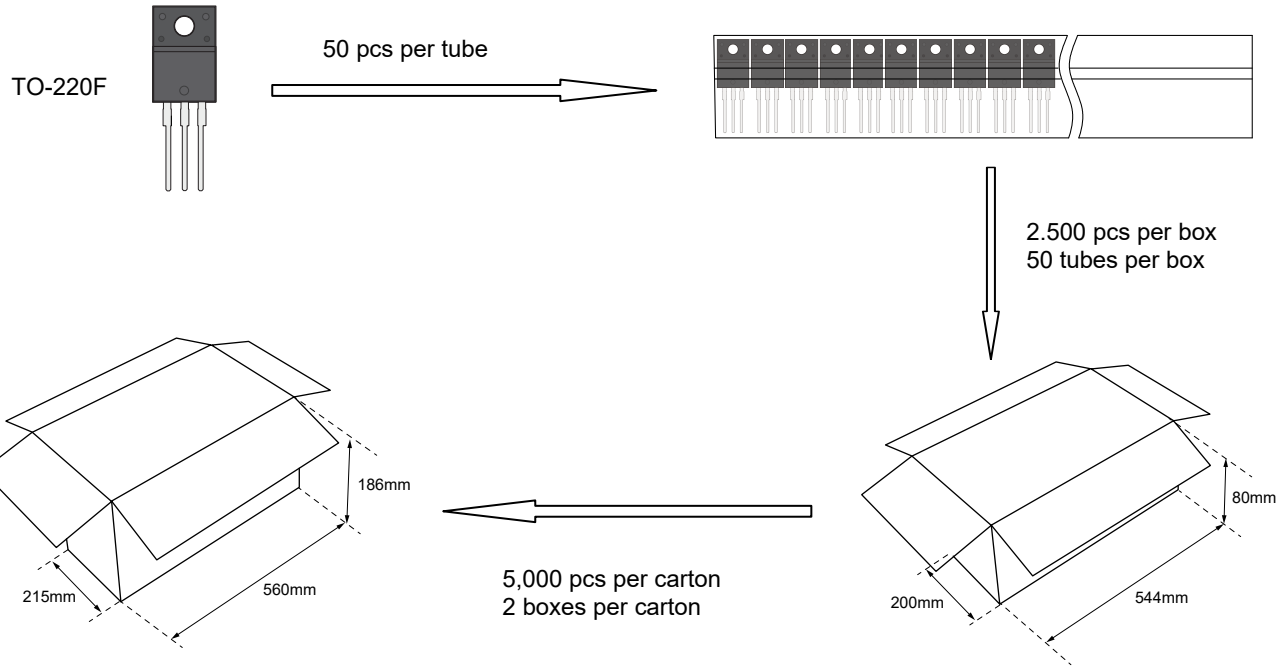
- Temperature: 360°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

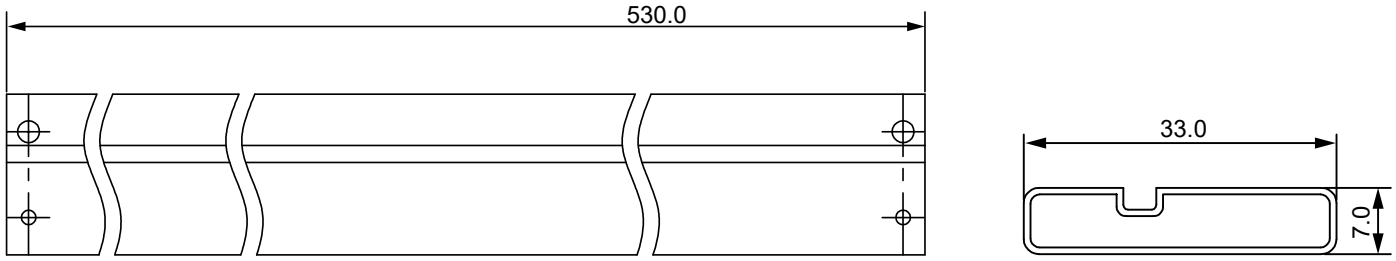
- **Temperature**
  5 to 40°C
- **Humidity**
  30 to 80% RH
- **Recommended period**
  One year after manufacturing

Package Specifications

- The method of packaging



◆ Tube data



Contact Information

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