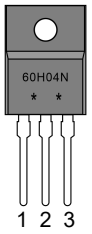
PJM60H04NTF
Single N−Channel Power MOSFET

Features

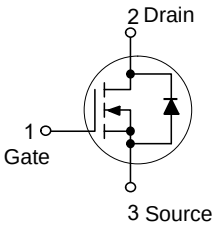
PJM60H04NTF, the silicon N-channel enhanced VDMOSFET, is obtained by the self-aligned planar technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy.

- Fast switching
- ESD improved capability
  HBM 2KV
- Low on resistance
- Low gatecharge
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- V_{DSS}=600V
  I_D=4 A
  P_D=30W
  $R_{DSON(TYP)}$=1.7Ω

TO-220F



Marking
60H04N: Product type
* *: Date of manufacture



Applications

- Power switch circuit of adaptor and charger

PJM60H04NTF Explanation

PJ: Brand abbreviation of PingJing
M: MOSFET
60H04: Product type
N:Channel type
TF:Package type

Absolute Maximum Ratings (T_C=25℃unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	600	V
I_D	Continuous Drain Current	4	A
	Continuous Drain Current T_C= 100°C	3.2	A
I_{DM} a1	Pulsed Drain Current	16	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS} a2	Single Pulse Avalanche Energy	280	mJ
E_{AR} a1	Avalanche Energy ,Repetitive	30	mJ
I_{AR} a1	Avalanche Current	2.5	A
dv/dt a3	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	30	W
	Derating Factor above 25°C	0.24	W/℃
T_J , T_{stg}	Operating Junction and Storage Temperature Range	150 , −55 to 150	℃
T_L	Maximum Temperature for Soldering	300	℃

a1 : Repetitive rating; pulse width limited by maximum junction temperature
a2 : L=10mH, I_D=6.9A, Start T_J=25℃
a3 : I_{SD}=4A,di/dt≤100A/us,V_{DD}≤BV_{DS}, Start TJ=25℃

Thermal Characteristics

Symbol	Parameter	Rating	Units
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	4.17	℃/ W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	100	℃/ W

Electrical Characteristics (T_J=25℃ unless otherwise specified)

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
Off Characteristics						
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V,I_D=250μA	600	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	I_D=250uA,Reference25℃	--	0.67	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS}=600V,V_{GS}=0V,Ta=25℃	--	--	1	μA
		V_{DS}=480V,V_{GS}=0V,Ta =125℃	--	--	100	
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS}=+30V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	VGS=-30V	--	--	-100	nA
On Characteristics						
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V,I_D=2A	--	1.7	2.3	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	2.0	--	4.0	V
Pulse width tp≤300μs,δ≤2%						
Dynamic Characteristics						
g_{fs}	Forward Trans conductance	V_{DS}=15V,I_D=2.0A	--	2.5	--	S
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=25V,f=1.0MHz	--	544	--	pF
C_{oss}	Output Capacitance		--	55	--	
C_{rss}	Reverse Transfer Capacitance		--	8.5	--	
Resistive Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time	I_D=4.0A,V_{DD}=300V ,R_g=4.7Ω	--	8.5	--	ns
tr	Rise Time		--	6.5	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	31	--	
t_f	Fall Time		--	8.5	--	
Q_g	Total Gate Charge	I_D=4.0A,V_{DD}=300V, V_{GS}=10V	--	14.5	--	nC
Q_{gs}	Gate to Source Charge		--	2.8	--	
Q_{gd}	Gate to Drain (“ Miller ”)Charge		--	6.3	--	
Source-Drain Diode Characteristics						
I_{SD}	Continuous Source Current (Body Diode)		--	--	4	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	16	A
V_{SD}	Diode Forward Voltage	I_S=4.0A,V_{GS}=0V	--	--	1.5	V
t_{rr}	Reverse Recovery Time	I_S=4.0A,T_J=25℃	--	430	--	ns
Q_{rr}	Reverse Recovery Charge	dI_F/dt=100A/μs,V_{GS}=0V	--	1270	--	nC
Pulse width tp≤300μs,δ≤2%						

Typical Characteristic Curves

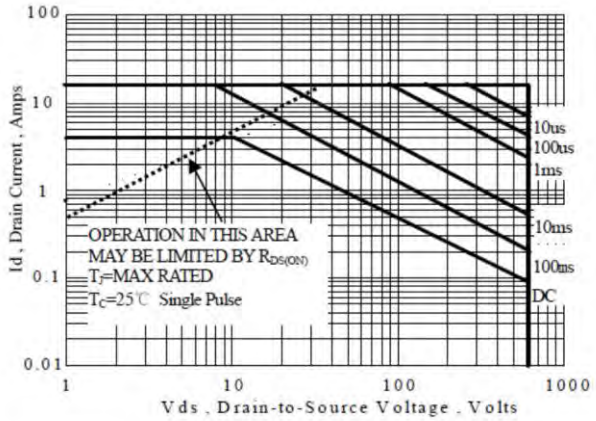


Figure 1 Maximum Forward Bias Safe Operating Area

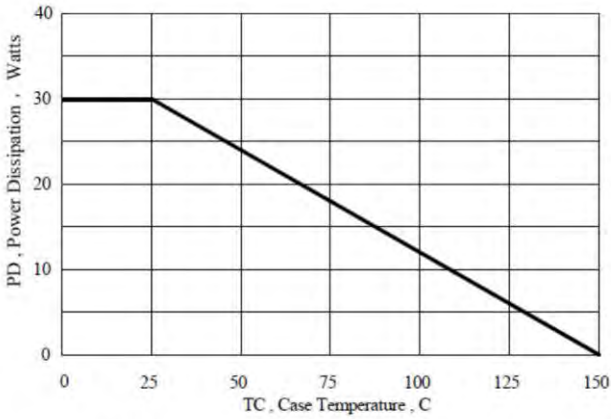


Figure 2 Maximum Power Dissipation vs Case Temperature

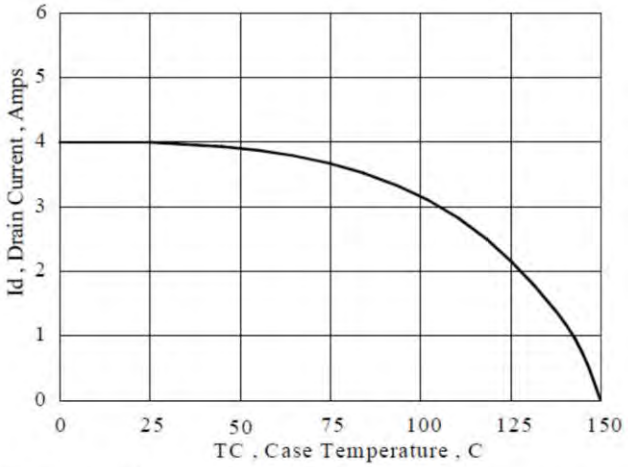


Figure 3 Maximum Continuous Drain Current vs Case Temperature

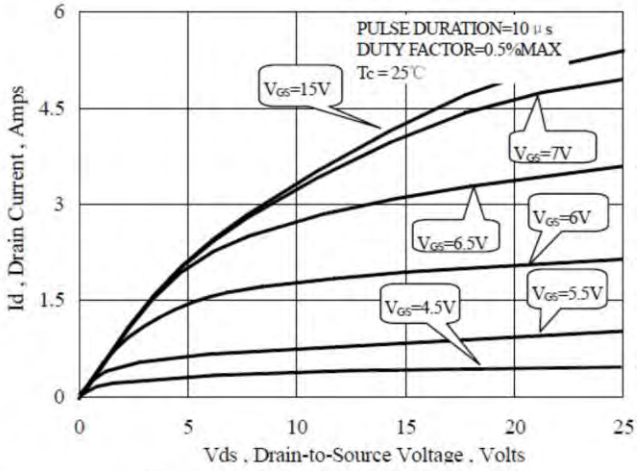


Figure 4 Typical Output Characteristics

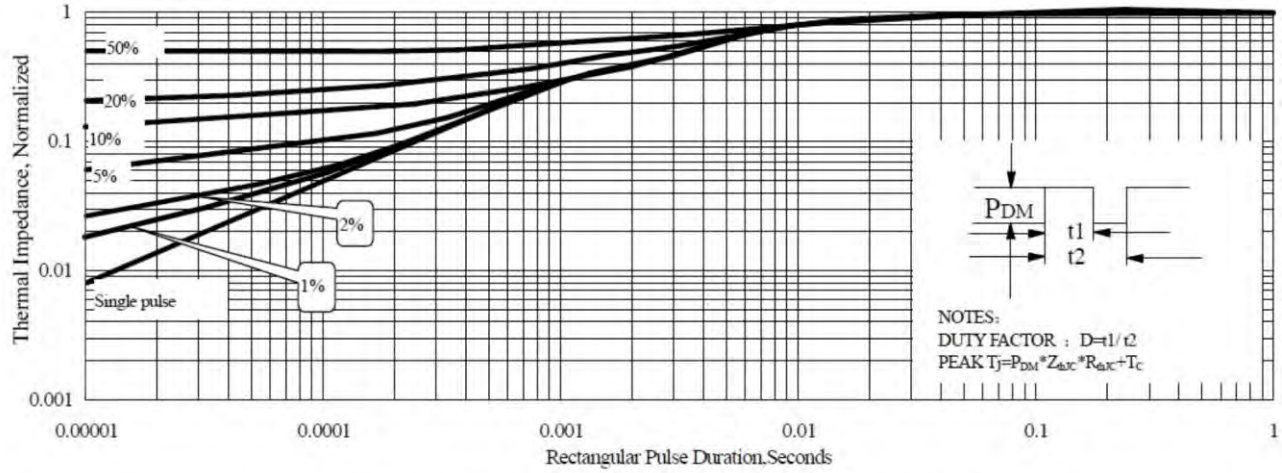


Figure 5 Maximum Effective Thermal Impendance , Junction to Case

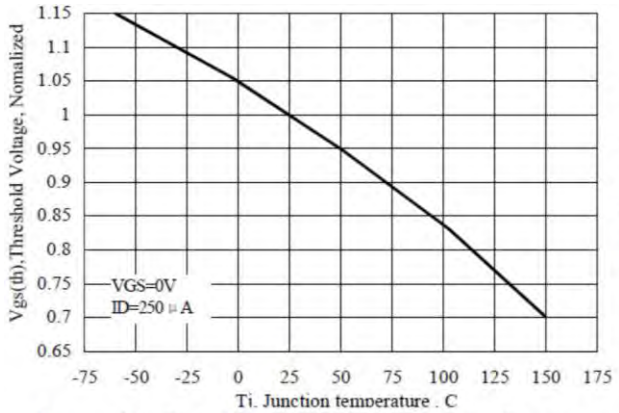


Figure 11 Typical Theshold Voltage vs Junction Temperature

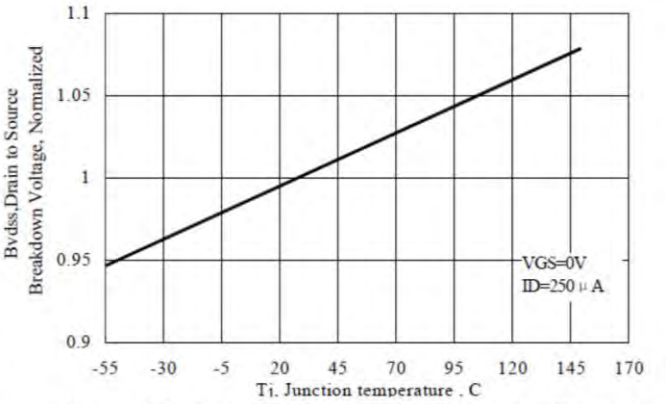


Figure 12 Typical Breakdown Voltage vs Junction Temperature

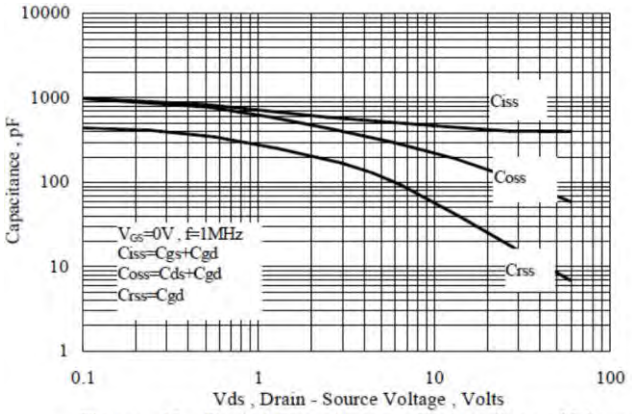


Figure 13 Typical Capacitance vs Drain to Source Voltage

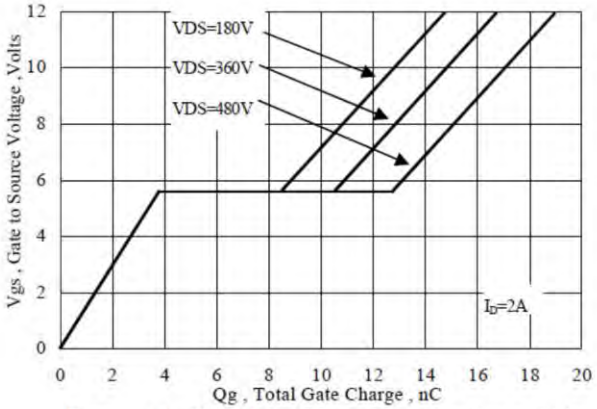


Figure 14 Typical Gate Charge vs Gate to Source Voltage

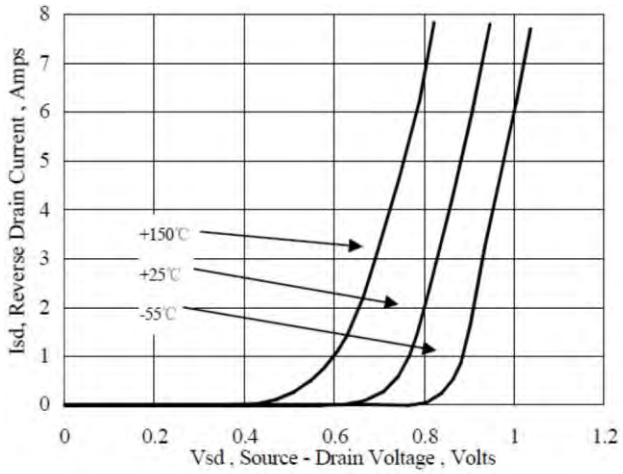


Figure 15 Typical Body Diode Transfer Characteristics

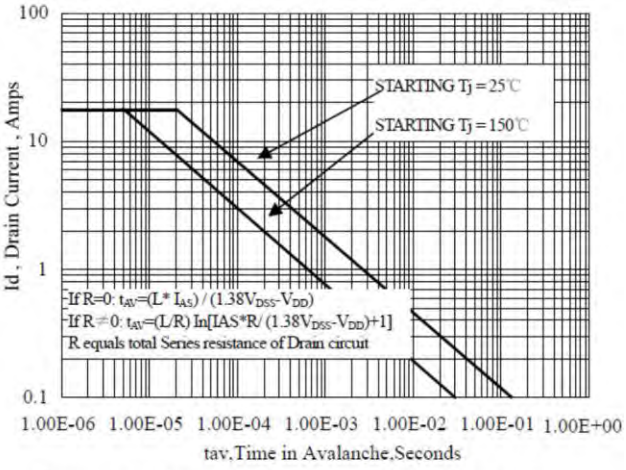
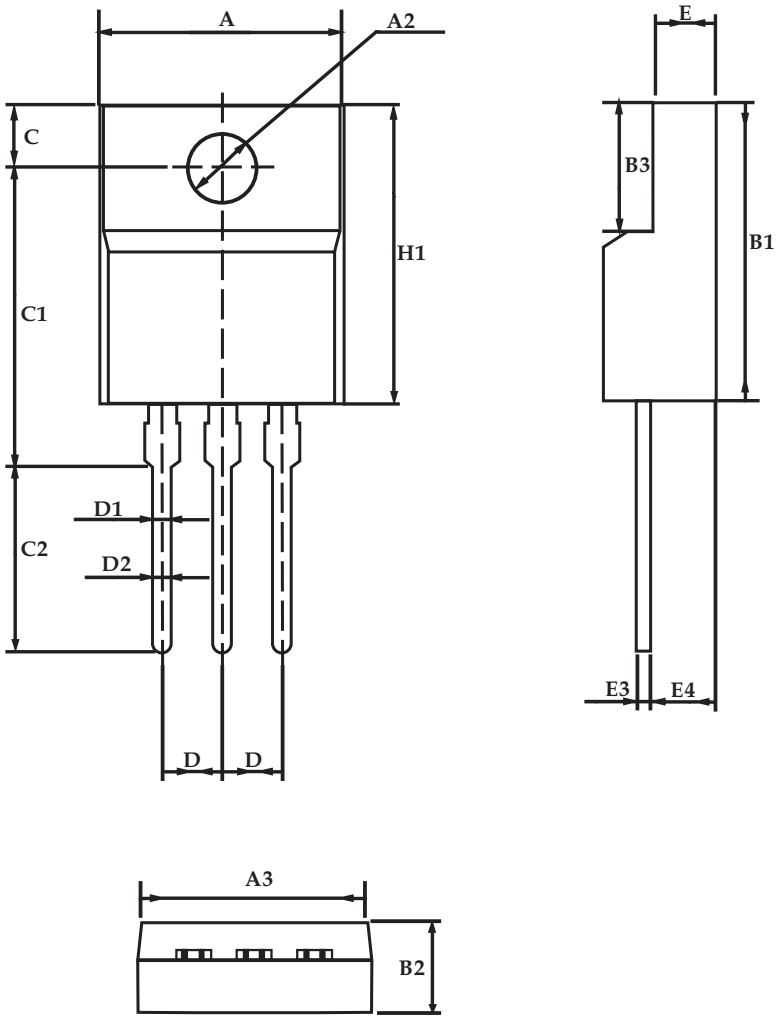


Figure 16 Unclamped Inductive Switching Capability

Package Outline

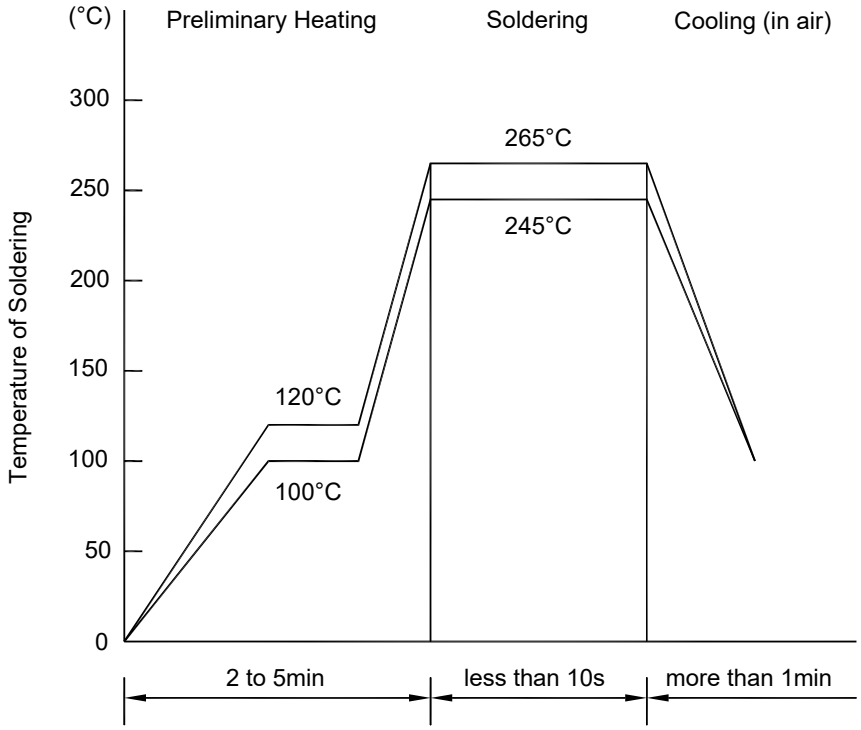
TO-220F
unit:mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	9.80		10.60	D		2.54	
A1		7.00		D1	1.15		1.55
A2	2.90		3.40	D2	0.60		1.00
A3	9.10		9.90	D3	0.20		0.50
B1	15.40		16.40	E	2.24		2.84
B2	4.35		4.95	E1		0.70	
B3	6.00		7.40	E2		1.0×45°	
C	3.00		3.70	E3	0.35		0.65
C1	15.00		17.00	E4	2.30		3.30
C2	8.80		10.80	α（度）		30°	



Conditions of soldering

- **Recommended condition of flow soldering**



Condition of hand soldering

Temperature: 370 °C

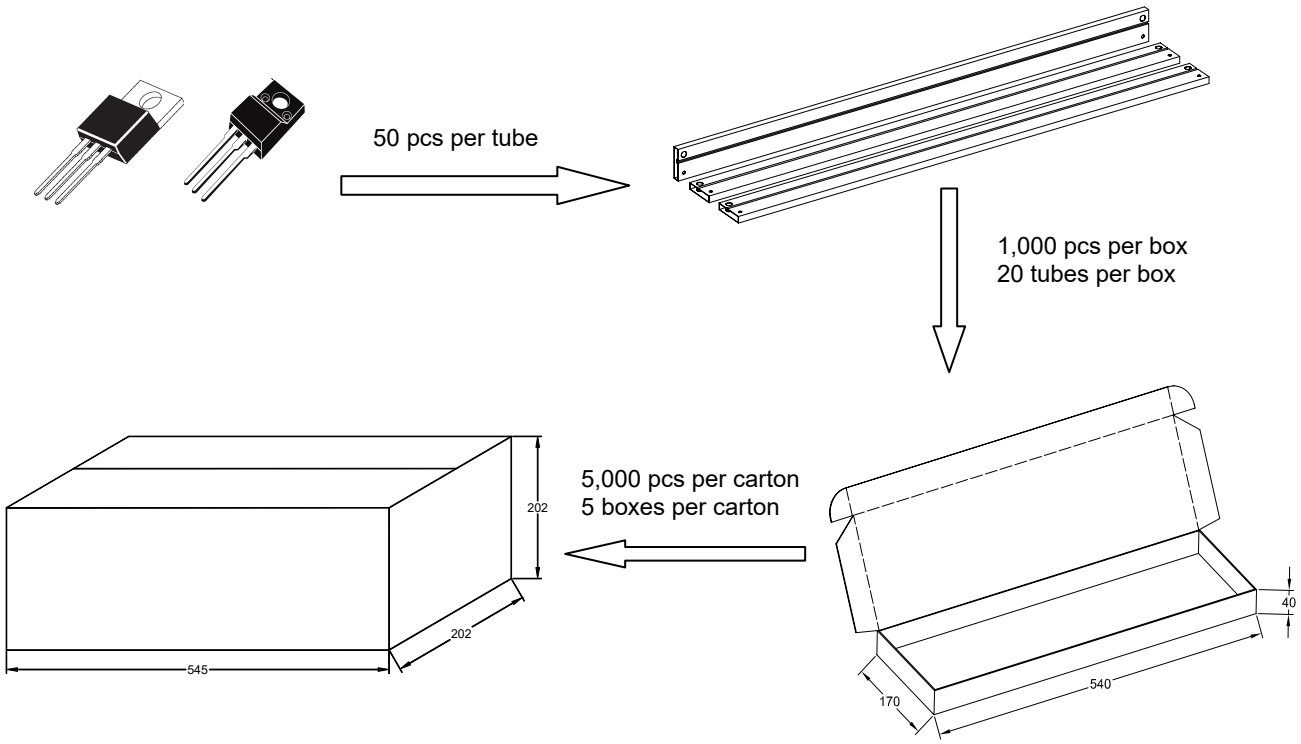
Time: 3s max.

Times: one time

MSL: 1 Level

Packaging Specifications of Tube Pack for TO-220/TO-220F

1. The method of packaging and dimension are shown as below figure. (Dimension in mm)



2. Tube data (Units: mm)