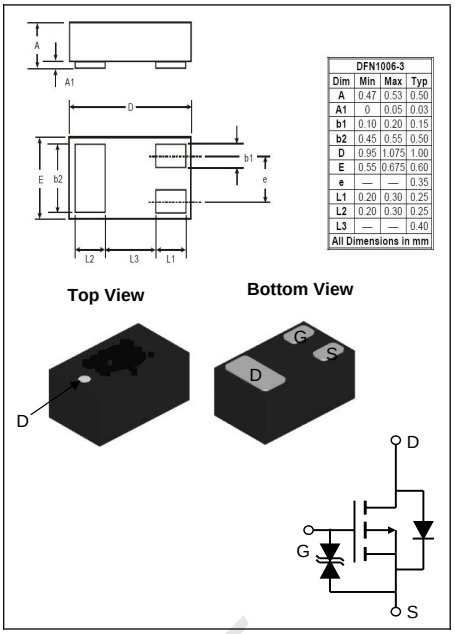
DFN1006-3L Plastic-Encapsulate MOSFETS

LJ1605PT12G

20V P-Channel MOSFET

General Description

The LJ1605NT12G utilize advanced trench MOSFET technology in small DFN 1.0 x 0.6 package. This device is ideal for load switch applications.



Product Summary

V_{DS}	-20V
I_D (at V_{GS}=-4.5V)	-0.7A
$R_{DS(ON)}$ (at V_{GS} =-4.5V)	< 650mΩ
$R_{DS(ON)}$ (at V_{GS} =-2.5V)	< 900mΩ
$R_{DS(ON)}$ (at V_{GS} =-1.8V)	< 1000mΩ

Typical ESD protection

Absolute Maximum Ratings T_A=25°C unless otherwise noted

Symbol	Parameter		Maximum	Units
V_{DS}	Drain-Source Voltage		-20	V
V_{GS}	Gate-Source Voltage		±8	V
I_D	Continuous Drain Current [E]	T_A=25°C	-0.7	A
		T_A=70°C	-0.55	
I_{DM}	Pulsed Drain Current [C]		-2	A
P_D	Power Dissipation [A]	T_A=25°C	0.9	W
		T_A=70°C	0.55	
T_J, T_{STG}	Junction and Storage Temperature Range		-55 to 150	°C

Thermal Characteristics					
	Parameter		Typ	Max	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient [A]	t ≤ 10s	80	100	°C/W
	Maximum Junction-to-Ambient [A]	Steady-State	110	140	°C/W
$R_{\theta JA}$	Maximum Junction-to-Ambient [B]	t ≤ 10s	200	245	°C/W
	Maximum Junction-to-Ambient [B]	Steady-State	280	340	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=-250μA, V_{GS}=0V	-20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V, V_{GS}=0V			-1	μA
		T_J=55°C			-5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±8V			±10	μA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-0.4	-0.65	-1.1	V
$I_{D(ON)}$	On state drain current	V_{GS}=-4.5V, V_{DS}=-5V	-2			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V, I_D=-0.4A		550	650	mΩ
		T_J=125°C		800	950	
		V_{GS}=-2.5V, I_D=-0.3A		700	900	mΩ
		V_{GS}=-1.8V, I_D=-0.2A		900	1000	mΩ
		V_{GS}=-1.5V, I_D=-0.1A		1015		mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-0.4A		1		S
V_{SD}	Diode Forward Voltage	I_S=-0.4A,V_{GS}=0V		-0.85	-1.2	V
I_S	Maximum Body-Diode Continuous Current [E]				-0.7	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-10V, f=1MHz		52		pF
C_{oss}	Output Capacitance			13		pF
C_{rss}	Reverse Transfer Capacitance			8.0		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		42		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-0.4A		0.73		nC
Q_{gs}	Gate Source Charge			0.13		nC
Q_{gd}	Gate Drain Charge			0.1		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-4.5V, V_{DS}=-10V, R_L=25Ω, R_{GEN}=3Ω		6		ns
t_r	Turn-On Rise Time			4		ns
$t_{D(off)}$	Turn-Off DelayTime			21		ns
t_f	Turn-Off Fall Time			9		ns

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150° C may be used if the PCB allows it to.

B. The value of $R_{\theta JA}$ is measured with the device mounted on FR-4 minimum pad board, in a still air environment with T_A =25° C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150° C may be used if the PCB allows it to.

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

D. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The SOA curve provides a single pulse rating.

E. The maximum current limited by package.

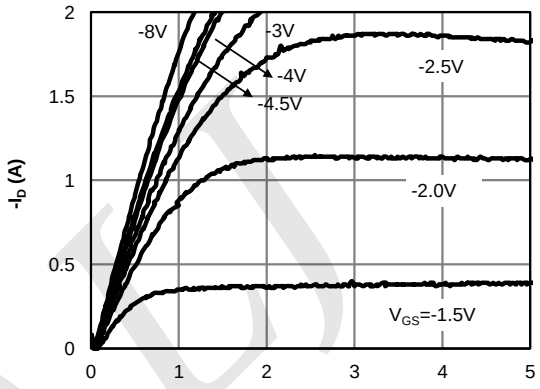


Fig 1: On-Region Characteristics (Note E)

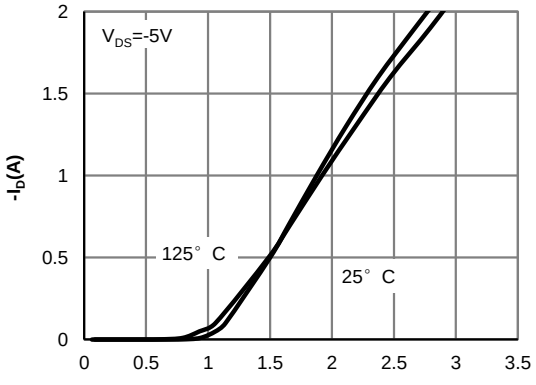


Figure 2: Transfer Characteristics (Note E)

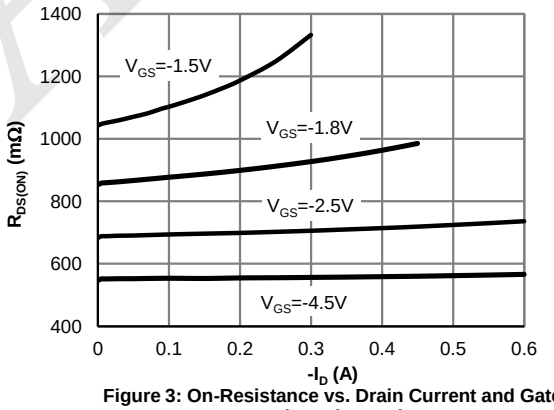


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

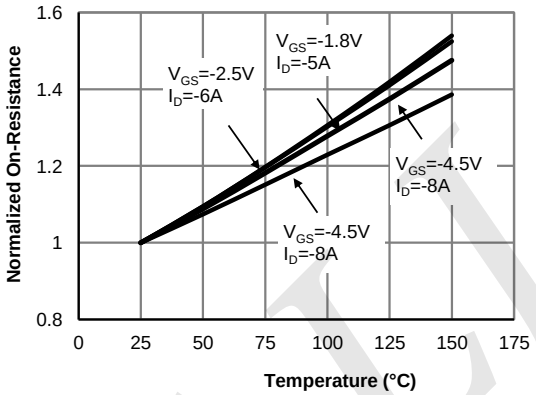


Figure 4: On-Resistance vs. Junction Temperature (Note E)

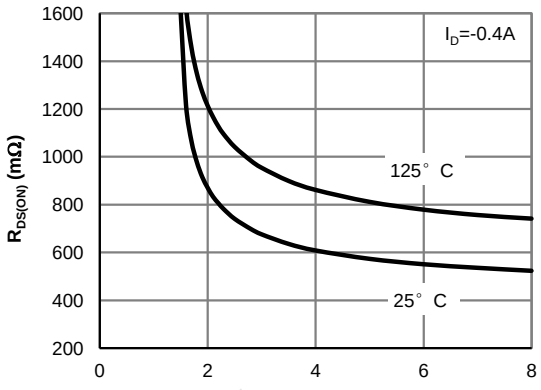


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

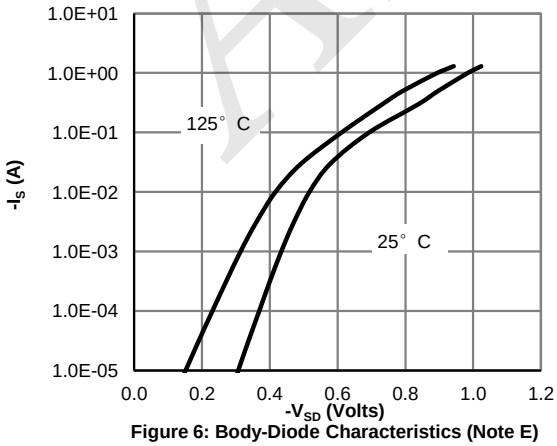


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

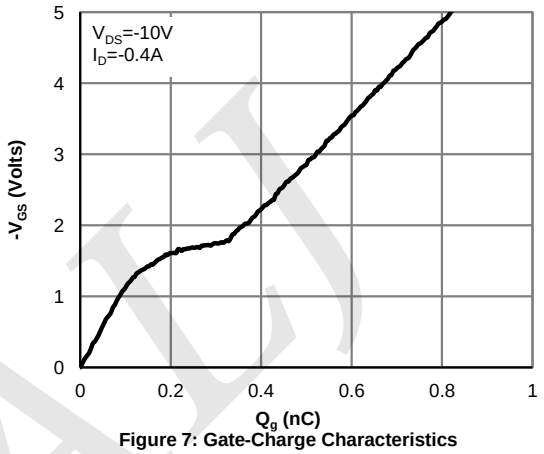


Figure 7: Gate-Charge Characteristics

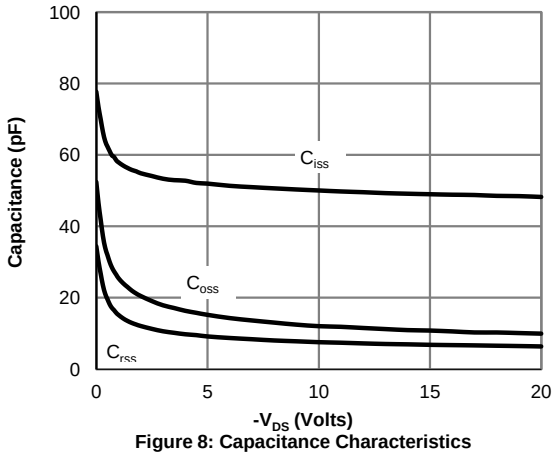


Figure 8: Capacitance Characteristics

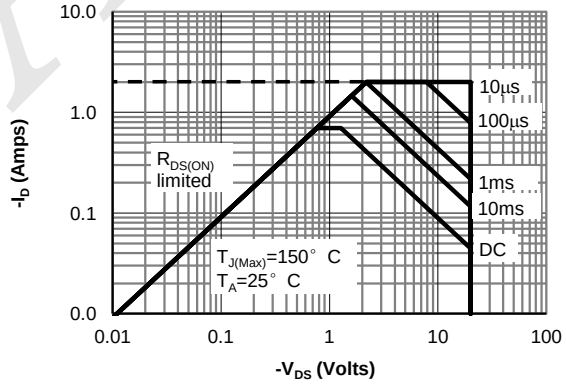


Figure 9: Maximum Forward Biased Safe Operating Area (Note B)

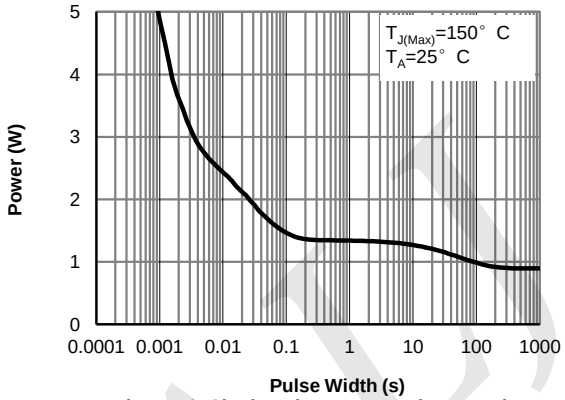


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note B)

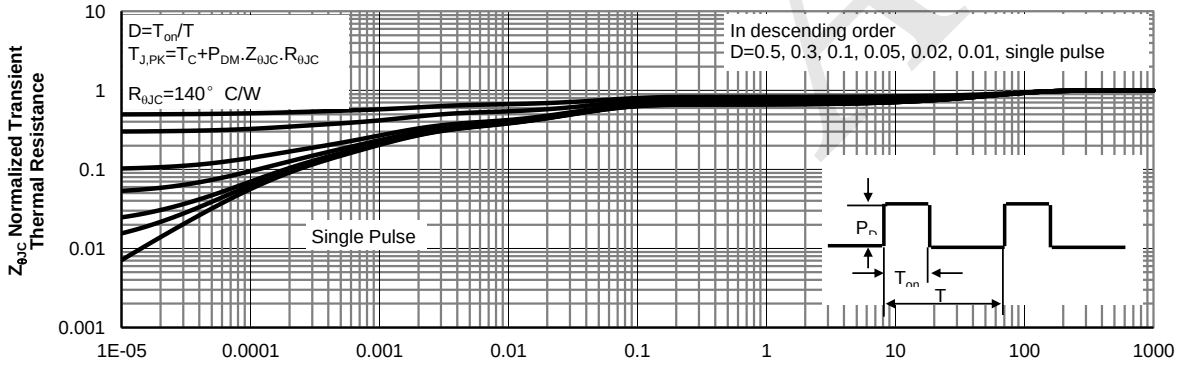
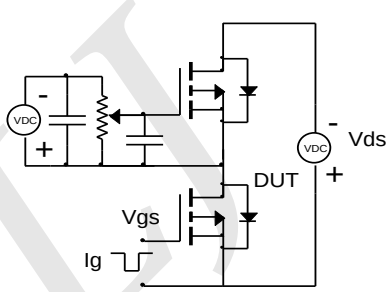
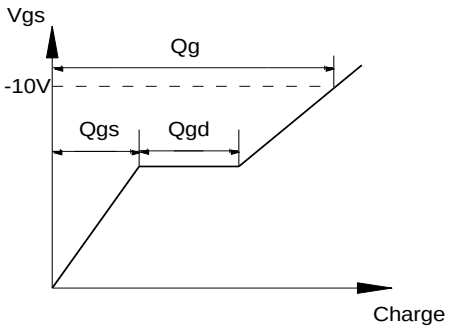


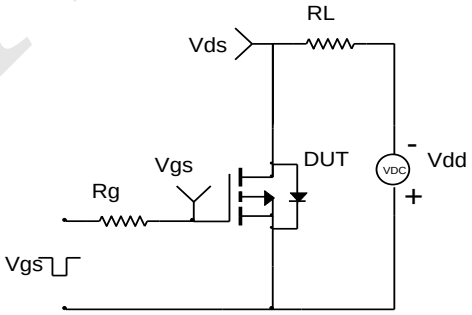
Figure 11: Normalized Maximum Transient Thermal Impedance (Note B)

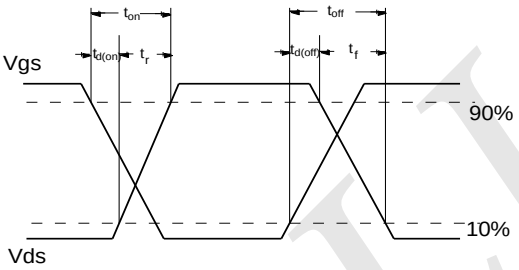
Gate Charge Test Circuit & Waveform



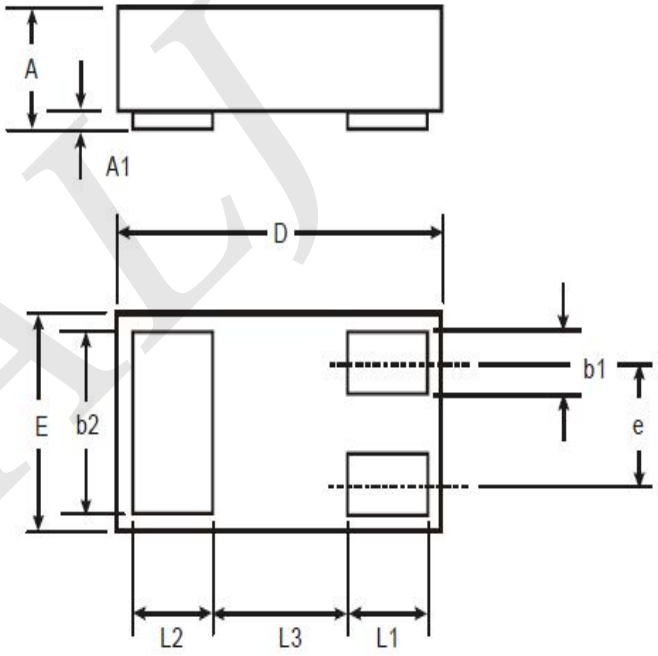


Resistive Switching Test Circuit & Waveforms



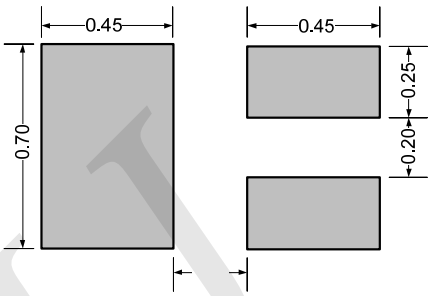


DFN1006-3L Package Outline Dimensions



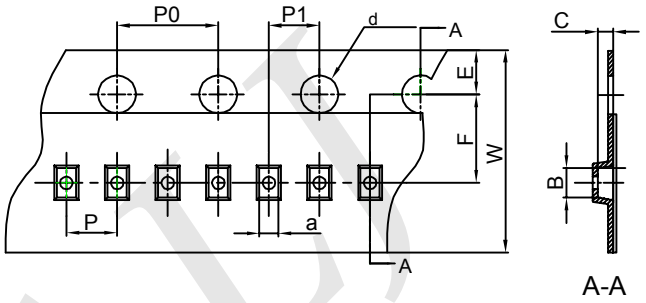
DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0	0.05	0.03
b1	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	—	—	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	—	—	0.40
All Dimensions in mm			

Recommend land pattern (Unit: mm)



Note: This land pattern is for your reference only. Actual pad layouts may vary depending on application.

WBFBP-03E(1.0×0.6×0.5) Embossed Carrier Tape

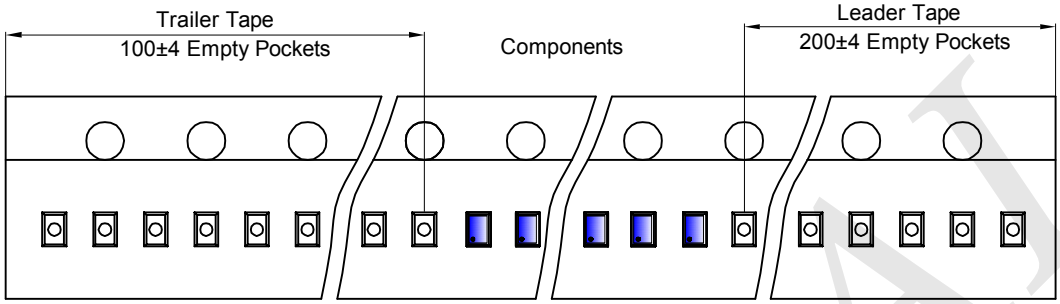


Packaging Description:

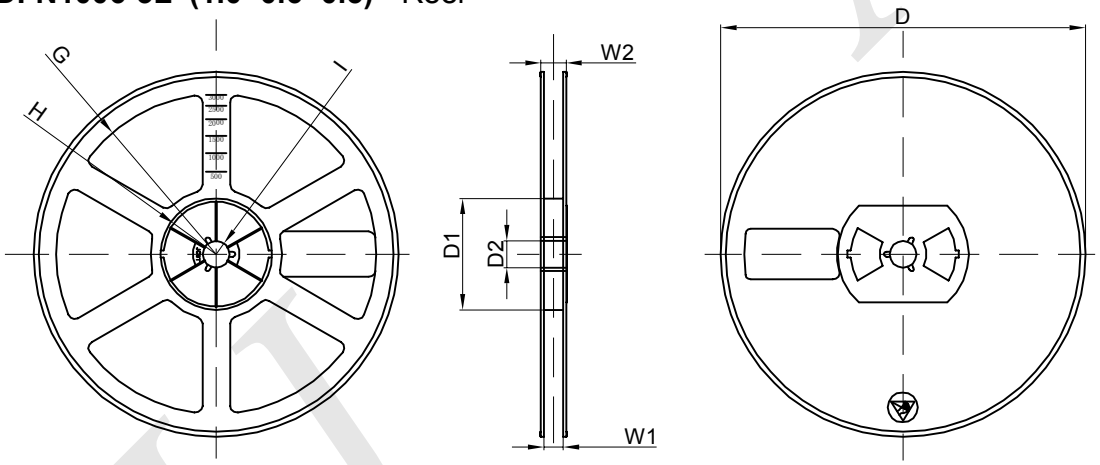
DFN1006-3L (1.0×0.6×0.5) parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 10,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
WBFBP-03E(1.0×0.6×0.5)	0.66	1.15	0.66	Ø1.50	1.75	3.50	4.00	2.00	2.00	8.00

DFN1006-3L (1.0×0.6×0.5) Tape Leader and Trailer



DFN1006-3L (1.0×0.6×0.5) Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
10000 pcs	7 inch	150,000 pcs	203×203×195	600,000 pcs	438×438×220	

Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	Temperature Min ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (min to max) (ts)	60 – 190 secs
Average ramp up rate (Liquidus Temp) (T_L) to peak		5°C/second max
		5°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Temperature (t_L)	60 – 150 seconds
		260+0/-5 °C
Time within actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		280°C