



# Technical Data Sheet

## 115.2Kbit/s Infrared Transceiver

**TM3201/TR2**

### Features

- Excellent Fluorescent Noise Immunity and Very High EMI Immunity
- Operating Voltage Range from 2.7 to 3.6 Volts
- Ultra Small Surface Mount Package:
  - L8.0mm \* W3.0mm \* H2.5mm
- Data Rate :9.6k ~ 115.2kbit/s
- Operating Temperature Range : -25°C to 85°C
- 32mA LED Drive Current
- Low Shutdown Current : 10nA Typical
- Few External Components Required
- IEC 60825-1 Eye Safe
- Pb-free
- The product itself will remain within RoHS compliant version.



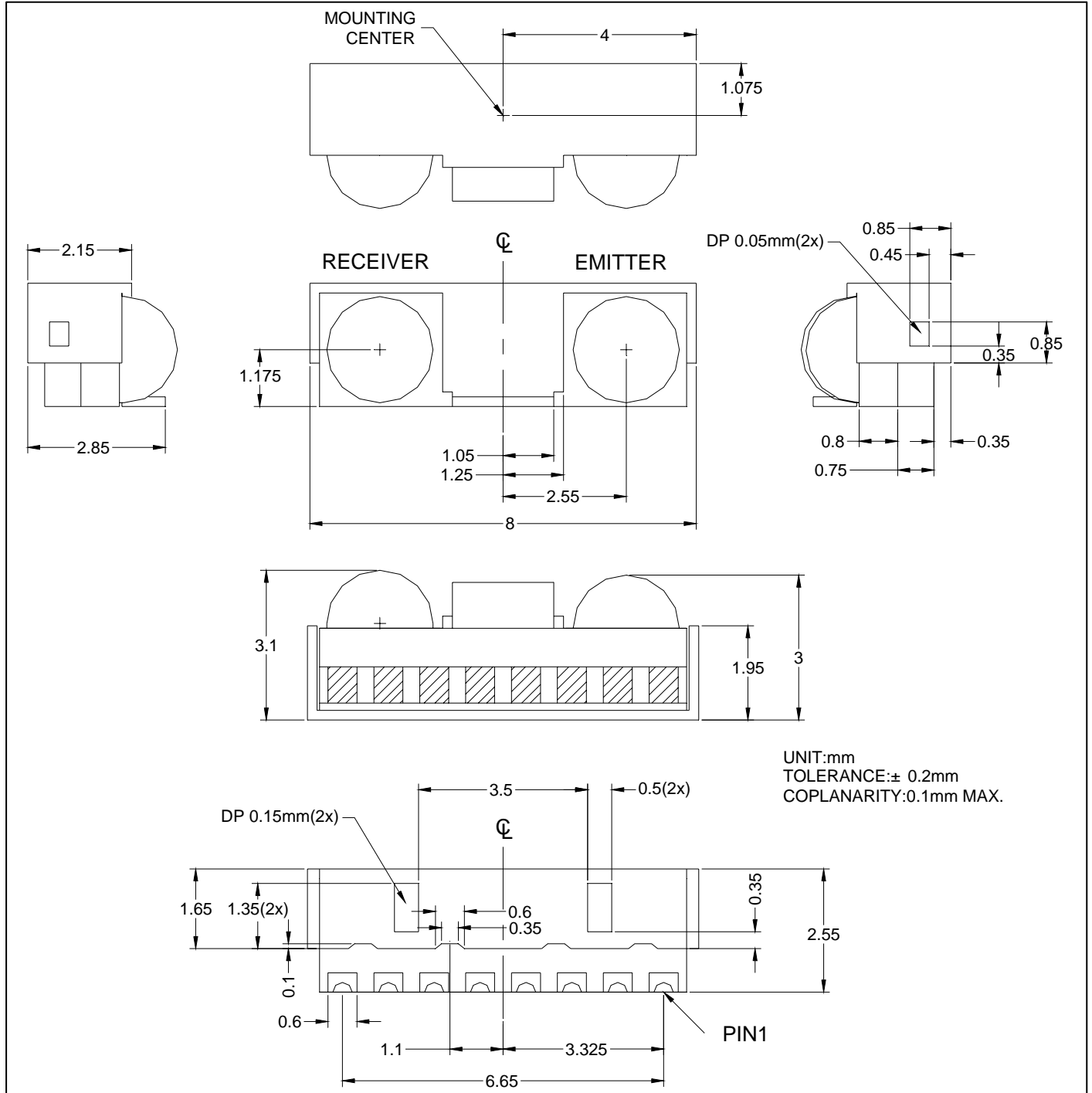
### Descriptions

The TM3201/TR2 is a new generation of low-cost infrared transceiver modules. The module is in ultra-small surface mount package. Although the operating voltage can range from 2.7 to 3.6 Volts, the LED drive current is internally compensated to a constant 32mA to assure that link distances meet the low power standard of IrDA 1.4 physical layer specification.

### Applications

- Mobile Telecom
  - Cellular Phones
  - Pagers
  - Smart Phones
- Data Communication
  - PDAs
  - Portable Printers
- Digital Imaging
  - Digital Cameras
  - Photo-Imaging Printers

**Package Dimensions**





## TM3201/TR2

### Device Selection Guide

Mode	Low Power		Standard		$\lambda$ p	Operating Voltage (Vcc)	Data Rate
	Link Distance	Angle $2\theta$ 1/2	Link Distance	Angle $2\theta$ 1/2			
TM3201/TR2	>20cm	+/-15 +/-30	>30cm	+/-15 +/-30	850~900 nm	2.7~3.6 Volts	9.6~115.2 kbps

### Pin Descriptions

Pin	Symbol	Function	Description	I/O	Active
1	GND	Ground	Connect to system ground		
2	NC	No Connect	*Note 1		
3	Vcc	Supply Voltage	Supply Voltage from 2.7 to 3.6Volts.		
4	AGND	Analog Ground	Connect to a “quiet” ground.		
5	SD	Shut Down	Must be driven either high or low. *Note 2		High
6	RXD	Receiver Data Output	The output signal is a low pulse when a light pulse is received. *Note 3,4	O	Low
7	TXD	Transmitter Data Input	Logic High turn on the IrED. *Note 5	I	High
8	LEDA	IrED Supply Voltage	IrED Supply Voltage from 2.7 to 6.0 Volts.		

Note 1: This pin must be left unconnected.

Note 2: This pin must not be left floating.

Note 3: RXD will echo the TXD signal while TXD is transmitting data.

Note 4: RXD has a built-in 500 kohm pull-up resistor.

Note 5: If TXD is stuck high, the LED will turn off after about 30 us.



## TM3201/TR2

**Absolute Maximum Ratings ( $T_a=25^{\circ}\text{C}$ )** reference point Pin GND unless otherwise noted.

Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	All States	V <sub>CC</sub>	-0.5		7	V
IrED Supply Voltage		V <sub>LEDA</sub>	-0.5		7	V
Receiver Data Output	All States	RXD	-0.5		7	V
Transmitter Data Input	All States	TXD	-0.5		7	V
Shut Down	All States	SD	-0.5		7	V
Operating Temperature Range		T <sub>amb</sub>	-25		+85	°C
Storage Temperature Range		T <sub>stg</sub>	-40		+100	°C
Soldering Temperature	See Recommended Solder Profile			-	260	°C

### Recommended Operating Conditions

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Operating Temperature Range		T <sub>amb</sub>	-25		+85	°C
Supply Voltage	V <sub>CC</sub> to GND	V <sub>CC</sub>	2.7		3.6	V
Receiver Data Rate			9.6		115.2	kbps

### Electrical Characteristics

T<sub>amb</sub>=25°C, V<sub>CC</sub>=2.7V to 3.6V unless otherwise noted.

Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
<b>Transceiver</b>						
Supply Voltage	V <sub>CC</sub> to GND	V <sub>CC</sub>	2.7		3.6	V
Supply Current Pin V <sub>CC</sub> (Receive Mode)	V <sub>CC</sub> =2.7 to 3.6V	I <sub>CC</sub> (Rx)		135		uA
Supply Current(Standby)		I <sub>CC</sub> (Idle)		100		uA
Shut Down Current Pin SD	SD=V <sub>CC</sub> , V <sub>CC</sub> =2.7 to 3.6V	I <sub>SD</sub>		0.01	1.0	uA
Transmit Receiver Latency		T <sub>TRL</sub>		50	100	us
Transceiver Power on Latency		T <sub>PON</sub>		13.5	20	us
Max. Optical Pulse Width	TXD pin stuck high	T <sub>OPWM</sub>		20	30	us
Optical Pulse Width	T <sub>PW</sub> (TXD)=1.6 us	T <sub>OPW</sub>	2.0	2.24	2.6	us



## TM3201/TR2

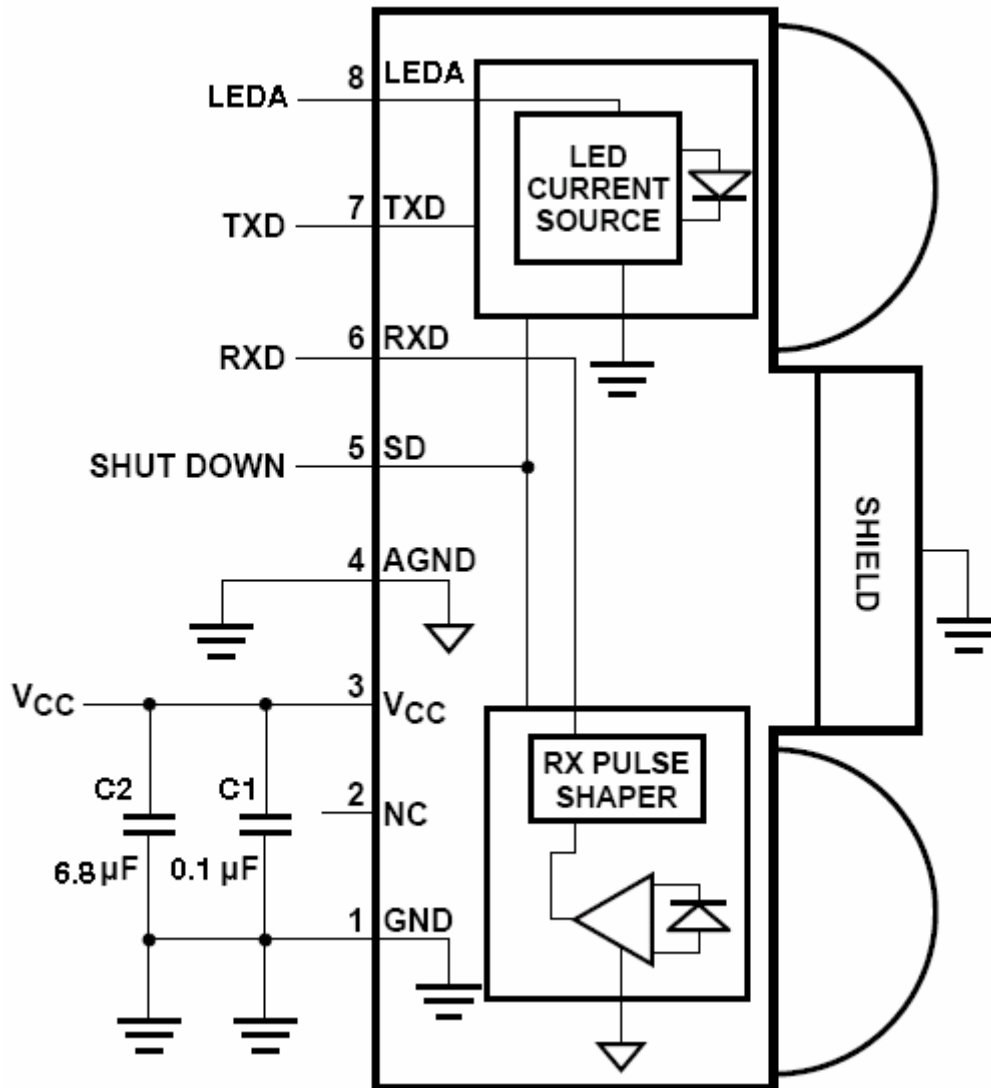
### Opto-electronic Characteristics

Tamb=25°C, Vcc=2.7V to 3.6V unless otherwise noted.

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Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
<b>Receiver</b>						
Angle of Half Intensity		$2\theta_{1/2}$	30			°
RXD Output Voltage	Vcc=3.6V, IOH=-200uA	VOH	2.7		3.6	V
	Vcc=3.6V, IOL=200uA	VOL	-0.1		0.38	V
RXD Pulse Width		TRPW	2.0	2.45	3.0	us
Receiver Latency Time				25	50	us
Receiver Wakeup Time	VSD ≥ VTXD	TRW		40	100	us
Logic LOW Receiver Input Irradiance		Ee			0.4	uW/cm <sup>2</sup>
Rise/Fall Time-RXD	Vcc=3.0V	t <sub>r</sub> /t <sub>f</sub> (RXD)		15	20	ns
<b>Transmitter</b>						
LED Operating Current	Low Power Mode Vcc=2.7 to 3.6V	I <sub>IrED</sub>		32	-	mA
Logic LOW Transmitter Input Voltage		V <sub>IL</sub>	0		1/3Vcc	V
Logic HIGH Transmitter Input Voltage	Vcc=2.7 to 3.6V	V <sub>IH</sub>	2/3Vcc		Vcc	V
Output Radiant Intensity	Vcc=5.0V	I <sub>e</sub>	-	9	-	mW/sr
	TXD Logic LOW Level	I <sub>e</sub>			0.04	mW/sr
Angle of Half Intensity		$2\theta_{1/2}$	30		60	°
Peak Wavelength of Emission		λ <sub>p</sub>	850	870	900	nm
Half-Width of Emission Spectrum		Δλ		40		nm
Average IrED Current		I <sub>IrED</sub> (DC)		6		mA
Repetitive Pulsed IrED Current	t<50 μs, t <sub>on</sub> <20%	I <sub>IrED</sub> (PK)		32		mA
Optical Rise/Fall Time,		t <sub>r</sub> /t <sub>f</sub>		180	600	ns
Optical Overshoot					25	%

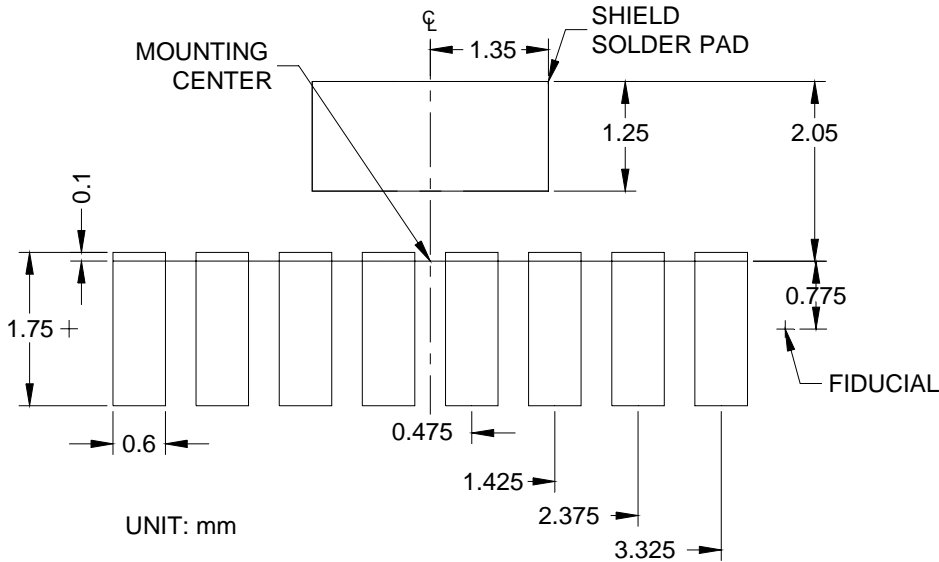
**Recommended Circuit Diagram**



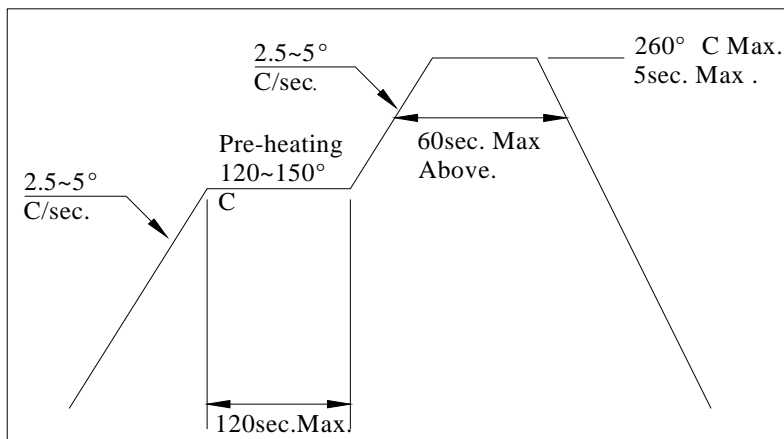
Note: Outlined components are optional depending on the quality of the power supply.

Component	Recommended Value
C1, C2	which is optional, must be placed as close as possible of the TM3201/TR2 to obtain optimum noise immunity.

**Recommended SMD Pad Layout**



**Recommended Solder Profile**

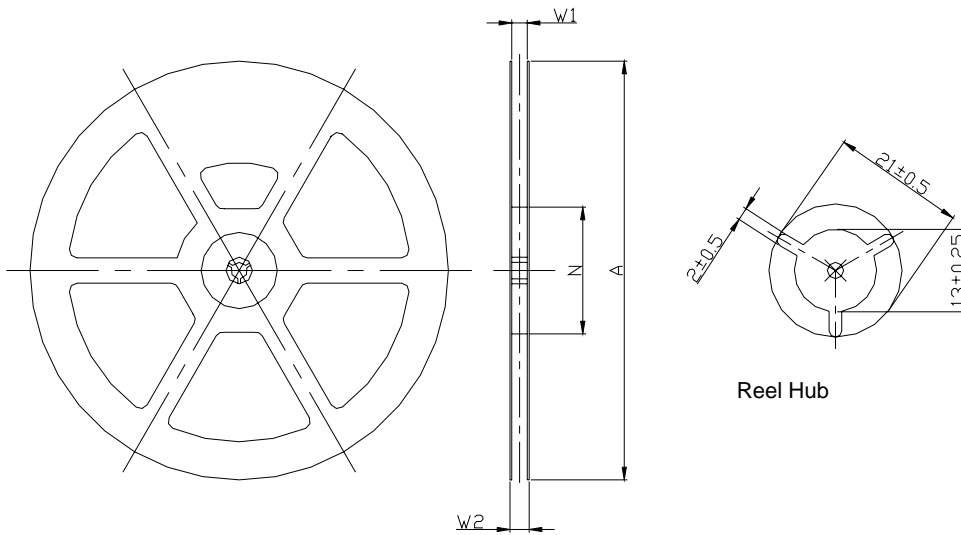


**Notice:**

- (1) Reflow soldering should not be done more than two times.
- (2) When soldering, do not put stress on the IrDA devices during heating.
- (3) After soldering, do not warp the circuit board.

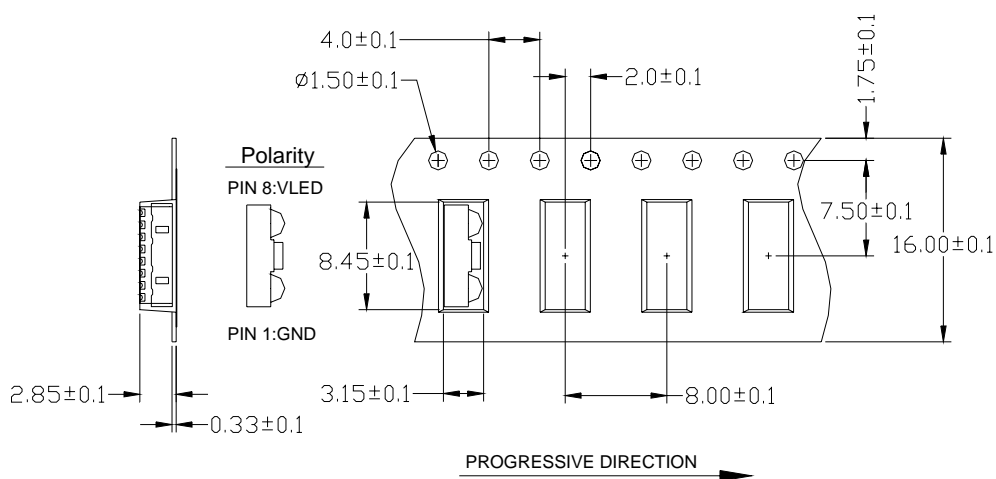
**Taping and Packing Information**

Shape of Reel and Dimensions

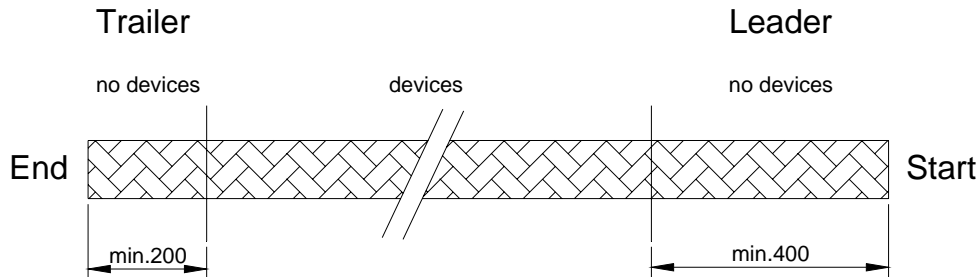


Version	Tape Width	A	N	W1	W2max
C	16	330±1	100±1.5	18±2	21.7

**Tape Dimensions**



Leader and Trailer



Quantity

TM3201/TR2 2500 pcs. per reel

Cover Tape Peel Strength

According to IEC 286

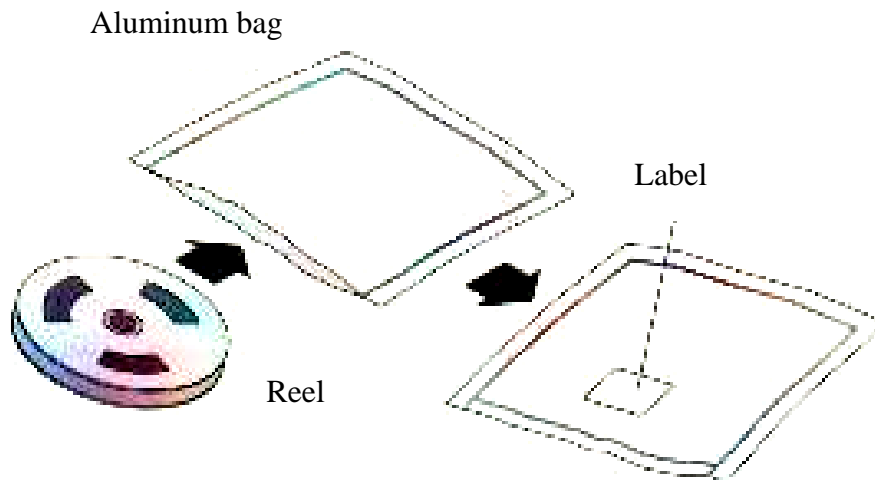
0.1 to 1.3N

300±10% mm/min

165° -180° peel angle

Damp Proof Packing.

The reel is packed in a damp proof aluminum bag to protect the devices from absorbing moisture during transportation and storage.



### Recommended Method of Storage

Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

- Storage temperature 10°C to 30°C
- Storage humidity  $\leq 60\%RH$  max.

After more than 72hours under these conditions moisture content will be too high for reflow soldering.

In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

192 hours at 40°C+5°C/-0°C and 5% RH(dry air/nitrogen) or

96 hours at 60°C+5°C and <5% RH for all device containers or

24 hours at 125°C+5°C not suitable for reel or tubes.

### ESD Precaution

Proper storage and handling procedures should be followed to prevent ESD damage to the devices especially when they are removed from the Antistatic Shielding Bag. Electro-Static Sensitive Devices warning labels are on the packing.

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