Technical Data Sheet
Infrared Data Transceiver Module

TM3000/TR2

Features

- Excellent Fluorescent Noise Immunity and Very High EMI Immunity
- Wide Operating Voltage Range from 2.4 to 5.5 Volts
- Ultra Small Surface Mount Package:
  - L9.10mm * W3.75mm * H2.65mm
- Data Rate :9.6k ~ 115.2kbit/s
- Operating Temperature Range : -25℃ to 85℃
- Low-power,Idle current, 90 µA (typical) at 3.0 V
- Low Shutdown Current : 0.1 μ A Typical
- Few External Components Required
- Pb-free
- The product itself will remain within RoHS compliant version.

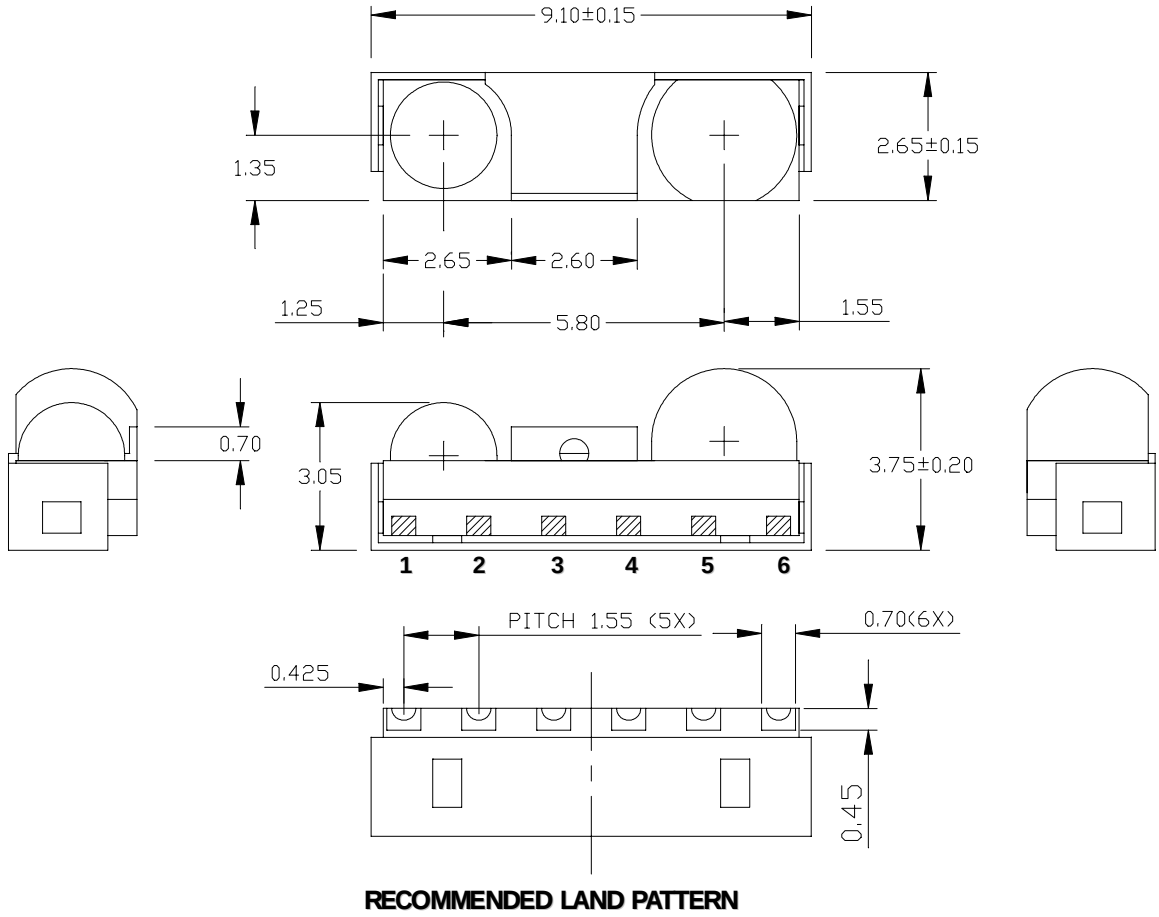
Descriptions

The TM3000/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 2.4 to 5.5 Volts, the LED drive current is internally compensated to assure that link distances meet the Infrared Data Association (IrDA) specifications and consumer IR modes.

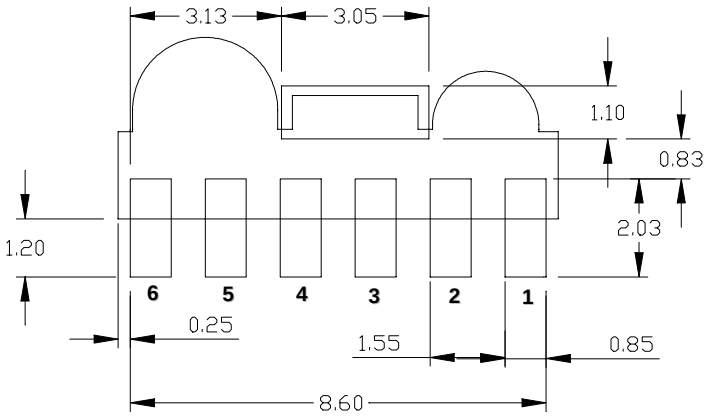
Applications

- Notebook, Desktop PC
- Cellular Phone
- Set-Top Box
- Bar Code Reader
- Other Infrared Collection Equipment

Package Dimensions



RECOMMENDED LAND PATTERN



Notics:
1.All dimensions are in mm.
2.Unspecified tolerance is ±0.2mm

Device Selection Guide

Mode	Standard		λ p (nm)	Operating Voltage (Vcc)	Data Rate (kbps)
	Link Distance	Angle 2θ 1/2			
TM3000/TR2	>1.5m	+/-15~+/-30	850~900	2.7~6 Volts	9.6~115.2

Pin Descriptions

Pin	Symbol	Function	Description	I/O	Active
1	LEDA	LED Anode	Tied through external resistor,R1,to regulated Vcc from 2.7 to 6 Volts.		
2	TXD	Transmitter Data Input	Logic High turn on the IrED.	I	High
3	RXD	Receiver Data Output	Output is a low pulse when a light pulse is seen.	O	Low
4	SD	Shut Down	Must be driven either high or low.		High
5	Vcc	Supply Voltage	Supply Voltage from 2.7 to 6 Volts.		
6	GND	Ground	Connect to system ground		
-	SHIELD	EMI Shield	Connect to system ground via a low inductance trace. For best performance, do not connect to GND directly at the part.		

TRANSCEIVER I/O Truth Table

The LED and RXD outputs are controlled by the combination of the TXD and SD pins and light falling on the receiver.As shown in the table below,the transmitteris non-inverting ;the LED is on when the TXD pin is high and off when TXD is low.The receiver is inverting;the RXD pin is low during IrDA signal pulses and high when the receiver does not see any light.When shutdown(SD pin high),the LED is off(the state of the TXD pin does not matter),and the RXD pin is pulled high with a weak internal pullup.

SD	TXD	LED	Receiver	RXD
Low	High	On	Don't care	Not Valid
	Low	Off	IrDA Signal	Low
			No Signal	High
High	Don't care	Off	Don't care	High

Absolute Maximum Ratings (Ta=25℃) 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	Vcc	-0.3		6	V
IrED Supply Voltage	SD=0, TXD=Vcc	V_{LEDA}	-0.5		6	V
	Vcc=0~6V, TXD=0	V_{LEDA}	-0.5		7.5	V
Receiver Data Output	All States	RXD	-0.5		Vcc+0.5	V
Transmitter Data Input	All States	TXD	-0.5		Vcc+0.5	V
Shut Down	All States	SD	-0.5		Vcc+0.5	V
Operating Temperature Range		Tamb	-25		+85	℃
Storage Temperature Range		Tstg	-40		100	℃
Soldering Temperature	See Recommended Solder Profile			-	245	℃

Recommended Operating Conditions

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Operating Temperature Range		Tamb	-25		+85	℃
Supply Voltage	Vcc to GND	Vcc	2.7		6	V
TXD,SD Input Threshold	Vcc=2.7 to 6V		0.8		Vcc+0.5	V
Receiver Date Rate			9.6		115.2	kbps

Electrical Characteristics

Tamb=25℃, Vcc=2.7V to 6V unless otherwise noted.

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

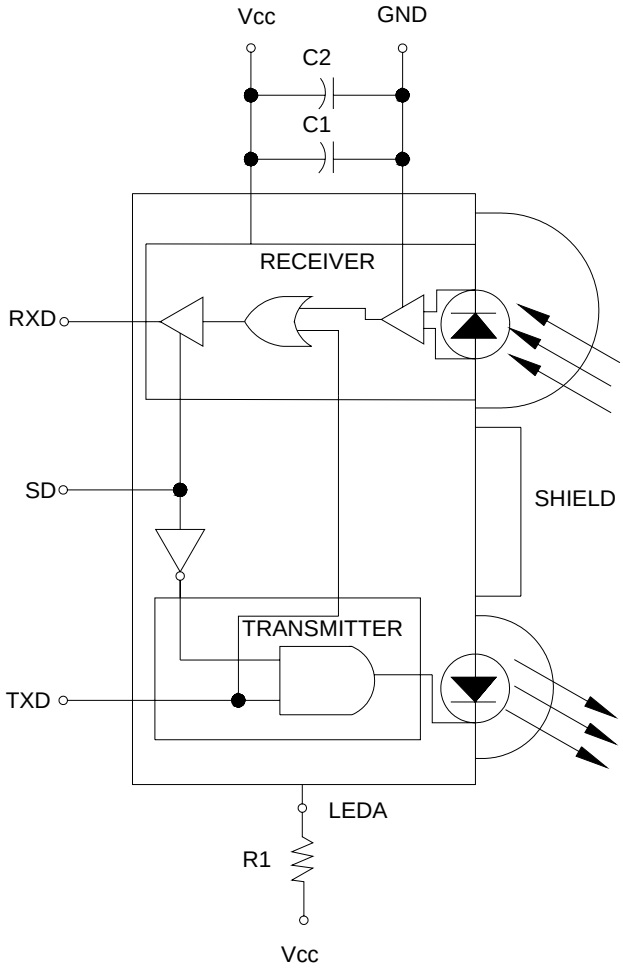
Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Transceiver						
Supply Voltage	Vcc to GND	Vcc	2.7		6	V
Supply Current Pin Vcc (Receive Mode)	Vcc=2.7 to 6V	Icc (Rx)		500		uA
Supply Current Pin Vcc (Avg.) (Transmit Mode)	I_{IrED}=500mA(at V_{LEDA} Pin) Vcc=6V	Icc1 (Tx)		500		uA
Shut Down Current Pin SD	SD=Vcc,Vcc=2.7 to 6V	I_{SD}		0.1	1.0	uA
Transmit Receiver Latency		T_{TRL}		50	100	us
Transceiver Power on Latency		T_{PON}		100	150	us

Opto-electronic Characteristics

Tamb=25℃,Vcc=2.7V to 6V 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
Receiver						
Minimum Detection Threshold Irradiance	SIR Mode, Vcc=6V	Ee	3.6	-		uW/m^2
Maximum Detection Threshold Irradiance	SIR Mode, Vcc=6V	Ee	- -		500	mW/cm^2
Logic LOW Receiver Input Irradiance		Ee	3.6			uW/cm^2
Output Voltage -Active	Vcc=6V, Iol=200uA	V_{OL}	-	0.24		V
	Vcc=2.5V, Iol=0.6mA	V_{OL}	-	-	0.4	V
Output Voltage -Non active	Vcc=6V, Iol=-200uA	V_{OH}		3.3	-	V
	Vcc=2.5V, Iol=-50uA	V_{OH}	-		2.5	V
Rise/Fall Time-RXD	Vcc=6V, C=15pF	$t_r/t_{f\ (RXD)}$		18		ns
	Vcc=2.7V, C=15pF	$t_r/t_{f\ (RXD}$		36		ns
Transmitter						
IrED Operating Current	Low Power Mode Vcc=2.7 to 6V	I_{IrED}			500	mA
Logic LOW Transmitter Input Voltage		V_{IL}	-0.5		0.8	V
Logic HIGH Transmitter Input Voltage	V_{CC}=2.7 to 6V	V_{IH}	2.1	-	4.1	V
Output Radiant Intensity	Vcc=6V	Ie	44		-	mW/sr
	TXD Logic LOW Level	Ie			0.04	mW/sr
Angle of Half Intensity		$2\theta_{1/2}$	30			°
Peak Wavelength of Emission		λp	850	870	900	nm
Half-Width of Emission Spectrum		$\Delta\lambda$		40		nm
Average IrED Current		I_{IrED} (DC)			100	mA
Repetitive Pulsed IrED Current	t<50 μs, Duty cycle=20%	I_{IrED} (RP)			500	mA
Optical Rise/Fall Time,		t_r/t_f		180	600	ns
Optical Overshoot					25	%

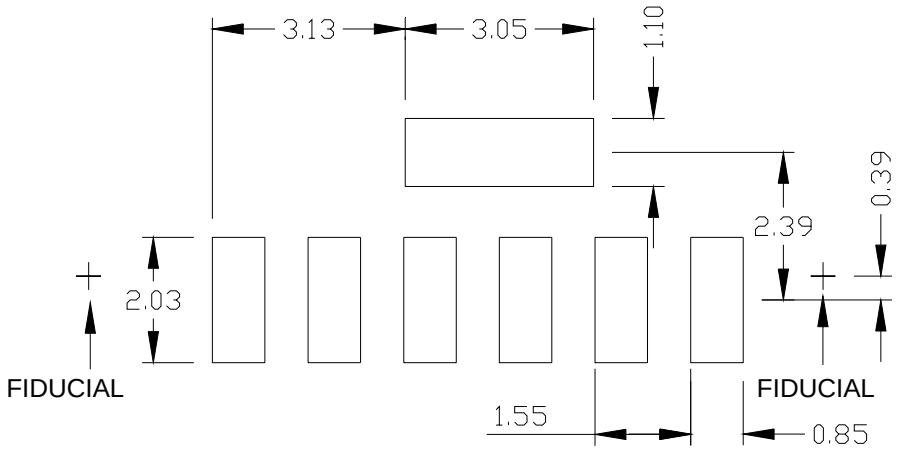
Functional Block Diagram



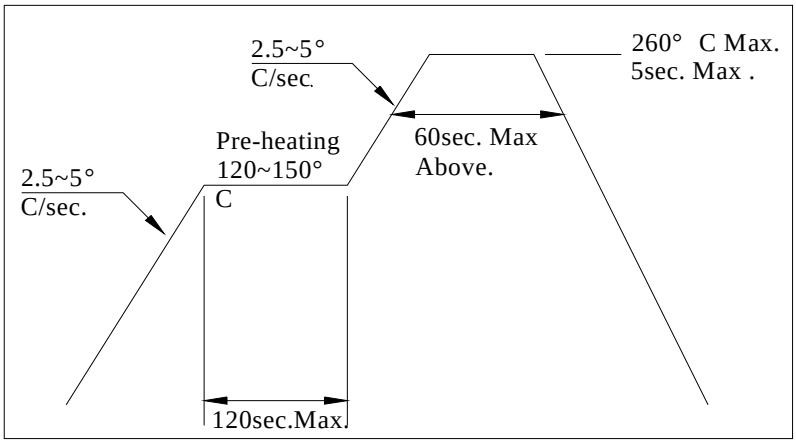
Note:Outlined components are optional depending on the quality of the power supply.

Component	Recommended Value
C1	0.1uF(Ceramic). It must be placed within 1.0cm of the TM3000/TR2
C2	10uF(Electrolytic). It must be placed within 15cm of the TM3000/TR2
R1	For V_{LEDA}=5V,recommended R1=16Ω. Resistor must have a positive temperature coefficient of 0.47% per degree C

Recommended SMD Pad Layout



Recommended Solder Profile



Notice:

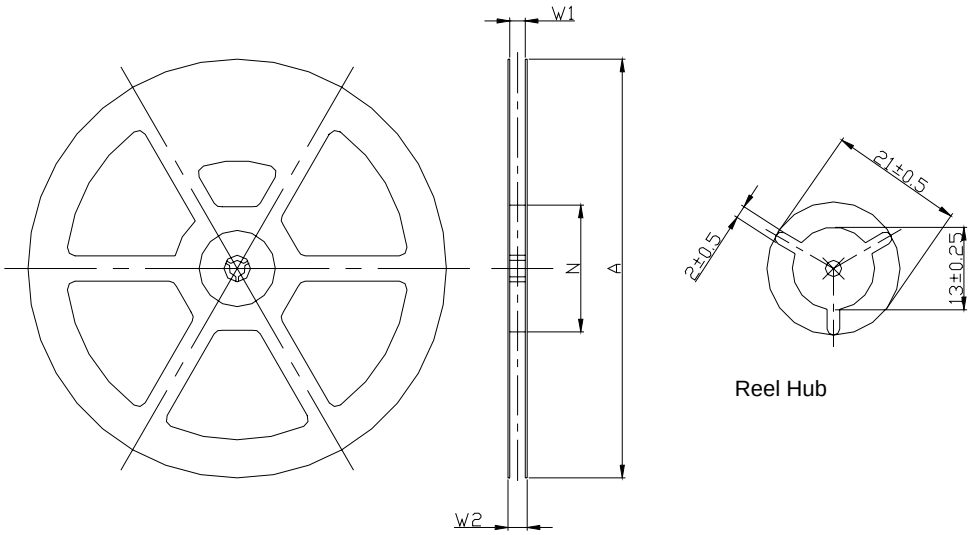
(1) Reflow soldering should not be done more than two times.

(2) When soldering, do not put stress on the IrDA devices during heating.

(3) After soldering, do not warp the circuit board.

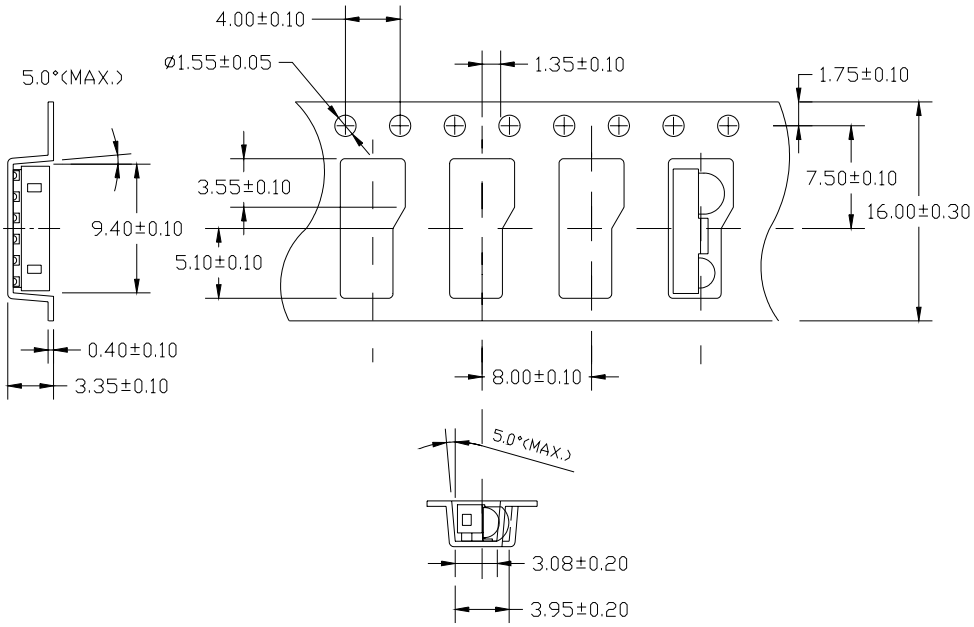
Taping and Packing Information

Shape of Reel and Dimensions

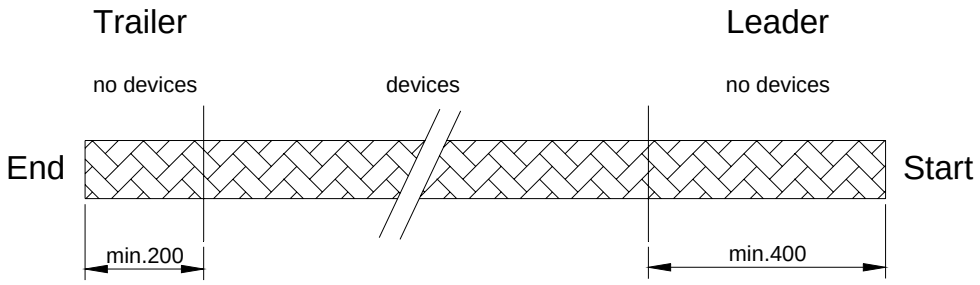


Version	Tape Width	A	N	W1	W2max
C	16	330±1	99±1.5	17.4±2	22

Tape Dimensions



Leader and Trailer



Quantity

TM3000/TR2 2500 pcs. per reel

Cover Tape Peel Strength

According to IEC 286

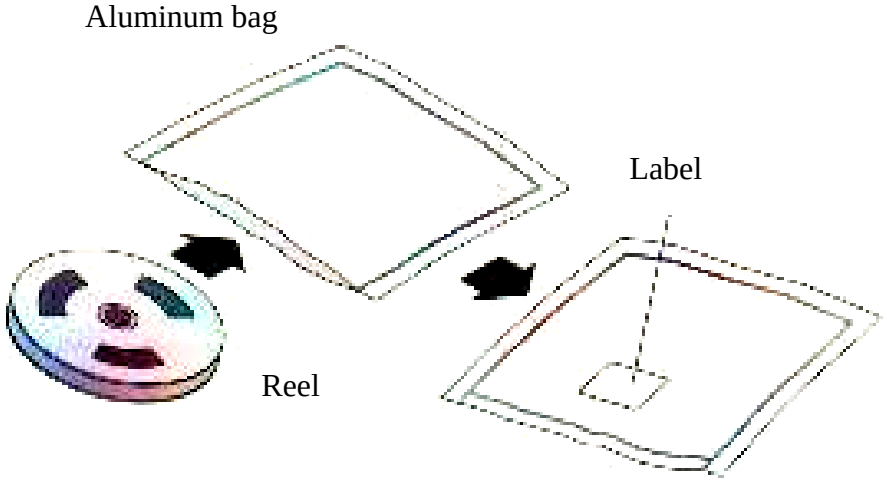
0.1 to 1.3N

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℃ to 30℃
- Storage humidity ≦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℃+5℃/-0℃ and 5% RH(dry air/nitrogen) or

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

24 hours at 125℃+5℃ 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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