

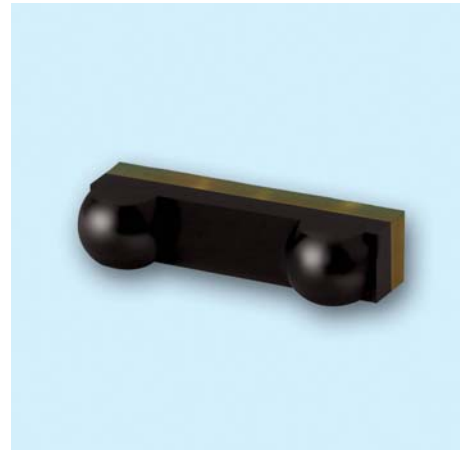
Technical Data Sheet

115.2Kbit/s Infrared Transceiver

TM3208/TR2

Features

- Compliant IrDA 1.4 Low power specification
- Excellent Fluorescent Noise Immunity and Very High EMI Immunity
- Wide Operating Voltage Range from 2.4 to 5.0Volts
- Ultra Small Surface Mount Package:
 - L7.0mm * W2.8mm * H1.6mm
- Data Rate :2.4k ~ 115.2kbit/s
- Operating Temperature Range : -25°C to 85°C
- Low Shutdown Current : 0.01 μ A Typical
- Link distance:80cm(Min.) at LEDA=50mA
- Few External Components Required
- Pb-free
- The product itself will remain within RoHS compliant version.



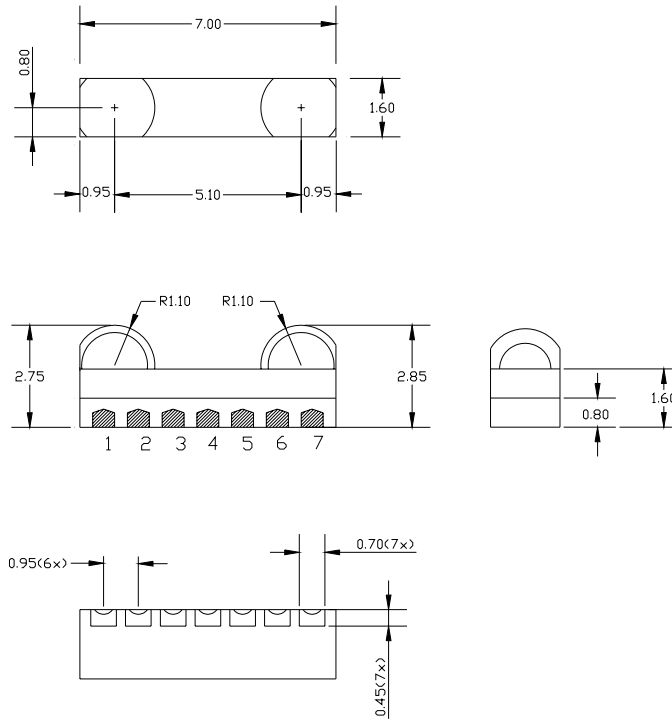
Descriptions

The TM3208/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 5.0Volts, the LED drive current is internally compensated to a constant 50mA to assure that link distances meet the low power standard of IrDA 1.4 physical layer specification.

Applications

- PDA
- Digital Still and Video Cameras
- Handheld Battery Operated Products, ex: Handheld Printers
- Electronic wallet
- Mobile Telecommunication

Package Dimensions

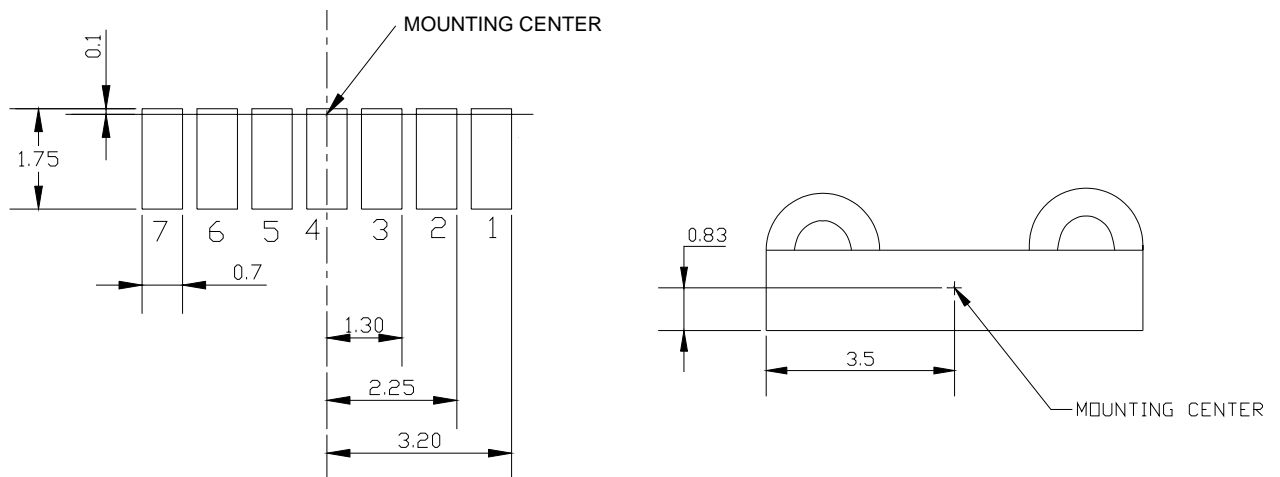


Unit: mm

Tolerance : ± 0.2 mm

Recommended Land Pattern for TM3208/TR2

Unit: mm



Device Selection Guide

Mode	Transmitter		Receiver		λ p	Operating Voltage (Vcc)	Data Rate
	Link Distance	Angle 2θ 1/2	Link Distance	Angle 2θ 1/2			
TM3208/TR2	>80cm	+/-15 +/-30	>80cm	+/-15 +/-30	850~900 nm	2.4~5.0 Volts	2.4k~115.2k bps

Pin Descriptions

Pin	Symbol	Function	Description	I/O	Active
1	LEDA	LED Anode	IrLED Supply Voltage from 2.4 to Vcc+4 V		
2	LEDC	LED Cathode	Internally Connected to the LED driver.		
3	TXD	Transmitter Data	Logic High turn on the IrLED *Note 4	I	High
4	RXD	Receiver Data	Output is a low pulse when a light pulse is seen.. *Note 3	O	Low
5	SD	Shut Down	Must be driven either high or low. *Note 2	I	High
6	VCC	Supply Voltage	Supply Voltage from 2.4 to 5.0Volts. *Note 1		
7	GND	Analog Ground	Connect to system ground		

Note 1: Receives power supply from 2.4to 5.0 Volts. This pin provides power for the receiver and transmitter drive section. Power supply noise in 100KHz to 2MHz range must have a dv/dt of less than 50mV/us in receive mode.

Note 2: Asserting this pin above 1.4V causes the device to shutdown, disabling transmitter and tri-stating the receiver output; however, it must be driven above Vdd-0.7V for shutdown current consumption to be less 1uA.

Note 3: Normally high goes low for duration of receive pulse. Output is a CMOS driver providing rail to rail operation. RXD may go low continuously if the DC ambient exceeds input capacity. During shutdown RXD output tri-states with a weak (500K) pull up.

Note 4: Asserting this pin above 1.4V turns on transmitter. This input is gated by the shutdown function and AC coupled. Maximum transmit pulse width is ~50usec. Input has 500K pull down which is active even during shutdown.

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 _{CC}	-0.5		7	V
IrED Supply Voltage	SD=0, TXD=V _{CC}	V _{LEDA}	-0.5		9	V
Receiver Data Output	All States	RXD	-0.5		V _{CC} +0.5	V
Transmitter Data Input	All States	TXD	-0.5		V _{CC} +0.5	V
Shut Down	All States	SD	-0.5		V _{CC} +0.5	V
Operating Temperature Range		T _{amb}	-25		+85	°C
Storage Temperature Range		T _{stg}	-40		100	°C
Soldering Temperature	See Recommended Solder Profile			-	245	°C

Recommended Operating Conditions

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Operating Temperature Range		T _{amb}	-25		+85	°C
Supply Voltage	V _{CC} to GND	V _{CC}	2.4		5.0	V
Receiver Data Rate			2.4		115.2	kbps

Electrical Characteristics

T_{amb}=25°C, V_{CC}=2.4V to 5.0V 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	V _{CC} to GND	V _{CC}	2.4		5.0	V
Supply Current Pin V _{CC} (Receive Mode)	V _{CC} =2.4 to 5.0V	I _{CC} (Rx)		150		uA
Supply Current Pin V _{CC} (Avg.) (Transmit Mode)	I _{IrED} =50 mA (at V _{LEDA} Pin) V _{CC} =3.6V	I _{CC1} (Tx)		1.4		mA
Shut Down Current Pin SD	SD=V _{CC} , V _{CC} =2.4 to 5.0V	I _{SD}		0.01	1.0	uA
Transmit Receiver Latency		T _{TRL}		50	100	uA
Transceiver Power on Latency		T _{PON}		100	150	us

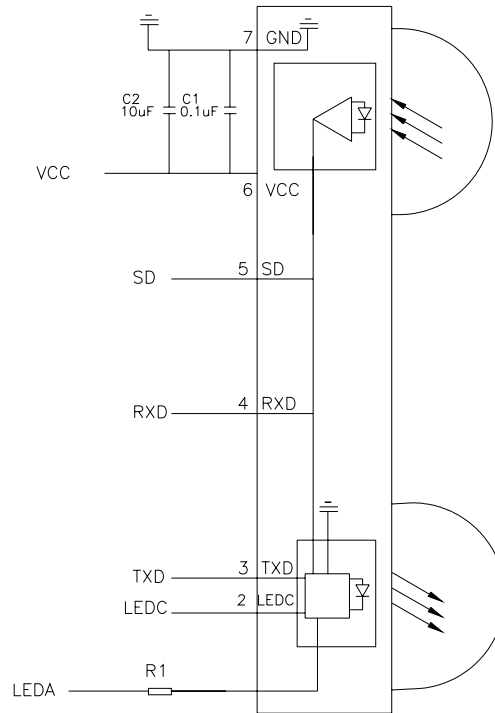
Opto-electronic Characteristics

$T_{amb}=25^{\circ}\text{C}$, $V_{cc}=2.4\text{V}$ to 5.0V unless otherwise noted.

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Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Receiver						
Minimum Detection Threshold Irradiance	SIR Mode, $V_{cc}=5.5\text{V}$	Ee	-	-	4	$\mu\text{W}/\text{cm}^2$
	SIR Mode, $V_{cc}=2.4\text{V}$	Ee	-	-	10	$\mu\text{W}/\text{m}^2$
Maximum Detection Threshold Irradiance	SIR Mode, $V_{cc}=5.5\text{V}$	Ee	-	500		$\mu\text{W}/\text{cm}^2$
	SIR Mode, $V_{cc}=2.4\text{V}$	Ee	-	1000		$\mu\text{W}/\text{cm}^2$
Logic LOW Receiver Input Irradiance		Ee			0.4	$\mu\text{W}/\text{cm}^2$
RXD Output Voltage	$I_{OH}=-200\ \mu\text{A}$, $EI \leq 0.3\ \mu\text{W}/\text{cm}^2$	V_{OH}	$V_{cc}-0.2$		V_{cc}	V
	$I_{OL}=200\ \mu\text{A}$,	V_{OL}	0		0.4	V
RXD Pulse Width	$V_{cc}=3.6\text{V}$	tpw	1.5		2.5	us
Rise/Fall Time-RXD	$V_{cc}=5.0\text{V}$, $C=15\text{pF}$	$t_r/t_f(\text{RXD})$		40		ns
	$V_{cc}=2.4\text{V}$, $C=15\text{pF}$	$t_r/t_f(\text{RXD})$		60		ns
Transmitter						
IrED Operating Current	$V_{cc}=2.4$ to 5.0V	I_{IrED}		50	-	mA
Logic LOW Transmitter Input Voltage		V_{IL}	0		$1/3V_{cc}$	V
Logic HIGH Transmitter Input Voltage		V_{IH}	$2/3V_{cc}$		V_{cc}	V
Output Radiant Intensity	$V_{cc}=2.4\text{V}$	I_e	4			mW/sr
	TXD Logic LOW Level	I_e			0.04	mW/sr
Angle of Half Intensity		$2\theta_{1/2}$	30		60	$^{\circ}$
Peak Wavelength of Emission		λ_p	850	875	900	nm
Half-Width of Emission Spectrum		$\Delta\lambda$		40		nm
Average IrED Current		$I_{IrED}(\text{DC})$			100	mA
Repetitive Pulsed IrED Current	$t < 50\ \mu\text{s}$, $t_{on} < 20\%$	$I_{IrED}(\text{RP})$			400	mA
Optical Rise/Fall Time,	tpw(TXD)= $1.6\ \mu\text{s}$	t_r/t_f			600	ns
Optical Overshoot					25	%

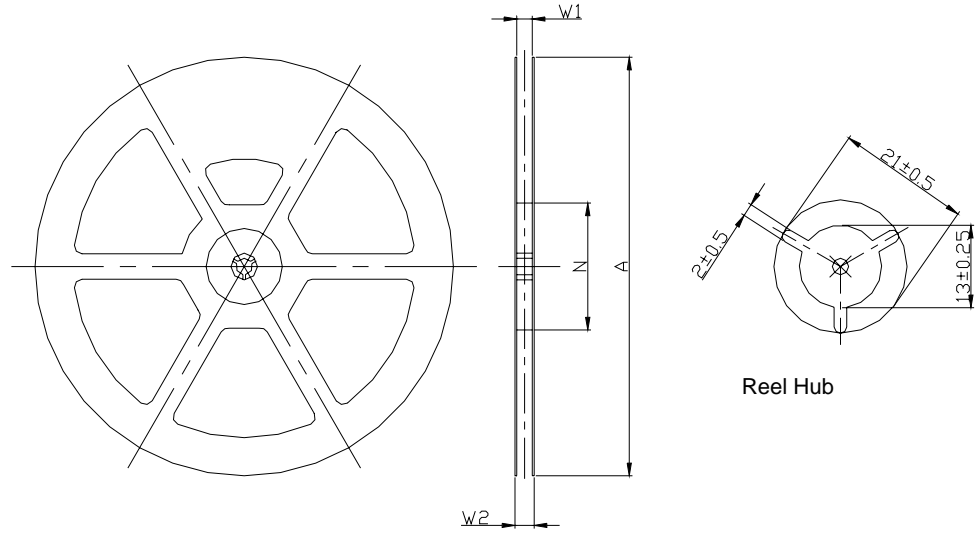
Recommended Circuit Diagram



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

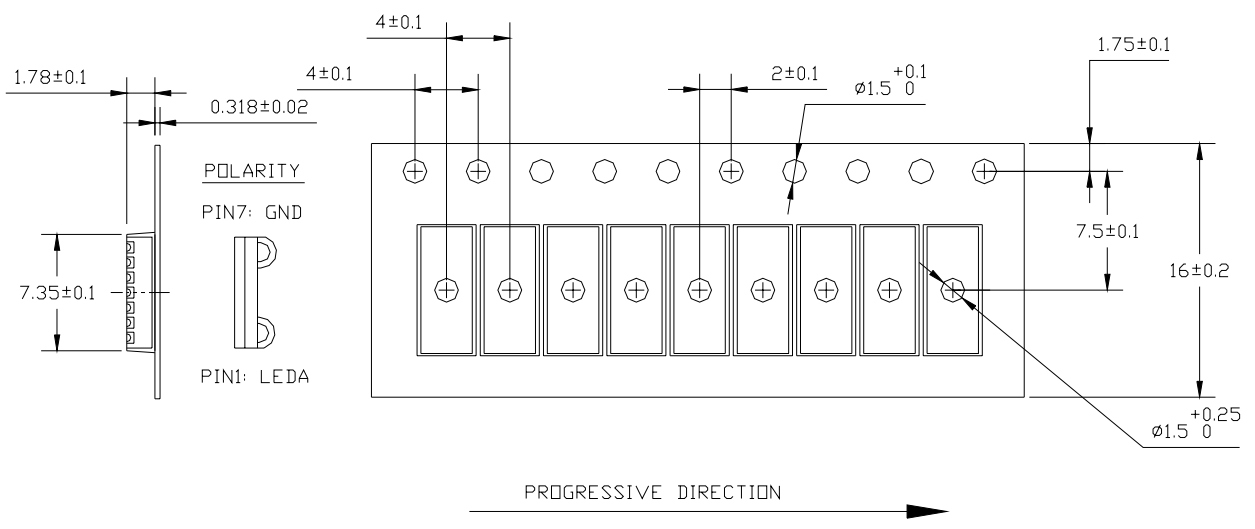
Component	Recommended Value
C1	0.1uF(Ceramic). It must be placed within 0.7cm of the TM3208/TR2
C2	10uF(Electrolytic). It must be placed within 15cm of the TM3208/TR2
R1	Recommended R1=10Ω . Resistor must have a positive temperature coefficient of 0.47% per degree C

Taping and Packing Information
Shape of Reel and Dimensions

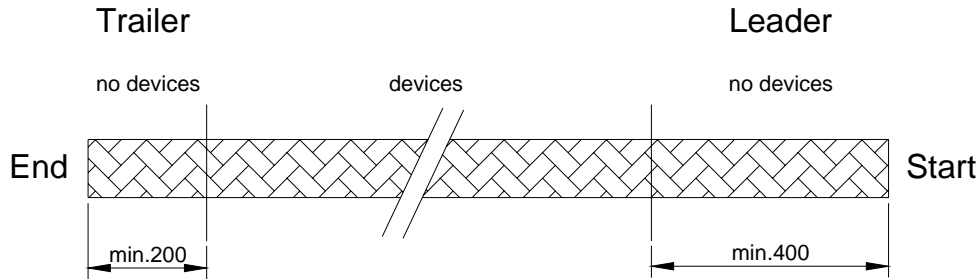


Version	Tape Width	A	N	W1	W2max
C	16	330±1	100±1.5	18±2	21.7

Tape Dimensions



Leader and Trailer



Quantity

TM3208/TR2 2500 pcs. per reel

Cover Tape Peel Strength

According to IEC 286

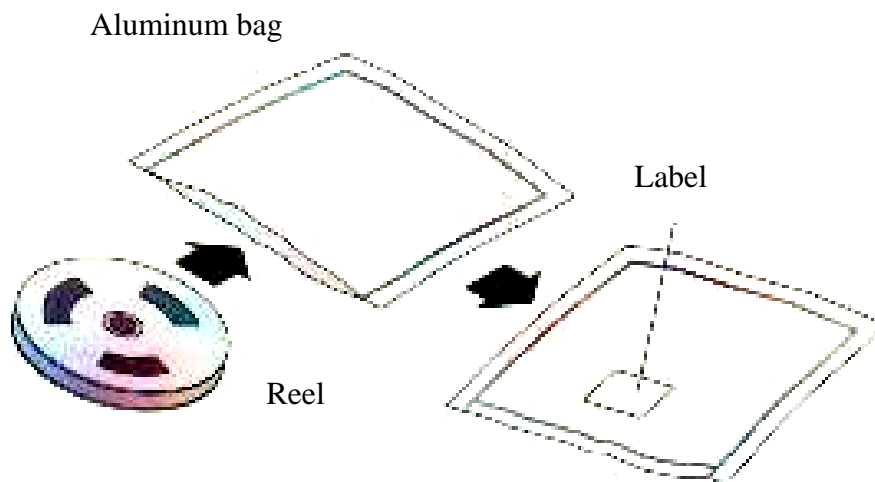
0.1 to 1.3N

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

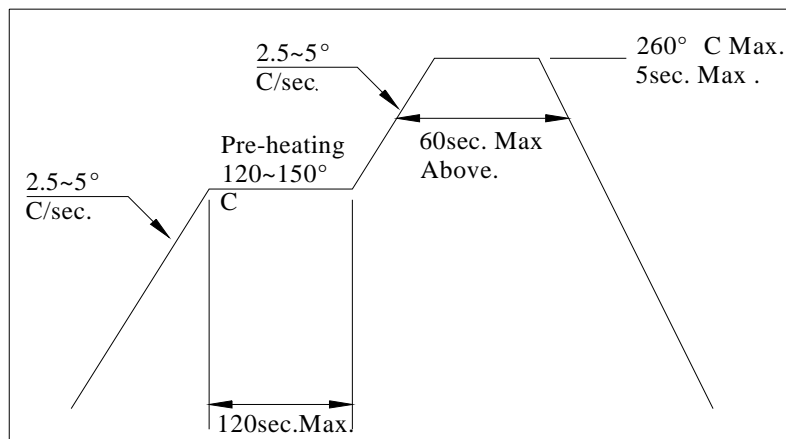
The following are general recommendations for moisture sensitive level (MSL) 4 storage and use:

- Shelf life in sealed bag: 12 months at $< 40^{\circ}\text{C}$ and $< 90\%$ relative humidity (RH)
- After bag is opened, devices that will be subjected to reflow solder or other high temperature process must
 - a) Mounted within 72 hours of factory conditions $< 30^{\circ}\text{C}/60\%\text{RH}$, or
 - b) Stored at $< 20\%$ RH
- Devices require bake, before mounting, if:
Humidity Indicator Card is $> 20\%$ when read at $23 \pm 5^{\circ}\text{C}$
- If baking is required, devices may be baked:
 - a) 192 hours at 40°C , and $< 5\%$ RH (dry air/nitrogen) or
 - b) 96 hours at 60°C , and $< 5\%$ RH for all device containers
 - c) 24 hours at 125°C

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.

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.