

# Technical Data Sheet

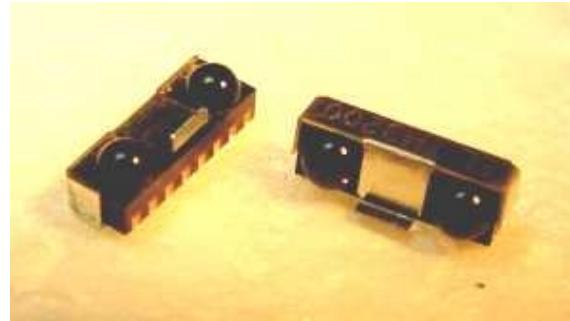
## Infrared Data Transceiver Module

Preliminary

**TM3201/TR2**

### Features

- Excellent Fluorescent noise immunity and very high EMI immunity
- Wide Operating Voltage Range from 2.0 to 5.5 Volts
- IrED Operating Voltage Range from 2.0 to Vcc+4 Volts
- Ultra Small Surface Mount Package:
  - L8.0mm \* W3.0mm \* H2.5mm
- 2.4kbps to 115.2kbps data rates IrDA compliant
- Programmable current limit transmitter:
  - Low 30mA & 50us pulse width limiting
- Few External Components Required



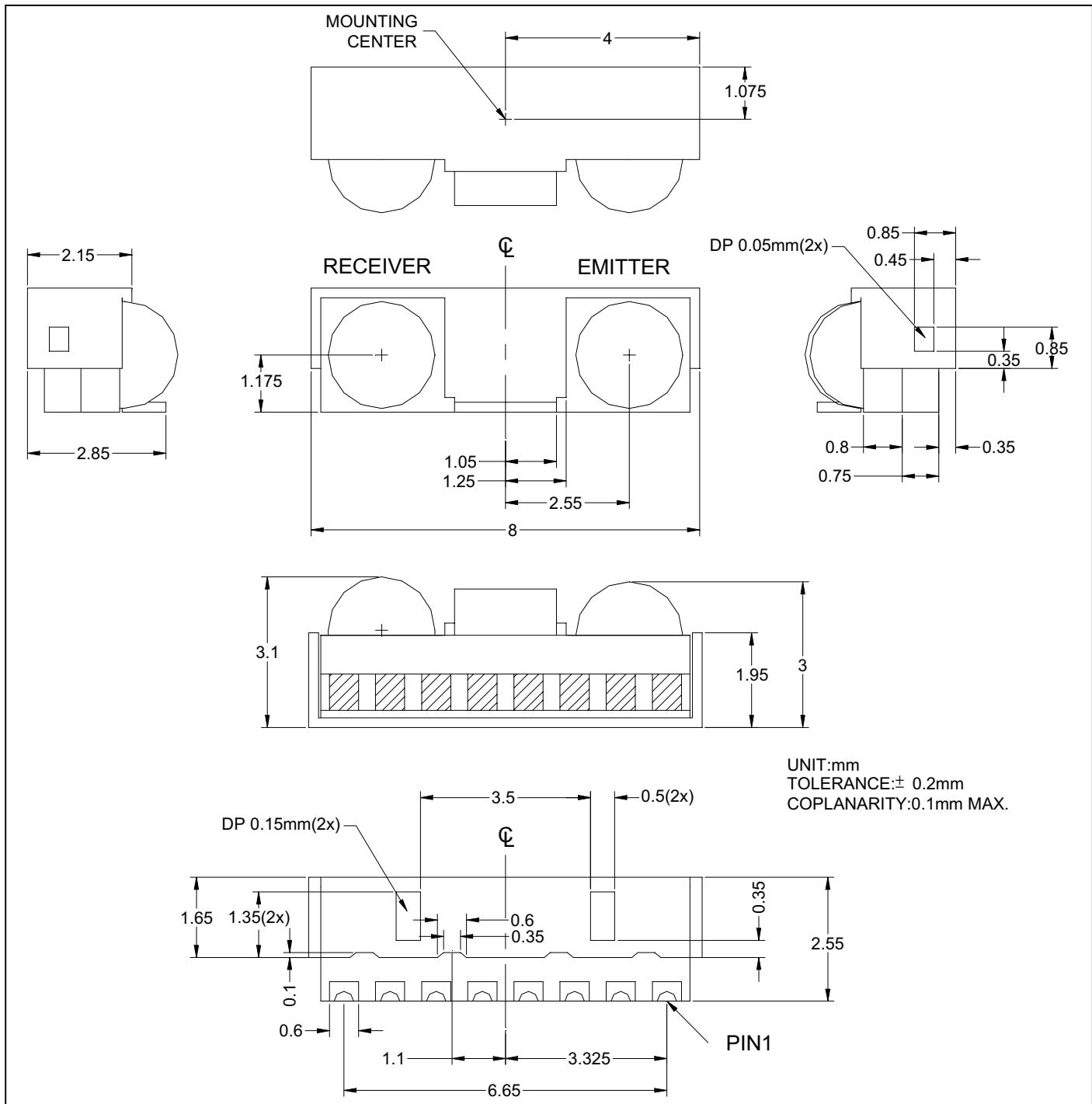
### Descriptions

The TM3201/TR2 is a new generation of low cost, multi-mode IrDA module in ultra small surface mount package. The operating voltage can range from 2.0 to 5.5 Volts and independent IrED supply voltage can arrive Vcc+4 Volts. This module supports data rates speed up to 115.2kbps and compliant to the IrDA 1.3. At low power mode, a Vcc bypass capacitor is the only external component required.

### Applications

- Cellular Phones, Pagers, Smart Phones
- PDA, Printers
- Digital Still and Video Cameras
- PCs

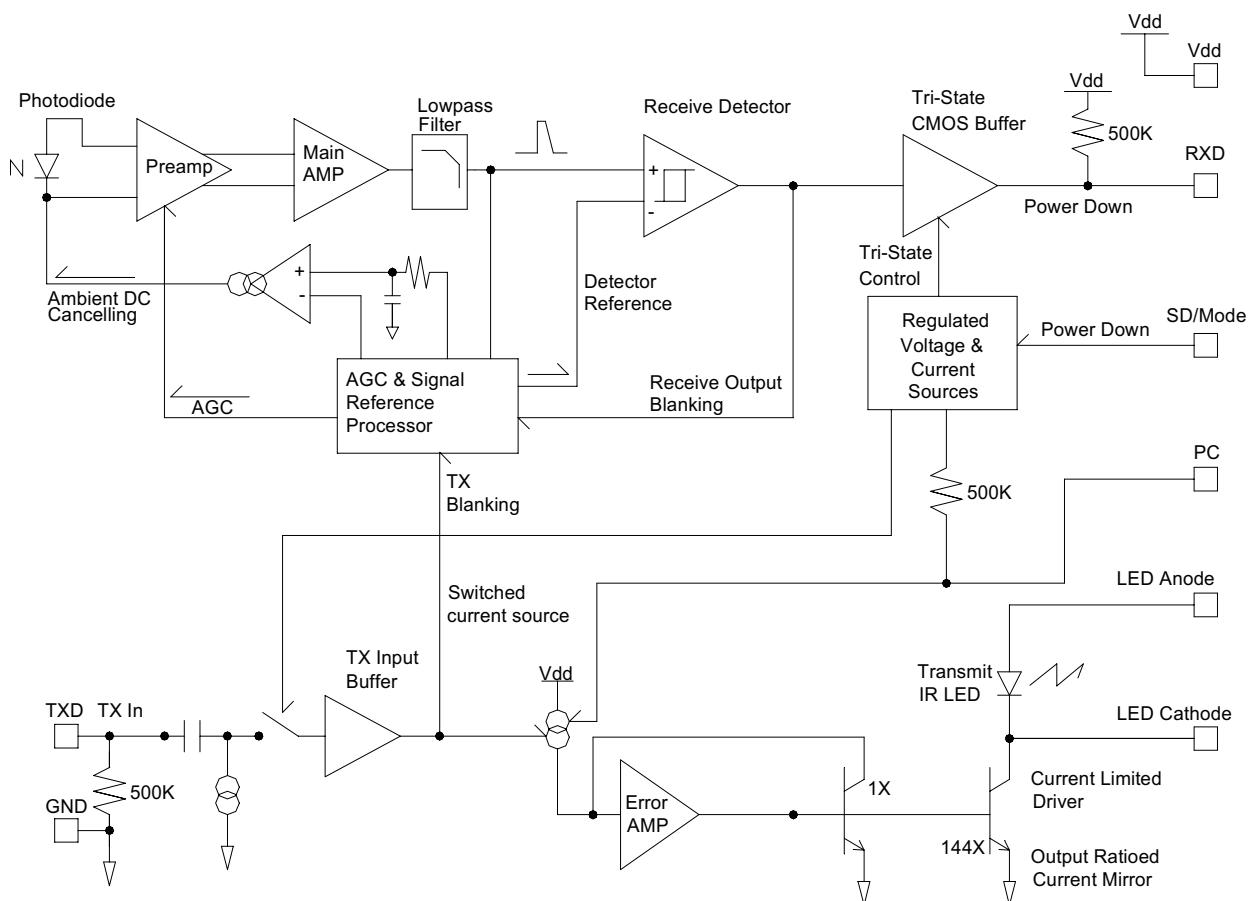
Device NO:DTM-321-001

**Package Dimensions**

**Device NO:DTM-321-001**

## Device Selection Guide

Mode	Low Power		Standard		$\lambda$ p	Operating Voltage (Vcc)	Data Rate
	Link Distance	Angle 2θ 1/2	Link Distance	Angle 2θ 1/2			
<b>Low Power TM3201/TR2</b>	>20cm	+/-15 +/-30	>30cm	+/-15 +/-30	850~900 nm	2.0~5.5 Volts	2.4~115.2 kbps

## Functional Block Diagram



**Pin Descriptions**

Pin	Symbol	Function	Description	I/O	Active
1	GND	Ground	Connect to system ground		
2	NC	No Connect			
3	Vcc	Supply Voltage	Supply Voltage from 2.0 to 5.5 Volts. *Note 1		
4	AGND	Analog Ground	Connect to a "quiet" ground.		
5	SD	Shut Down	Must be driven either high or low. *Note 2		
6	RXD	Receiver Data Output	Output is a low pulse when a light pulse is seen. *Note 3	O	Low
7	TXD	Transmitter Data Input	Logic High turn on the IrED. *Note 4	I	High
8	V <sub>LEDA</sub>	IrED Supply Voltage	IrED Supply Voltage from 2.0 to Vcc+4 Volts. *Note 5		

Note 1: Receives power supply from 2.0 to 5.5 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 shut down, 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. Power up receiver latency (time to come to full sensitivity) is < 100us. Enabling this pin (asserting logic low) will also clock the TXI input into the TX power mode control D flip flop.

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.

Note 5: V<sub>LEDA</sub>=9.0V(Max.) in standby mode

**Absolute Maximum Ratings (Ta=25°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	Vcc	-0.5		7	V
IrED Supply Voltage	SD=0, TXD=Vcc	V <sub>LEDA</sub>	-0.5		Vcc+4	V
	Vcc=0~7V, TXD=0	V <sub>LEDA</sub>	-0.5		9	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		T <sub>amb</sub>	-25		+85	°C
Storage Temperature Range		T <sub>stg</sub>	-40		+85	°C
Soldering Temperature	See Recommended Solder Profile			-	245	°C
Average IrED Current		I <sub>IrED</sub> (DC)			100	mA
Repetitive Pulsed IrED Current	t<50 μs, t <sub>on</sub> <20%	I <sub>IrED</sub> (RP)			400	mA

### Electrical Characteristics

T<sub>amb</sub>=25°C, Vcc=2.0V to 5.5V unless otherwise noted.

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Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
<b>Transceiver</b>						
Supply Voltage	Receive Mode Transmit Mode, R2=3.9Ω	Vcc	2.0		5.5	V
Supply Current Pin Vcc (Reecive Mode)	Vcc=2 to 5.5V	I <sub>cc</sub> (Rx)		145		uA
Supply Current Pin Vcc (avg) (Transmit Mode)	I <sub>IrED</sub> =400mA (at IrED Anode Pin) Vcc=5V	I <sub>cc1</sub> (Tx)				mA
Shut Down Current Pin SD	SD=Vcc=2 to 5.5V	I <sub>SD</sub>		0.01	1	uA
Transmit Receiver Latency		T <sub>TRL</sub>		50	100	uA
Transceiver Power On Setting Time		T <sub>PON</sub>		100	150	us

## TM3201/TR2

### Opto-electronic Characteristics

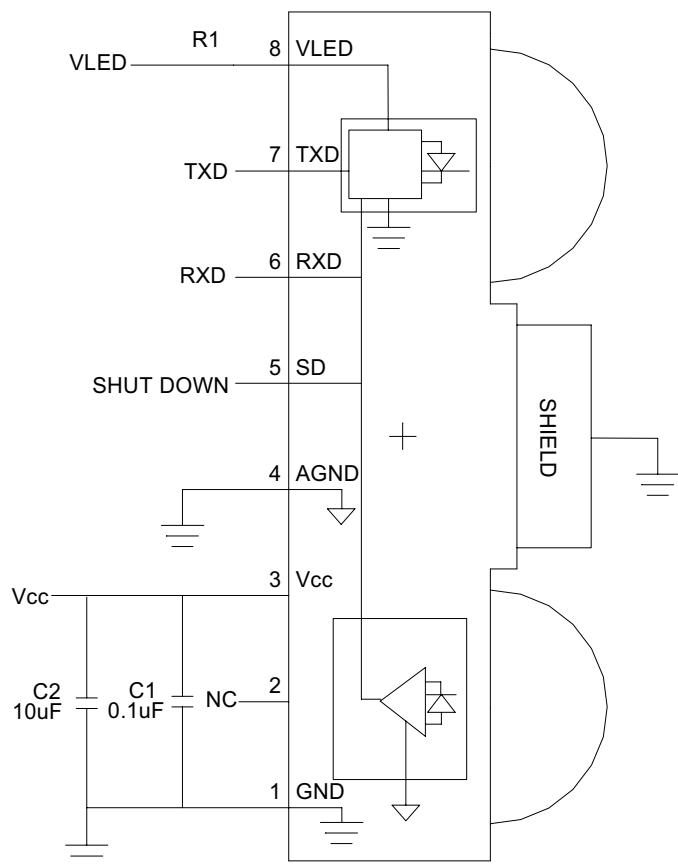
Tamb=25°C, Vcc=2.0V to 5.5V unless otherwise noted.

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

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
<b>Receiver</b>						
Minimum Detection Threshold Irradiance	SIR Mode, Vcc=5V	Ee	-	-	4	uW/cm <sup>2</sup>
	SIR Mode, Vcc=3V	Ee	-	-	10	uW/m <sup>2</sup>
Maximum Detection Threshold Irradiance	SIR Mode, Vcc=5V	Ee	-	500		uW/cm <sup>2</sup>
	SIR Mode, Vcc=3V	Ee	-	1000		uW/cm <sup>2</sup>
Logic LOW Receiver Input Irradiance		Ee			0.4	uW/cm <sup>2</sup>
Output Voltage -Active	Vcc=5V, Iol=8mA	V <sub>OL</sub>	-	0.22		V
	Vcc=2V, Iol=2mA	V <sub>OL</sub>	-	0.17		V
Output Voltage -Non active	Vcc=5V, Iol=8mA	V <sub>OH</sub>		4.6	-	V
	Vcc=2V, Iol=2mA	V <sub>OH</sub>		1.7	-	V
RXD short circuit	Vcc=5V, RXD=0, RXD=Vcc		-	40	-	mA
	Vcc=2V, RXD=0, RXD=Vcc		-	8	-	mA
Rise/Fall Time-RXD	Vcc=5V, C=15pF	t <sub>r</sub> /t <sub>f</sub> (RXD)		30		ns
	Vcc=2V, C=15pF	t <sub>r</sub> /t <sub>f</sub> (RXD)		63		ns
<b>Transmitter</b>						
IrED Operating Current	Low Power Mode Vcc=2 to 5.0V	I <sub>IrED</sub>		30	45	mA
Logic LOW Transmitter Input Voltage		V <sub>IL</sub>	0		0.8	V
Logic HIGH Transmitter Input Voltage		V <sub>IH</sub>	2.0		Vcc+0.5	V
Output Radiant Intensity	Vcc=5.0V	Ie	-	50	500	mW/sr
	TXD Logic LOW Level	Ie			0.04	mW/sr
Angle of Half Intensity		2θ <sub>1/2</sub>	30			°
Peak Wavelength of Emission		λ p	850	870	900	nm
Half-Width of Emission Spectrum		Δ λ		40		nm
Optical Rise/Fall Time,		t <sub>r</sub> /t <sub>f</sub>		200	600	ns
Optical Overshoot					25	%

Device NO:DTM-321-001

## Recommended Circuit Diagram



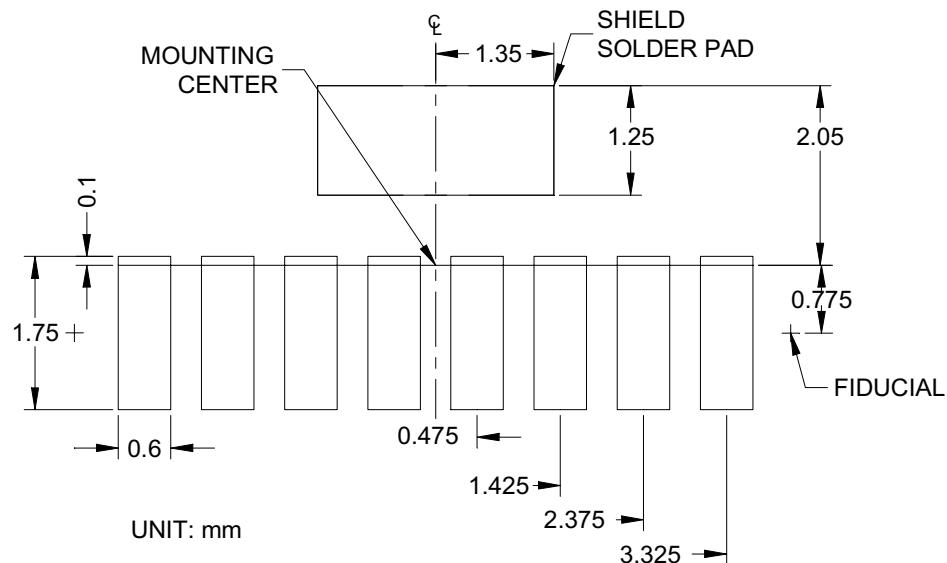
Note: Outlined components are optional depending on the quality of the power supply.

Component	Recommended Value
C1	0.1uF, Ceramic
C2	10uF, Electrolytic

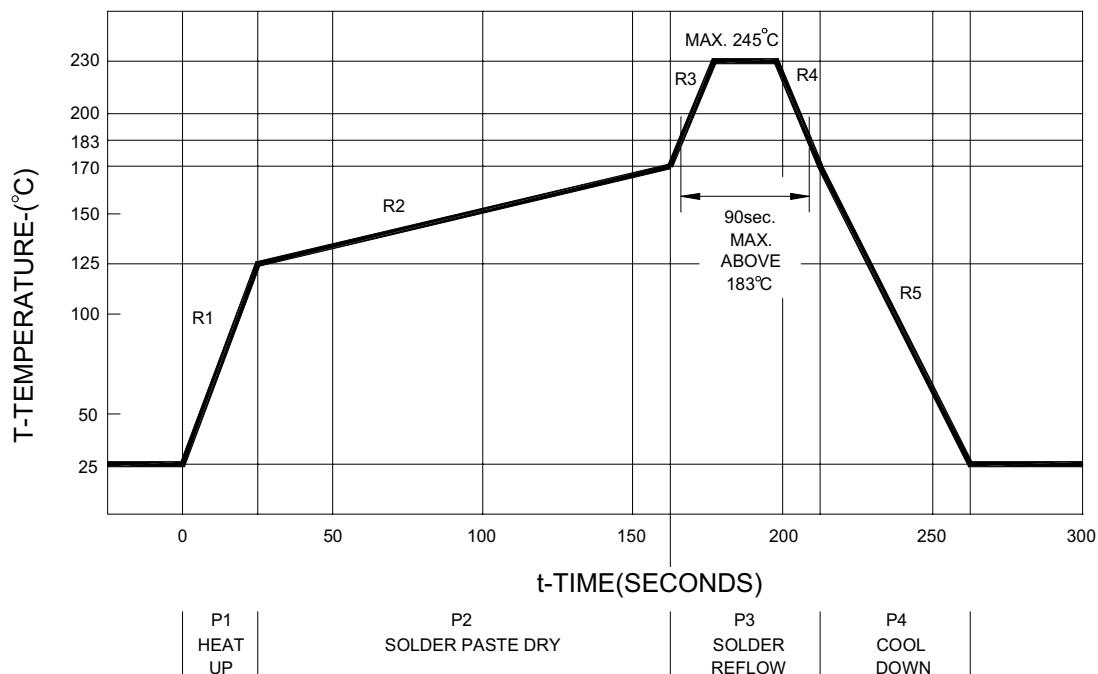
C2 is optional for the same supply voltage of Vcc and V<sub>LEDA</sub>

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### Recommended SMD Pad Layout



### Recommended Solder Profile



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