



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



QT-Brightek Optocoupler Series

High CMR, 1 Mbit/s High Speed Optocoupler

Part No.: QT4504

Product: QT4504	Date: February 01 , 2018	Page 1 of 19
	Version# 1.0	

Table of Contents:

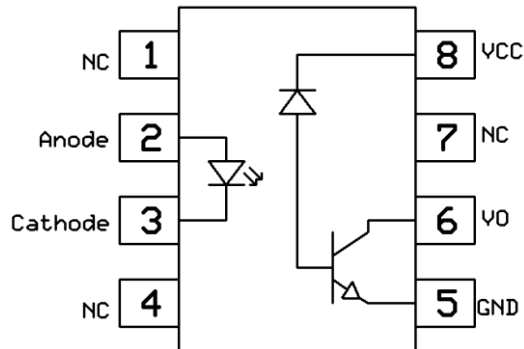
Introduction	3
Absolute Maximum Rating	6
Electrical Characteristic (T _A =25 °C).....	7
Characteristic Curves.....	10
Test Circuits	12
Solder Profile & Footprint.....	13
Packing & Labeling	16
Device Marking	17
Ordering Information	18
Revision History	19
Disclaimer	19

Introduction

Feature:

- High Speed phototransistor 1Mbit/s
- High Isolation voltage between input and output (Viso = 5000V rms)
- Creepage distance > 7.4mm
- Available in Tube or Tape and reel
- Available with standard DIP-4, Gullwing lead bend, SMD lead bend, and SMD low profile options.

Schematic:



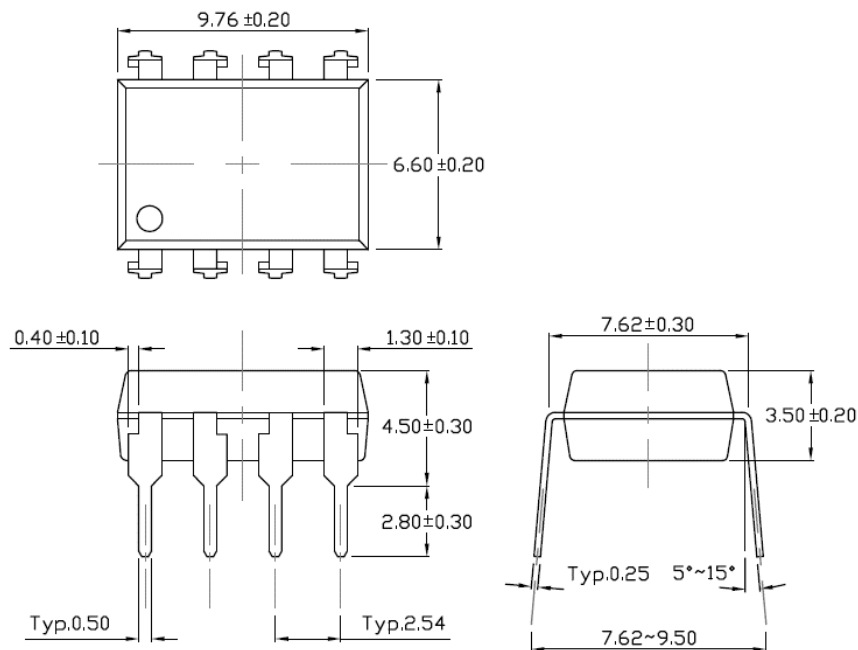
Certification & Compliance:

- Pb free and RoHS Compliant
- UL (Pending Approval)
- VDE (Pending Approval)

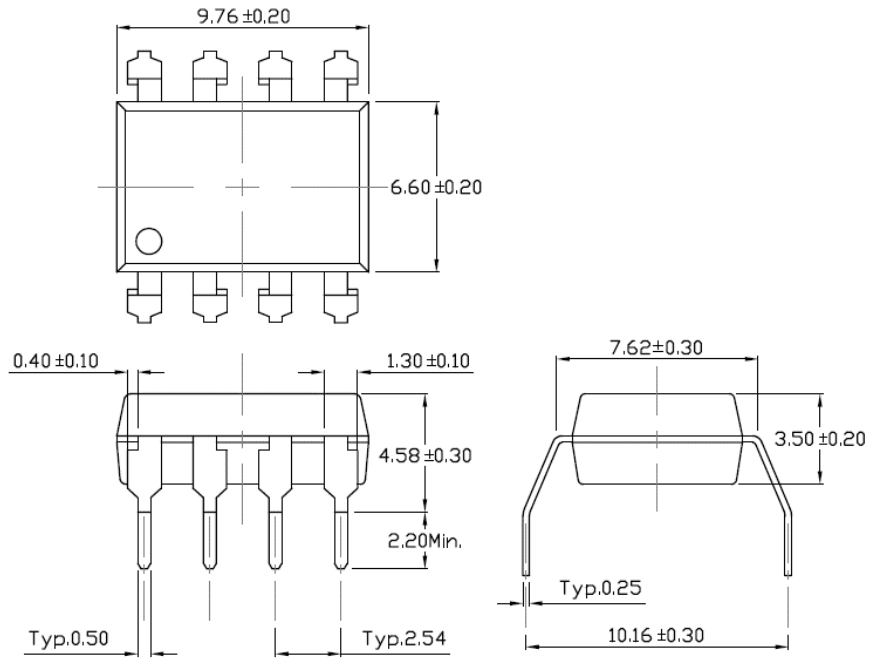


Dimension: (Dot location indicates pin 1)

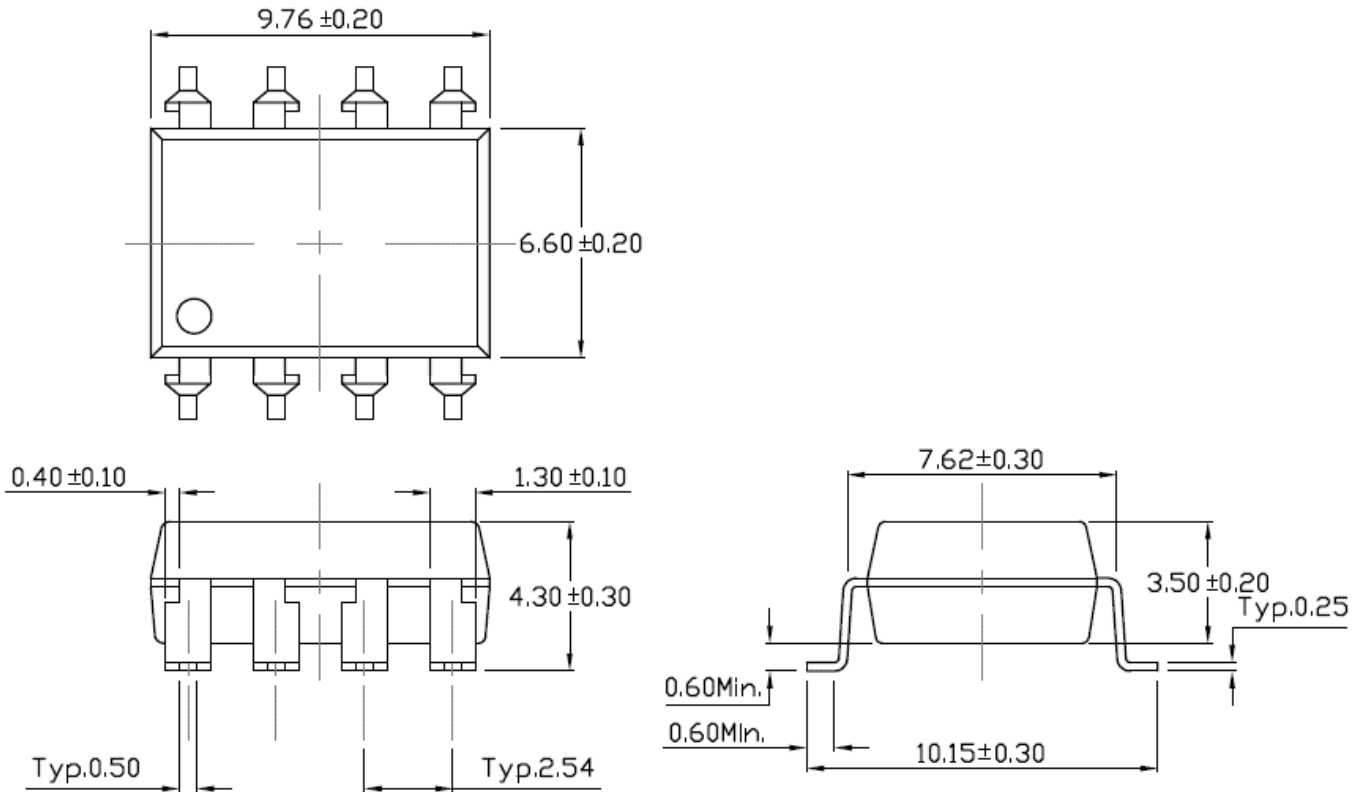
8-Pin Dip (standard):



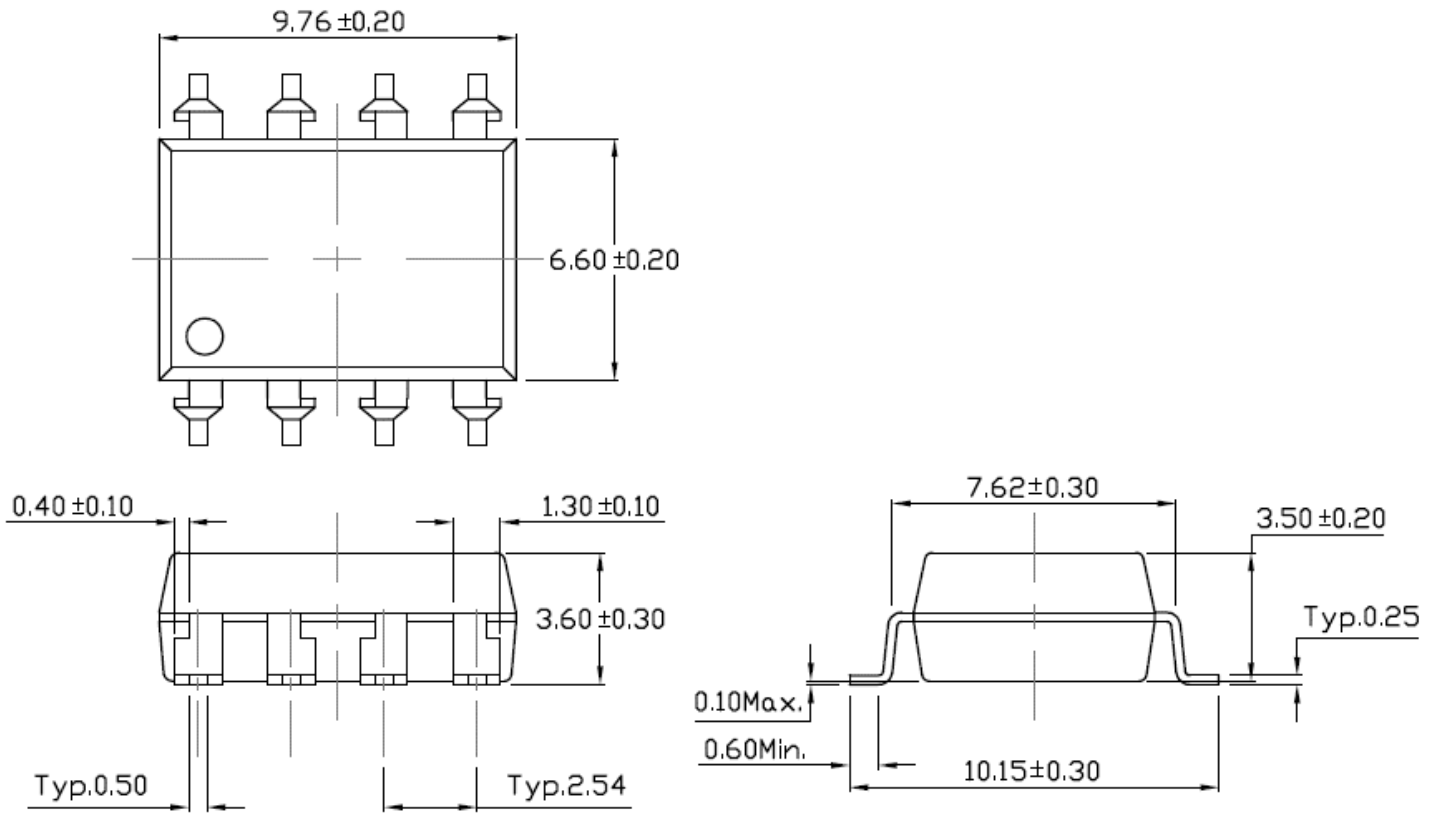
Gullwing (400mil) lead bend (Option M):



SMD lead bend (Option S):



SMD (Low Profile) bend (Option SL):



All Dimensions are in mm

Absolute Maximum Rating

Symbol	Parameter	Rating	Units
V _{ISO}	Isolation Voltage*	5000	V _{RMS}
T _{STG}	Storage Temperature	-55 ~ +125	°C
T _{OPR}	Operating Temperature	-55 ~ +100	°C
T _{SOL}	Lead Solder Temperature	260 for 10 sec	°C

EMITTER

I _F	Forward Current	25	mA
I _{FP}	Peak Forward Current (50% duty, 1ms P.W)	50	mA
I _{F(TRANS)}	Peak transient Current (≤ 1us, 300pps)	1	A
V _R	Reverse Voltage	5	V
P _D	Power Dissipation	45	mW
	Power Dissipation Derated above 100°C	-	mW/°C

DETECTOR

P _D	Power Dissipation	100	mW
V _{EBR}	Emitter-Base reverse voltage	5	V
I _B	Base current	5	mA
I _{O(AVG)}	Average Output current	8	mA
I _{O(PEAK)}	Peak Output current	16	mA
V _O	Output voltage	-0.5 to 20	V
V _{CC}	Supply voltage	-0.5 to 30	V

*AC for 1 minute, RH =40~60%

Electrical Characteristic ($T_A=25\text{ }^\circ\text{C}$)

($T_A=0$ to 70C unless specified otherwise)

Emitter

Symbol	Characteristics	Test Condition	Range			Unit
			Min	Typ	Max	
V_F	Forward Voltage	$I_F = 16\text{mA}$	-	1.45	1.6	V
V_R	Reverse Voltage	$I_R = 10\mu\text{A}$	5	-	-	V
$\Delta V_F/\Delta T_A$	Temperature coefficient of forward voltage	$I_F = 16\text{mA}$	-	-1.8	-	mV/ $^\circ\text{C}$

Detector

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
I_{OH}	Logic High Output Current	$I_F=0\text{mA}$, $V_O=V_{CC}=5.5\text{V}$, $T_A=25\text{ }^\circ\text{C}$	-	0.001	0.5	μA
		$I_F=0\text{mA}$, $V_O=V_{CC}=15\text{V}$, $T_A=25\text{ }^\circ\text{C}$	-	0.01	1	
		$I_F=0\text{mA}$, $V_O=V_{CC}=15\text{V}$	-	-	50	
I_{CCL}	Logic Low Supply Current	$I_F=16\text{mA}$, $V_O=\text{Open}$, $V_{CC}=15\text{V}$	-	140	200	μA
I_{CCH}	Logic High Supply Current	$I_F=0\text{mA}$, $V_O=\text{Open}$, $V_{CC}=15\text{V}$, $T_A=25\text{ }^\circ\text{C}$	-	0.01	1	μA
		$I_F=0\text{mA}$, $V_O=\text{Open}$, $V_{CC}=15\text{V}$	-	-	2	

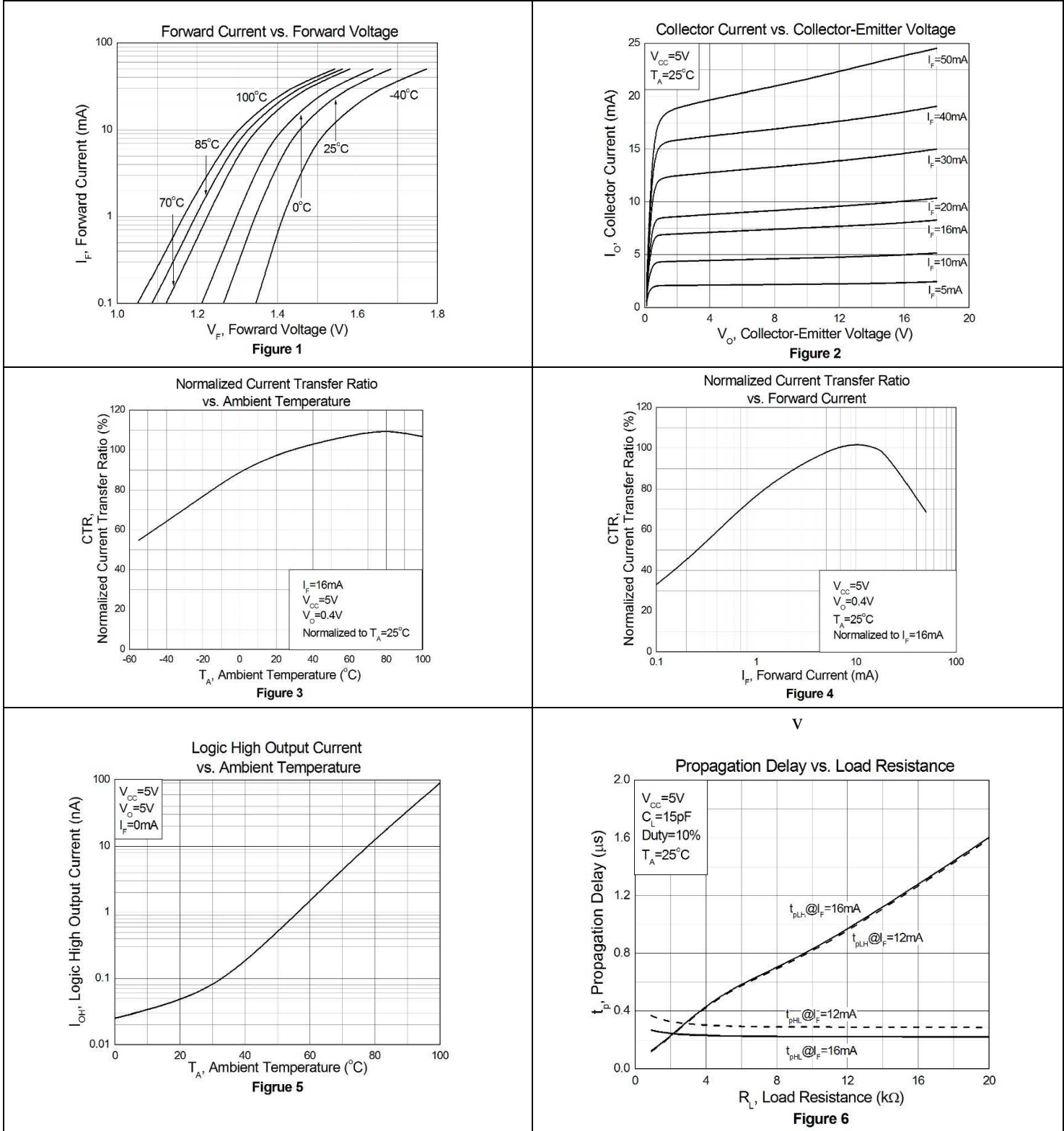
Transfer Characteristics

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
CTR	Current Transfer Ratio	$I_F=16\text{mA}, V_O=0.4\text{V}, V_{CC}=4.5\text{V}, T_A=25^\circ\text{C}$	25	35	60	%
		$I_F=16\text{mA}, V_O=0.5\text{V}, V_{CC}=4.5\text{V}$	21	40	-	
		$I_F=12\text{mA}, V_O=0.4\text{V}, V_{CC}=4.5\text{V}, T_A=25^\circ\text{C}$	26	38	65	
		$I_F=12\text{mA}, V_O=0.5\text{V}, V_{CC}=4.5\text{V}$	22	43	-	
V_{OL}	Logic Low Output Voltage	$I_F=16\text{mA}, I_O=4.0\text{mA}, V_{CC}=4.5\text{V}, T_A=25^\circ\text{C}$	-	0.2	0.4	V
		$I_F=16\text{mA}, I_O=3.3\text{mA}, V_{CC}=4.5\text{V}$	-	-	0.5	

Switching Characteristics (TA=25°C, VCC=5V)

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
T _{PHL}	Propagation Delay Time Logic High to Logic Low	I _F =16mA, V _{CC} =5.0V, R _L =1.9kΩ, C _L =15pF, V _{THHL} =1.5V, T _A =25°C	-	0.24	0.3	μs
		I _F =16mA, V _{CC} =5.0V, R _L =1.9kΩ, C _L =15pF, V _{THHL} =1.5V.	-	-	0.5	
		I _F =12mA, V _{CC} =15.0V, R _L =20kΩ, C _L =100pF, V _{THHL} =1.5V, T _A =25°C	-	0.58	0.7	
		I _F =12mA, V _{CC} =15.0V, R _L =20kΩ, C _L =100pF, V _{THHL} =1.5V	-	-	1.0	
T _{PLH}	Propagation Delay Time Logic Low to Logic High	I _F =16mA, V _{CC} =5.0V, R _L =1.9kΩ, C _L =15pF, V _{THLH} =1.5V, T _A =25°C	-	0.21	0.5	μs
		I _F =16mA, V _{CC} =5.0V, R _L =1.9kΩ, C _L =15pF, V _{THLH} =1.5V.	-	0.21	0.7	
		I _F =12mA, V _{CC} =15.0V, R _L =20kΩ, C _L =100pF, V _{THLH} =2.0V, T _A =25°C	-	0.76	1.1	
		I _F =12mA, V _{CC} =15.0V, R _L =20kΩ, C _L =100pF, V _{THLH} =2.0V	-	0.76	1.4	
T _{PLH} - T _{PHL}	Propagation Delay Difference	I _F =12mA, V _{CC} =15.0V, R _L =20kΩ, C _L =100pF, V _{THHL} =1.5V, V _{THLH} =2.0V, T _A =25°C	-0.4	0.3	0.9	μs
		I _F =12mA, V _{CC} =15.0V, R _L =20kΩ, C _L =100pF	-0.7	0.3	1.3	
CM _H	Common Mode Transient Immunity at Logic High	I _F = 0mA, V _{CM} =1.5kVp-p, V _{CC} =5V, R _L =1.9kΩ, C _L =15pF, T _A =25°C	15000	30000	-	V/μs
		I _F = 0mA, V _{CM} =1.5kVp-p, V _{CC} =15V, R _L =20kΩ, C _L =100pF, T _A =25°C	15000	30000	-	
CM _L	Common Mode Transient Immunity at Logic Low	I _F = 12mA, V _{CM} =1.5kVp-p, V _{CC} =5V, R _L =1.9kΩ, C _L =15pF, T _A =25°C	15000	30000	-	
		I _F = 16mA, V _{CM} =1.5kVp-p, V _{CC} =15V, R _L =20kΩ, C _L =100pF, T _A =25°C	15000	30000	-	

Characteristic Curves



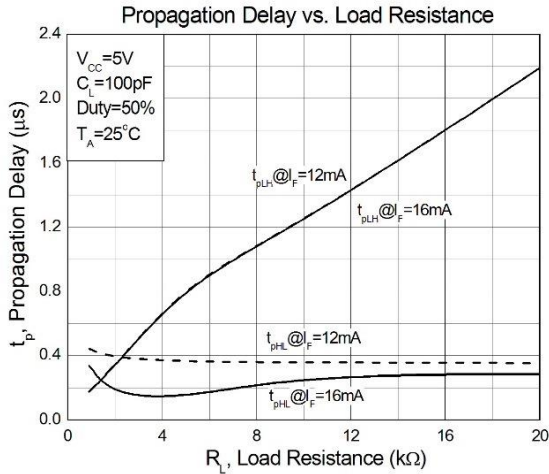


Figure 7

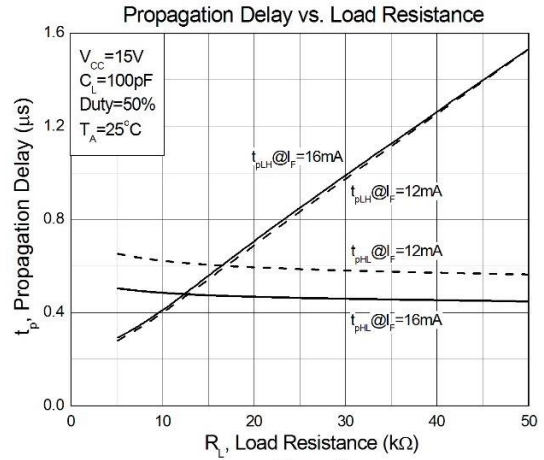


Figure 8

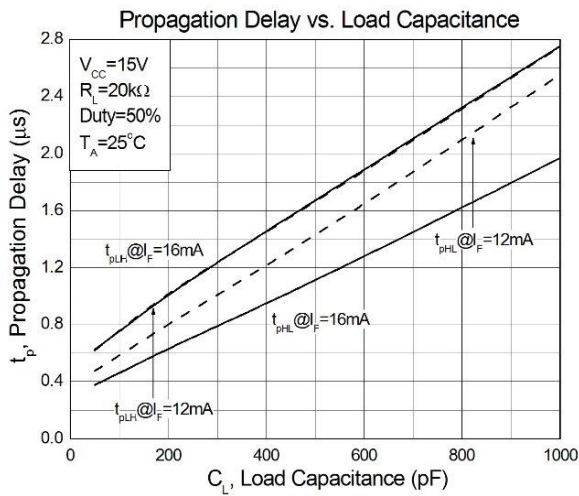


Figure 9

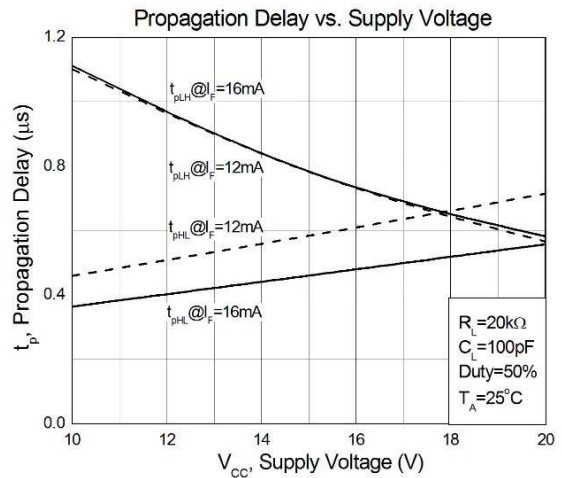


Figure 10

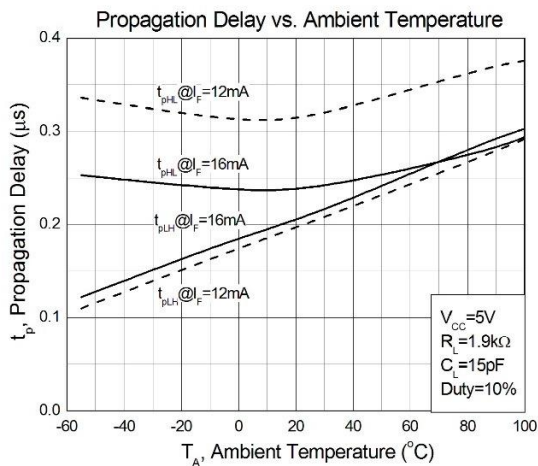


Figure 11

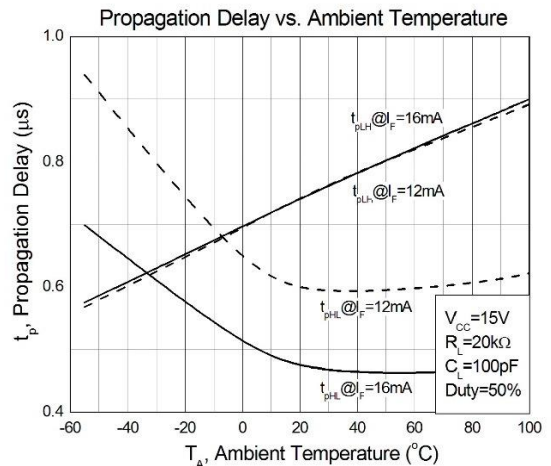
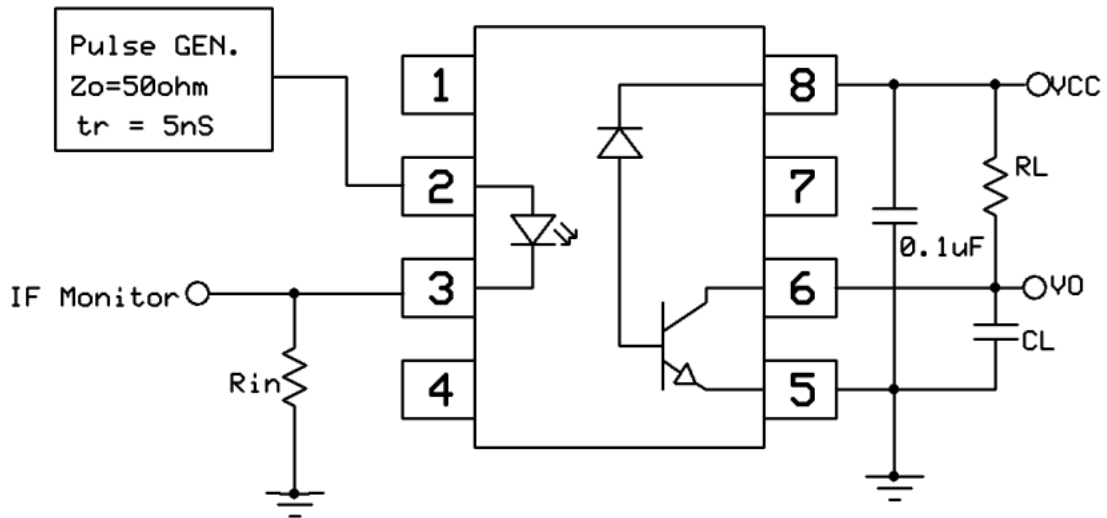
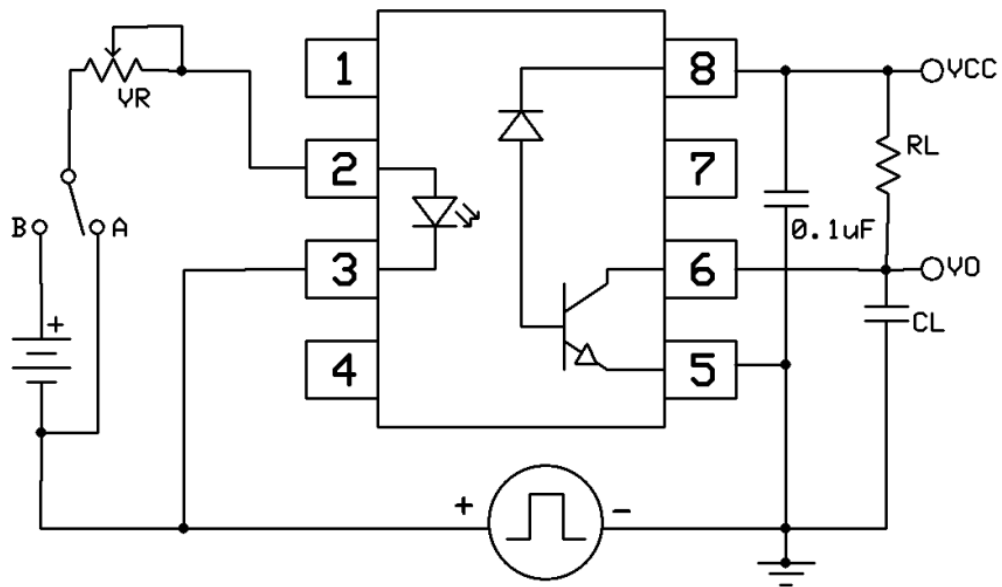


Figure 12

Test Circuits



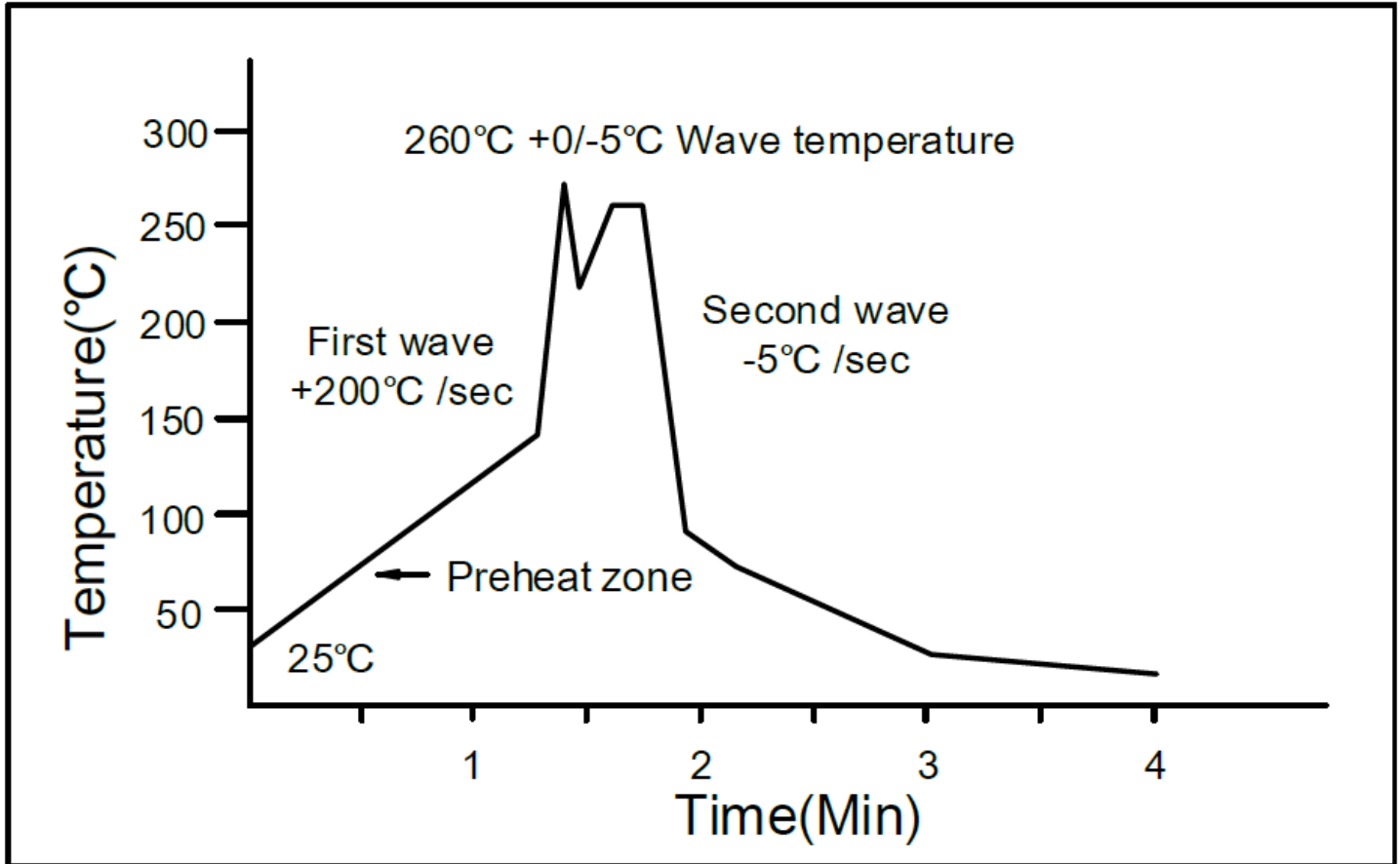
Switching Time Test Circuit



CMR Test Circuit

Solder Profile & Footprint

Wave soldering



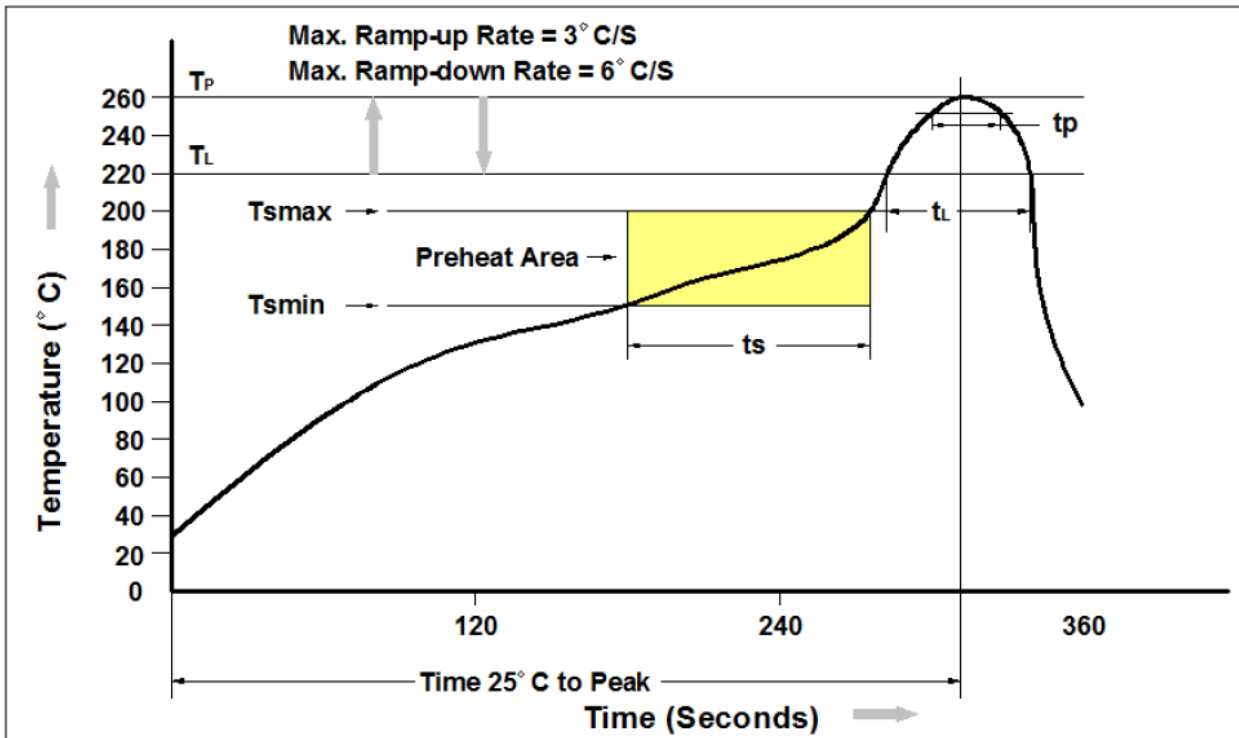
Temperature: 260 ± 5 °C

Time: 10 Sec

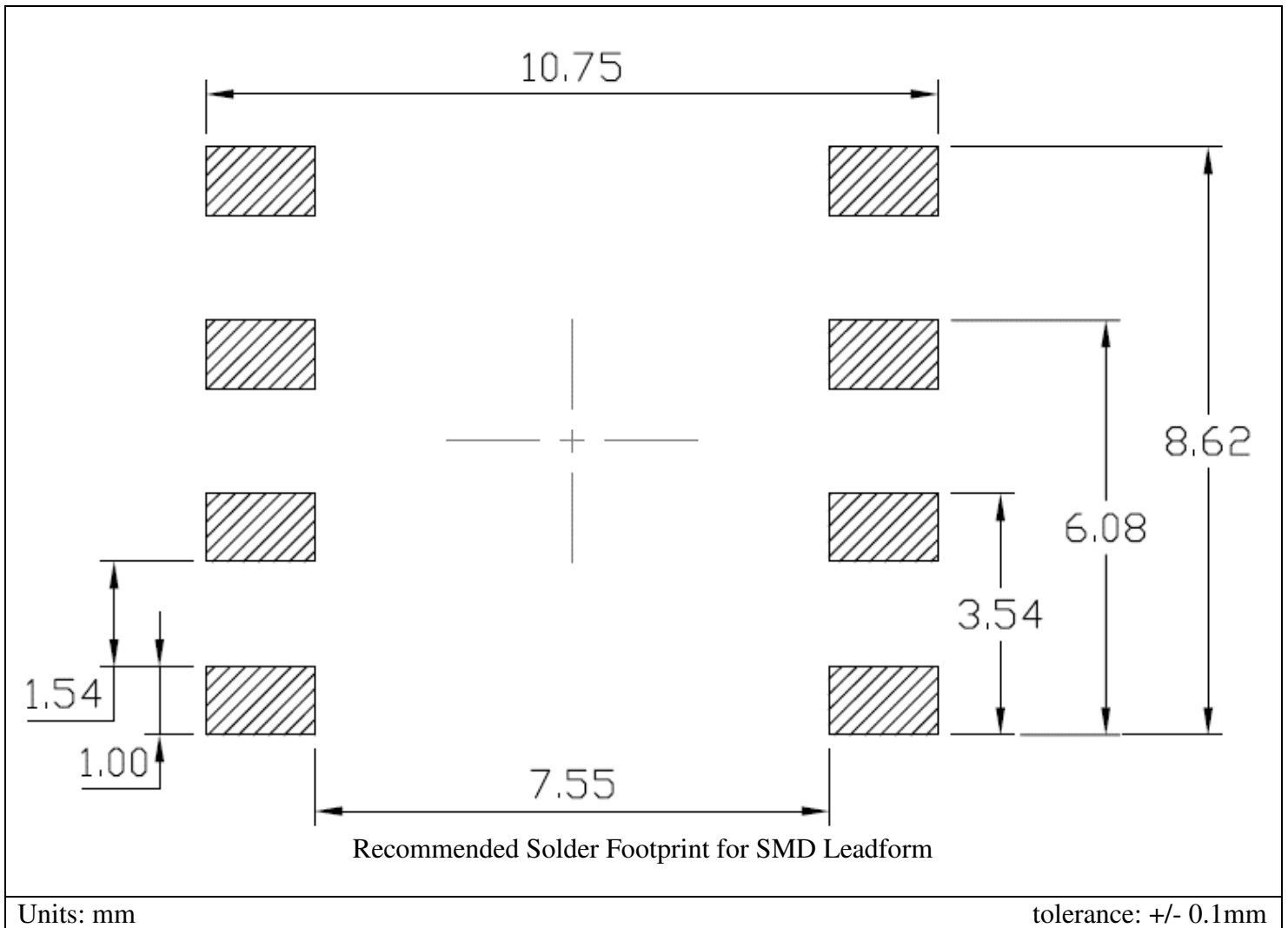
Preheat temperature: 25 to 140 °C

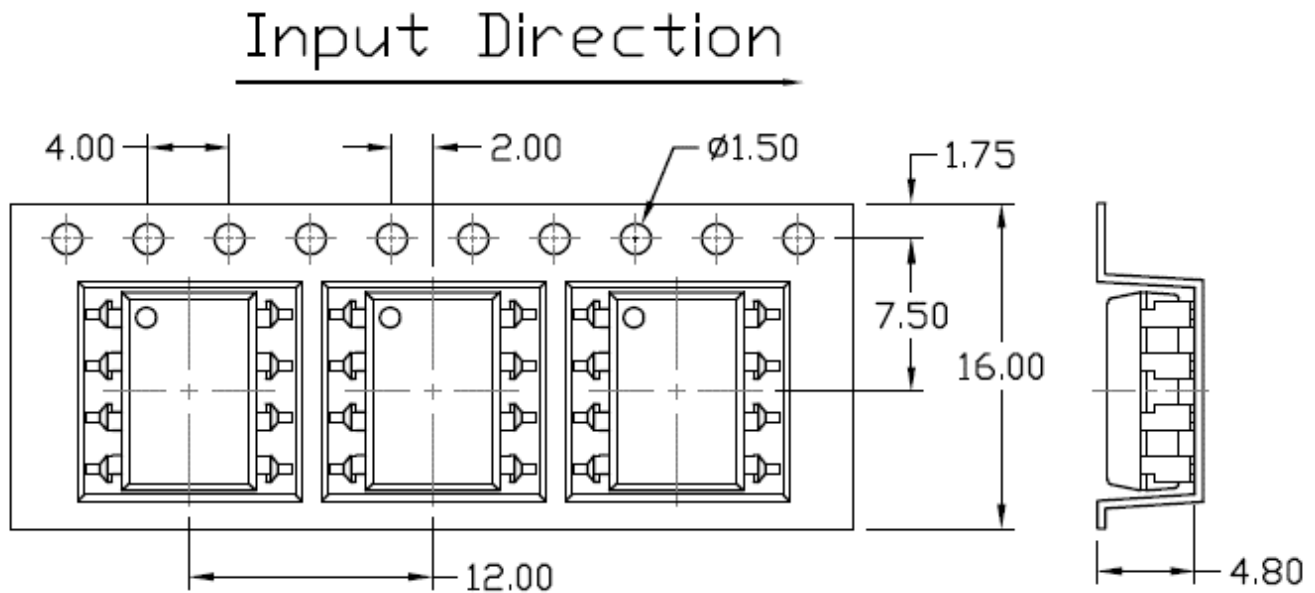
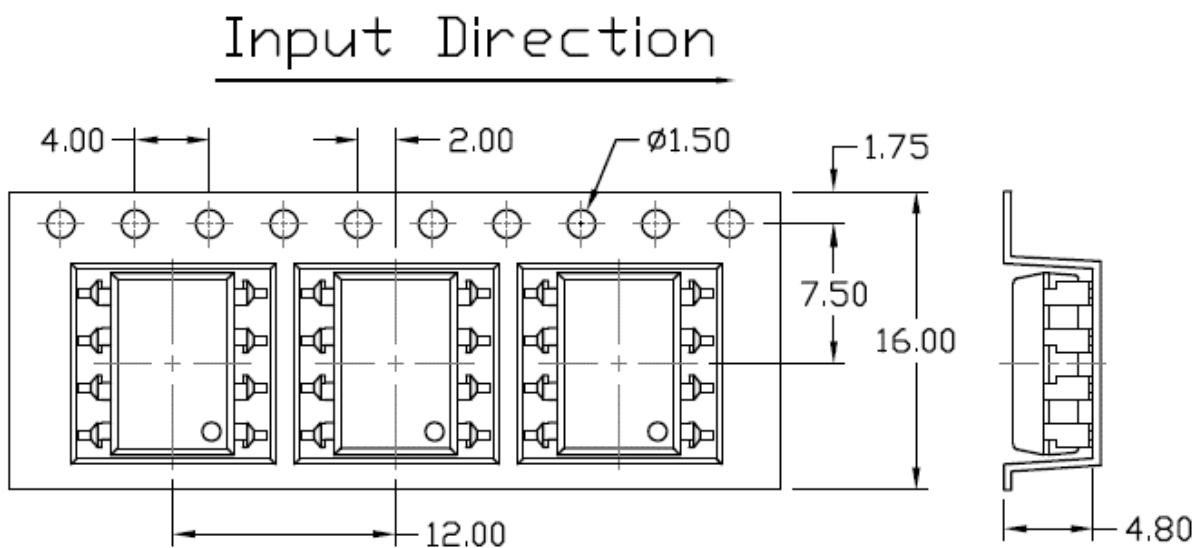
Preheat time: 30 to 80 sec.

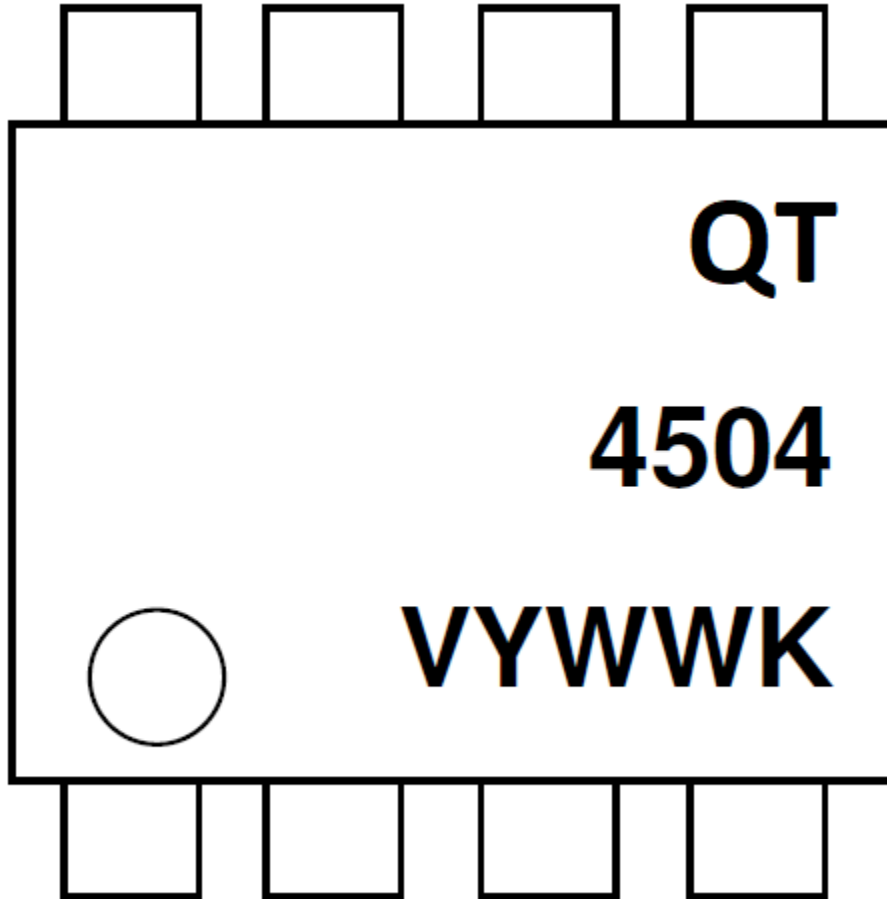
Reflow Soldering



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150°C
Temperature Max. (T _{smax})	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Ramp-up Rate (t _L to t _P)	3°C/second max.
Liquidous Temperature (T _L)	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds
Peak Body Package Temperature	260°C +0°C / -5°C
Time (t _P) within 5°C of 260°C	30 seconds
Ramp-down Rate (T _P to T _L)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.



Packing & Labeling**Tape Dimension:****Option S(T1) & SL(T1)****Option S(T2) & SL(T2)**

Device Marking

QT = QT-Brightek Corporation
4504 = part number
Y = Year
WW = Week
V = VDE Option
K = Manufacturing code

Product: QT4504	Date: February 01 , 2018	Page 17 of 19
	Version# 1.0	

Ordering Information

QT4504(V)(Y)(Z)

V = VDE option (V or None)

Y = Lead form option (S, SL, M or none)

Z=Tape and reel option (T1 or T2)

Option	Description	Quantity
None	Standard 8-Pin DIP	40 Units/Tube
M	Gullwing	40 Units/Tube
S(T1)	Surface Mount Lead Forming – with Option 1 Taping	1000 pcs/ reel
S(T2)	Surface Mount Lead Forming – with Option 2 Taping	1000 pcs/ reel
SL(T1)	SMD (Low Profile) Lead Forming – with Option 1 Taping	1000 pcs/ reel
SL(T2)	SMD (Low Profile) Lead Forming – with Option 2 Taping	1000 pcs/ reel

Revision History

Description:	Revision #	Revision Date
Initial release of QT4504	1.0	02/01/2018

Disclaimer

QT-BRIGHTTEK reserves the right to make changes without further notice to any products herein to improve reliability, function or design. QT-BRIGHTTEK does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights, nor the rights of others.

Life Support Policy

QT-BRIGHTTEK's products are not authorized for use as critical components in life support devices or systems without the express written approval of QT-BRIGHTTEK. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.