



9mm, 10MBit/s Logic Gate Optocoupler

Features

- High speed 10MBit/s
- High isolation voltage between input and output (Viso=5000 Vrms)
- Guaranteed performance from -40°C to 85°C
- Wide operating temperature range of -55°C to 100°C

Applications

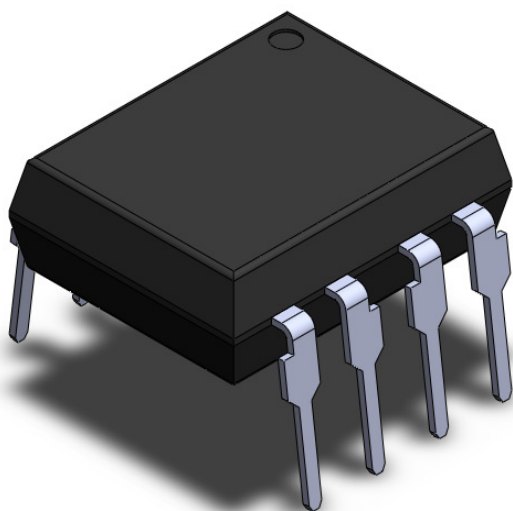
- Line receivers
- Telecommunication equipments
- Feedback loop in switch-mode power supplies
- Home appliances
- High speed logic ground isolation

Description

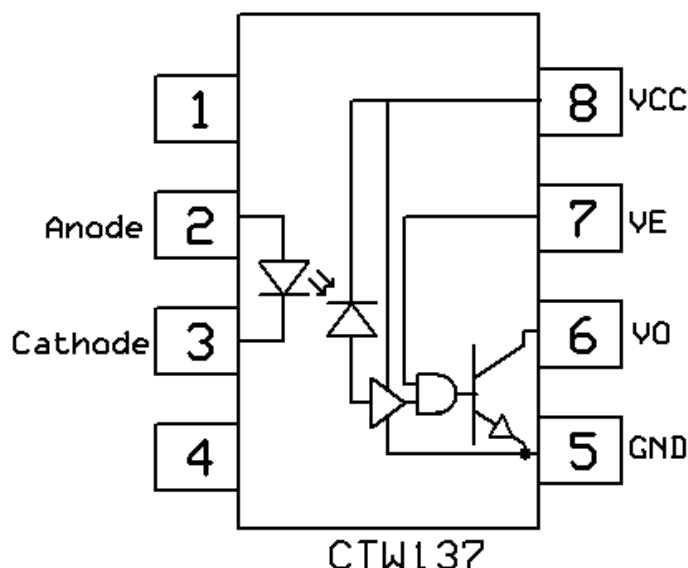
The CTW137 optocouplers consist of a 850 nm AlGaAS LED, optically coupled to a very high speed integrated photo-detector logic gate with a strobable output. This output features an open collector, there by permitting wired OR outputs. The switching parameters are guaranteed over the temperature range of -40°C to +85°C. A maximum input signal of 5mA will provide a minimum output sink current of 13mA (fan out of 8).

The device is packaged in an 8-pin DIP wide body and also available in surface mount option.

Package Outline



Schematic



Note: Different lead forming options available. See package dimension.

**Absolute Maximum Rating at 25°C**

Symbol	Parameters	Ratings	Units	Notes
V _{ISO}	Isolation voltage *1	5000	V _{RMS}	
T _{OPR}	Operating temperature	-55 ~ +100	°C	
T _{STG}	Storage temperature	-55 ~ +125	°C	
T _{SOL}	Soldering temperature *2	260	°C	
Emitter				
I _F	Forward current	50	mA	
I _{F(TRANS)}	Peak transient current (≤1μs P.W,300pps)	1	A	
V _R	Reverse voltage	5	V	
P _D	Power dissipation	100	mW	
Detector				
P _D	Power dissipation	85	mW	
I _O	Average Output current	50	mA	
V _O	Output voltage	7.0	V	
V _{CC}	Supply voltage	7.0	V	



Electrical Characteristics

$T_A = -40 - 85^\circ\text{C}$ (unless otherwise specified). Typical values are measured at $T_A = 25^\circ\text{C}$ and $V_{CC}=5\text{V}$

Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_F	Forward voltage	$I_F = 10\text{mA}$	-	1.45	1.6	V	
V_R	Reverse Voltage	$I_R = 10\mu\text{A}$	5.0	-	-	V	
$\Delta V_F/\Delta T_A$	Temperature coefficient of forward voltage	$I_F = 10\text{mA}$	-	-1.8	-	mV/ $^\circ\text{C}$	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
I_{CCL}	Logic Low Supply Current	$I_F=10\text{mA}$, $V_E=0.5\text{V}$, $V_{CC}=5.5\text{V}$	-	9.3	12.5	mA	
I_{CCH}	Logic High Supply Current	$I_F=0\text{mA}$, $V_E=0.5\text{V}$, $V_{CC}=5.5\text{V}$	-	7.5	11	mA	
V_{EH}	High Level Enable Voltage	$I_F=10\text{mA}$, $V_{CC}=5.5\text{V}$	2.0	-	-	V	
V_{EL}	Low Level Enable Voltage	$I_F=10\text{mA}$, $V_{CC}=5.5\text{V}$	-	-	0.8	V	
I_{EH}	High Level Enable Current	$V_E=0.5\text{V}$, $V_{CC}=5.5\text{V}$	-	-0.58	-1.62	mA	
I_{EL}	Low Level Enable Current	$V_E=2.0\text{V}$, $V_{CC}=5.5\text{V}$	-	-0.82	-1.62	mA	

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
I_{FT}	Input Threshold Current	$V_{CC}=5.5\text{V}$, $V_O=0.6\text{V}$, $V_E=2.0\text{V}$, $I_O=13\text{mA}$	-	2.7	5	mA	
I_{OH}	Logic High Output Current	$I_F=250\mu\text{A}$, $V_O=V_{CC}=5.5\text{V}$, $V_E=2.0\text{V}$	-	2.0	100	μA	
V_{OL}	Low Level Output Voltage	$I_F=5\text{mA}$, $V_{CC}=5.5\text{V}$, $V_E=2.0\text{V}$, $I_O=13\text{mA}$	-	0.35	0.6	V	



Electrical Characteristics

$T_A = -40 - 85^\circ\text{C}$ (unless otherwise specified). Typical values are measured at $T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{V}$ and $I_F = 7.5\text{mA}$

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
T_{PHL}	Output Propagation Delay High To Low	$C_L = 15\text{pF}$, $R_L = 350\Omega$	-	34	75	ns	
T_{PLH}	Output Propagation Delay Low to High		-	39	75	ns	
P_{WD}	Pulse Width Distortion		-	5	34	ns	
T_r	Output Rise Time		-	37	-	ns	
T_f	Output Fall Time		-	10	-	ns	
T_{ELH}	Enable Propagation Delay Low To High	$V_{EH} = 3.5\text{V}$, $C_L = 15\text{pF}$, $R_L = 350\Omega$	-	15	-	ns	
T_{EHL}	Enable Propagation Delay High To Low		-	15	-	ns	
CM_H	Common Mode Transient Immunity at Logic High	$I_F = 0\text{mA}$, $V_{CM} = 50\text{Vp-p}$, $V_{OH} = 2.0\text{V}$, $R_L = 350\Omega$	5000	-	-	$\text{V}/\mu\text{s}$	
CM_L	Common Mode Transient Immunity at Logic Low	$I_F = 7.5\text{mA}$, $V_{CM} = 50\text{Vp-p}$, $V_{OL} = 0.8\text{V}$, $R_L = 350\Omega$	5000	-	-	$\text{V}/\mu\text{s}$	



Typical Characteristic Curves

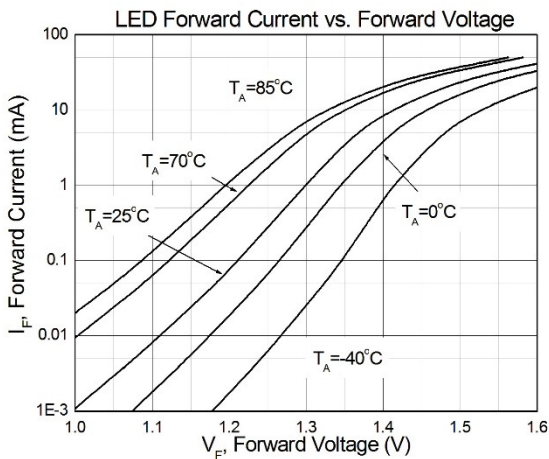


Figure 1

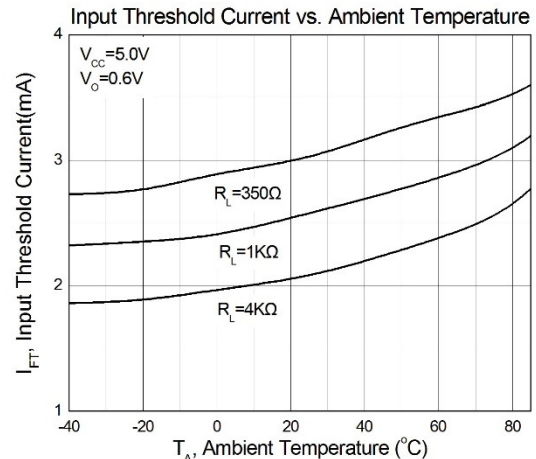


Figure 2

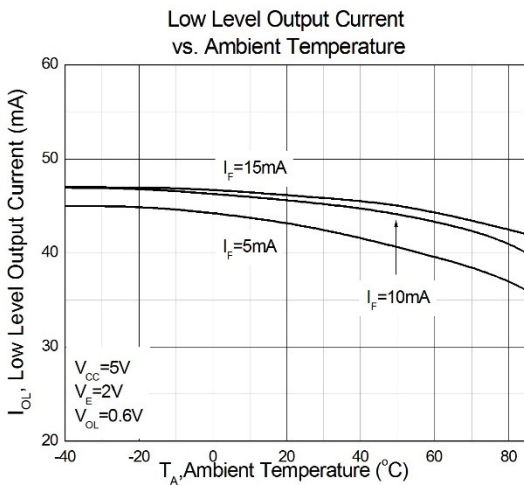


Figure 3

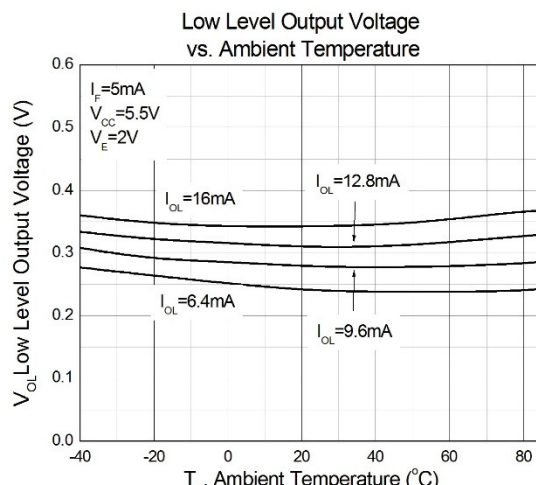


Figure 4

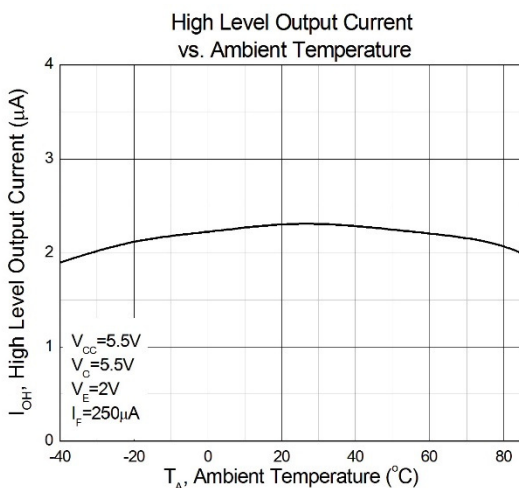


Figure 5

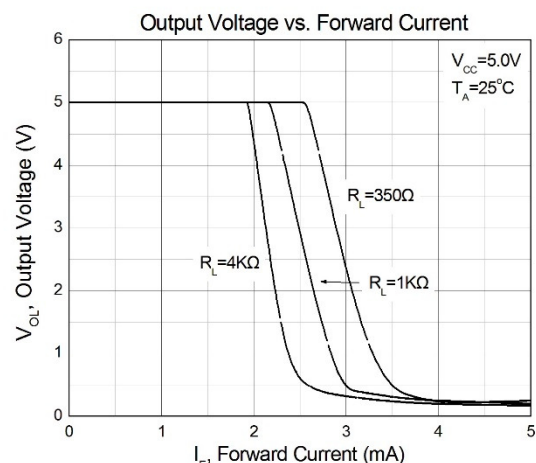


Figure 6

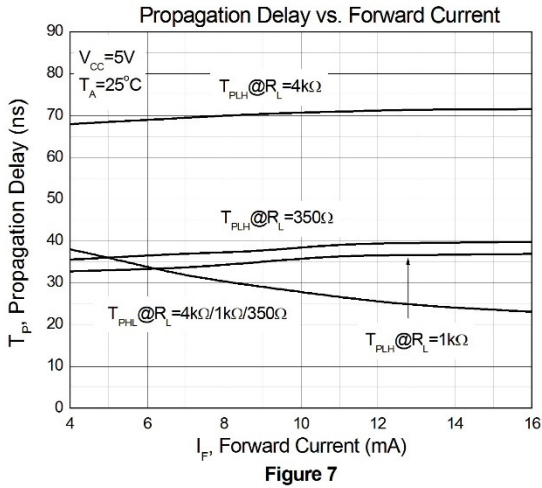


Figure 7

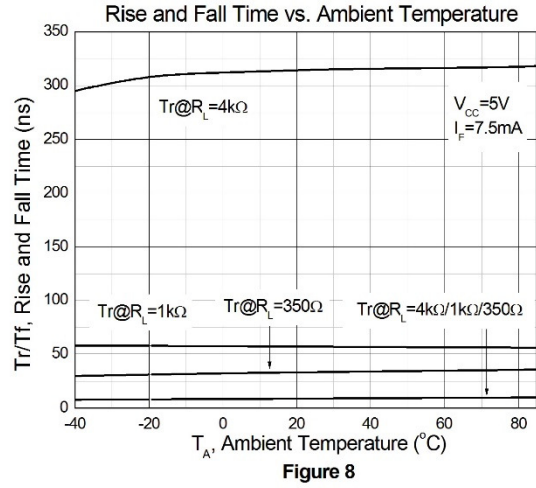


Figure 8

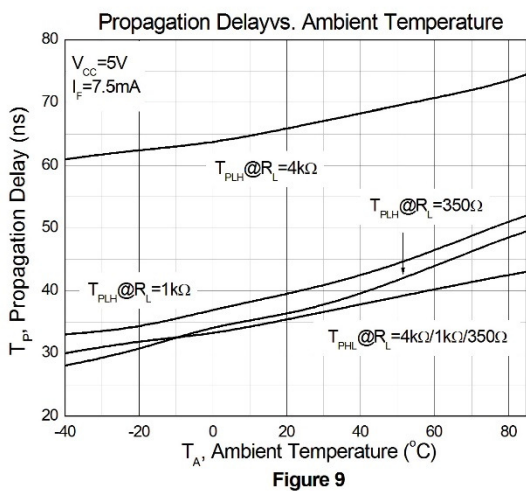


Figure 9

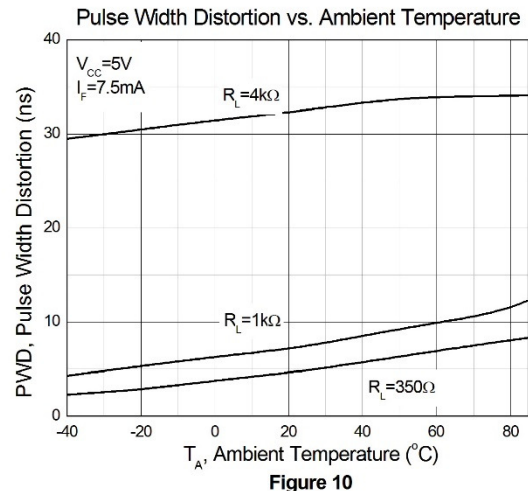


Figure 10

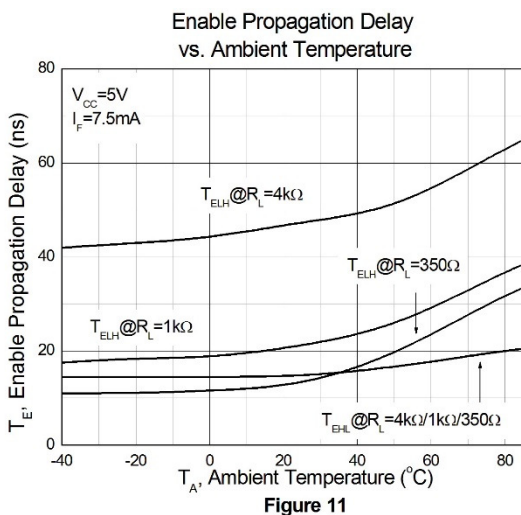
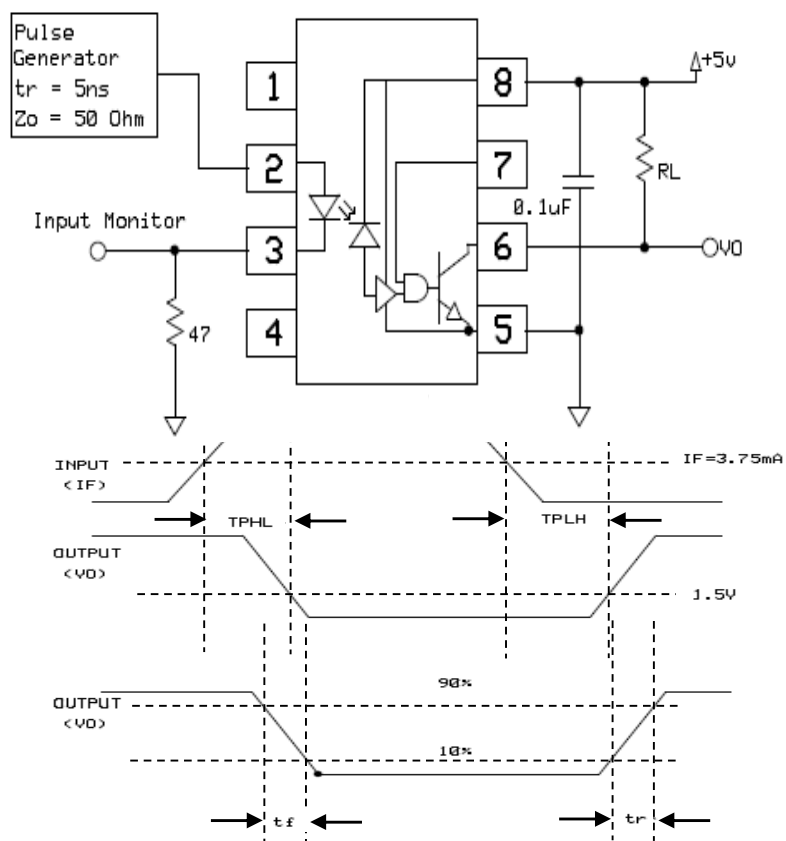


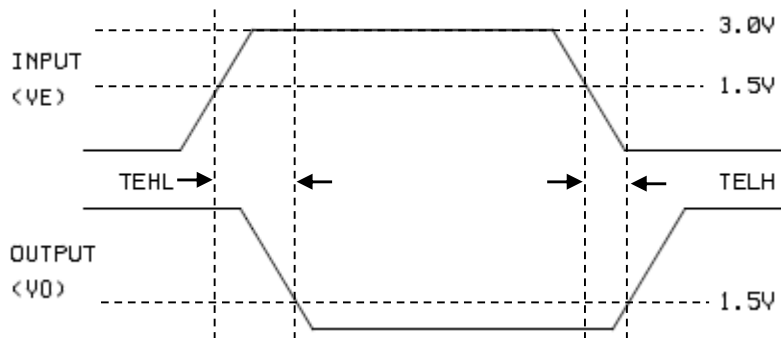
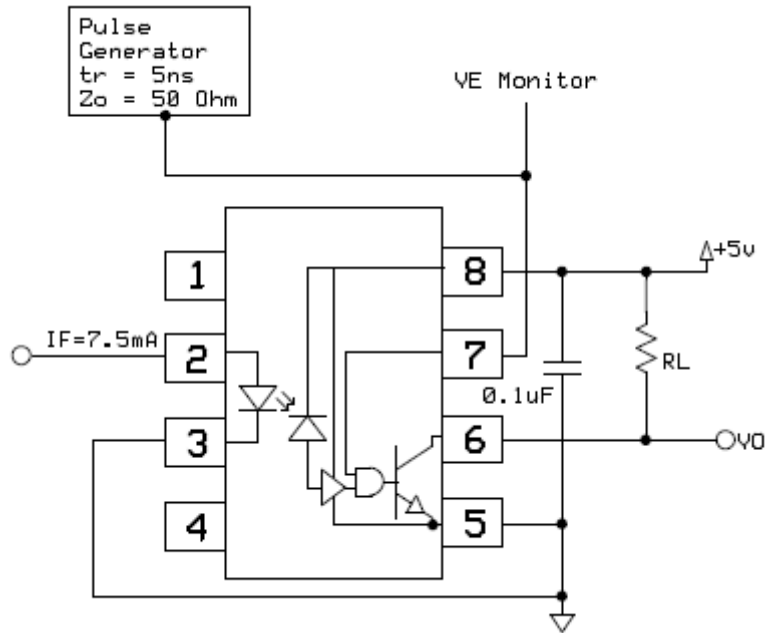
Figure 11



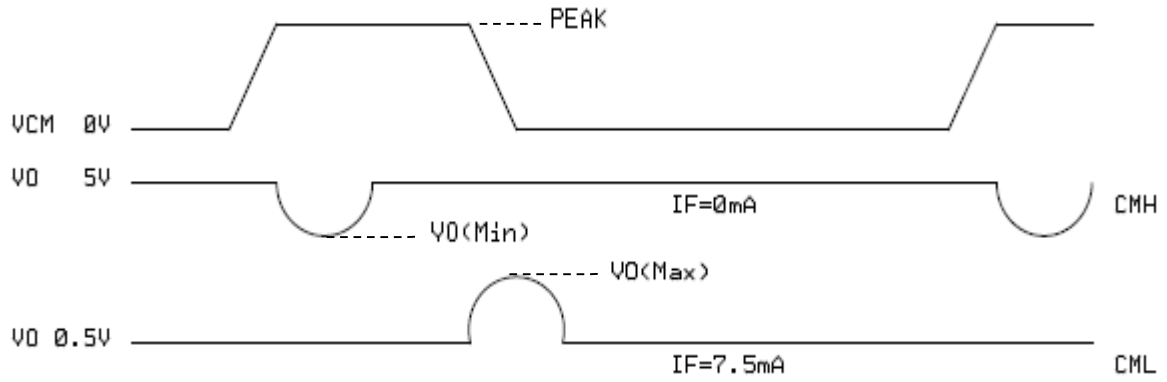
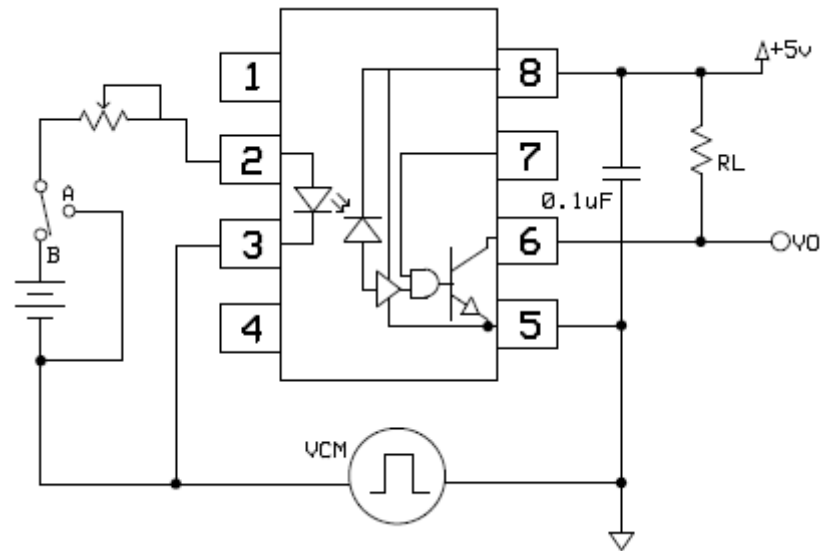
Test Circuits



Switching Time Test Circuit



Enable Switching Time Test Circuit

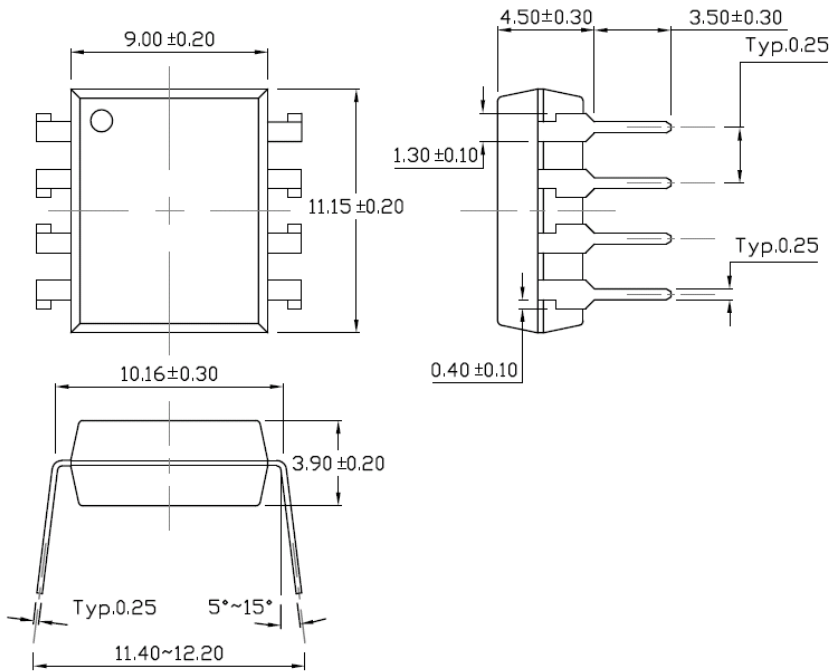


CMR Test Circuit

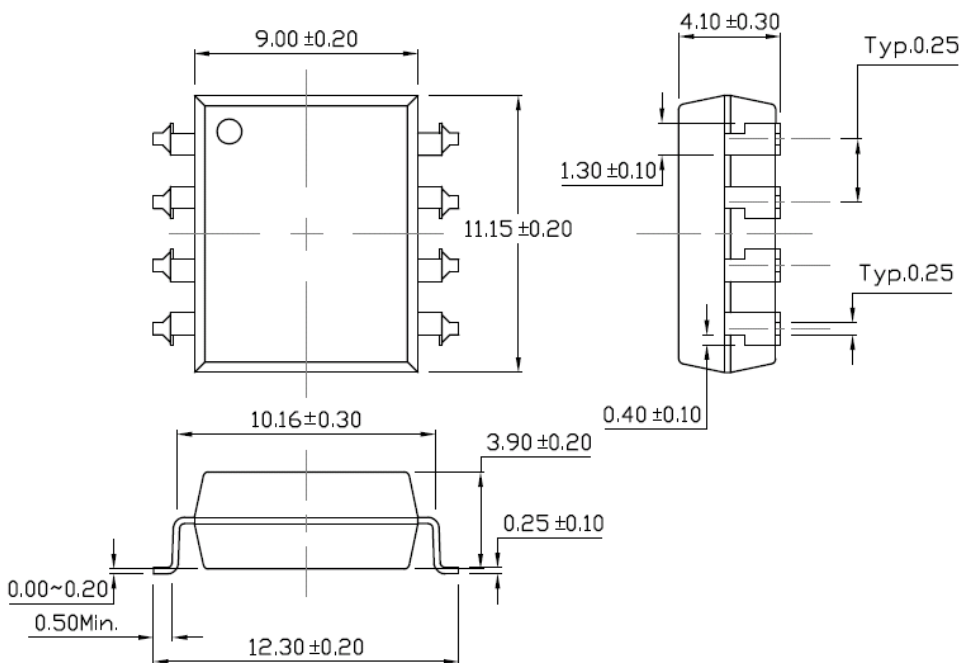


Package Dimension *Dimensions in mm unless otherwise stated*

Standard Wide Body DIP – Through Hole

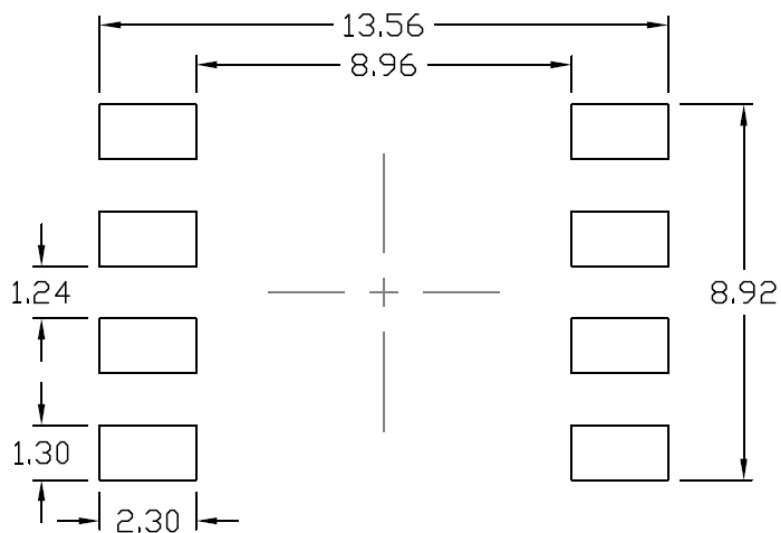


Surface Mount Lead Forming

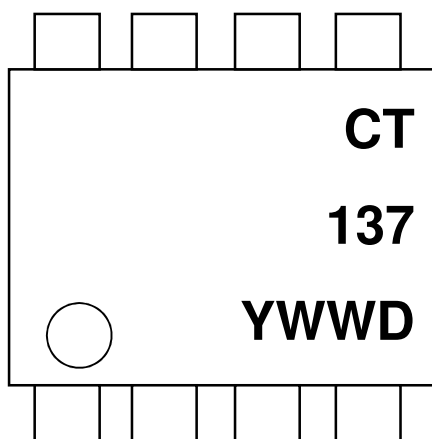




Recommended Solder Mask *Dimensions in mm unless otherwise stated*



Device Marking



Note:

- CT : Denotes "CT Micro"
- 137 : Product Number
- Y : Fiscal Year
- WW : Work Week
- D : Production Code



Ordering Information

CTW137(Y)(Z)

Y = Lead form option (S or none)

Z = Tape and reel option (T1, T2 or none)

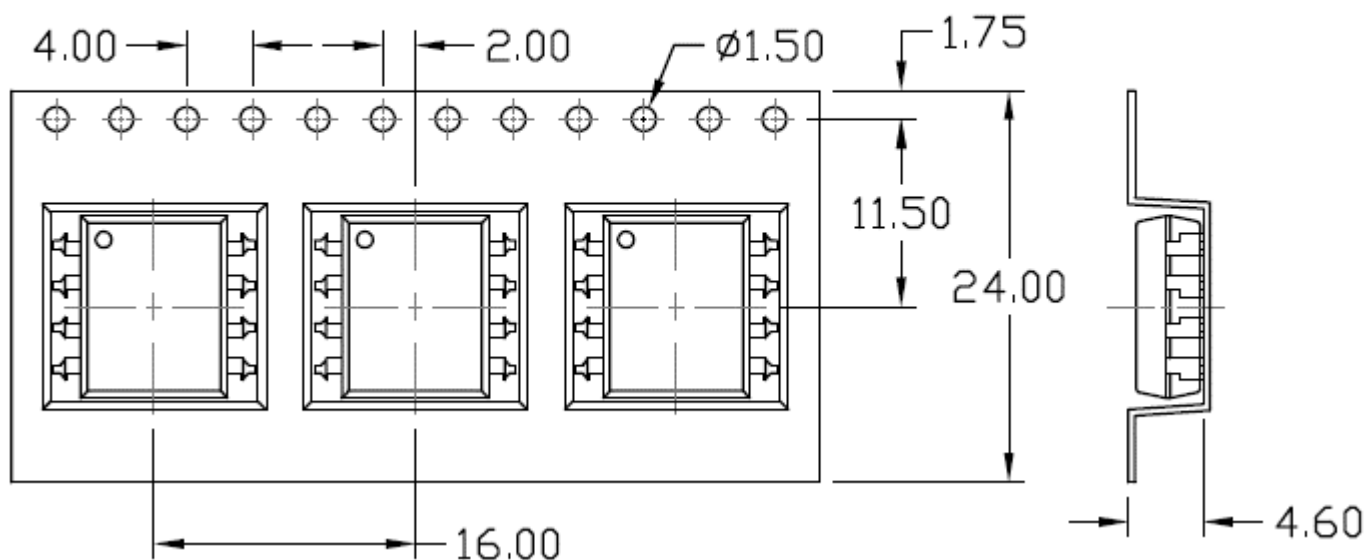
<i>Option</i>	<i>Description</i>	<i>Quantity</i>
None	Standard Wide Body 8 Pin Dip	45 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel



Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

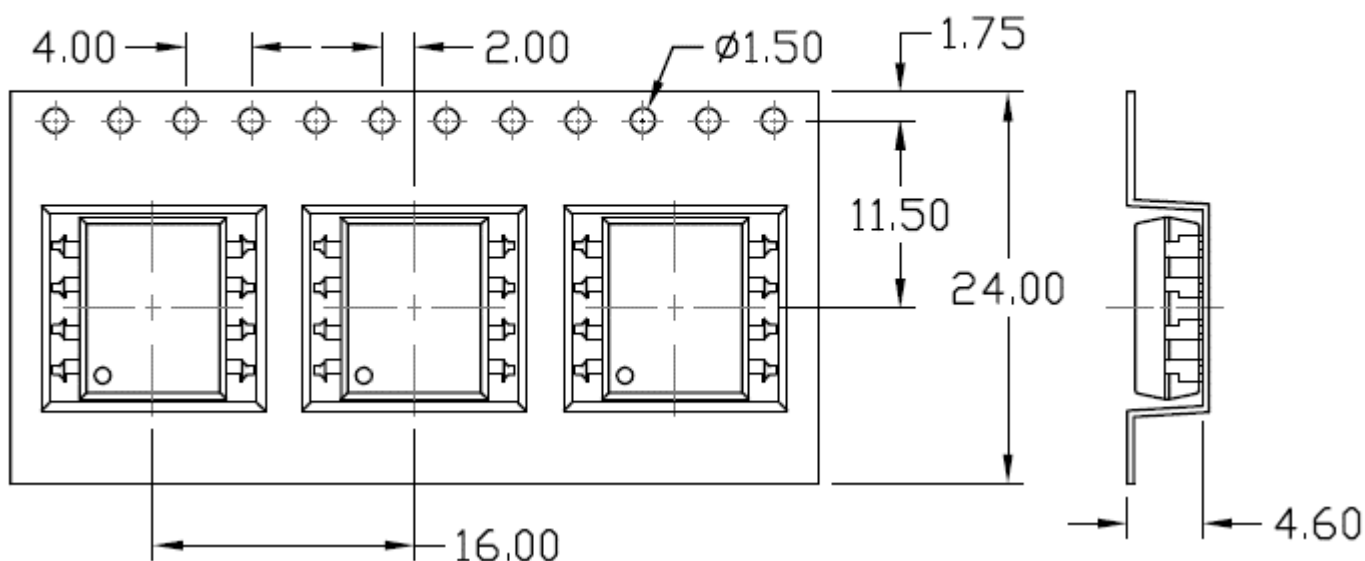
Option S(T1)

Input Direction



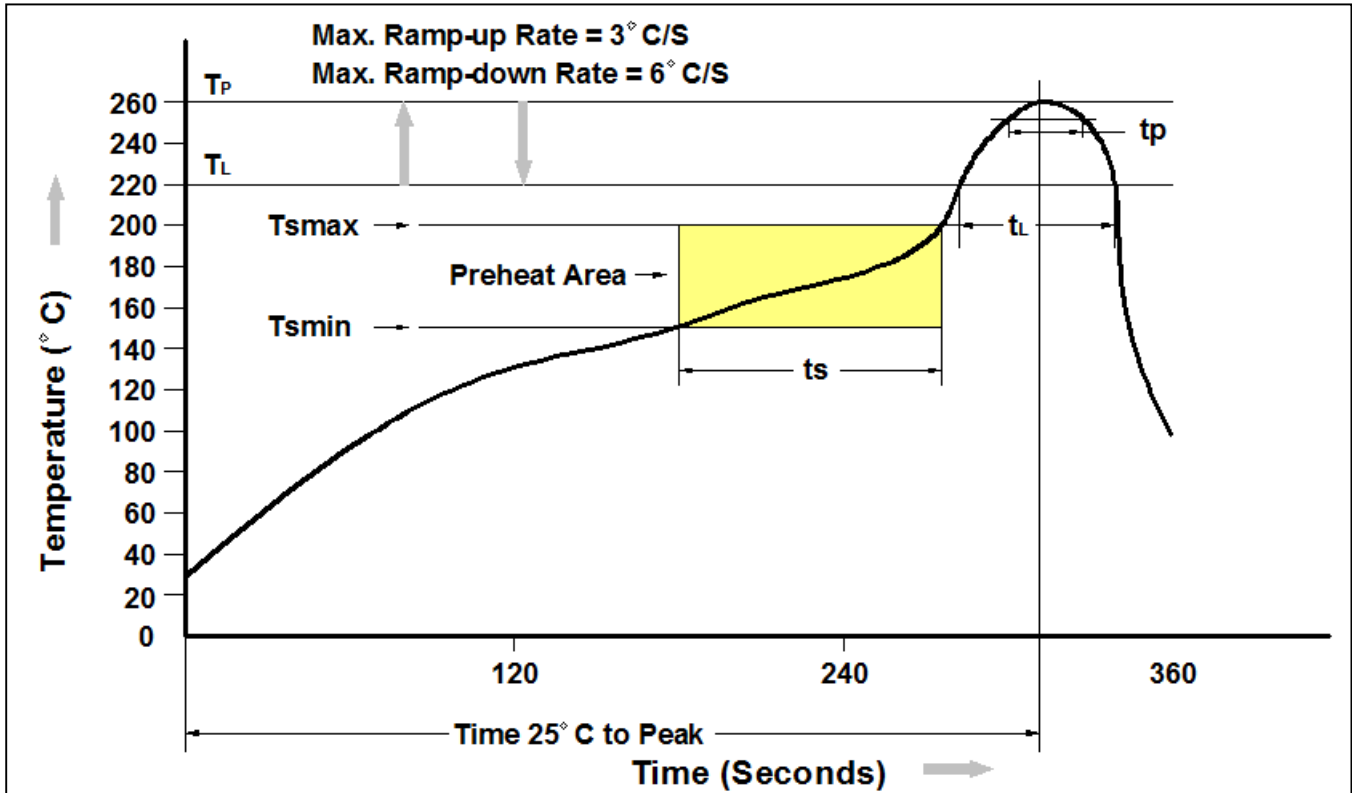
Option S(T2)

Input Direction





Reflow Profile



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.

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