



2.5A MOSFET/IGBT Gate Driver Optocoupler

Features

- Peak Output Current : IOP = ±2.5A (max)
- Threshold Input Current: IFLH = 5 mA (max)
- Common mode transient immunity : ±20kV/μs (min)
- Under voltage lock out (UVLO) protection with hysteresis
- Pb free and RoHS compliant.

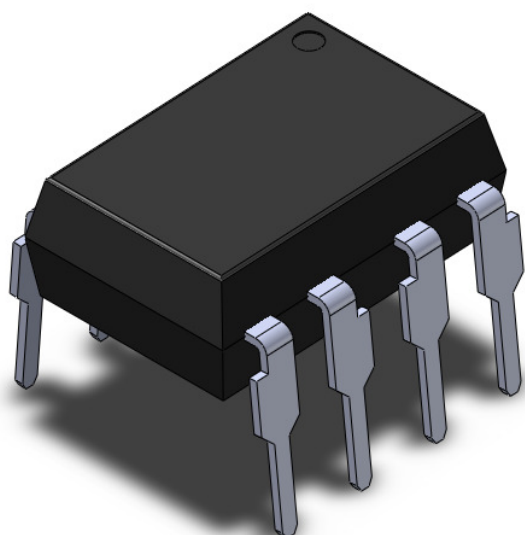
Applications

- Isolated IGBT/Power MOSFET gate drive
- Industrial Inverter
- AC brushless and DC motor drives
- Induction Heating

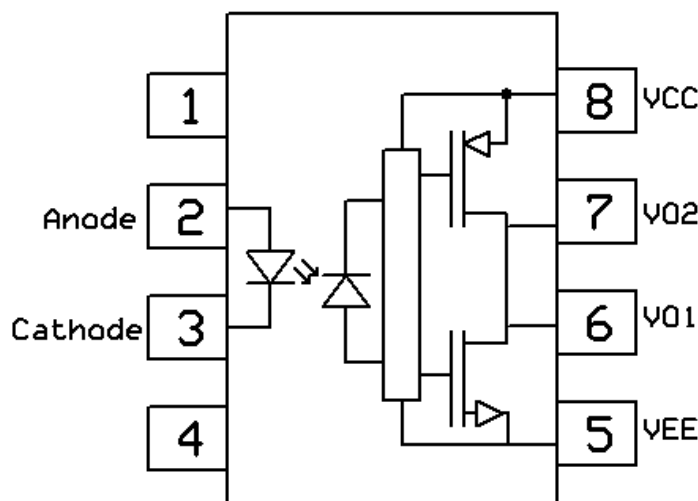
Description

The CT350 consists of a GaAsP LED optically coupled to an integrated circuit with a power output stage. This optocoupler is ideally suited for driving power IGBTs and MOSFETs used in motor control inverter applications. The high operating voltage range of the output stage provides the drive voltages required by gate controlled devices.

Package Outline



Schematic



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



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Truth Table

LED	V _{CC} -V _{EE} Positive Going	V _{CC} -V _{EE} Negative Going	Output
Off	0 to 30 V	0 to 30V	Low
On	0 to 11.5V	0 to 10V	Low
On	11.5 to 13.5V	10 to 12V	Transition
On	13.5 to 30V	12 to 30V	High

Absolute Maximum Rating at 25°C

Symbol	Parameters	Ratings	Units	Notes
V _{ISO}	Isolation voltage	3750	V _{RMS}	1
T _{OPR}	Operating temperature	-40 ~ +100	°C	
T _{STG}	Storage temperature	-55 ~ +125	°C	
T _{SOL}	Soldering temperature	260	°C	2
P _T	Total Power Dissipation	300	mW	
f _{OPR}	Operating Frequency	50	kHz	3
Emitter				
I _F	Forward current	25	mA	
I _{FP}	Peak forward current (50% duty, 1ms P.W)	1	A	
V _R	Reverse voltage	5	V	
Detector				
P _D	Power dissipation	250	mW	
V _{O(PEAK)}	Peak Output Voltage	35	V	
I _{OPH}	Output High Peak Current	-2.5	A	4
I _{OPL}	Output Low Peak Current	2.5	A	4
V _{CC}	Supply voltage	0 to 35	V	

Notes

1. AC for 1 minute, RH = 40 ~ 60%.
2. For 10 second peak
3. Exponential Waveform, I_{O(PEAK)} ≤ |2.5A|, Pulse Width ≤ 0.3us
4. Pulse Width = 10uS, DC = 1.0%



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Electrical Characteristics

Typical values are measured at $T_A = -40^{\circ}\text{C}$ to 100°C (unless otherwise stated)

Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_F	Forward voltage	$I_F = 10\text{mA}$	--	1.45	1.8	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	$I_F = 0\text{mA}$, $V_O = \text{Open}$	--	1.5	2.0	mA	
I_{CCH}	Logic High Supply Current	$I_F = 10\text{mA}$, $V_O = \text{Open}$	--	1.7	2.2	mA	

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_{OH}	High Level Output Voltage	$I_F = 5\text{mA}$, $V_{CC1} = +15\text{V}$, $V_{EE1} = -15\text{V}$, $R_L = 200\ \Omega$	11.0	13.7	--	V	
V_{OL}	Low Level Output Voltage	$V_F = 0.8\text{V}$, $V_{CC1} = +15\text{V}$, $V_{EE1} = -15\text{V}$, $R_L = 200\ \Omega$	--	-14.9	-12.5	V	
I_{OPH}	High Level Output Current	$I_F = 5\text{mA}$, $V_{CC} = 30\text{V}$ $V_{8-6} = -3.5\text{V}$	--	-1.6	-1.0	A	
		$I_F = 5\text{mA}$, $V_{CC} = 15\text{V}$ $V_{8-6} = -7.0\text{V}$	--	--	-2.0		
I_{OPL}	Low Level Output Current	$I_F = 0\text{mA}$, $V_{CC} = 30\text{V}$ $V_{6-5} = 2.5\text{V}$	1.0	1.6	--	A	
		$I_F = 0\text{mA}$, $V_{CC} = 15\text{V}$ $V_{6-5} = 7\text{V}$	2.0	--	--		
I_{FHL}	Input Threshold Current	$V_{CC} = 15\text{V}$, $I_O = 0\text{mA}$, $V_O > 1\text{V}$	--	1.8	5.0	mA	
V_{FHL}	Input Threshold Voltage	$V_{CC} = 15\text{V}$, $I_O = 0\text{mA}$, $V_O < 1\text{V}$	0.8	--	--	V	
V_{UVLO+}	Under Voltage Lockout Threshold	$I_F = 5\text{mA}$, $V_O > 2.5\text{V}$	11.0	12.5	13.5	V	
V_{UVLO-}		$I_F = 5\text{mA}$, $V_O < 2.5\text{V}$	9.5	11.0	12.2		



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Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes	
T_{PHL}	High to Low Propagation Delay	$I_F = 5\text{mA}$, $C_g = 10\text{nF}$, $R_L = 20\Omega$, $f = 10\text{kHz}$, Duty = 50%, $T_A = 25\text{ }^\circ\text{C}$	50	170	500	ns		
T_{PLH}	Low to High Propagation Delay		50	180	500	ns		
P_{WD}	Pulse Width Distortion		--	10	100	ns		
t_{PSK}	Propagation Delay Skew		--	--	40	ns		
t_r	Rise Time		--	15	--	ns		
t_f	Fall Time		--	8	--	ns		
$t_{UVLO(ON)}$	UVLO Turn On Delay	$I_F = 5\text{mA}$, $V_O > 5\text{V}$	--	2.5	--	μs		
$t_{UVLO(OFF)}$	UVLO Turn Off Delay	$I_F = 5\text{mA}$, $V_O < 5\text{V}$	--	0.4	--	μs		
$ CM_H $	Common Mode Transient High	$V_{CC} = 30\text{V}$, $R_L = 350\Omega$, $T_A = 25\text{ }^\circ\text{C}$, $V_{CM} = 1\text{kV}$	$I_F = 5\text{mA}$	-15	--	--	$\text{kV}/\mu\text{s}$	
$ CM_L $	Common Mode Transient Low		$I_F = 0\text{mA}$	15	--	--	$\text{kV}/\mu\text{s}$	



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Typical Characteristic Curves

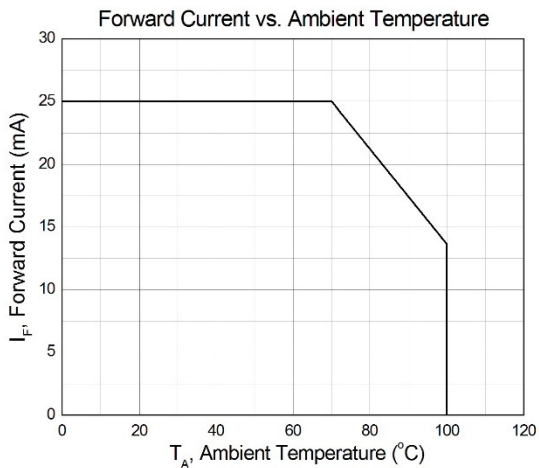


Figure 1

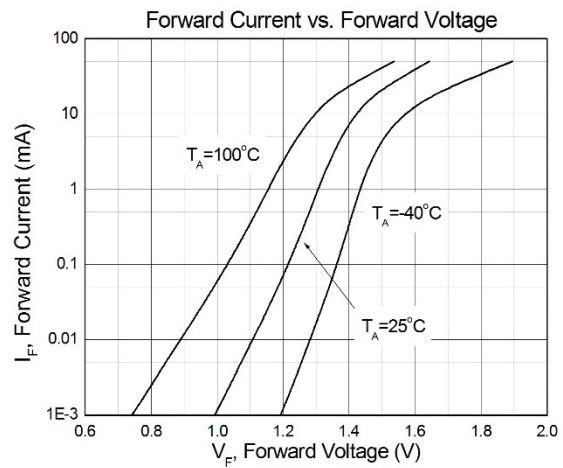


Figure 2

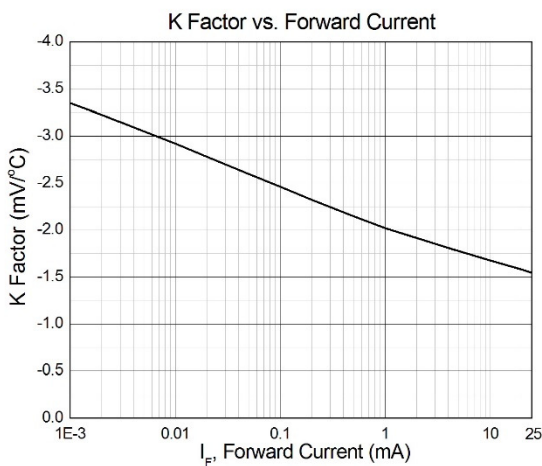


Figure 3

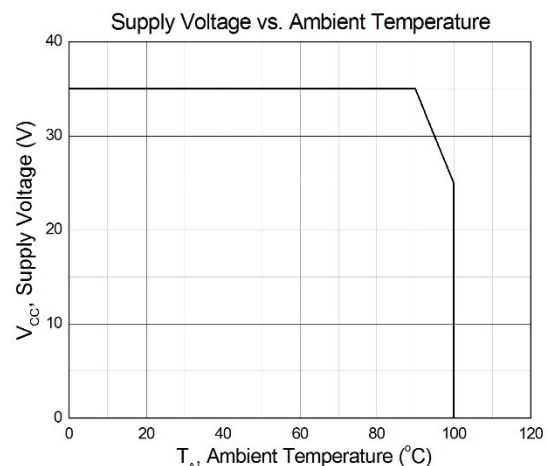


Figure 4

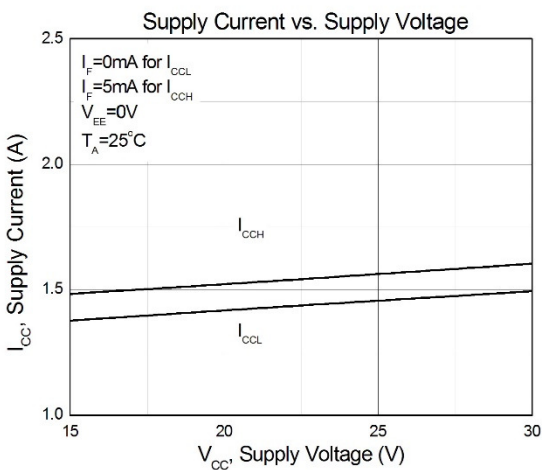


Figure 5

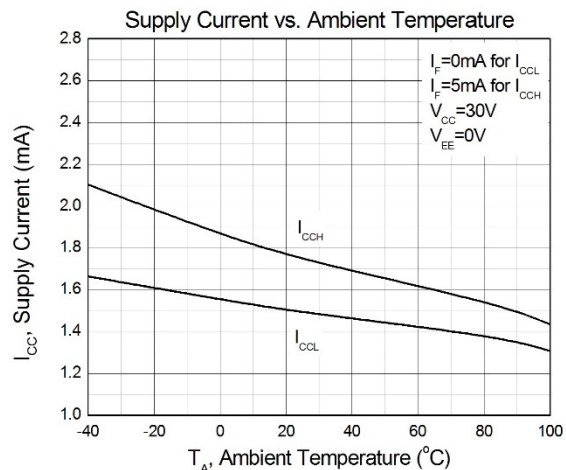


Figure 6



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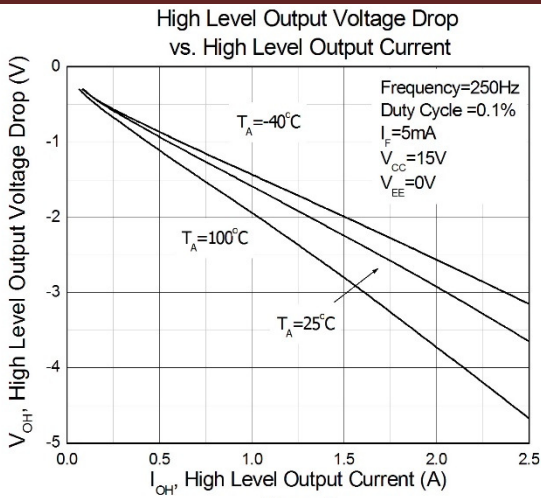


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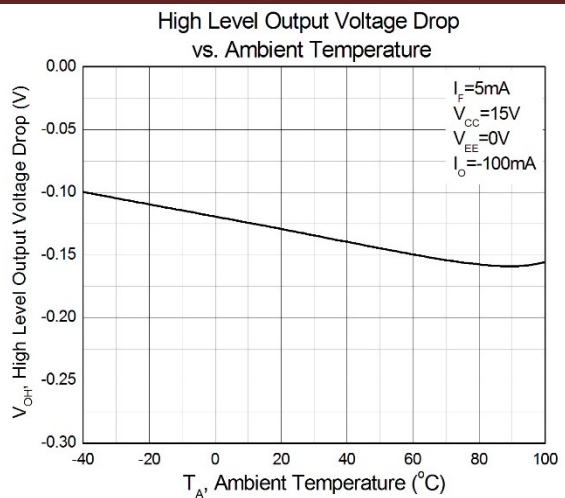


Figure 8

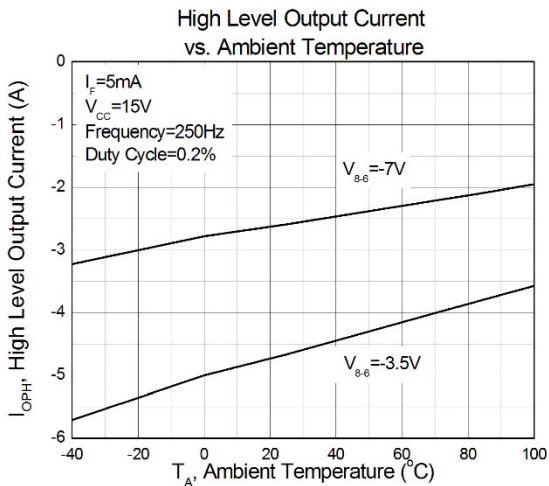


Figure 9

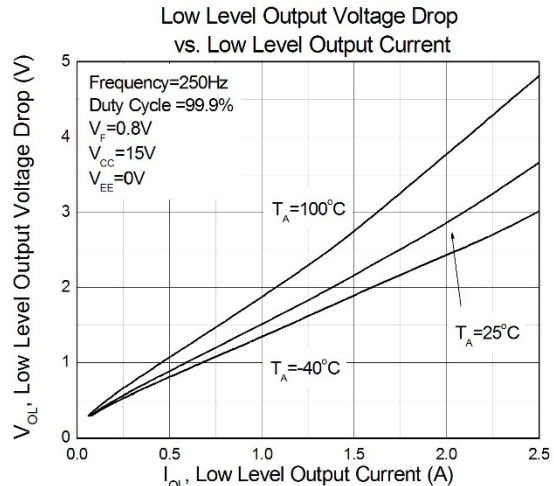


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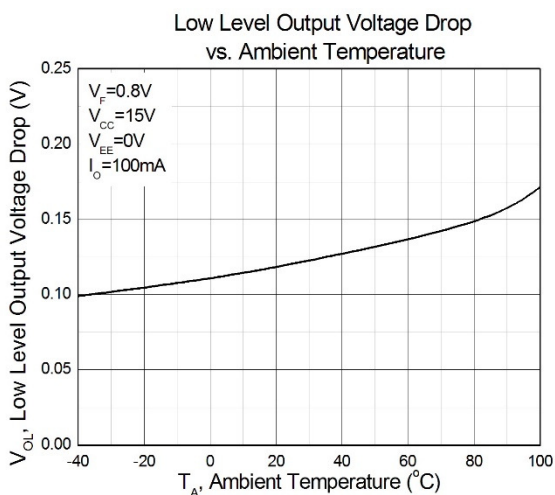


Figure 11

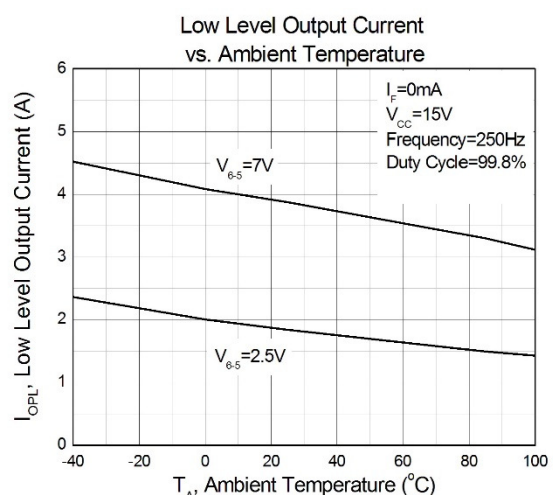


Figure 12



2.5A MOSFET/IGBT Gate Driver Optocoupler

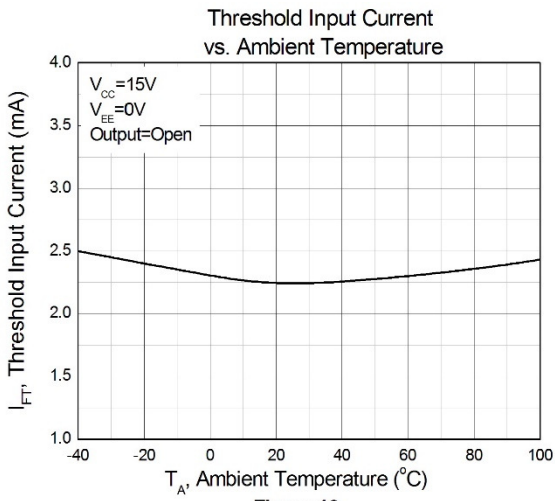


Figure 13

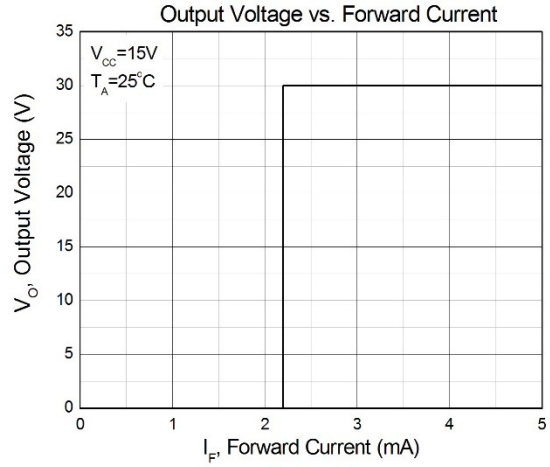


Figure 14

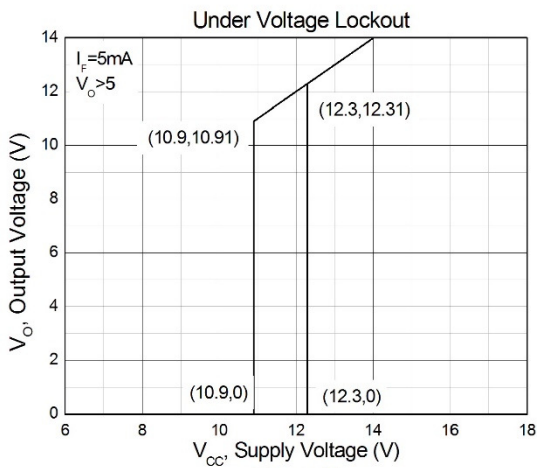


Figure 15

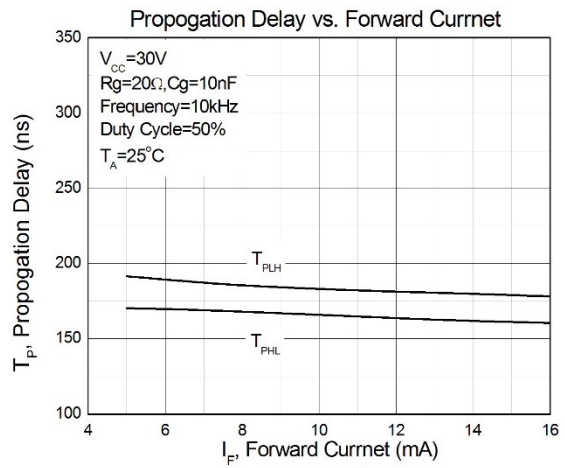


Figure 16

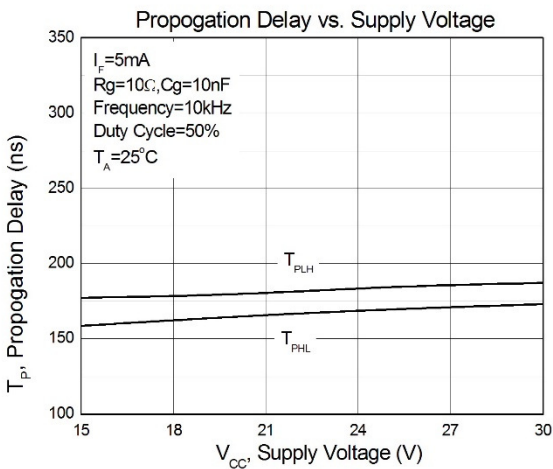


Figure 17

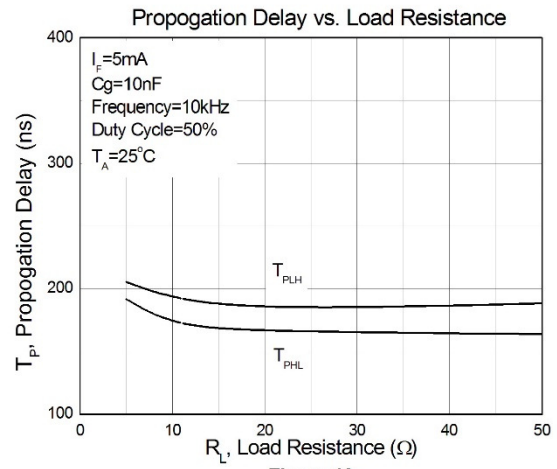


Figure 18



2.5A MOSFET/IGBT Gate Driver Optocoupler

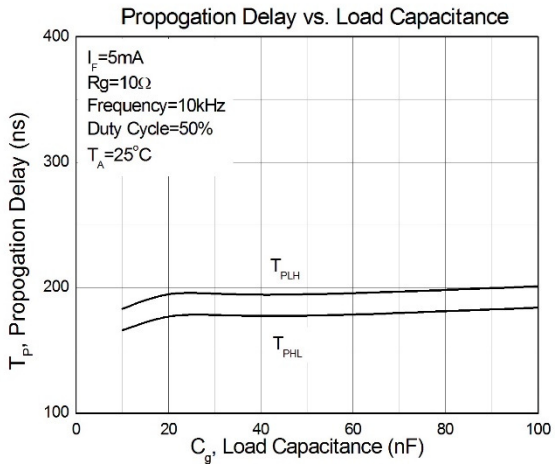


Figure 19

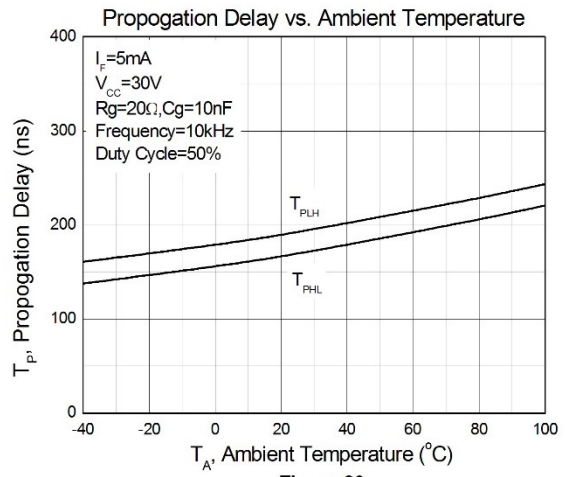


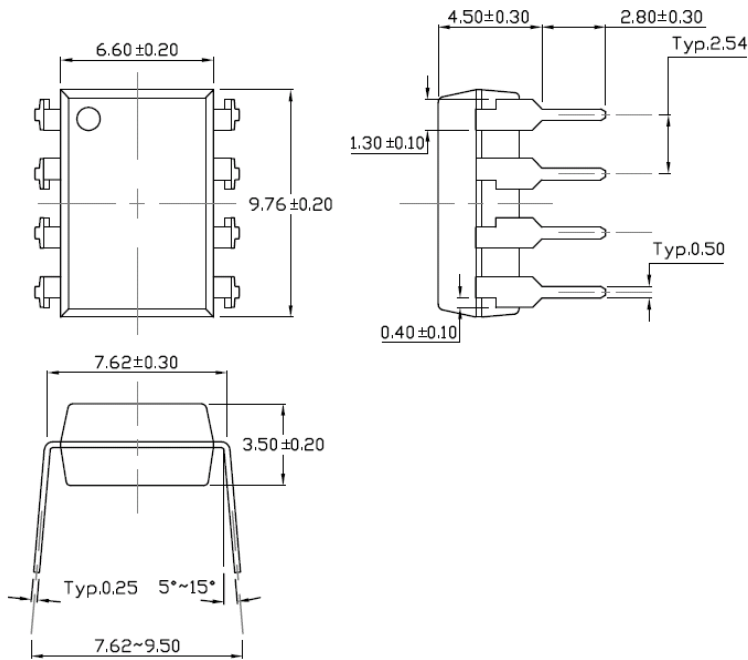
Figure 20



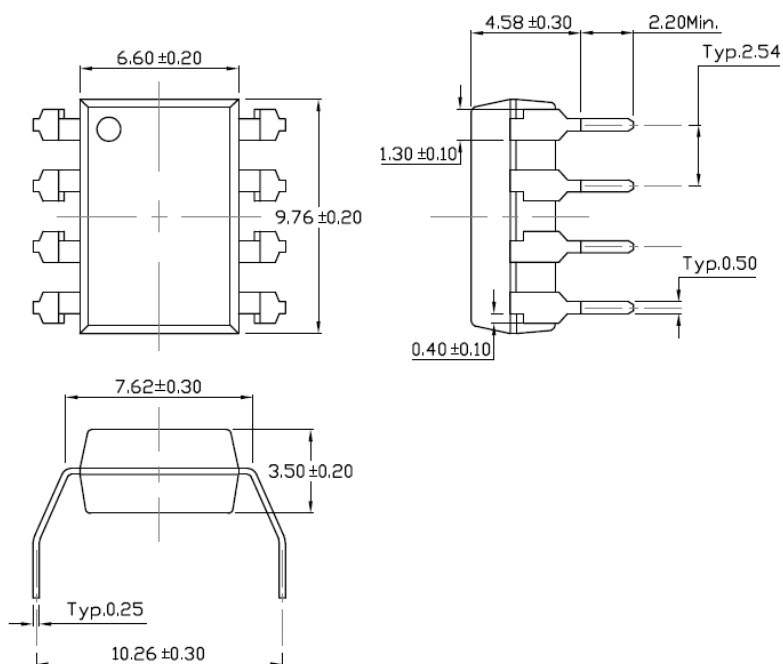
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Package Dimension *Dimensions in mm unless otherwise stated*

Standard DIP – Through Hole



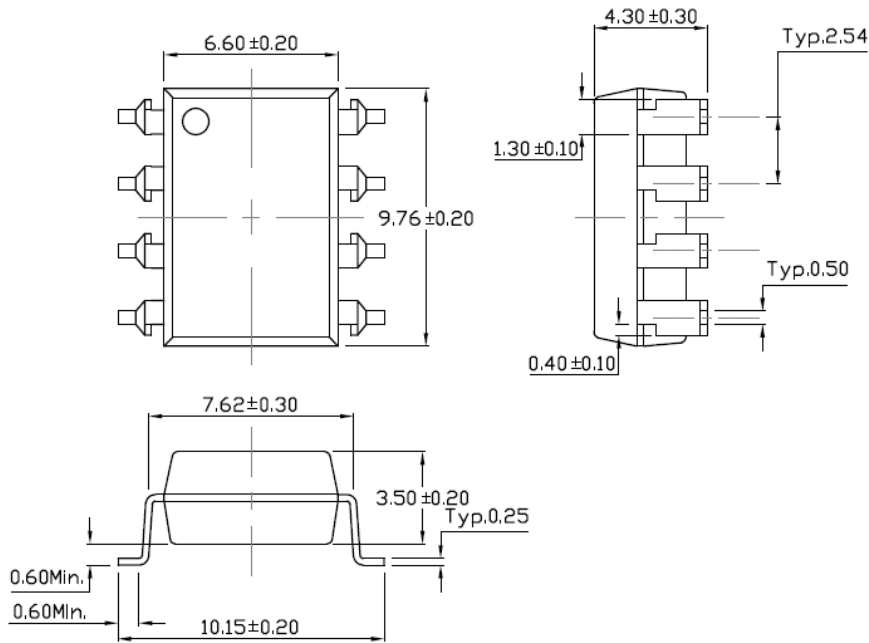
Gullwing (400mil) Lead Forming – Through Hole



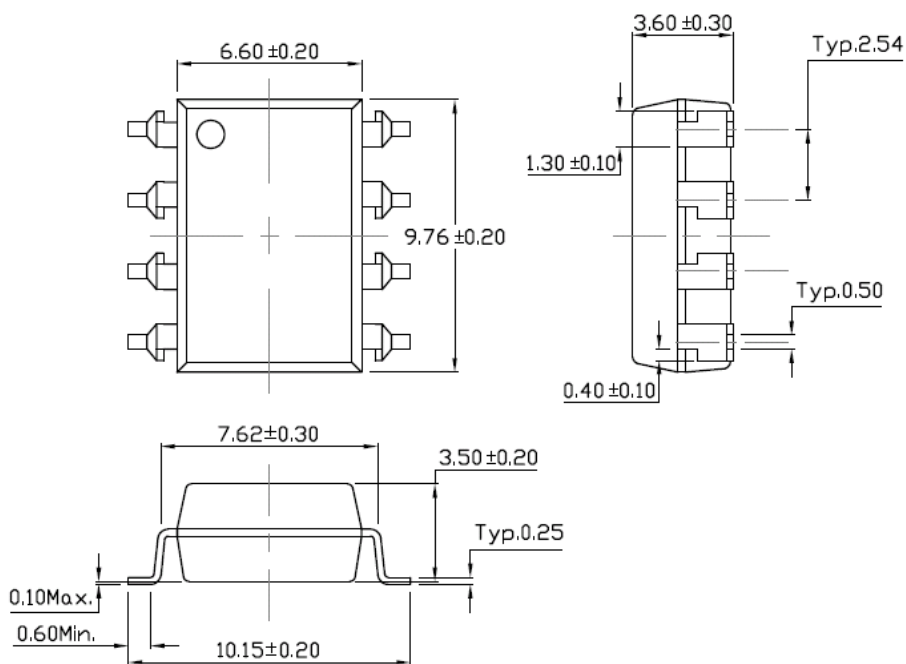


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Surface Mount Lead Forming



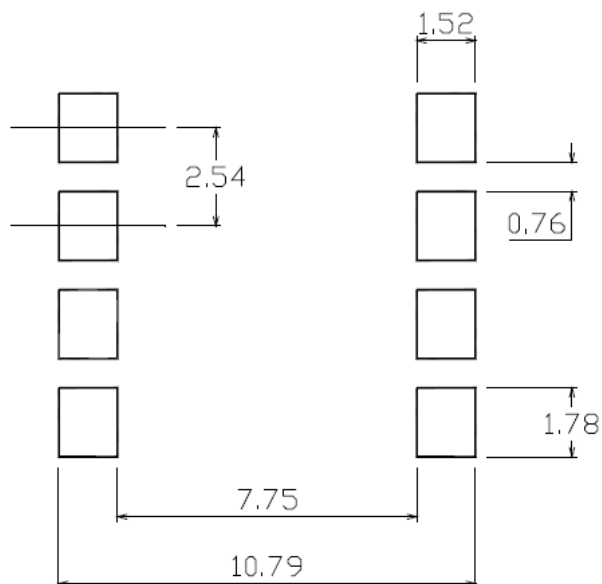
Surface Mount (Low Profile) Lead Forming



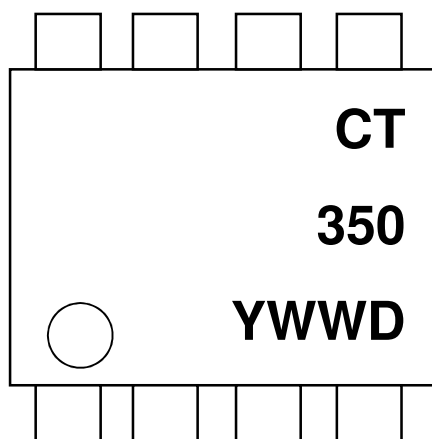


2.5A MOSFET/IGBT Gate Driver Optocoupler

Recommended Solder Mask Dimensions in mm unless otherwise stated



Device Marking



Note:

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



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Ordering Information

CT350(Y)(Z)

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

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

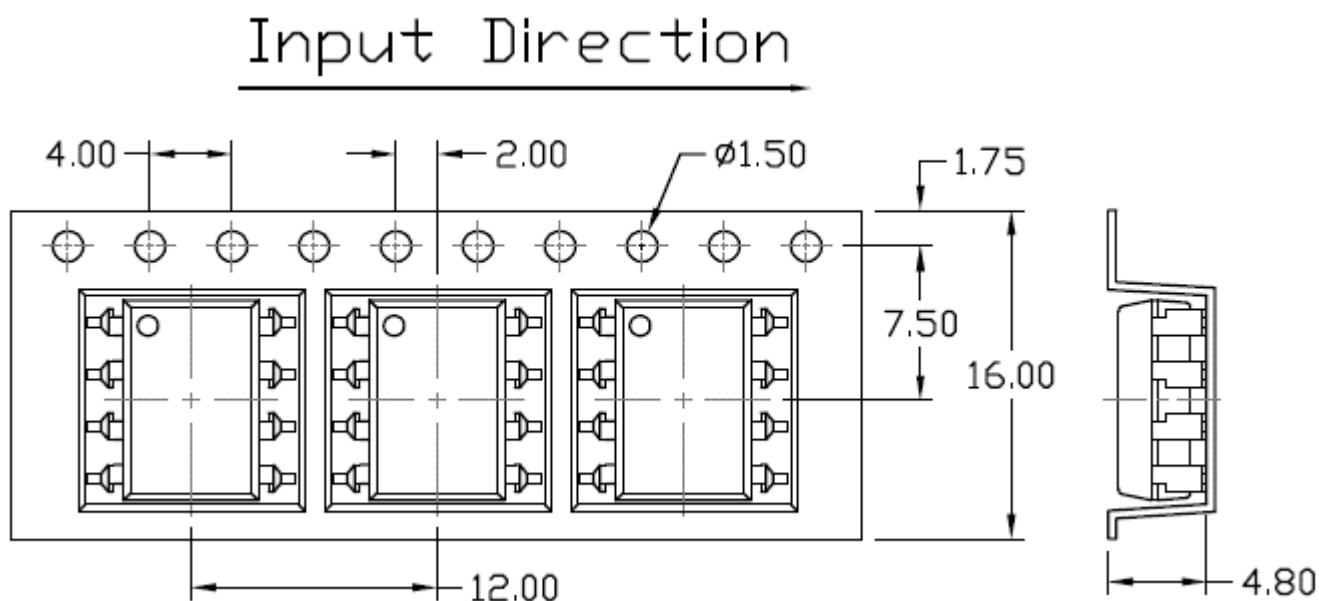
<i>Option</i>	<i>Description</i>	<i>Quantity</i>
None	Standard 8 Pin Dip	45 Units/Tube
M	Gullwing (400mil) Lead Forming	45 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	1000 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1000 Units/Reel



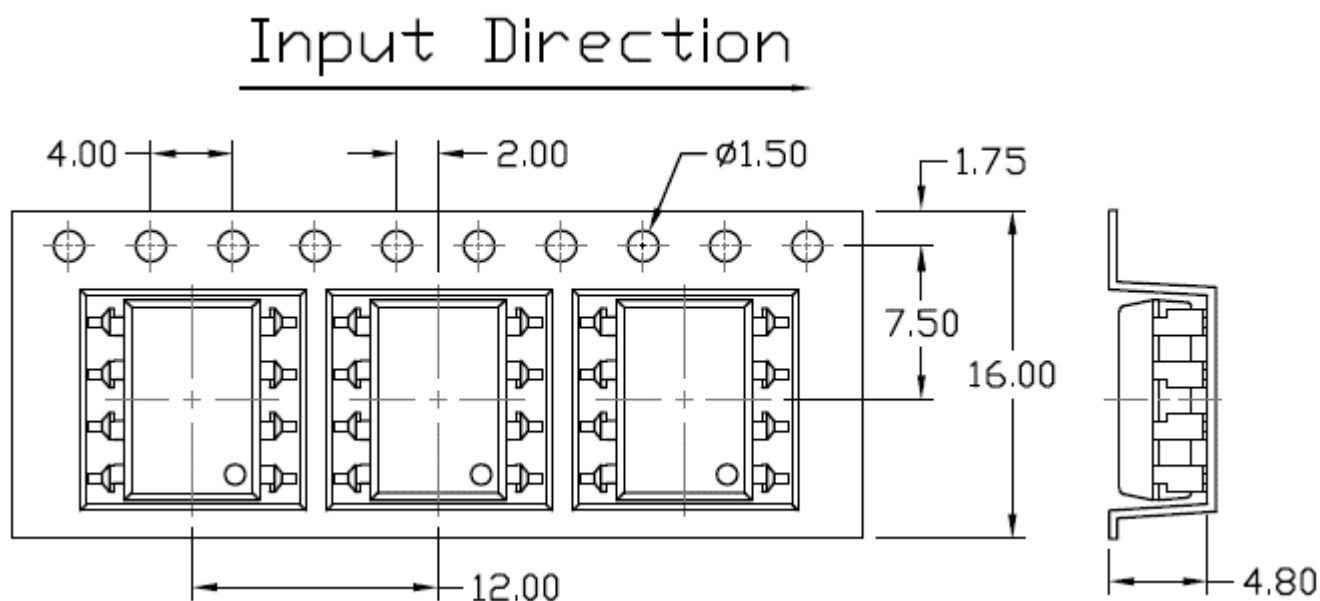
2.5A MOSFET/IGBT Gate Driver Optocoupler

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option S(T1) & SL(T1)



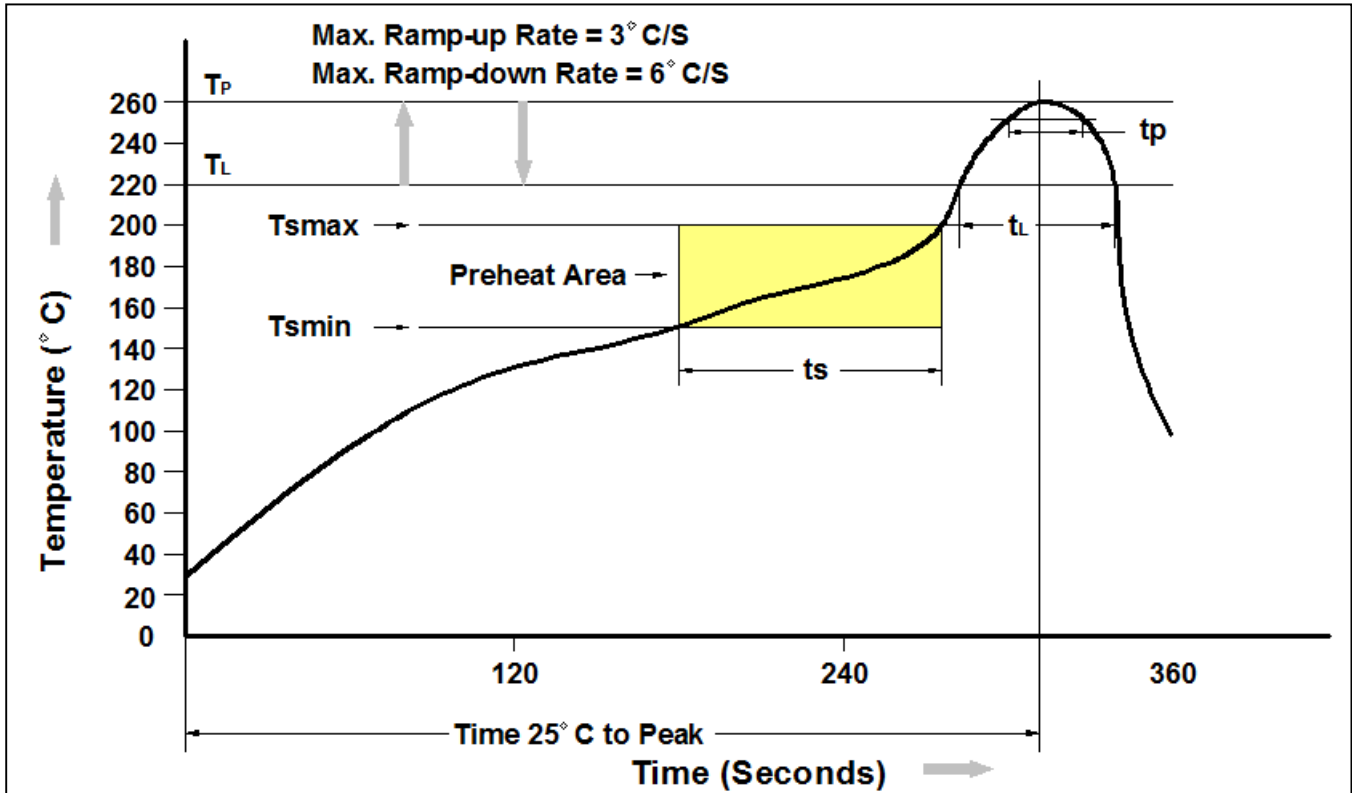
Option S(T2) & SL(T2)





2.5A MOSFET/IGBT Gate Driver Optocoupler

Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150 °C
Temperature Max. (Tsmax)	200 °C
Time (ts) from (Tsmin to Tsmax)	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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