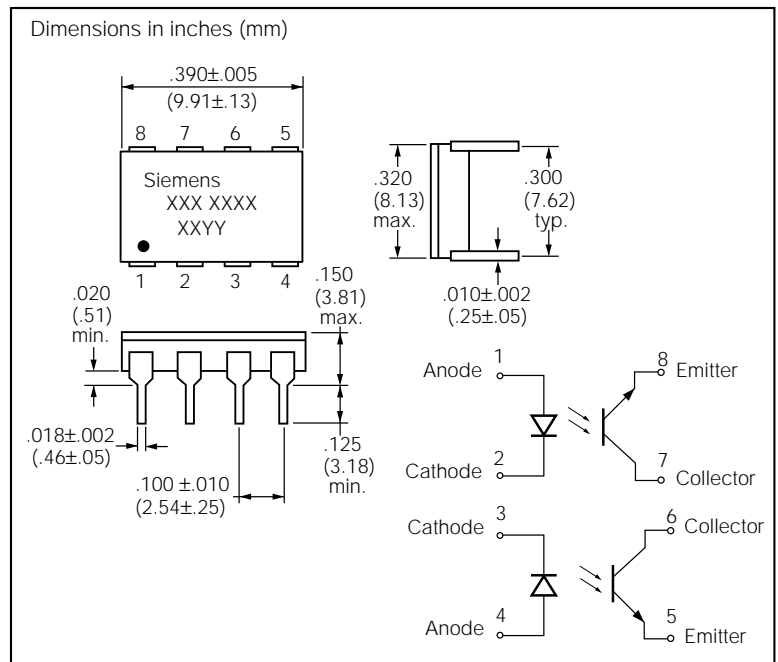


## FEATURES

- Operating Temperature Range,  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Current Transfer Ratio Guaranteed from  $-55^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$  Ambient Temperature Range
- High Current Transfer Ratio at Low Input Current
- Isolation Test Voltage, 3000 VDC
- Two Isolated Channels per Package
- Standard 8 Pin DIP Package

## DESCRIPTION

The ILH200 is designed especially for hi-rel applications requiring optical isolation with high current transfer ratio and low saturation  $V_{CE}$ . Each channel of the optocoupler consists of a light emitting diode and a NPN silicon phototransistor mounted and coupled in an 8 pin hermetically sealed DIP package. The low input current makes the ILH200 well suited for direct CMOS to LSTTL/TTL interfaces.



## Maximum Ratings

### Emitter (per channel)

Reverse Voltage .....	6.0 V
Forward Current .....	60 mA
Peak Forward Current <sup>(1)</sup> .....	1 A
Power Dissipation.....	75 mW
Derate Linearly from 25°C .....	0.75 mW/°C

### Detector (per channel)

Collector-Emitter Voltage .....	70 V
Emitter-Collector Voltage .....	7 V
Continuous Collector Current.....	50 mA
Power Dissipation.....	100 mW
Derate Linearly from 25°C .....	1.0 mW/°C

### Package

Input to Output Isolation Test Voltage <sup>(2)</sup> .....	3000 VDC
Storage Temperature Range .....	$-65^{\circ}\text{C}$ to $+150^{\circ}\text{C}$
Operating Temperature Range.....	$-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$
Junction Temperature.....	150°C
Soldering Time at 240°C, 1.6 mm from case .....	10 sec.
Power Dissipation.....	350 mW
Derate Linearly from 25°C .....	3.5 mW/°C

### Notes:

1. Values applies for  $P_W \leq 1$  ms,  $PRR \leq 300$  pps.
2. Measured between pins 1,2,3 and 4 shorted together and pins 5,6,7 and 8 shorted together.  $T_A = 25^{\circ}\text{C}$  and duration=1 second, RH=45%.

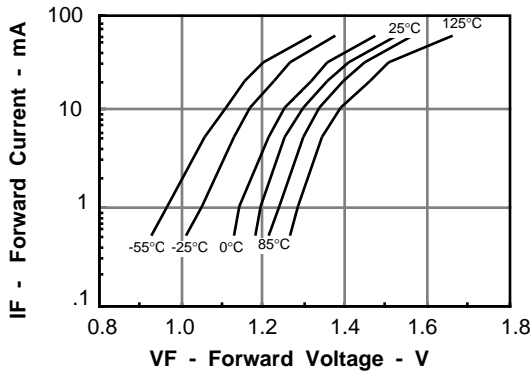
**Characteristics (Each Channel),  $T_A=25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
<b>Emitter</b>						
Forward Voltage	$V_F$		1.46	1.7	V	$I_F=60\text{ mA}$
Reverse Breakdown Voltage	$V_{BR}$	6			V	$I_R=10\ \mu\text{A}$
Reverse Current	$I_R$		0.01	10	$\mu\text{A}$	$V_R=6\text{ V}$
Capacitance	$C_J$		20		pF	$V_F=0\text{ V}$ , $f=1\text{ MHz}$
Thermal Resistance	$R_{TH}$		220		$^\circ\text{C/W}$	Junction to Lead
<b>Detector</b>						
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		0.25	0.4	V	$I_B=20\ \mu\text{A}$ , $I_{CE}=1\text{ mA}$
Collector-Emitter Leakage Current	$I_{CEO}$		5	50	nA	$V_{CE}=10\text{ V}$
Capacitance	$C_{CE}$		6.8		pF	$V_{CE}=5\text{ V}$ , $f=1\text{ MHz}$
Thermal Resistance	$R_{TH}$		220		$^\circ\text{C/W}$	Junction to Lead
<b>Coupled Characteristic <math>-55^\circ\text{C}</math> to <math>100^\circ\text{C}</math></b>						
Saturated Current Transfer Ratio	$CTR_{(sat)}$	70	210	250	%	$I_F=10\text{ mA}$ , $V_{CE}=0.4\text{ V}$
Current Transfer Ratio Collector-Emitter	$CTR_{ce}$	100	300	450	%	$I_F=10\text{ mA}$ , $V_{CE}=10\text{ V}$
<b>Isolation and Insulation</b>						
Common Mode Rejection, Output High	$CM_H$	1000	2000		V/ $\mu\text{s}$	$V_{CM}=500\text{ V}_{p-p}$ , $V_{CC}=5\text{ V}$ , $R_L=1\text{ K}\Omega$ , $I_F=0\text{ mA}$
Common Mode Rejection, Output High	$CM_L$	1000	2000		V/ $\mu\text{s}$	$V_{CM}=500\text{ V}_{p-p}$ , $V_{XX}=5\text{ V}$ , $R_L=1\text{ K}\Omega$ , $I_F=10\text{ mA}$
Package Capacitance	$C_{IO}$		1.5		pF	$V_{IO}=0\text{ V}$ , $1\text{ MHz}$
Insulation Resistance	$R_{IO}$	$10^{11}$	$10^{14}$		W	$V_{IO}=500\text{ VDC}$
Leakage Current, Input-Output	$I_{IO}$			10	$\mu\text{A}$	Relative Humidity $\leq 50\%$ , $V_{IO}\ 3000\text{ VDC}$ , $5\text{ sec.}$

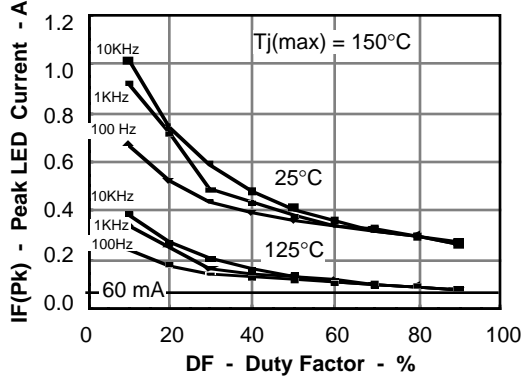
**Typical Switching Speeds,  $T_A=25^\circ\text{C}$** 

Non-Saturated Switching	Symbol	Typ.	Max.	Unit	Test Condition
Delay	td	0.8	2	$\mu\text{s}$	
Rise	tr	2	5	$\mu\text{s}$	$V_{CC}=5\text{ V}$
Storage	ts	0.4	1.5	$\mu\text{s}$	$R_L=75\ \Omega$
Fall	tf	2	5	$\mu\text{s}$	$I_F=10\text{ mA}$
Propagation-High to Low	tpHL	1	3	$\mu\text{s}$	50% of $V_{pp}$
Propagation-Low to High	tpLH	1.5	4	$\mu\text{s}$	
Saturated Switching <sup>(1)</sup>	Symbol	Typ.	Max.	Unit	Test Condition
Delay	td	0.7	2	$\mu\text{s}$	
Rise	tr	1	3	$\mu\text{s}$	$V_{CE}=0.4\text{ V}$
Storage	ts	13.5	30	$\mu\text{s}$	$R_L=1\text{ K}\Omega$
Fall	tf	12	30	$\mu\text{s}$	$I_F=10\text{ mA}$
Propagation-High to Low	tpHL	1.4	5	$\mu\text{s}$	$V_{CC}=5\text{ V}$ , $V_{TH}=1.5\text{ V}$
Propagation-Low to High	tpLH	15	40	$\mu\text{s}$	

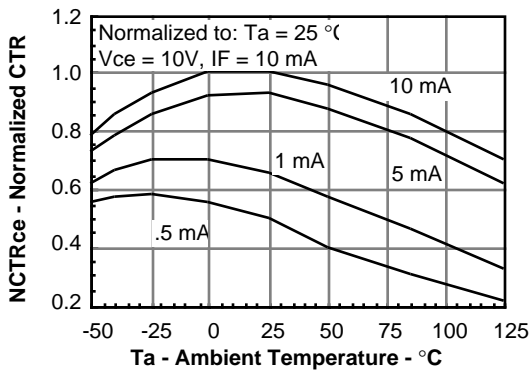
**Figure 1. Forward current versus forward voltage and temperature**



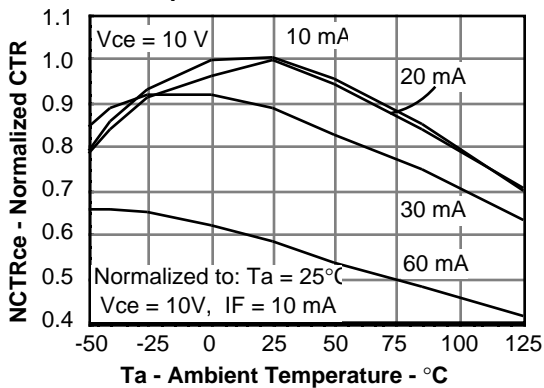
**Figure 2. Peak LED current versus duty factor refresh rate and temperature**



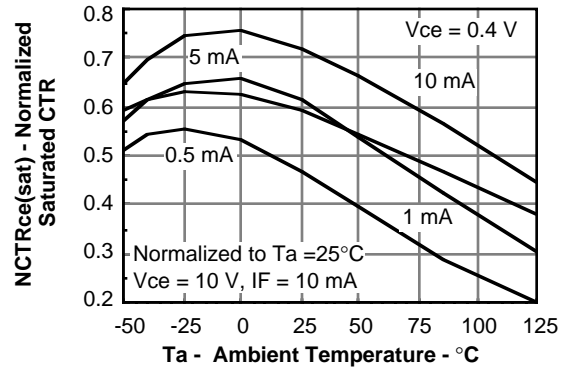
**Figure 3. Normalized non-saturated current transfer ratio versus temperature and LED current**



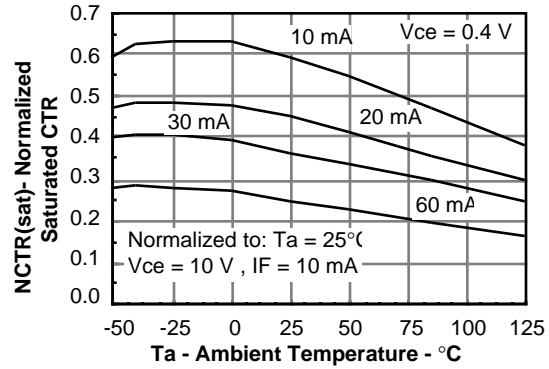
**Figure 4. Normalized non-saturated current transfer ratio versus temperature and LED current**



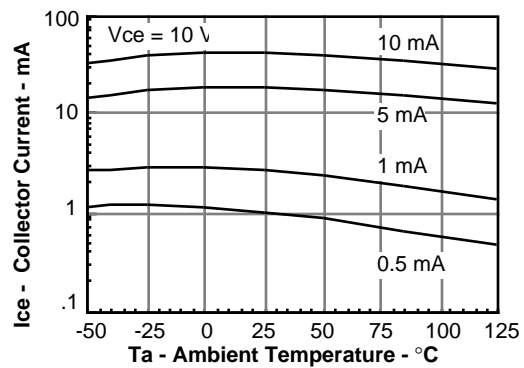
**Figure 5. Normalized saturated current transfer ratio versus temperature and LED current**



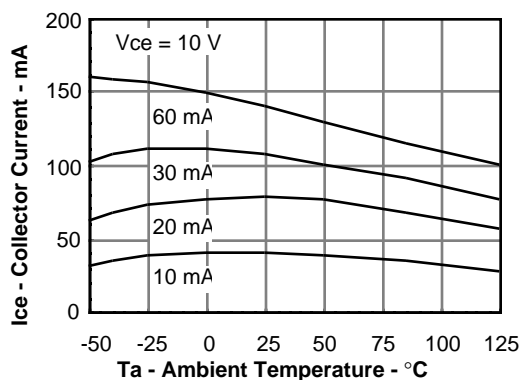
**Figure 6. Normalized saturated current transfer ratio versus temperature and LED current**



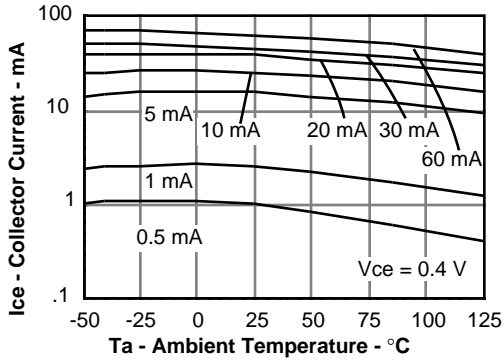
**Figure 7. Collector-emitter current versus temperature and LED current**



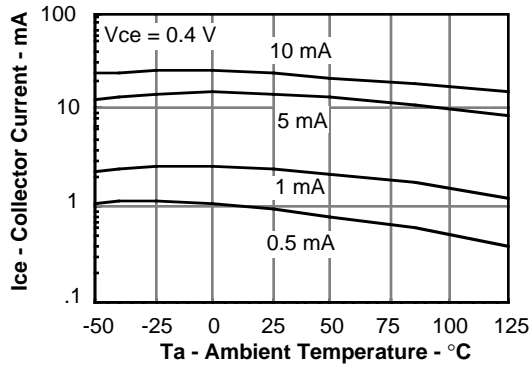
**Figure 8. Collector-emitter current versus temperature and LED current**



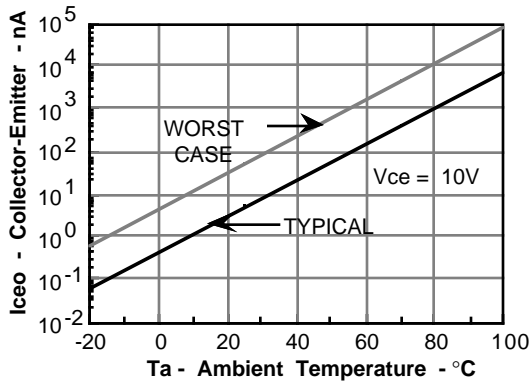
**Figure 9. Saturated collector-emitter current versus temperature and LED current**



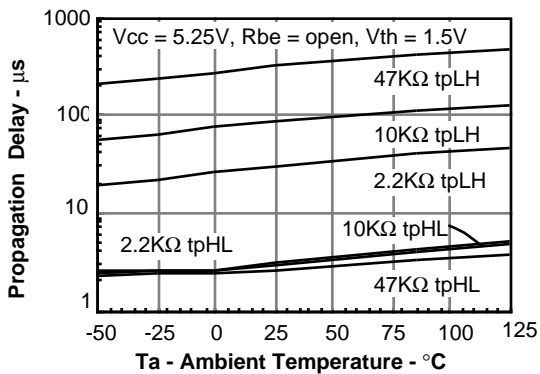
**Figure 10. Saturated collector-emitter current versus temperature and LED current**



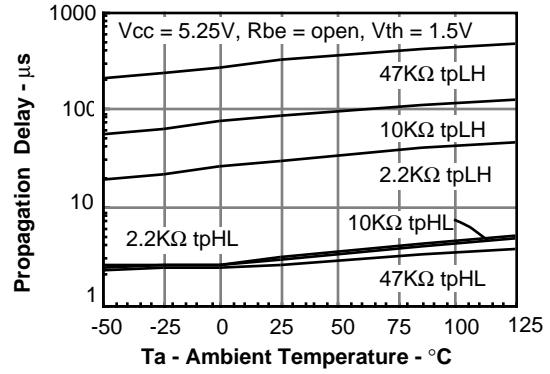
**Figure 11. Collector-emitter leakage current versus temperature**



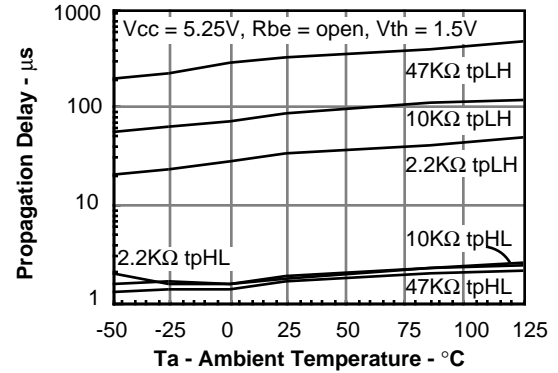
**Figure 12. Propagation delay versus temperature and collector load resistance for  $I_F=5$  mA**



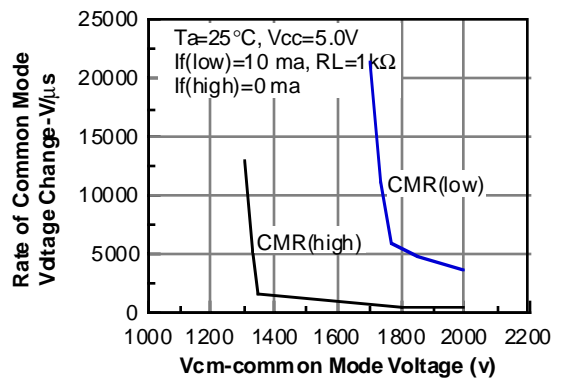
**Figure 13. Propagation delay versus temperature and collector load resistance for  $I_F=10$  mA**



**Figure 14. Propagation delay versus temperature and collector load resistance for  $I_F=20$  mA**



**Figure 15. Common mode transient rejection**



**Figure 16. Saturated switching**

