THE DATASHEET OF

CNW83

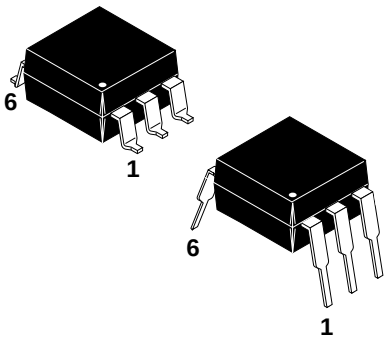
FAIRCHILD
SEMICONDUCTOR™

WIDE BODY, HIGH ISOLATION OPTOCOUPLERS

CNW82
CNW83
CNW84
CNW85

DESCRIPTION

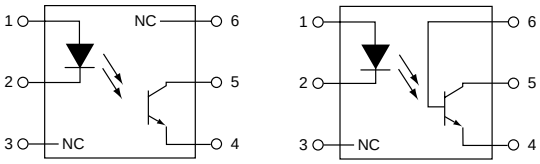
The CNW82, CNW83, CNW84 and CNW85 optocouplers consist of a GaAs infrared emitting diode which is optically coupled to an NPN phototransistor.
The CNW82 and CNW84 do not have the base pin connected for improved noise immunity.



FEATURES

- Wide body DIL encapsulation, with a pin distance of 10.16 mm.
- Minimum creepage distance 10 mm.
- High current transfer ratio and Low Saturation Voltage, making the device suitable for use with TTL integrated circuits.
- High degree of AC and DC insulation (5900 V (RMS) and 8340 V (DC)).
- Minimum 2 mm isolation thickness between emitter and detector. (CNW84/85 only).
- An external clearance 0f 9.6 mm minimum and an external creepage distance of 10 mm minimum.
- Collector-Emitter Breakdown Voltage: 50 V (CNW82/83 only).
- Collector-Emitter Breakdown Voltage: 80 V (CNW84/85 only).
- UL recognized (File # E90700)

SCHEMATIC



CNW82/84

PIN 1. ANODE
2. CATHODE
3. NO CONNECTION
4. EMITTER
5. COLLECTOR
6. NO CONNECTION

CNW83/85

PIN 1. ANODE
2. CATHODE
3. NO CONNECTION
4. EMITTER
5. COLLECTOR
6. BASE

ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Value	Units
EMITTER				
Forward Current - Continuous		I_F	100	mA
Forward Current - Peak (PW = 100µs, 120pps)		I_F(pk)	3	A
Reverse Voltage		V_R	5	V
Total Power Dissipation @ T_A = 25°C		P_D	200	mW
Derate above 25°C			2.0	mW/°C
DETECTOR				
Collector Current-Continuous		I_C	100	mA
Emitter-Collector Voltage		V_{ECO}	7	V
Collector-Emitter Voltage	(CNW82/CNW83)	V_{CEO}	50	V
	(CNW84/CNW85)		80	
Collector-Base Voltage	(CNW83)	V_{CBO}	70	V
	(CNW85)		120	
Total Power Dissipation @ T_A = 25°C		P_D	200	mW
Derate above 25°C			2.0	mW/°C
TOTAL DEVICE				
Storage Temperature Range		T_{stg}	-55 to 150	°C
Ambient Operating Temperature Range		T_A	-40 to 100	°C
Lead Soldering Temperature (1/16” from case, 10 sec. duration)		T_L	260	°C

CNW82, CNW83, CNW84, CNW85

ELECTRICAL CHARACTERISTICS (T_A =25°C Unless otherwise specified)

Parameter		Test Conditions	Symbol	Min	Typ	Max	Unit
EMITTER							
Input Forward Voltage		(I_F = 10 mA)	V_F	—	1.20	1.50	V
Reverse Leakage Current		(V_R = 5.0 V)	I_R	—	—	10	µA
DETECTOR	(CNW82/83)	(I_C = 1.0 mA)	BV_{CEO}	50	100	—	V
Collector-Emitter Breakdown Voltage	(CNW84/85)			80	100	—	
Emitter-Collector Breakdown Voltage		(I_E = 0.1 mA)	BV_{ECO}	7	10	—	V
Collector-Base Breakdown Voltage	(CNW83)	(I_C = 0.1 mA)	BV_{CBO}	70	100	—	V
	(CNW85)			120	140	—	
Collector-Emitter Dark Current	(T_A = 25°C)	(V_{CE} = 10 V, I_F = 0)	I_{CEO}	—	1	50	nA
	(T_A = 70°C)			—	0.1	10	µA
Collector-Base Cut-off Current	(CNW83/85)	(V_{CB} = 10 V, I_F = 0)	I_{CBO}	—	—	20	nA
COUPLED							
Collector-Emitter Saturation Voltage		(I_C = 4 mA, I_F = 10 mA)	$V_{CE(sat)}$	—	0.15	0.4	V
Isolation Voltage	(DC Value)	(t = 1.0 min.)[1]	V_{ISO}	8.34	—	—	kV
	(RMS Value)	(t = 1.0 min.)[1]		5.9	—	—	
Isolation Resistance		(V_{I-O} = 500 V)	R_{ISO}	1	10	—	TΩ
Isolation Capacitance		(V_{I-O} = 0, f = 1.0 MHz)	C_{ISO}	—	0.4	1	pF
Current Transfer Ratio	(CNW82/83)	(I_F = 10 mA, V_{CE} = 0.4 V)	CTR	0.4	0.8	—	%
	(CNW84/85)	(I_F = 10 mA, V_{CE} = 5 V)		0.63	1.5	3.2	
Capacitance	(CNW83/85)	(V_{CB} = 10 V, f = 1 MHz)	C_{CB}	—	4.5	—	pF
Turn-on Time		(I_C = 2 mA, V_{CC} = 5 V, R_L = 100 Ω)	T_{ON}	—	3	—	µs
		(I_C = 2 mA, V_{CC} = 5 V, R_L = 1 kΩ)		—	12	—	
Turn-off Time		(I_C = 2 mA, V_{CC} = 5 V, R_L = 100 Ω)	T_{OFF}	—	3	—	µs
		(I_C = 2 mA, V_{CC} = 5 V, R_L = 1 kΩ)		—	12	—	

NOTE:
1. Every product is tested with pins 1, 2 and 3 shorted together, and pins 4, 5 and 6 shorted together.

CNW82, CNW83, CNW84, CNW85

Fig. 1 Forward Current vs. Forward Voltage

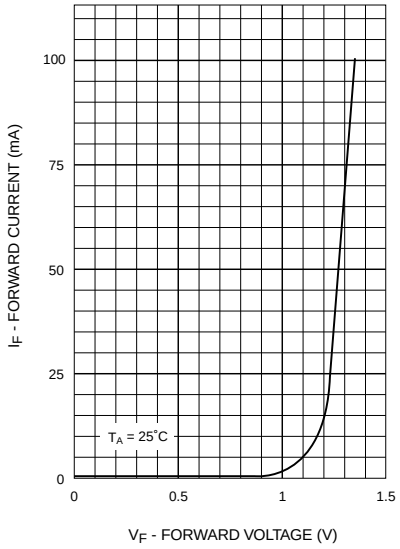


Fig. 2 Collector Current vs. Forward Current (for CNW84 and CNW85)

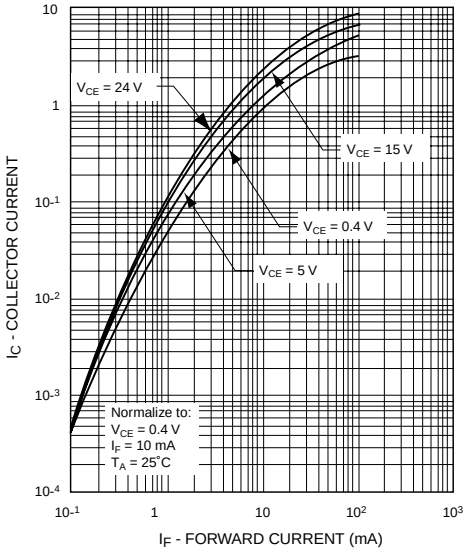


Fig. 3 Collector Current vs. Forward Current (for CNW82 and CNW83)

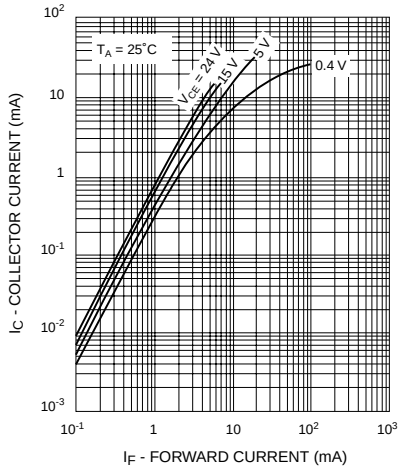


Fig. 4 Collector Current vs. Collector-Emitter Voltage

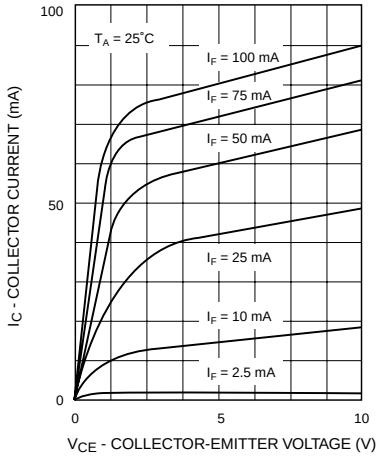


Fig. 5 Collector Current vs. Ambient Temperature (for CNW82 and CNW83)

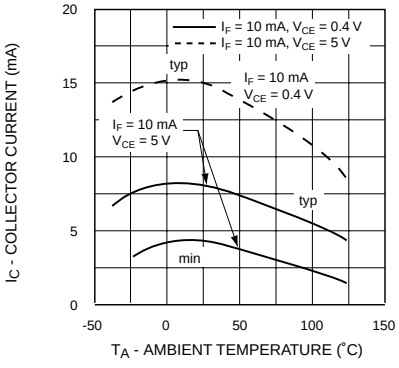


Fig. 6 Collector Current vs. Ambient Temperature (for CNW84 and CNW85)

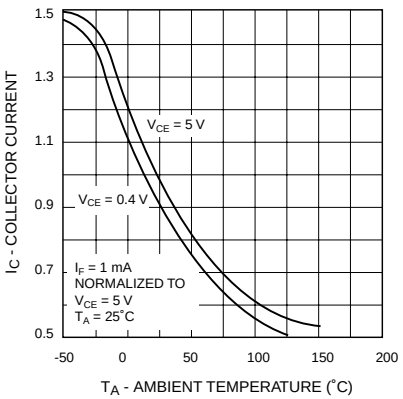


Fig. 7 Collector Current vs. Ambient Temperature (for CNW84 and CNW85)

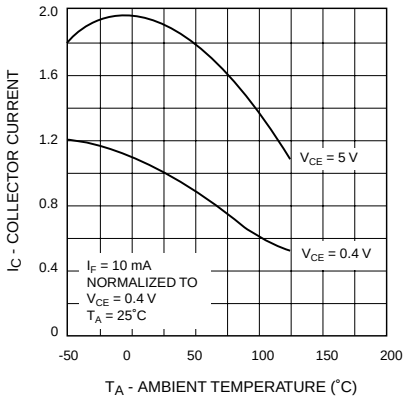


Fig. 8 Collector-Emitter Dark Current vs. Junction Temperature

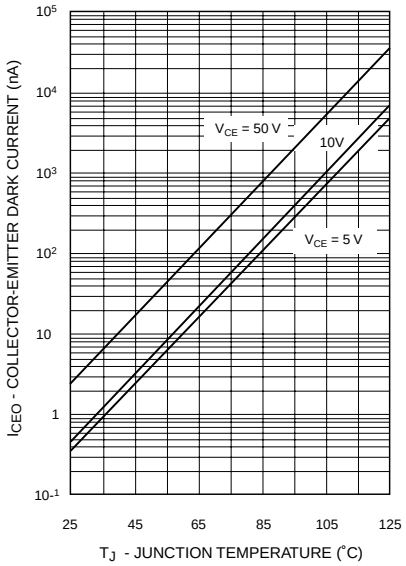


Fig. 9 Collector-Emitter Saturation Voltage vs. Collector Current

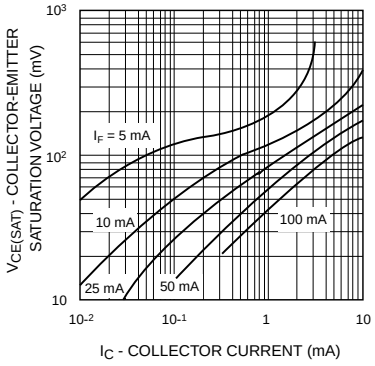
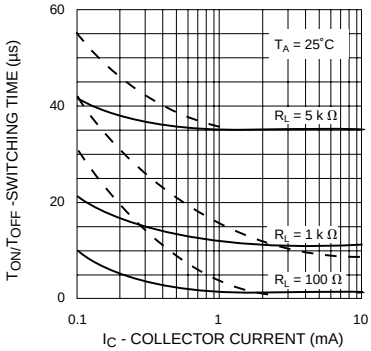


Fig. 10 Rise and Fall Time vs. Collector Current



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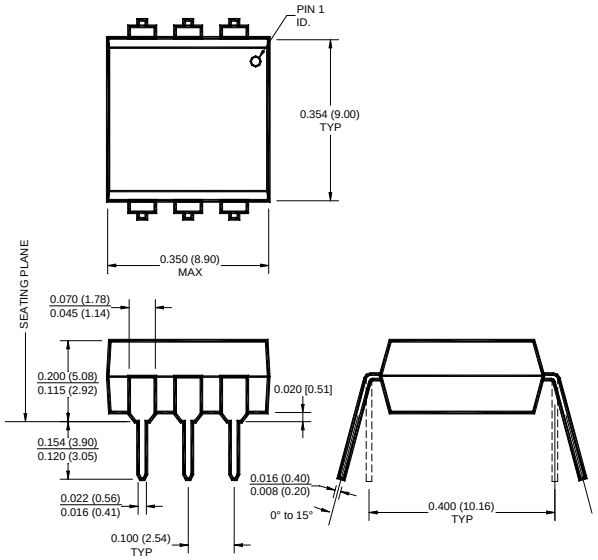
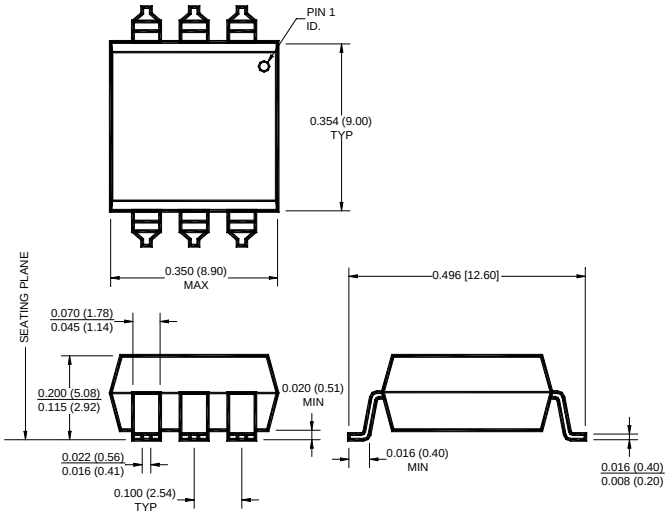
Package Dimensions (Through Hole)



Package Dimensions (Surface Mount)



NOTE

All dimensions are in inches (millimeters)

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