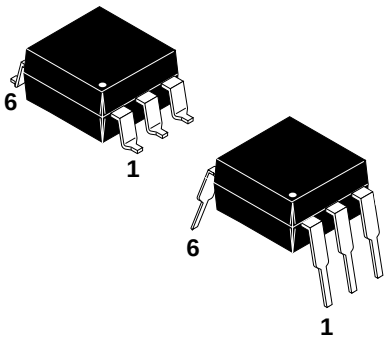
FAIRCHILD
SEMICONDUCTOR™

WIDE BODY, HIGH ISOLATION OPTOCOUPLERS

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.

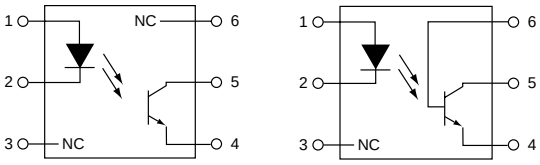


CNW82
CNW83
CNW84
CNW85

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.

Fig. 1 Forward Current vs. Forward Voltage

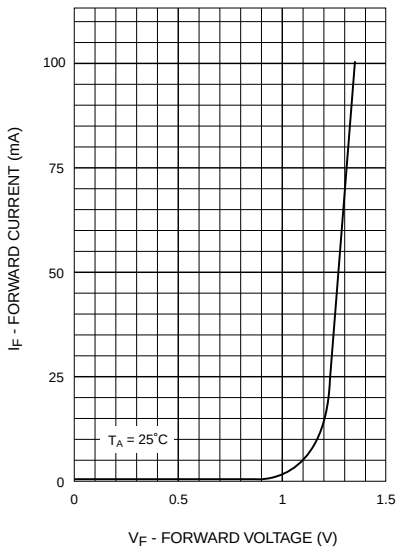


Fig. 2 Collector Current vs. Forward Current (for CNW84 and CNW85)

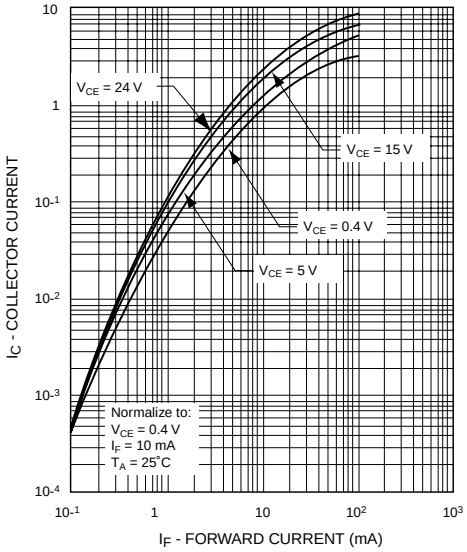


Fig. 3 Collector Current vs. Forward Current (for CNW82 and CNW83)

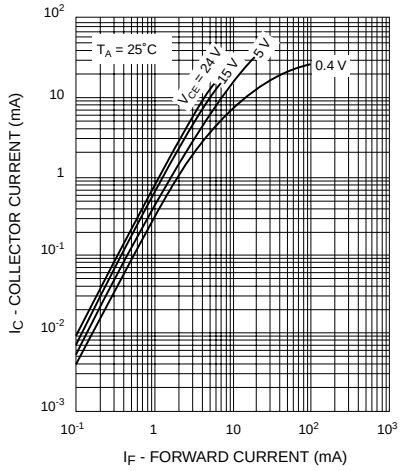


Fig. 4 Collector Current vs. Collector-Emitter Voltage

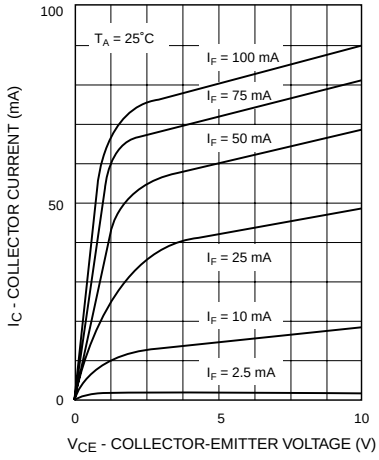


Fig. 5 Collector Current vs. Ambient Temperature (for CNW82 and CNW83)

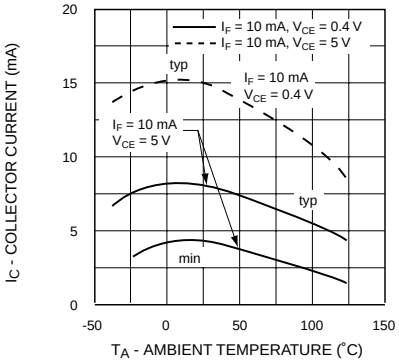


Fig. 6 Collector Current vs. Ambient Temperature (for CNW84 and CNW85)

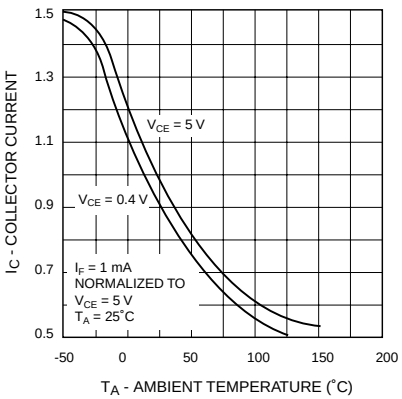


Fig. 7 Collector Current vs. Ambient Temperature (for CNW84 and CNW85)

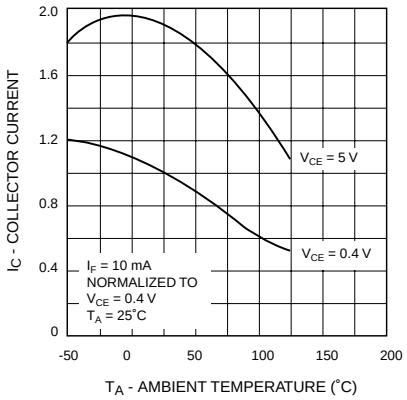


Fig. 8 Collector-Emitter Dark Current vs. Junction Temperature

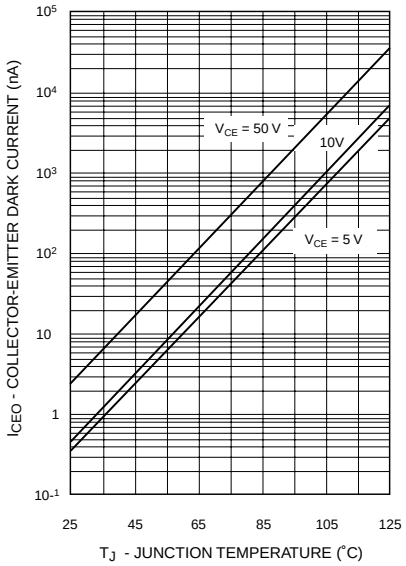


Fig. 9 Collector-Emitter Saturation Voltage vs. Collector Current

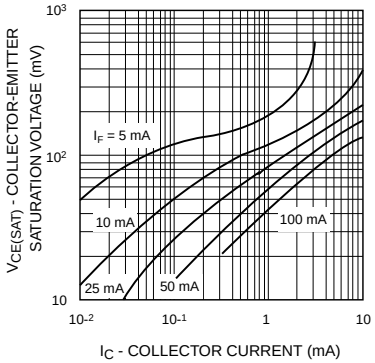
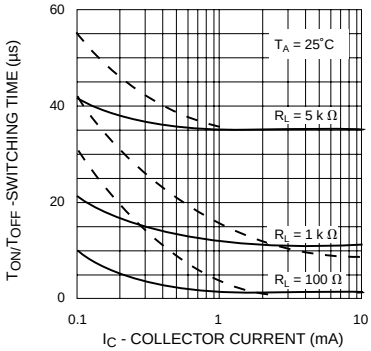
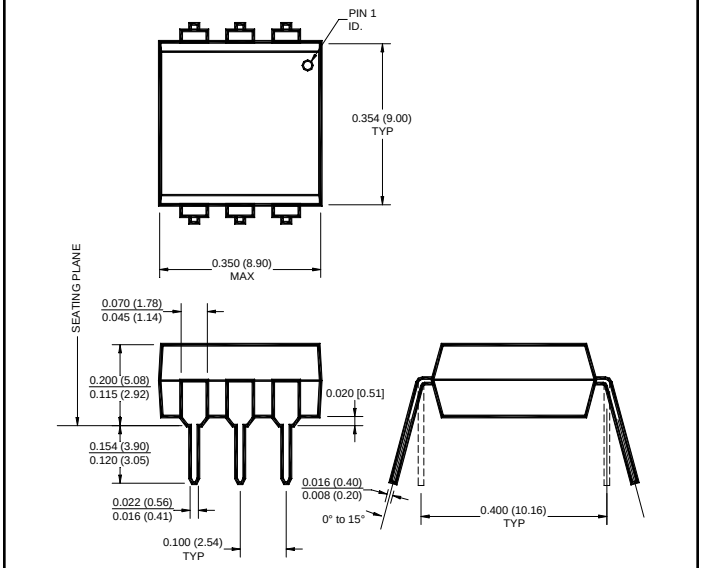


Fig. 10 Rise and Fall Time vs. Collector Current

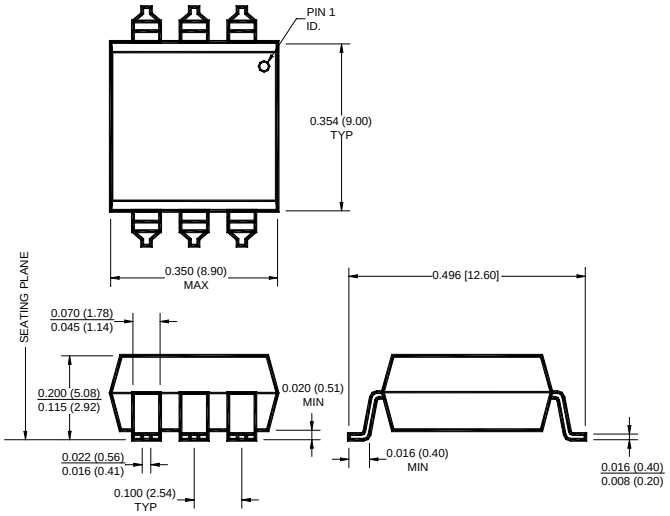


CNW82, CNW83, CNW84, CNW85

Package Dimensions (Through Hole)



Package Dimensions (Surface Mount)



NOTE

All dimensions are in inches (millimeters)

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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.