FAIRCHILD
SEMICONDUCTOR®

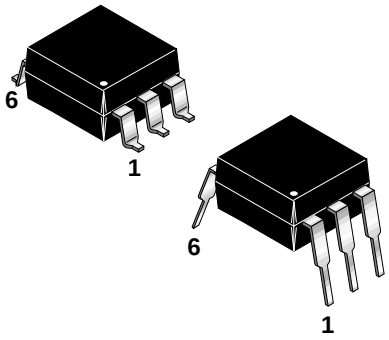
HIGH VOLTAGE 6-PIN PHOTOTRANSISTOR OPTOCOUPLERS

CNW11AV-1 CNW11AV-2 CNW11AV-3

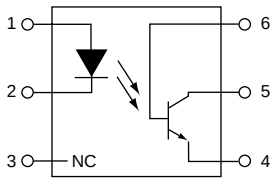
DESCRIPTION

The CNW11AV series are high voltage optocouplers in a wide body dual-in-line package (DIP).

Each optocoupler consists of a GaAs infrared emitter optically coupled to a silicon npn phototransistor with the base connected.



SCHEMATIC



CNW11AV-1/2/3

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

FEATURES

- Minimum 2 mm isolation thickness between emitter and receiver
- A wide body encapsulation with a pin distance of 10.16 mm
- An external clearance 0f 9.6 mm minimum and an external creepage of 10 mm minimum
- 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 (4000 V (RMS) and 5656 V (DC))
- Collector-emitter breakdown Voltage: 70 V
- Low isolation capacitance of 0.5 pF maximum
- UL recognized (File # E90700)
- VDE recognized (File # 76876)
  - Ordering option ‘300’ (e.g. CNW11AV-1.300)

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Units
TOTAL DEVICE Storage Temperature Range	T_{STG}	-55 to 150	°C
Ambient Operating Temperature Range	T_{OPR}	-40 to 100	°C
Lead Soldering Temperature	T_{SOL}	260 for 10 sec	°C
Junction Temperature	T_J	125	°C
EMITTER Forward Current - Continuous	I_F	100	mA
Forward Current - Peak (t_{on} = 10µs, δ = 0.01)	I_F(pk)	3	A
Reverse Voltage	V_R	6	V
Total Power Dissipation @ T_A = 25°C	P_D	200	mW
Derate Linearly From 25°C		2.0	mW/°C
DETECTOR Collector Current-Continuous	I_C	100	mA
Emitter-Collector Voltage	V_{ECO}	7	V
Collector-Emitter Voltage	V_{CEO}	70	V
Collector-Base Voltage	V_{CBO}	70	V
Total Power Dissipation @ T_A = 25°C	P_D	200	mW
Derate Linearly From 25°C		2.0	mW/°C

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

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
EMITTER	I_F = 10 mA	V_F	0.8	1.15	1.50	V
Input Forward Voltage	I_F = 10 mA, T_A = -55°C		0.9	—	1.70	
	I_F = 10 mA, T_A = 100°C		0.7	—	1.40	
Reverse Leakage Current	V_R = 6.0 V	I_R	—	—	10	µA
Input Capacitance	V_I = 0, f = 1 MHz	C_J	—	25	100	pF
DETECTOR Collector-Emitter Breakdown Voltage	I_C = 1.0 mA	BV_{CEO}	70	—	—	V
Collector-Base Breakdown Voltage	I_C = 0.1 mA	BV_{CBO}	70	—	—	V
Emitter-Collector Breakdown Voltage	I_E = 0.1 mA	BV_{ECO}	7	—	—	V
Emitter-Base Breakdown Voltage	I_E = 0.1 mA	BV_{EBO}	7	—	—	V
Collector-Emitter Dark Current	V_{CE} = 10 V, I_F = 0, T_A = 25°C	I_{CEO}	—	0.5	50	nA
	V_{CE} = 10 V, I_F = 0, T_A = 70°C		—	—	10	µA
Collector-Base Cut-off Current	I_F = 0, V_{CB} = 10 V	I_{CBO}	—	—	20	nA

ISOLATION CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Min	Typ	Max	Units
Input-Output Isolation Voltage	DC Value, Time = 1 min.	V_{ISO}	5,656			V
	RMS Value, Time = 1 min.		4,000			
Isolation Resistance	V_{I-O} = ±500 VDC	R_{ISO}	1	10		TΩ
Isolation Capacitance	V = 0V, f = 1 MHz	C_{ISO}		0.3	0.5	pF
Output Capacitance	V_{CB} = 10 V, f = 1 MHz	C_O		4.5		pF

TRANSFER CHARACTERISTICS (T_A = 25°C Unless otherwise specified.)

DC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
Output/Input Current Transfer Ratio	I_F = 10 mA, V_{CE} = 10 V	CTR	CNW11AV-1	100		300	%
			CNW11AV-2	50			
			CNW11AV-3	20			
Collector-Emitter Saturation Voltage	I_F = 20 mA, I_C = 2 mA	$V_{CE(SAT)}$	All		0.1	0.4	V
Common Mode Rejection Ratio	I_C= 2mA,V_{CC}=5V, f=10kHz, R=1kV	CMRR	All		-60		dB
AC Characteristics	**Test Conditions**	**Symbol**	**Device**	**Min**	**Typ**	**Max**	**Units**
Saturated Switching Times Turn-On Time (fig. 2 & 3)	I_C= 2 mA, V_{CC}= 10V, R_L=100Ω	t_{on}	All		3	15	µs
Turn-Off Time (fig. 2 & 3)		t_{off}	All		2.5	15	µs

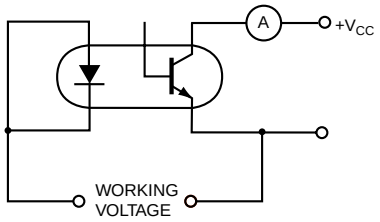


Fig. 1 Test Circuit

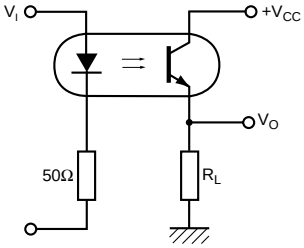


Fig. 2 Switching Circuit

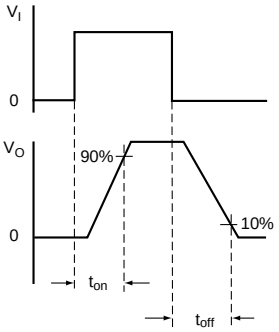


Fig. 3 Waveforms

Fig. 4 LED Forward Voltage vs. Forward Current

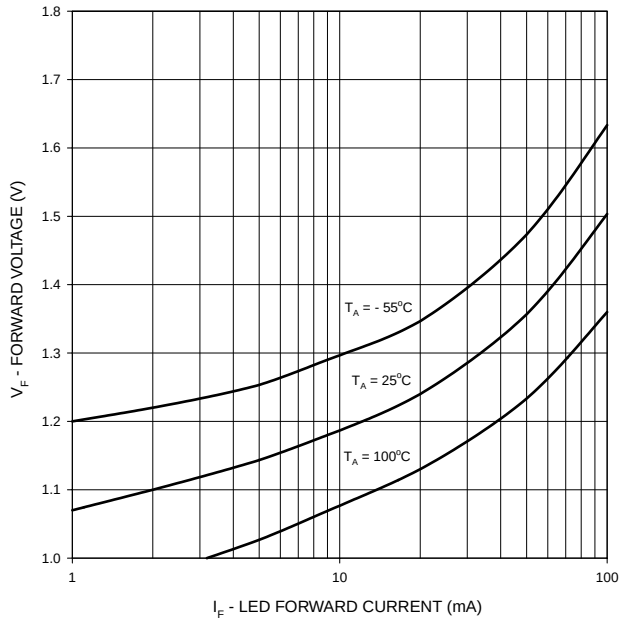


Fig. 5 Normalized CTR vs. Forward Current

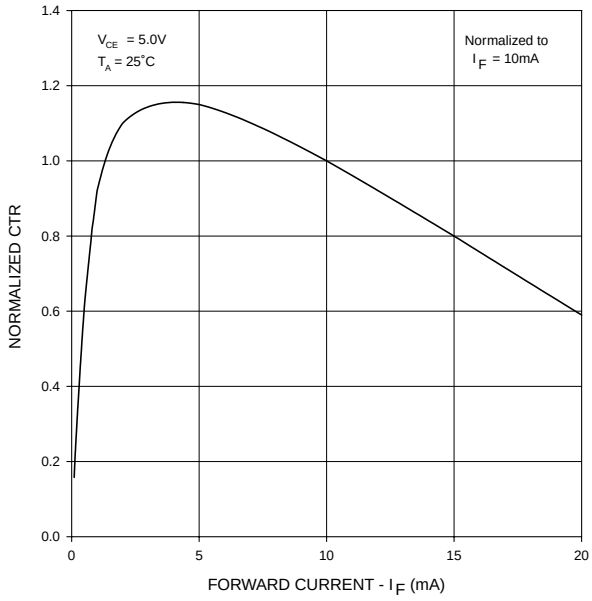


Fig. 6 Normalized CTR vs. Temperature

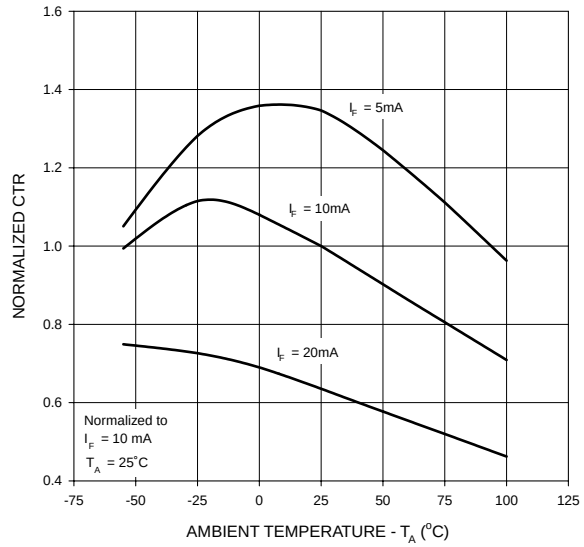


Fig. 7 CTR vs. RBE (Unsaturated)

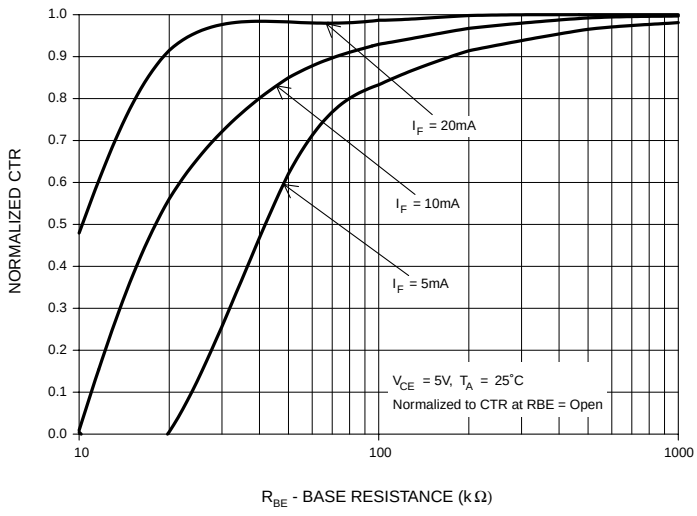


Fig. 8 CTR vs. RBE (Saturated)

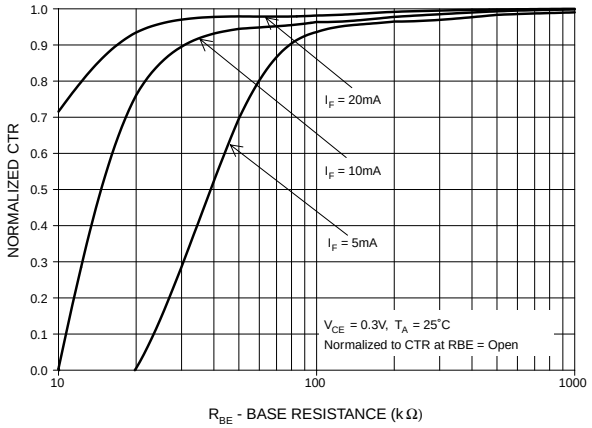


Fig. 9 Normalized t_{on} vs. R_{BE}

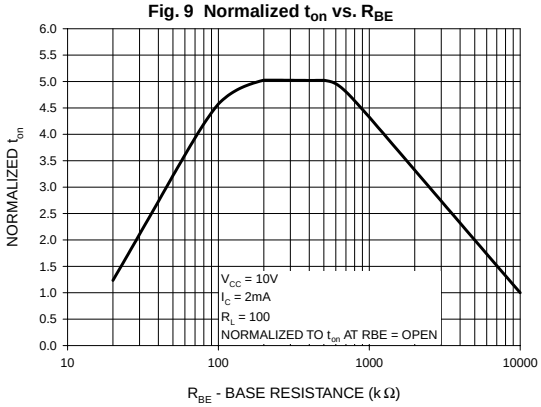


Fig. 10 Normalized t_{off} vs. R_{BE}

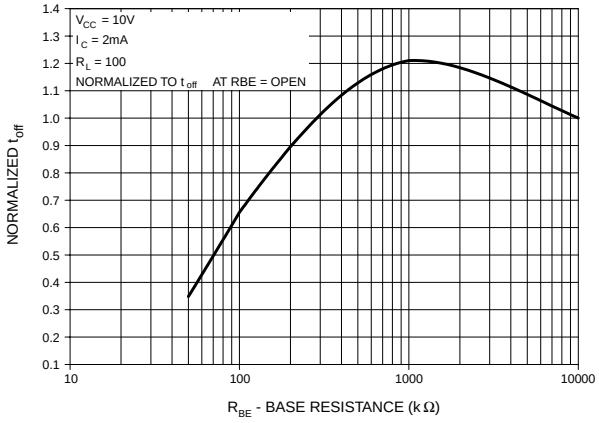


Fig. 11 Switching Speed vs. Load Resistor

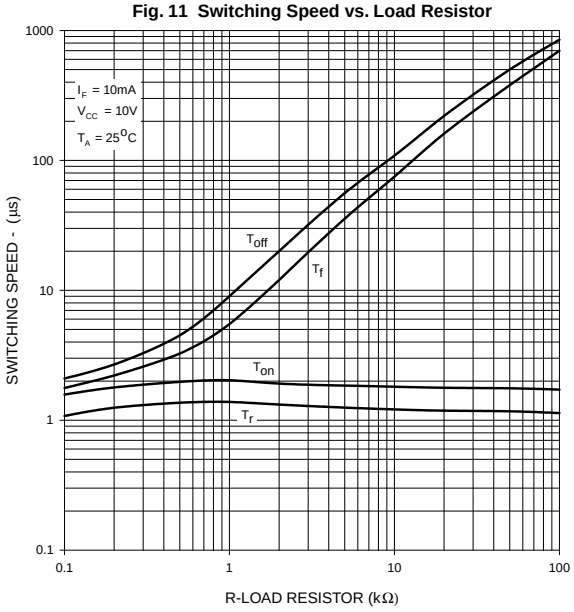


Fig. 12 Collector-Emitter Saturation Voltage vs Collector Current

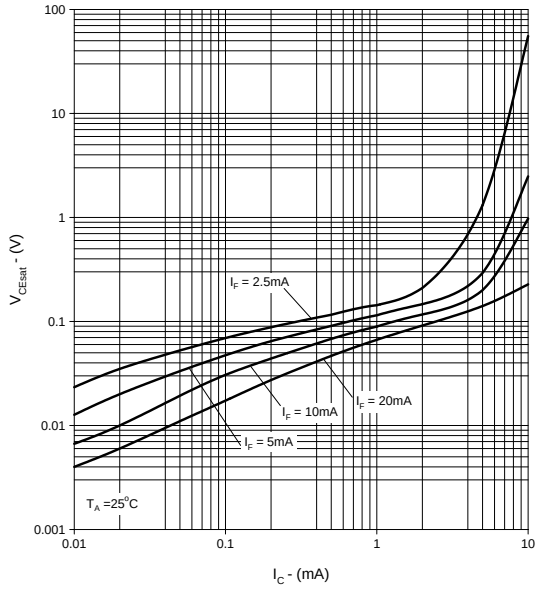
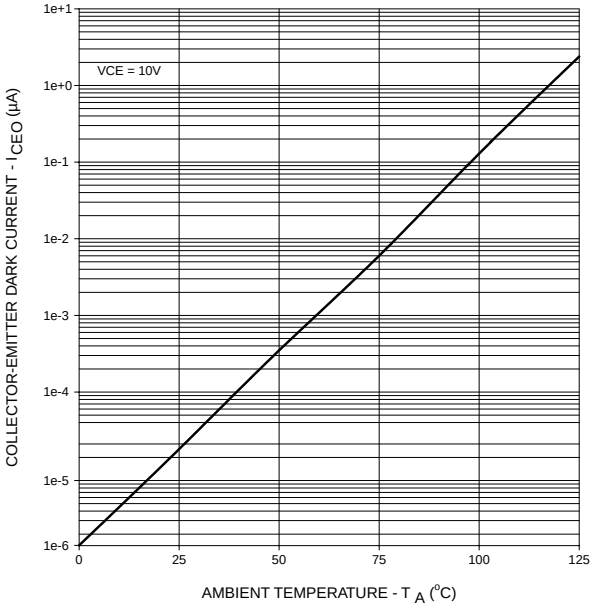


Fig. 13 Dark Current vs. Ambient Temperature



HIGH VOLTAGE 6-PIN PHOTOTRANSISTOR OPTOCOUPLERS

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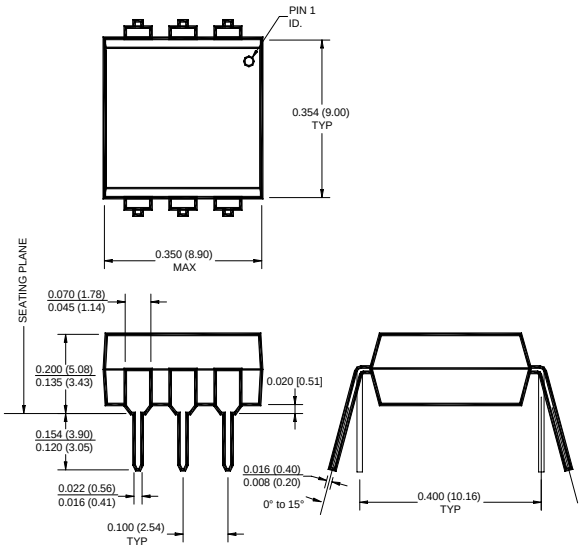
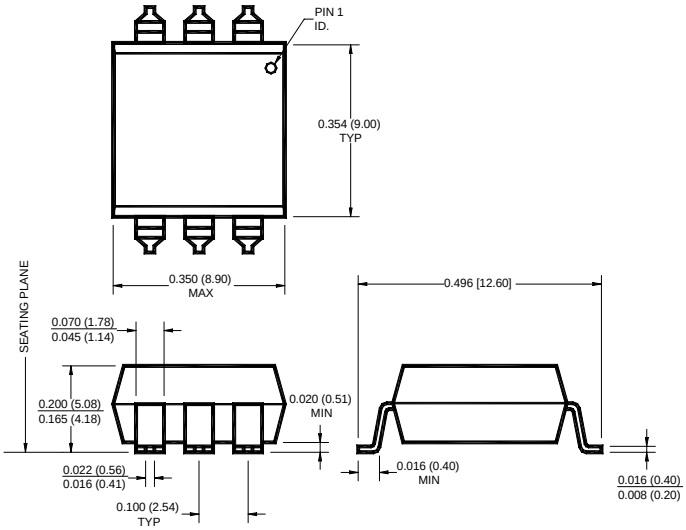
Package Dimensions (Through Hole)



Package Dimensions (Surface Mount)



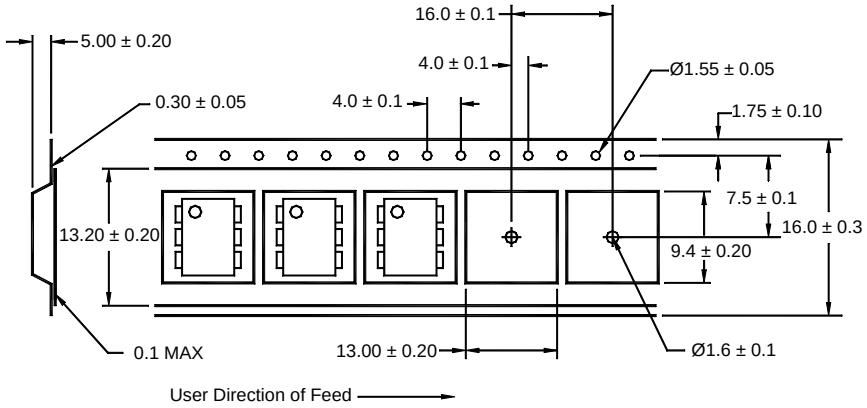
NOTE

All dimensions are in inches (millimeters)

ORDERING INFORMATION

Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
300	.300	VDE 0884

Carrier Tape Specifications (“D” Taping Orientation)



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.