Device No.	Output	Max Ratings @ T_A = 25°C					Coupled Characteristics			
			Transistor		Diode			Min Current Transfer Ratio		
		P_D mW	I_C mA	V_{CEO} V	V_R V	I_F mA	V_{ISO} kV	I_C/I_F %	@I_F mA	@V_{CE} V
H11A1	Trans	250	100	30	3.0	60	2.5	50	10	10
H11A2	Trans	250	100	30	3.0	60	1.5	20	10	10
H11A3	Trans	250	100	30	3.0	60	2.5	20	10	10
H11A4	Trans	250	100	30	3.0	60	1.5	10	10	10
H11B1	Darlg	250	100	25	3.0	60	2.5	50	10	5.0
H11B2	Darlg	250	100	25	3.0	60	1.5	20	10	5.0
H11D1	Trans	250	25	300	6.0	50	2.5	20	10	10
H11D2	Trans	250	25	300	6.0	50	1.5	20	10	10
H11D3	Trans	250	25	200	6.0	50	1.5	20	10	10
H11D4	Trans	250	25	200	6.0	50	1.5	10	10	10
MCA230	Darlg	300	0.1	30	3.0	60	1.5	40	10	5.0
MCA231(3)	Darlg	300	0.1	30	3.0	60	1.5	4.0	1.0	1.0
MCA255	Darlg	300	0.1	55	3.0	60	1.5	40	10	5.0
MCT2	Trans	250	—	30	3.0	60	1.5	20	10	10
MCT2E	Trans	250	—	30	3.0	60	2.5	20	10	10
MCT26	Trans	250	—	30	3.0	60	1.5	6.0	10	10
TIL111(3)	Trans	250	—	30	3.0	100	1.5	7.0	16	0.4
TIL112	trans	250	—	20	3.0	100	1.5	2.0	10	5.0
TIL113(3)	Trans	250	—	30	3.0	100	1.5	100	10	1.0
TIL114(3)	Trans	250	—	30	3.0	100	2.5	7.0	16	0.4
TIL115	Trans	250	—	20	3.0	100	2.5	2.0	10	5.0
TIL116	Trans	250	—	30	3.0	100	2.5	5.0	10	10
TIL117	Trans	250	—	30	3.0	100	2.5	9.0	10	10
TIL118	Trans	250	—	20	3.0	100	1.5	10	10	5.0
TIL119	Darlg	250	—	30	3.0	100	1.5	160	10	2.0

Notes
1. Standard Transistor output
2. *High-speed transistor output*
   guaranteed 2.0 μs max t_r and t_f with 100 Ω R_L
   8.0 μs typ at 1 kΩ R_L
3. CTR guaranteed with transistor in saturation
4. JEDEC registered data and conditions
5. CTR typ at 1.0 mA = 40%

Couplers (Cont'd)

Coupled Characteristics		Input Diode Characteristics		Output Transistor Characteristics			Output Darlington Characteristics		Data Sheet Page No.	Device No.
T_r μs Typ	t_f μs Typ	V_F V Max	@ I_F mA	$V_{CE(sat)}$ V Max	@ I_C mA	@ I_F mA	I_{CEO} μA Max	@ V_{CE} V		
2.0	2.0	1.5	10	0.4	0.5	10			5-25	H11A1
2.0	2.0	1.5	10	0.4	0.5	10			5-25	H11A2
2.0	2.0	1.5	10	0.4	0.5	10			5-25	H11A3
2.0	2.0	1.5	10	0.4	0.5	10			5-25	H11A4
125	100	1.5	10	1.0	1.0	1.0	0.1	10	5-27	H11B1
125	100	1.5	10	1.0	1.0	1.0	0.1	10	5-27	H11B2
5.0	5.0	1.5	10	0.4	0.5	10			5-29	H11D1
5.0	5.0	1.5	10	0.4	0.5	10			5-29	H11D2
5.0	5.0	1.5	10	0.4	0.5	10			5-29	H11D3
5.0	5.0	1.5	10	0.4	0.5	10			5-29	H11D4
40	50	1.5	20	1.0	50	50	0.1	10	5-33	MCA230
40	50	1.5	20	1.0	2.0	1.0	0.1	10	5-33	MCA231(3)
40	50	1.5	20	1.0	50	50	0.1	10	5-33	MCA255
2.5	2.5	1.5	20	0.4	2.0	16			5-35	MCT2
2.5	2.5	1.5	20	0.4	2.0	16			5-35	MCT2E
2.5	2.5	1.5	20	0.5	1.6	60			5-35	MCT26
2.5	2.5	1.4	16	0.4	2.0	16			5-40	TIL111(3)
15.0	15.0	1.4	16	0.5	2.0	50			5-43	TIL112
50	50	1.5	10	1.0	125	50	0.1	10	5-45	TIL113(3)
2.0	2.0	1.4	16	0.4	2.0	16			5-40	TIL114(3)
15.0	15.0	1.5	10	0.5	2.0	50			5-43	TIL115
2.0	2.0	1.5	60	0.4	2.2	15			5-40	TIL116
2.0	2.0	1.4	16	0.4	0.5	10			5-40	TIL117
15.0	15.0	1.5	10	0.5	2.0	50			5-43	TIL118
50	50	1.5	10	1.0	10	10	0.1	10	5-45	TIL119

Optically-Coupled Darlington Isolator

Optoelectronic Products

MCA230
MCA231
MCA255

General Description
The MCA230, MCA231 and MCA255 series of optically-coupled isolators are electrical and mechanical replacements for the Monsanto series. Optical intercoupling provides a high degree of ac and dc isolation. Connection to the base is also provided for design flexibility.

Glassolated™
High Current Transfer Ratio At Low Input Current
10^{11} Ω Isolation Resistance
Low Coupling Capacitance—Typically 1.5 pF

Absolute Maximum Ratings

Storage Temperature	−55°C to +150°C
Operating Temperature	−55°C to +100°C
Pin Temperature (Soldering, 10 s)	260°C
Total Package Power Dissipation at T_A = 25°C (LED plus Detector)	300 mW
Derate Linearly from 25°C	4.0 mW/°C

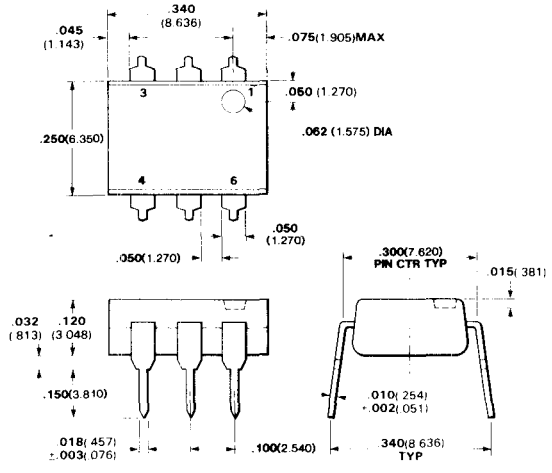
Input Diode

V_R	Reverse Voltage	3.0 V
I_F	Forward dc Current	60 mA
I_{pk}	Peak Forward Current (1 μs pulse width, 300 pps)	3.0 A
P_D	Power Dissipation at T_A = 25°C	90 mW
	Derate Linearly from 55°C	2.0 mW/°C

Output Transistor (Darlington)

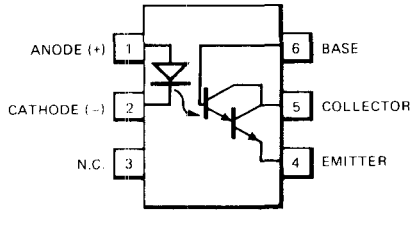
V_{CE}	Collector-to-Emitter Voltage	
	MCA230/231	30 V
	MCA255	55 V
V_{CB}	Collector-to-Base Voltage	
	MCA230/231	30 V
	MCA255	55 V
P_D	Power Dissipation at T_A = 25°C	210 mW
	Derate Linearly from 25°C	2.8 mW/°C

Package Outline



Notes
All dimensions in inches **bold** and millimeters (parentheses)
Tolerance unless specified = ±.015 (±.381)

Connection Diagram
DIP (Top View)



Pin		
1	Anode (+)	Input Diode
2	Cathode (−)	
3	NC	
4	Emitter	Output npn Phototransistor
5	Collector	
6	Base	

Electrical Characteristics—Input Diode T_A = 25°C

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_F	Forward Voltage		1.2	1.5	V	I_F = 20 mA
BV_R	Reverse Breakdown Voltage	3.0	5.0		V	I_R = 10 μA

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Typical Electrical Characteristics

MCA230
MCA231
MCA255

Electrical Characteristics—Output Transistor $T_A = 25°C$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{CEO}	Collector-to-Emitter Voltage					
	MCA230/231	30			V	I_C = 1.0 mA, I_F = 0
	MCA255	55			V	I_C = 1.0 mA, I_F = 0
V_{CBO}	Collector-to-Base Voltage					
	MCA230/231	30			V	I_C = 10 μA, I_F = 0
	MCA255	55				
I_{CEO}	Collector-to-Emitter Leakage Current		1.0	100	nA	V_{CE} = 10 V, I_F = 0
h_{FE}	Forward Current Gain		25 k			V_{CE} = 5.0 V, I_C = 500 μA
V_{EBO}	Emitter-to-Base Voltage					I_E = 10 μA
	MCA230/255	8			V	
	MCA231	6			V	

Electrical Characteristics—Coupled $T_A = 25°C$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_C	Collector Output Current					
	MCA230	10	40		mA	V_{CE} = 5.0 V, I_F = 10 mA
	MCA231	2.0	4.0		mA	V_{CE} = 1.0 V, I_F = 1.0 mA
	MCA255	10	40		mA	V_{CE} = 5.0 V, I_F = 10 mA
V_{ISO}	Isolation Voltage	1.5 k	2.0 k		V	
R_{ISO}	Isolation Resistance		10^{11}		Ω	V = 500 V
$V_{CE(sat)}$	Collector-to-Emitter Saturation Voltage					
	MCA230, MCA255		0.8	1.0	V	I_C = 50 mA, I_F = 50 mA
	MCA231		0.8	1.0	V	I_C = 2.0 mA, I_F = 1.0 mA
	MCA231		0.8	1.0	V	I_C = 10 mA, I_F = 5 mA
	MCA231		0.9	1.2	V	I_C = 40 mA, I_F = 10 mA
t_{on}	Turn-on Time		40		μs	I_C = 1.0 mA, V_{CC} = 10 V, R_L = 100 Ω
t_{off}	Turn-off Time (See Note 1)		50		μs	

Notes
1. Collector current transfer ratio is defined as the ratio of the collector current to the forward bias input current.
2. Rise time is defined as the time for the collector current to rise from 10% to 90% of peak value. Fall time is defined as the time required for the current to decrease from 90% to 10% of peak value.