**Optoelectronics Division**
TRW Electronic Components Group

Product Bulletin 5242
January 1985

**1987 Cost Saver Product!**
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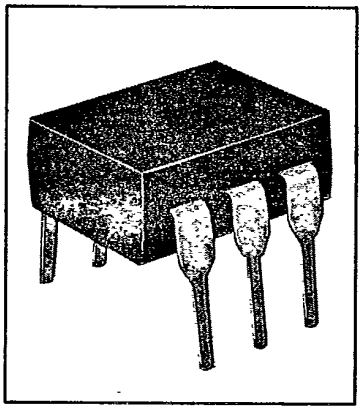
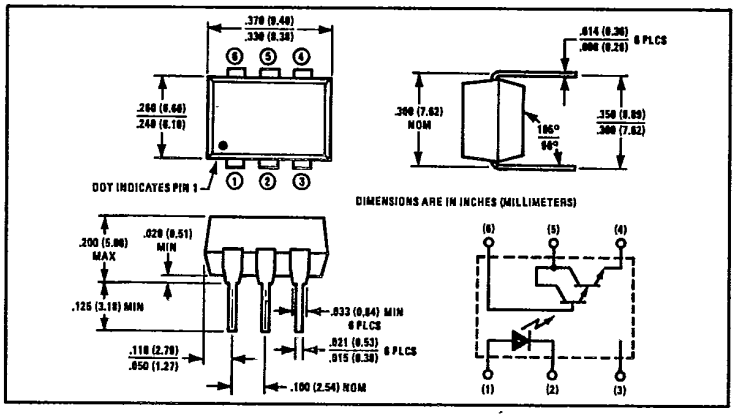
T-41-85

# Optically Coupled Isolators
## Types 4N29, 4N30, 4N31, 4N32, 4N33






### Features
- Photodarlington output
- High current transfer ratio
- 2500 or 1500 volt isolation ratings
- UL recognized File No. E68730

### Description
The 4N29, 4N30, 4N31, 4N32, and 4N33 are JEDEC registered optically coupled isolators each consisting of a gallium arsenide infrared emitting diode and an NPN silicon photodarlington mounted in a standard plastic six pin dual-in-line package.

### Absolute Maximum Ratings ($T_A$ = 25°C unless otherwise noted)

| | |
|---|---|
| Input-to-Output Isolation Voltage — 4N30, 4N31, 4N33 | ±1500 VDC[1] |
| 4N29, 4N32 | ±2500 VDC[1] |
| Storage Temperature Range | −55°C to +150°C |
| Operating Temperature Range | −55°C to +100°C |
| Lead Soldering Temperature (1/16 inch [1.6 mm] from case for 5 sec. with soldering iron)[2] | 260°C |
| **Input Diode** | |
| Forward DC Current | 60 mA |
| Peak Forward Current (1 μs pulse width, 330 pps) | 3.0 A |
| Reverse DC Voltage | 3.0 V |
| Power Dissipation | 100 mW[3] |
| **Output Photodarlington** | |
| Collector-Emitter Voltage | 30 V |
| Collector-Base Voltage | 30 V |
| Emitter-Collector Voltage | 5.0 V |
| Power Dissipation | 150 mW[4] |

**Notes:**
(1) Measured with input leads shorted together and output leads shorted together.
(2) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
(3) Derate linearly 1.33 mW/°C above 25°C.
(4) Derate linearly 2.0 mW/°C above 25°C.

# Types 4N29, 4N30, 4N31, 4N32, 4N33

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**Electrical Characteristics** ($T_A$ = 25°C unless otherwise noted)

| Symbol | Parameter | | Min. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| **Input Diode** | | | | | | |
| $V_F$ | Forward Voltage | | | 1.50 | V | $I_F$ = 10.0 mA |
| $I_R$ | Reverse Current | | | 100 | μA | $V_R$ = 3.0 V |
| **Output Photodarlington** | | | | | | |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage | | 30 | | V | $I_C$ = 100 μA, |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage | | 30 | | V | $I_C$ = 100 μA, |
| $V_{(BR)ECO}$ | Emitter-Collector Breakdown Voltage | | 5.0 | | V | $I_E$ = 100 μA, |
| $I_{CEO}$ | Collector-Emitter Dark Current | | | 100 | nA | $V_{CE}$ = 10.0 V |
| **Coupled** | | | | | | |
| $I_C/I_F$ | DC Current Transfer Ratio | 4N29, 4N30 | 100 | | % | $I_F$ = 10.0 mA, $V_{CE}$ = 10.0 V |
| | | 4N31 | 50 | | % | |
| | | 4N32, 4N33 | 500 | | % | |
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage | 4N29, 4N30, 4N32, 4N33 | | 1.00 | V | $I_F$ = 8.0 mA, $I_C$ = 2.0 mA, $I_B$ = 0 |
| | | 4N31 | | 1.20 | V | |
| $t_{on}$ | Turn-On Time | | | 5.0 | μs | $V_{CC}$ = 10.0 V, $I_C$ = 50 mA, $I_F$ = 200 mA |
| $t_{off}$ | Turn-Off Time | 4N29, 4N30, 4N31 | | 40 | μs | |
| | | 4N32, 4N33 | | 100 | μs | |

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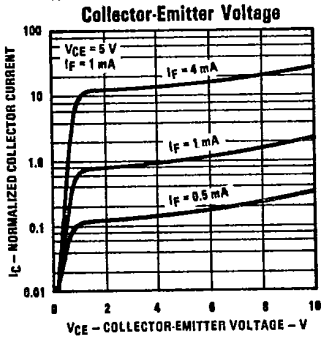
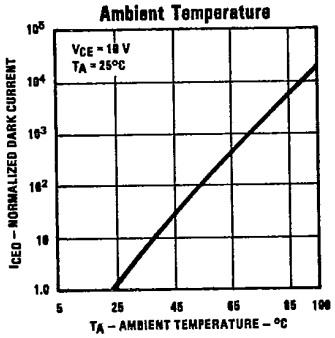
## Typical Performance Curves

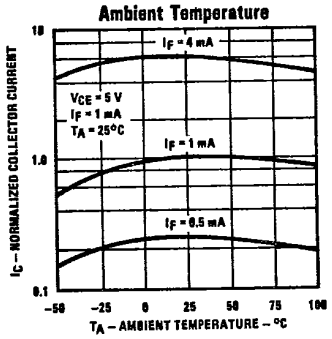
**Normalized Collector Current vs. Collector-Emitter Voltage**



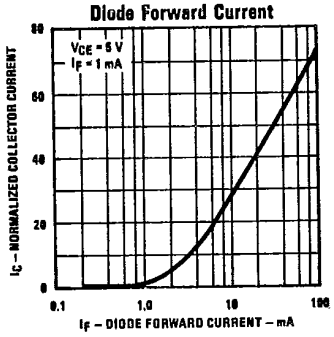

**Normalized Dark Current vs. Ambient Temperature**




**Normalized Collector Current vs. Ambient Temperature**




**Normalized Collector Current vs. Diode Forward Current**






Optoelectronics Division, TRW Electronic Components Group, 1215 W. Crosby Rd., Carrollton, TX 75006 (214) 323-2200, TLX 6716032 or 215849