

# Optoisolator

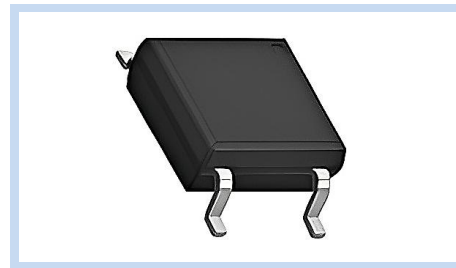
## 1CH DC Darlington SOP-4

OPI137DCDEL452

MERITEK

### FEATURE

- Current Transfer Ratio: 1000% Min
- Isolation Voltage: 3750 Vrms
- High CTR with Low Input Current
- Low Coupling Capacitance
- Application: Programmable Controller, Relay Contact Monitor, HF Power Supply Feedback Control, AC Line/Digital Logic, Telegraph Line Receiver
- In Accordance with Safety Class UL1577 Standard

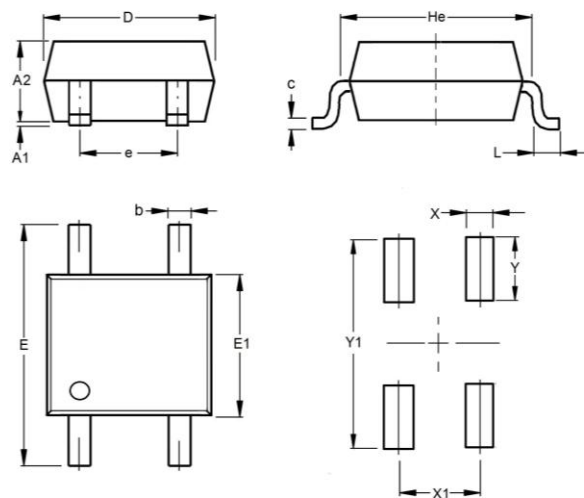


### MAXIMUM RATINGS

| Parameter                        |                         | Symbol    | Value    | Unit      |
|----------------------------------|-------------------------|-----------|----------|-----------|
| Input Forward Current            |                         | $I_F$     | 60       | mA        |
| Input Peak Forward Current       | Pulse width $t=10\mu s$ | $I_{FP}$  | 1        | A         |
| Input Power Dissipation          |                         | $P_I$     | 100      | mW        |
| Output Collector Current         |                         | $I_C$     | 150      | mA        |
| Output Power Dissipation         |                         | $P_C$     | 150      | mW        |
| Output Collector-Emitter Voltage |                         | $V_{CEO}$ | 350      | V         |
| Output Emitter-Collector Voltage |                         | $V_{ECO}$ | 0.1      | V         |
| Isolation Voltage                | AC for 60sec, RH40~60%  | $V_{ISO}$ | 3750     | $V_{RMS}$ |
| Total Power Dissipation          |                         | $P_T$     | 170      | mW        |
| Operating Temperature Range      |                         | $T_{Opr}$ | -55~+110 | °C        |
| Storage Temperature Range        |                         | $T_{Stg}$ | -55~+125 | °C        |
| Soldering Temperature            | For 10 sec              | $T_{SOL}$ | 260      | °C        |

### DIMENSIONS

| Item | Min (mm) | Max (mm) | Pin Layout                                                         |
|------|----------|----------|--------------------------------------------------------------------|
| A1   | 0.00     | 2.00     | <br>1. LED Anode      3. Emitter<br>2. LED Cathode    4. Collector |
| A2   | 1.85     | 2.05     |                                                                    |
| b    | 0.30     | 0.50     |                                                                    |
| c    | 0.20     |          |                                                                    |
| D    | 3.90     | 4.30     |                                                                    |
| E    | 6.70     | 7.30     |                                                                    |
| E1   | 4.40     |          |                                                                    |
| e    | 2.54     |          |                                                                    |
| He   | 4.90     | 5.50     |                                                                    |
| X    | 0.60     |          |                                                                    |
| X1   | 2.54     |          |                                                                    |
| Y    | 1.50     |          |                                                                    |
| Y1   | 7.85     |          |                                                                    |



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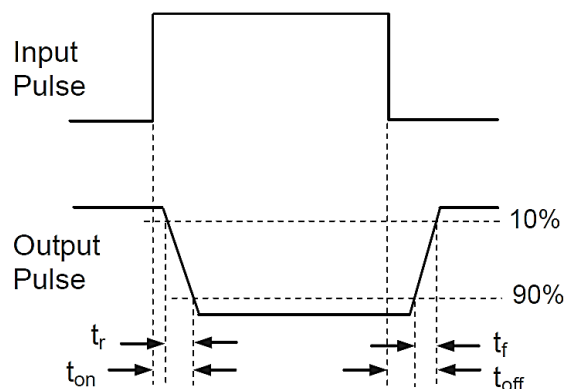
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### ELECTRICAL CHARACTERISTICS

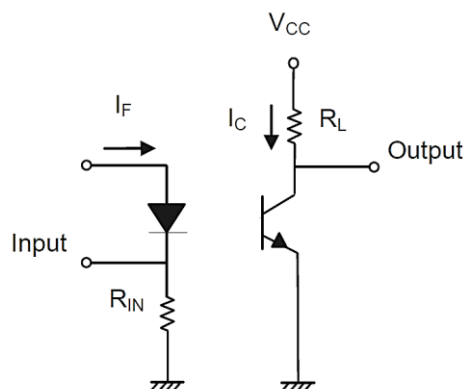
| Input Characteristics                | Conditions                                                     | Symbol        | Min                | Typ.      | Max | Unit          |
|--------------------------------------|----------------------------------------------------------------|---------------|--------------------|-----------|-----|---------------|
| Forward Voltage                      | $I_F=10\text{mA}$                                              | $V_F$         | --                 | 1.2       | 1.4 | V             |
| Reverse Current                      | $V_R=4\text{V}$                                                | $I_R$         | --                 | --        | 10  | $\mu\text{A}$ |
| Input Capacitance                    | $V=0, f=1\text{KHz}$                                           | $C_{in}$      | --                 | 50        | --  | pF            |
| Output Characteristics               | Conditions                                                     | Symbol        | Min                | Typ.      | Max | Unit          |
| Collector-Emitter Dark Current       | $V_{CE}=200\text{V}, I_F=0\text{mA}$                           | $I_{CEO}$     | --                 | --        | 100 | nA            |
| Collector-Emitter Breakdown Voltage  | $I_C=0.1\text{mA}$                                             | $BV_{CEO}$    | 350                | --        | --  | V             |
| Emitter-Collector Breakdown Voltage  | $I_E=0.01\text{mA}$                                            | $BV_{ECO}$    | 0.1                | --        | --  | V             |
| Coupled Characteristics              | Conditions                                                     | Symbol        | Min                | Typ.      | Max | Unit          |
| Current Transfer Ratio               | $I_F=1\text{mA}, V_{CE}=2\text{V}$                             | CTR           | 1000               | 2000      | --  | %             |
| Collector-Emitter Saturation Voltage | $I_F=20\text{mA}, I_C=100\text{mA}$                            | $V_{CE(SAT)}$ | --                 | 1.2       | 1.5 | V             |
| Isolation Resistance                 | $V_{IO}=500\text{V}_{DC}, RH40\sim60\%$                        | $R_{ISO}$     | $5 \times 10^{10}$ | $10^{11}$ | --  | $\Omega$      |
| Cut-off Frequency                    | $V_{CE}=2\text{V}, I_C=2\text{mA}, R_L=100\Omega, -3\text{dB}$ | $f_c$         | --                 | 7         | --  | kHz           |
| Isolation Capacitance                | $V_{IO}=0\text{V}, f=1\text{MHz}$                              | $C_{ISO}$     | --                 | 0.6       | --  | pF            |
| Rise Time                            | $V_{CE}=2\text{V}, I_C=20\text{mA}, R_L=100\Omega$             | $t_r$         | --                 | 80        | 250 | $\mu\text{s}$ |
| Fall Time                            | $V_{CE}=2\text{V}, I_C=20\text{mA}, R_L=100\Omega$             | $t_f$         | --                 | 10        | 100 | $\mu\text{s}$ |

Note:  $T_A=25^\circ\text{C}$  unless otherwise noted.

Switching Time Waveform

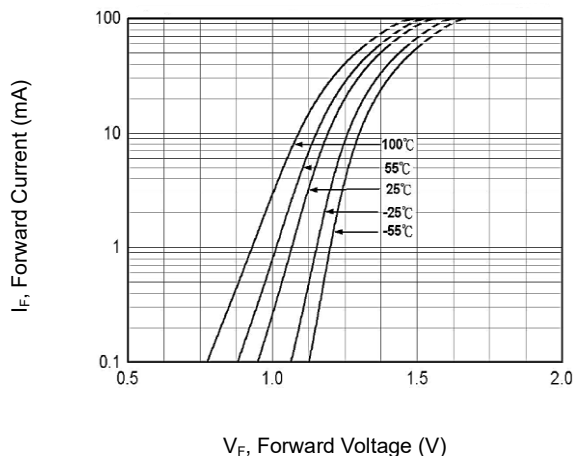


Switching Test Circuit

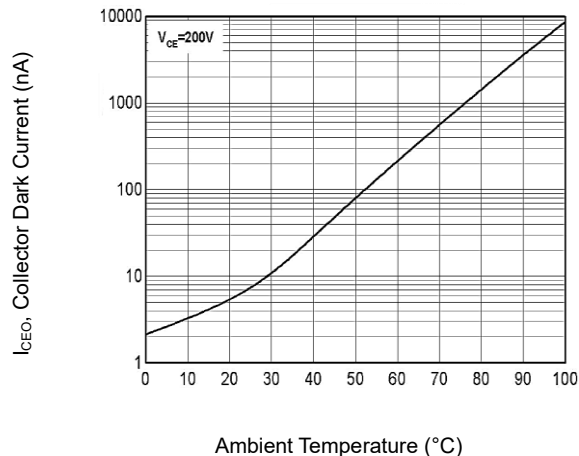


### CHARACTERISTIC CURVES

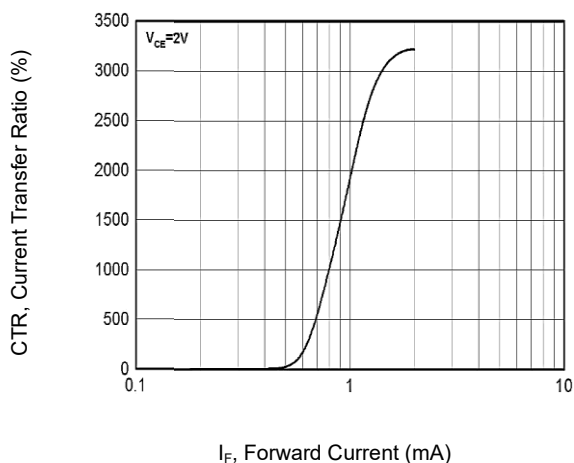
Forward Current vs. Forward Voltage



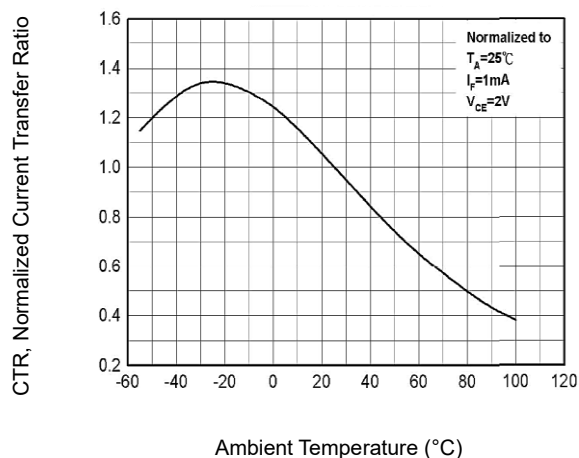
Collector Dark Current vs. Temperature



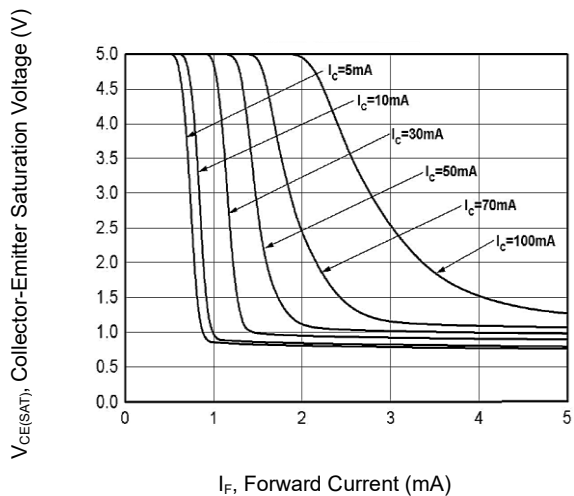
Current Transfer Ratio vs. Forward Current



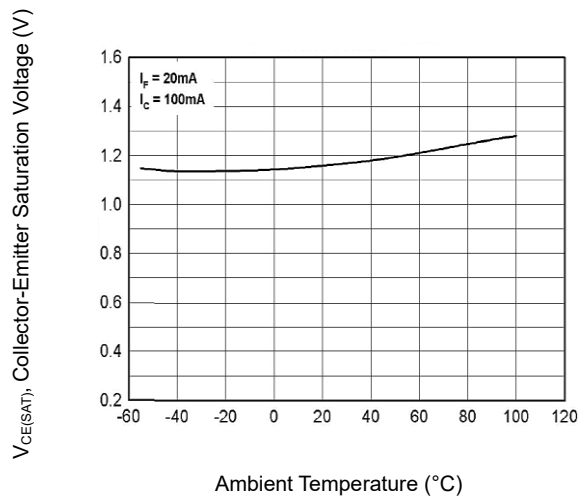
Relative Current Transfer Ratio vs. Temperature



Collector-Emitter Saturation Voltage vs. Forward Current

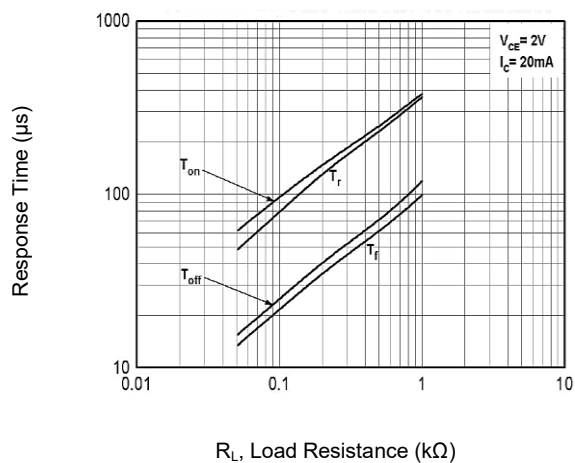


Collector-Emitter Saturation Voltage vs. Temperature

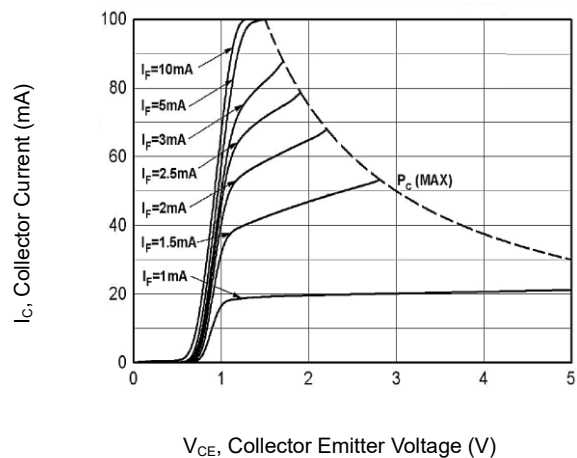


### CHARACTERISTIC CURVES

Response Time vs. Load Resistance



Collector Current vs. Collector Emitter Voltage



Frequency Response

