


Small Outline Optoisolators Transistor Output

These devices consist of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon phototransistor detector, in a surface mountable, small outline, plastic package. They are ideally suited for high density applications, and eliminate the need for through-the-board mounting.

- Convenient Plastic SOIC-8 Surface Mountable Package Style
 - Standard SOIC-8 Footprint, with 0.050" Lead Spacing
- Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering
- High Input-Output Isolation of 3000 Vac (rms) Guaranteed
- UL Recognized  File #E90700, Volume 2

Ordering Information:

- To obtain MOC211, 212 and 213 in Tape and Reel, add R2 suffix to device numbers:
R2 = 2500 units on 13" reel
- To obtain MOC211, 212 and 213 in quantities of 50 (shipped in sleeves) — No Suffix

Marking Information:

- MOC211 = 211
- MOC212 = 212
- MOC213 = 213

Applications:

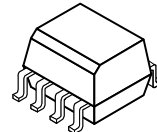
- General Purpose Switching Circuits
- Interfacing and coupling systems of different potentials and impedances
- Regulation Feedback Circuits
- Monitor and Detection Circuits

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

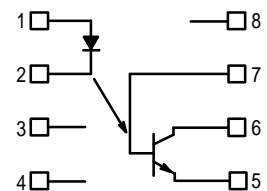
| Rating | Symbol | Value | Unit |
|---|--------------------|-------------|-------------|
| INPUT LED | | | |
| Forward Current — Continuous | I _F | 60 | mA |
| Forward Current — Peak (PW = 100 μs, 120 pps) | I _{F(pk)} | 1.0 | A |
| Reverse Voltage | V _R | 6.0 | V |
| LED Power Dissipation @ T _A = 25°C Derate above 25°C | P _D | 90 0.8 | mW mW/°C |
| OUTPUT TRANSISTOR | | | |
| Collector-Emitter Voltage | V _{CEO} | 30 | V |
| Collector-Base Voltage | V _{CB0} | 70 | V |
| Emitter-Collector Voltage | V _{ECO} | 7.0 | V |
| Collector Current — Continuous | I _C | 150 | mA |
| Detector Power Dissipation @ T _A = 25°C Derate above 25°C | P _D | 150 1.76 | mW mW/°C |

MOC211
MOC212
MOC213

**SMALL OUTLINE
OPTOISOLATORS
TRANSISTOR OUTPUT**



SCHEMATIC



1. LED ANODE
2. LED CATHODE
3. NO CONNECTION
4. NO CONNECTION
5. EMITTER
6. COLLECTOR
7. BASE
8. NO CONNECTION

MAXIMUM RATINGS — continued ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Rating | Symbol | Value | Unit |
|--|-----------|-------------|-------------|
| TOTAL DEVICE | | | |
| Input–Output Isolation Voltage ^(1,2) (60 Hz, 1.0 sec. duration) | V_{ISO} | 3000 | Vac(rms) |
| Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 250 2.94 | mW mW/°C |
| Ambient Operating Temperature Range ⁽³⁾ | T_A | –45 to +100 | °C |
| Storage Temperature Range ⁽³⁾ | T_{stg} | –45 to +125 | °C |
| Lead Soldering Temperature (1/16" from case, 10 sec. duration) | — | 260 | °C |

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)⁽⁴⁾

| Characteristic | Symbol | Min | Typ ⁽⁴⁾ | Max | Unit |
|----------------|--------|-----|--------------------|-----|------|
|----------------|--------|-----|--------------------|-----|------|

INPUT LED

| | | | | | |
|--|-------|---|------|-----|---------------|
| Forward Voltage ($I_F = 10\text{ mA}$) | V_F | — | 1.15 | 1.5 | V |
| Reverse Leakage Current ($V_R = 6.0\text{ V}$) | I_R | — | 0.1 | 100 | μA |
| Capacitance | C | — | 18 | — | pF |

OUTPUT TRANSISTOR

| | | | | | |
|--|---------------|-----|-----|----|---------------|
| Collector–Emitter Dark Current ($V_{CE} = 10\text{ V}$, $T_A = 25^\circ\text{C}$) ($V_{CE} = 10\text{ V}$, $T_A = 100^\circ\text{C}$) | I_{CEO1} | — | 1.0 | 50 | nA |
| | I_{CEO2} | — | 1.0 | — | μA |
| Collector–Emitter Breakdown Voltage ($I_C = 100\ \mu\text{A}$) | $V_{(BR)CEO}$ | 30 | 90 | — | V |
| Emitter–Collector Breakdown Voltage ($I_E = 100\ \mu\text{A}$) | $V_{(BR)ECO}$ | 7.0 | 7.8 | — | V |
| Collector–Emitter Capacitance ($f = 1.0\text{ MHz}$, $V_{CE} = 0$) | C_{CE} | — | 7.0 | — | pF |

COUPLED

| | | | | | | |
|--|----------------------------|----------------------------|----------------------------------|----------------------------------|-------------|---------------|
| Output Collector Current ($I_F = 10\text{ mA}$, $V_{CE} = 10\text{ V}$) | MOC211 MOC212 MOC213 | I_C (CTR) ⁽⁵⁾ | 2.0 (20) 5.0 (50) 10 (100) | 6.5 (65) 9.0 (90) 14 (140) | — — — | mA (%) |
| Collector–Emitter Saturation Voltage ($I_C = 2.0\text{ mA}$, $I_F = 10\text{ mA}$) | | $V_{CE(sat)}$ | — | 0.15 | 0.4 | V |
| Turn–On Time ($I_C = 2.0\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\ \Omega$) | | t_{on} | — | 7.5 | — | μs |
| Turn–Off Time ($I_C = 2.0\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\ \Omega$) | | t_{off} | — | 5.7 | — | μs |
| Rise Time ($I_C = 2.0\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\ \Omega$) | | t_r | — | 3.2 | — | μs |
| Fall Time ($I_C = 2.0\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\ \Omega$) | | t_f | — | 4.7 | — | μs |
| Input–Output Isolation Voltage ($f = 60\text{ Hz}$, $t = 1.0\text{ sec.}$) ^(1,2) | | V_{ISO} | 3000 | — | — | Vac(rms) |
| Isolation Resistance ($V_{I-O} = 500\text{ V}$) ⁽²⁾ | | R_{ISO} | 10^{11} | — | — | Ω |
| Isolation Capacitance ($V_{I-O} = 0$, $f = 1.0\text{ MHz}$) ⁽²⁾ | | C_{ISO} | — | 0.2 | — | pF |

1. Input–Output Isolation Voltage, V_{ISO} , is an internal device dielectric breakdown rating.
2. For this test, pins 1 and 2 are common, and pins 5, 6 and 7 are common.
3. Refer to Quality and Reliability Section in Opto Data Book for information on test conditions.
4. Always design to the specified minimum/maximum electrical limits (where applicable).
5. Current Transfer Ratio (CTR) = $I_C/I_F \times 100\%$.

TYPICAL CHARACTERISTICS

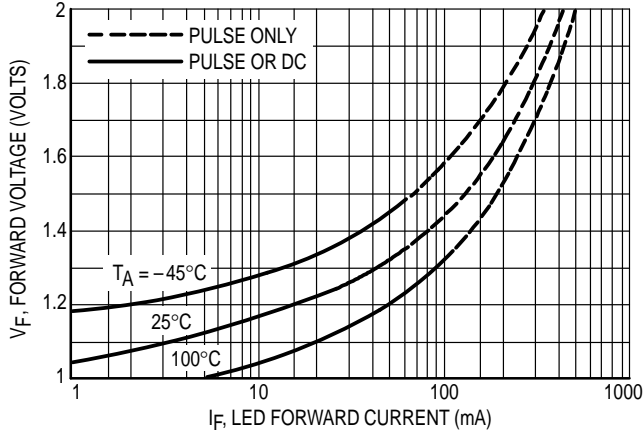


Figure 1. LED Forward Voltage versus Forward Current

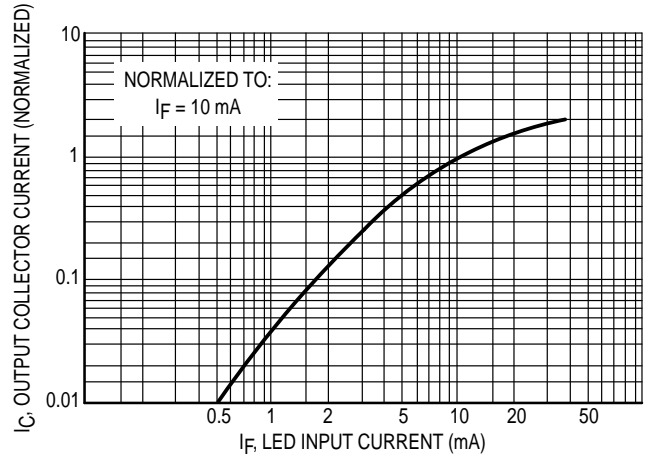


Figure 2. Output Current versus Input Current

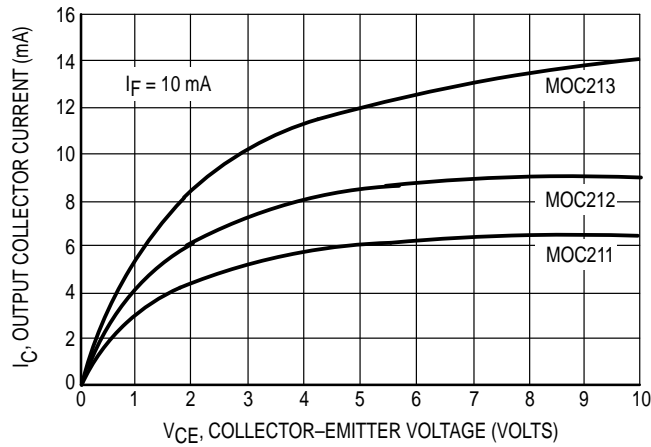


Figure 3. Output Current versus Collector-Emitter Voltage

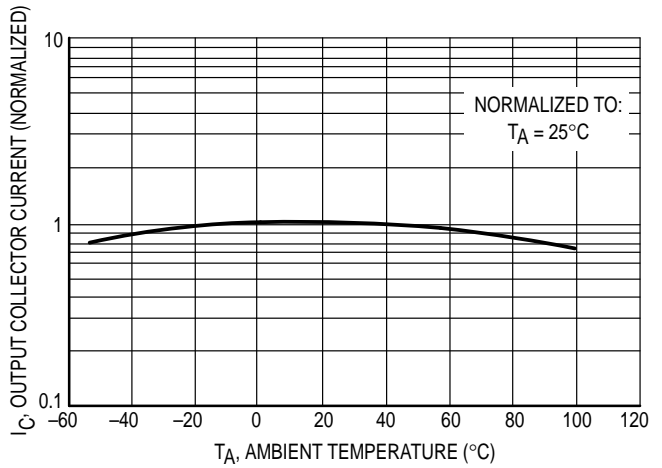


Figure 4. Output Current versus Ambient Temperature

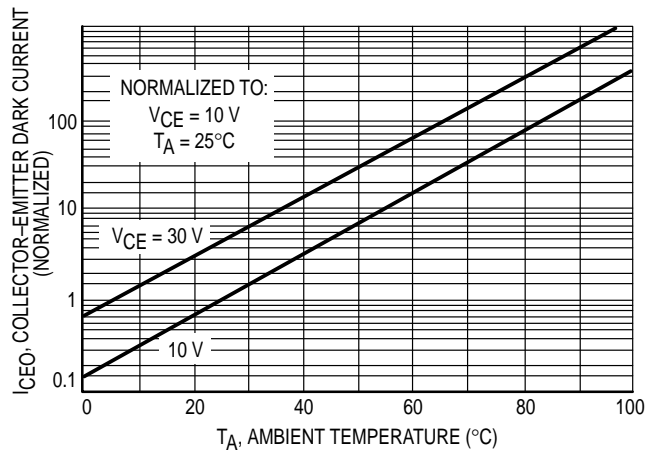


Figure 5. Dark Current versus Ambient Temperature

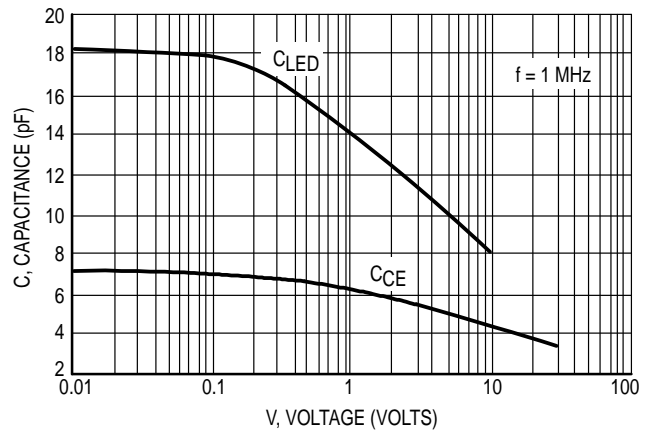
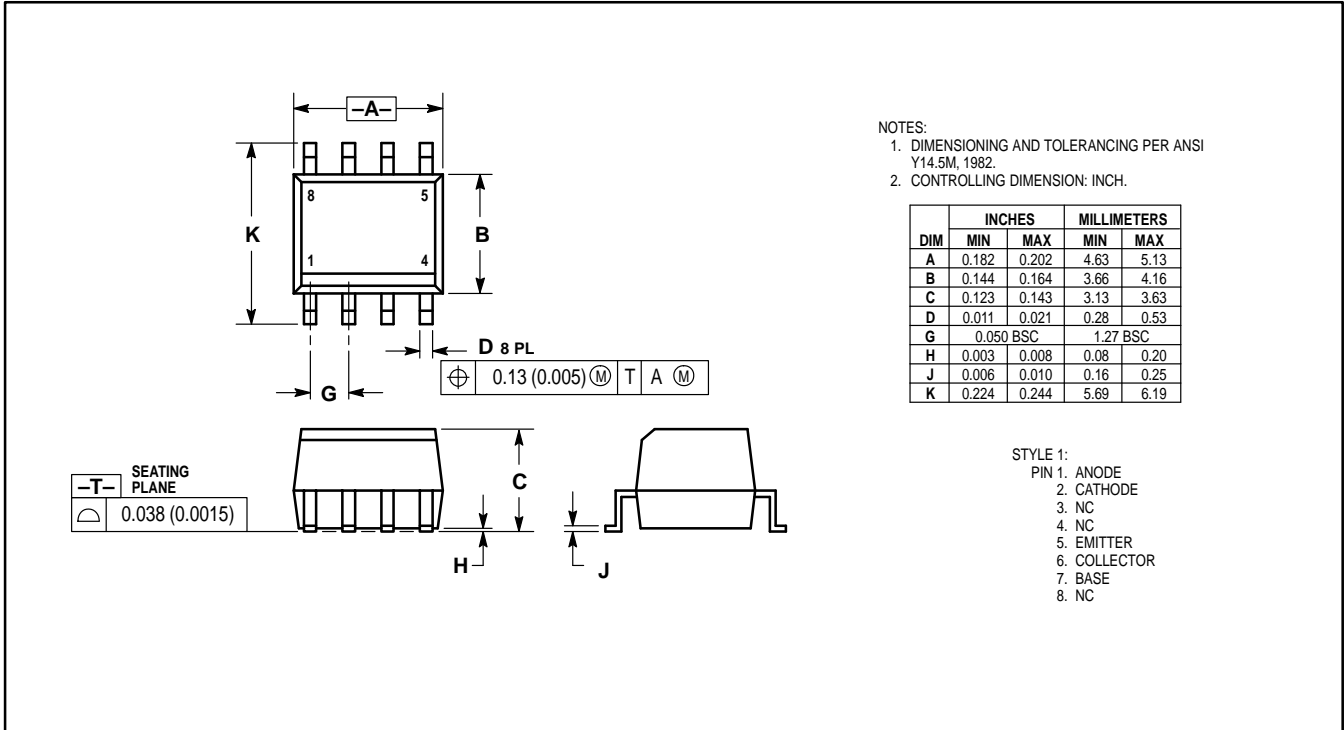


Figure 6. Capacitance versus Voltage

PACKAGE DIMENSIONS



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