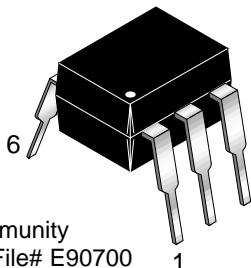


DESCRIPTION

The MOC8020 and MOC8021 are photodarlington-type optically coupled optocouplers. The devices have a gallium arsenide infrared emitting diode coupled with a silicon darlington phototransistor.

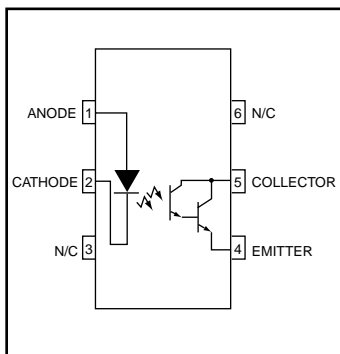
FEATURES

- High current transfer ratio
-500% (MOC8020)
-1000% (MOC8021)
- No base connection for improved noise immunity
- Underwriters Laboratory (UL) recognized File# E90700

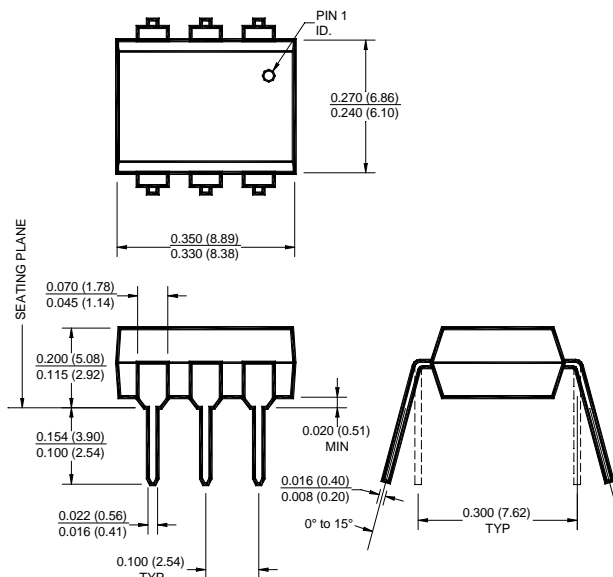


APPLICATIONS

- Appliances, measuring instruments
- I/O interface for computers
- Programmable controllers
- Portable electronics
- Interfacing and coupling systems of different potentials and impedance
- Solid state relays



PACKAGE DIMENSIONS



NOTE
All dimensions are in inches (millimeters)

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)

| Parameter | Symbol | Value | Units |
|---|-----------|----------------|----------------------|
| TOTAL DEVICE | | | |
| Storage Temperature | T_{STG} | -55 to +150 | $^\circ\text{C}$ |
| Operating Temperature | T_{OPR} | -55 to +100 | $^\circ\text{C}$ |
| Lead Solder Temperature | T_{SOL} | 260 for 10 sec | $^\circ\text{C}$ |
| Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ | P_D | 250 | mW |
| Derate above 25°C | | 2.94 | mW/ $^\circ\text{C}$ |
| Input-Output Isolation Voltage | V_{ISO} | 5300 | Vac(rms) |
| EMITTER | | | |
| DC/Average Forward Input Current | I_F | 60 | mA |
| Reverse Input Voltage | V_R | 3 | V |
| LED Power Dissipation @ $T_A = 25^\circ\text{C}$ | P_D | 120 | mW |
| Derate above 25°C | | 1.41 | mW/ $^\circ\text{C}$ |
| DETECTOR | | | |
| Collector-Emitter Voltage | V_{CEO} | 50 | V |
| Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ | P_D | 150 | mW |
| Derate above 25°C | | 1.76 | mW/ $^\circ\text{C}$ |
| Continuous Collector Current | I_C | 150 | mA |

MOC8020

MOC8021

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)

INDIVIDUAL COMPONENT CHARACTERISTICS

| Parameter | Test Conditions | Symbol | Min | Typ** | Max | Unit |
|-------------------------------------|------------------------------------|------------|-----|-------|-----|---------------|
| EMITTER | | | | | | |
| Input Forward Voltage | ($I_F = 10\text{ mA}$) | V_F | | 1.15 | 2 | V |
| Input Capacitance | ($V_F = 0, f = 1\text{ MHz}$) | C_{IN} | | 18 | | pF |
| Reverse Leakage Current | ($V_R = 3.0\text{ V}$) | I_R | | 0.05 | 10 | μA |
| DETECTOR | | | | | | |
| Collector-Emitter Breakdown Voltage | ($I_C = 1.0\text{ mA}$) | BV_{CEO} | 50 | | | V |
| Emitter-Collector Breakdown Voltage | ($I_E = 100\text{ }\mu\text{A}$) | BV_{ECO} | 5 | | | V |
| Collector-Emitter Dark Current | ($V_{CE} = 10\text{ V}$) | I_{CEO} | | | 100 | nA |

TRANSFER CHARACTERISTICS

| DC Characteristic | Test Conditions | Symbol | Min | Typ** | Max | Units |
|--------------------------------------|---|---------------|------|-------|-----|-------|
| Current Transfer Ratio, | MOC8020 ($I_F = 10\text{ mA}, V_{CE} = 5\text{ V}$) | CTR | 500 | | | % |
| Collector-Emitter | MOC8021 ($I_F = 10\text{ mA}, V_{CE} = 5\text{ V}$) | | 1000 | | | |
| Collector-Emitter Saturation Voltage | ($I_F = 10\text{ mA}, I_C = 25\text{ mA}$) | $V_{CE(SAT)}$ | | | 2 | V |

TRANSFER CHARACTERISTICS

| Characteristic | Test Conditions | Symbol | Min | Typ** | Max | Units |
|------------------------|--|-----------|-----|-------|-----|---------------|
| SWITCHING TIMES | | | | | | |
| Turn-on Time | ($V_{CC} = 10\text{ V}, R_L = 100\Omega, I_F = 5\text{ mA}$) | t_{on} | | 3.5 | | μs |
| Turn-off Time | | t_{off} | | 95 | | μs |

ISOLATION CHARACTERISTICS

| Characteristic | Test Conditions | Symbol | Min | Typ** | Max | Units |
|--------------------------------|--|-----------|-----------|-------|-----|----------|
| Input-Output Isolation Voltage | ($I_{I-O} \leq 1\text{ }\mu\text{A}, 1\text{ min.}$) | V_{ISO} | 7500 | | | Vac(pk) |
| | ($I_{I-O} \leq 1\text{ }\mu\text{A}, 1\text{ min.}$) | | 5300 | | | Vac(rms) |
| Isolation Resistance | ($V_{I-O} = 500\text{ VDC}$) | R_{ISO} | 10^{11} | | | Ω |
| Isolation Capacitance | ($f = 1\text{ MHz}$) | C_{ISO} | | 0.5 | | pf |

Note
** Typical values at $T_A = 25^\circ\text{C}$

Fig. 1 Output Current vs. Input Current

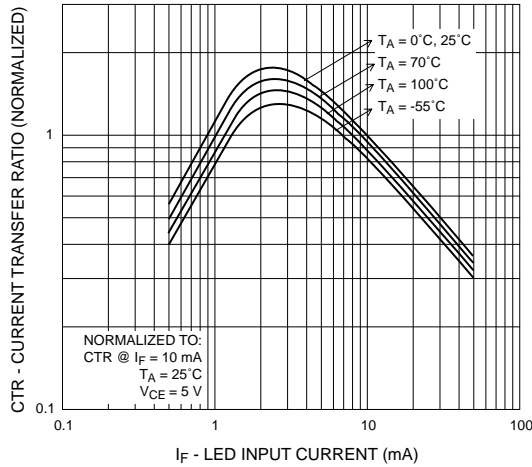


Fig. 2 Current Transfer Ratio vs. Ambient Temperature

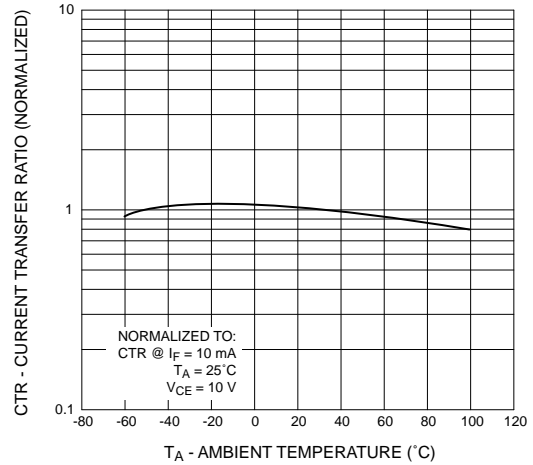


Fig. 3 Collector Current vs. Collector-Emitter Voltage

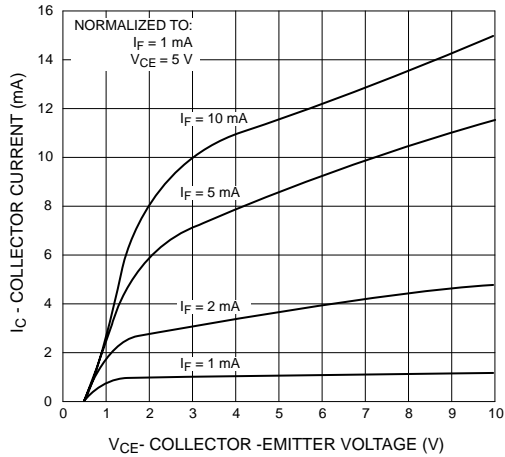


Fig. 4 Dark Current vs. Ambient Temperature

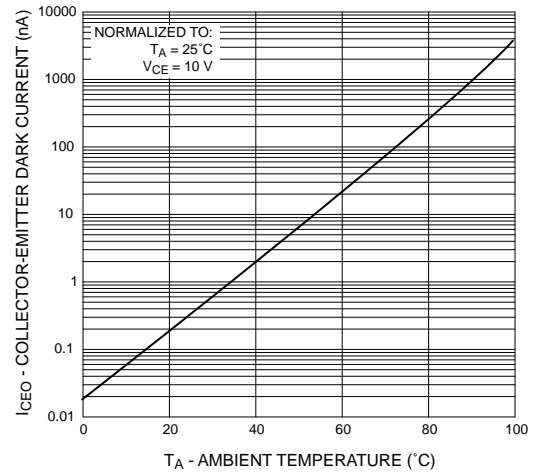


Fig. 5 Turn-On Time vs. Input Current

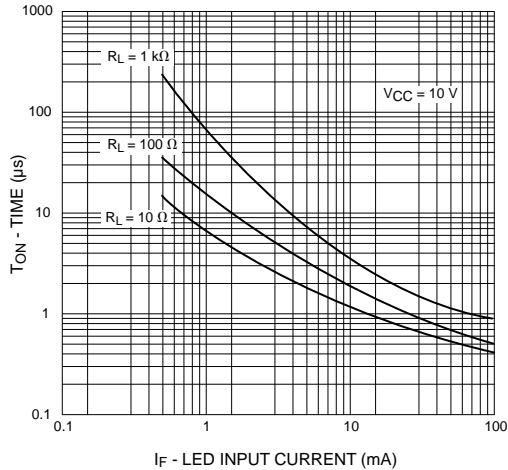
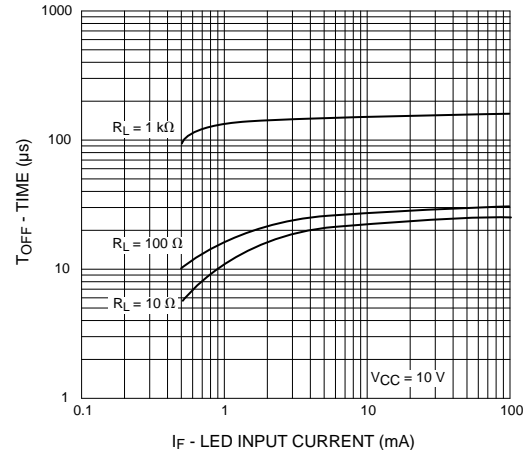


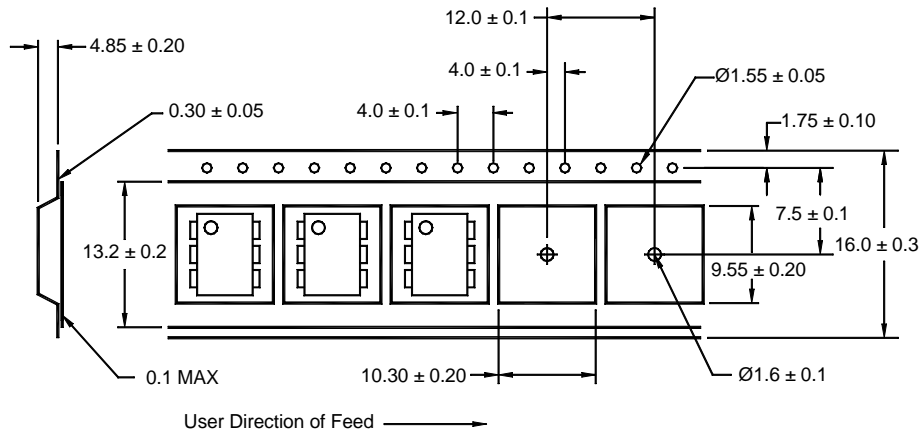
Fig. 6 Turn-Off Time vs. Input Current

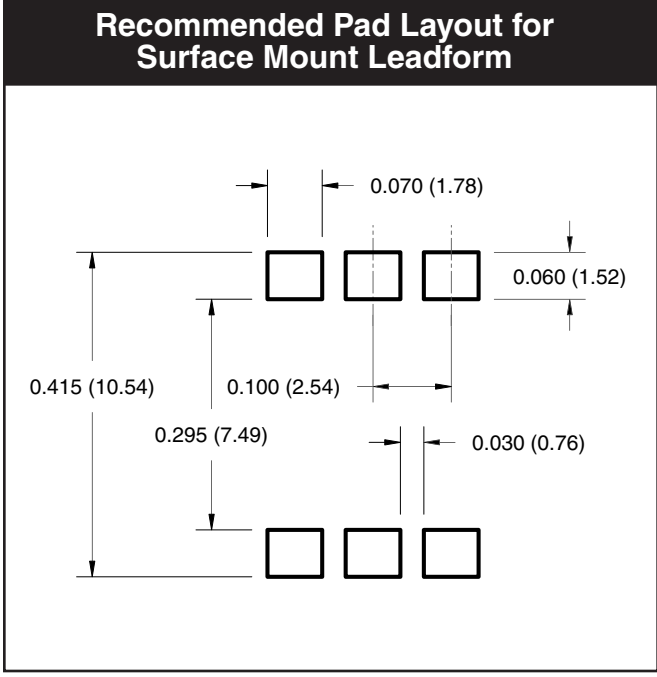


ORDERING INFORMATION

| Option | Order Entry Identifier | Description |
|--------|------------------------|--------------------------------------|
| S | .S | Surface Mount Lead Bend |
| SD | .SD | Surface Mount; Tape and reel |
| W | .W | 0.4" Lead Spacing |
| 300 | .300 | VDE 0884 |
| 300W | .300W | VDE 0884, 0.4" Lead Spacing |
| 3S | .3S | VDE 0884, Surface Mount |
| 3SD | .3SD | VDE 0884, Surface Mount, Tape & Reel |

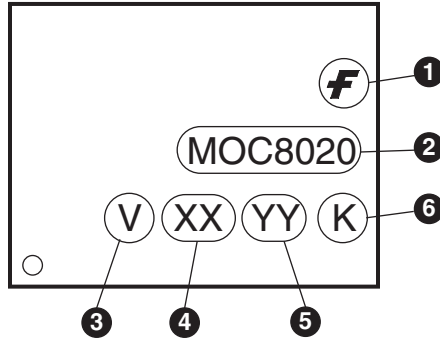
QT Carrier Tape Specifications ("D" Taping Orientation)





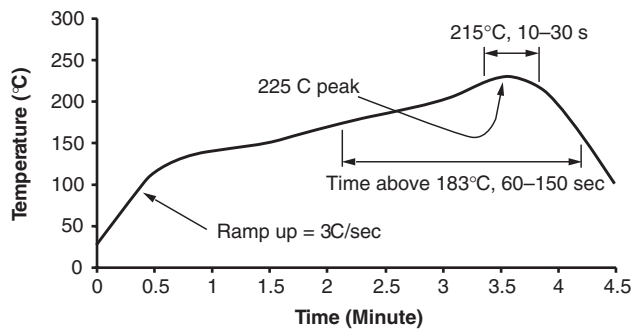
Note
All dimensions are in inches (millimeters)

MARKING INFORMATION



| Definitions | |
|-------------|--|
| 1 | Fairchild logo |
| 2 | Device number |
| 3 | VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table) |
| 4 | Two digit year code, e.g., '03' |
| 5 | Two digit work week ranging from '01' to '53' |
| 6 | Assembly package code |

Reflow Profile (Black Package, No Suffix)



- Peak reflow temperature: 225°C (package surface temperature)
- Time of temperature higher than 183°C for 60–150 seconds
- One time soldering reflow is recommended

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| Bottomless™ | FPST™ | MICROCOUPLER™ | PowerSaver™ | SuperSOT™-3 |
| CoolFET™ | FRFET™ | MicroFET™ | PowerTrench® | SuperSOT™-6 |
| CROSSVOLT™ | GlobalOptoisolator™ | MicroPak™ | QFET® | SuperSOT™-8 |
| DOMET™ | GTO™ | MICROWIRE™ | QS™ | SyncFET™ |
| EcoSPARK™ | HiSeC™ | MSX™ | QT Optoelectronics™ | TinyLogic® |
| E ² CMOS™ | μC™ | MSXPro™ | Quiet Series™ | TINYOPTO™ |
| EnSigna™ | i-Lo™ | OCX™ | RapidConfigure™ | TruTranslation™ |
| FACT™ | ImpliedDisconnect™ | OCXPro™ | RapidConnect™ | UHC™ |
| FACT Quiet Series™ | | OPTOLOGIC® | μSerDes™ | UltraFET® |
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| The Power Franchise® | | PACMAN™ | SMART START™ | |
| Programmable Active Droop™ | | POP™ | SPM™ | |

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| Datasheet Identification | Product Status | Definition |
|--------------------------|------------------------|---|
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