

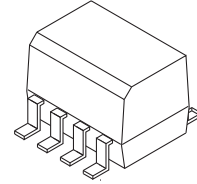
MOC215-M

MOC216-M

MOC217-M

DESCRIPTION

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.



FEATURES

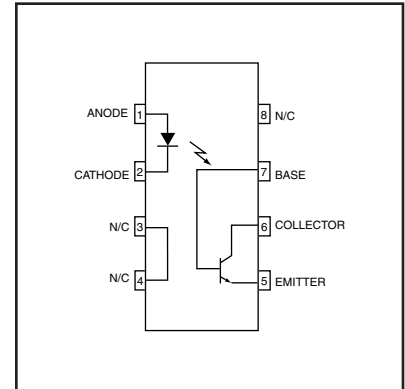
- UL Recognized (File #E90700, Volume 2)
- VDE Recognized (File #13616) (add option "V" for VDE approval, i.e., MOC215V-M)
- Convenient Plastic SOIC-8 Surface Mountable Package Style
- Low LED Input Current Required, for Easier Logic Interfacing
- Standard SOIC-8 Footprint, with 0.050" Lead Spacing
- Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering
- High Input-Output Isolation of 2500 Vac (rms) Guaranteed

APPLICATIONS

- Low power Logic Circuits
- Interfacing and coupling systems of different potentials and impedances
- Telecommunications equipment
- Portable electronics

Marking Information:

- MOC215-M = 215
- MOC216-M = 216
- MOC217-M = 217



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| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ Unless otherwise specified) | | | |
|--|---------------|--------------|----------------------------|
| Rating | Symbol | Value | Unit |
| EMITTER | | | |
| 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 @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 90 0.8 | mW mW/ $^\circ\text{C}$ |
| DETECTOR | | | |
| Collector-Emitter Voltage | V_{CEO} | 30 | V |
| Collector-Base Voltage | V_{CBO} | 70 | V |
| Emitter-Collector Voltage | V_{ECO} | 7.0 | V |
| Collector Current-Continuous | I_C | 150 | mA |
| Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 150 1.76 | mW mW/ $^\circ\text{C}$ |
| TOTAL DEVICE | | | |
| Input-Output Isolation Voltage ^(1,2) (60 Hz, 1 minute duration) | V_{ISO} | 2500 | Vac(rms) |
| Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 250 2.94 | mW mW/ $^\circ\text{C}$ |
| Ambient Operating Temperature Range | T_A | -40 to +100 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -40 to +125 | $^\circ\text{C}$ |

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| ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified) | | | | | | |
|--|---|------------|-----------------|-------------|-------------|---------------|
| Characteristic | | Symbol | Min | Typ** | Max | Unit |
| EMITTER | | | | | | |
| Forward Voltage | ($I_F = 1.0\text{ mA}$) | V_F | — | 1.07 | 1.3 | V |
| Reverse Leakage Current | ($V_R = 6.0\text{ V}$) | I_R | — | 0.001 | 100 | μA |
| Capacitance | | C | — | 18 | — | pF |
| DETECTOR | | | | | | |
| Collector-Emitter Dark Current | ($V_{CE} = 5.0\text{ V}, T_A = 25^\circ\text{C}$) | I_{CEO} | — | 1.0 | 50 | nA |
| | ($V_{CE} = 5.0\text{ V}, T_A = 100^\circ\text{C}$) | | — | 1.0 | — | μA |
| Collector-Emitter Breakdown Voltage | ($I_C = 100\ \mu\text{A}$) | BV_{CEO} | 30 | 100 | — | V |
| Emitter-Collector Breakdown Voltage | ($I_E = 100\ \mu\text{A}$) | BV_{ECO} | 7.0 | 10 | — | V |
| Collector-Emitter Capacitance | ($f = 1.0\text{ MHz}, V_{CE} = 0$) | C_{CE} | — | 7.0 | — | pF |
| COUPLED | | | | | | |
| Output Collector Current ⁽⁴⁾ | MOC215-M MOC216-M MOC217-M | I_C | 20 50 100 | — — — | — — — | % |
| | ($I_F = 1.0\text{ mA}, V_{CE} = 5.0\text{ V}$) | | | | | |
| Collector-Emitter Saturation Voltage | ($I_C = 100\ \mu\text{A}, I_F = 1.0\text{ mA}$) | | | | | |
| Turn-On Time | ($I_C = 2.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\ \Omega$, fig. 10) | t_{on} | — | 4.0 | — | μs |
| Turn-Off Time | ($I_C = 2.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\ \Omega$, fig. 10) | t_{off} | — | 4.0 | — | μs |
| Rise Time | ($I_C = 2.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\ \Omega$, fig. 10) | t_r | — | 3.0 | — | μs |
| Fall Time | ($I_C = 2.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\ \Omega$, fig. 10) | t_f | — | 3.0 | — | μs |
| Input-Output Isolation Voltage ^(1,2,3) | ($f = 60\text{ Hz}, t = 1.0\text{ min.}$) | V_{ISO} | 2500 | — | — | Vac(rms) |
| Isolation Resistance ⁽²⁾ | ($V_{I-O} = 500\text{ V}$) | R_{ISO} | 10^{11} | — | — | Ω |
| Isolation Capacitance ⁽²⁾ | ($V_{I-O} = 0, f = 1.0\text{ MHz}$) | C_{ISO} | — | 0.2 | — | pF |

** Typical values at $T_A = 25^\circ\text{C}$ unless otherwise noted.

1. Input-Output Isolation Surge 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. V_{ISO} rating of 2,500 $V_{AC(RMS)}$ for $t = 1$ minute is equivalent to a rating of 3,000 $V_{AC(RMS)}$ for $t = 1$ second.
4. Current Transfer Ratio (CTR) = $I_C/I_F \times 100\%$.

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Fig. 1 LED Forward Voltage vs. Forward Current

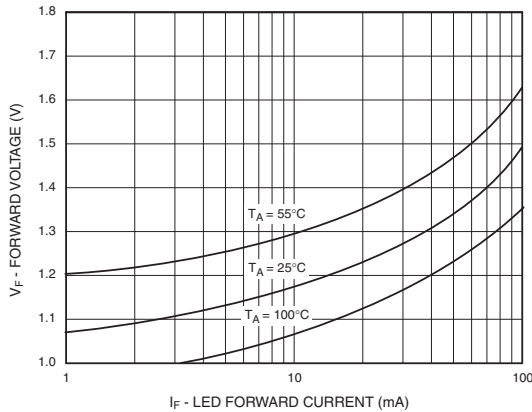


Fig. 2 Output Current vs. Input Current

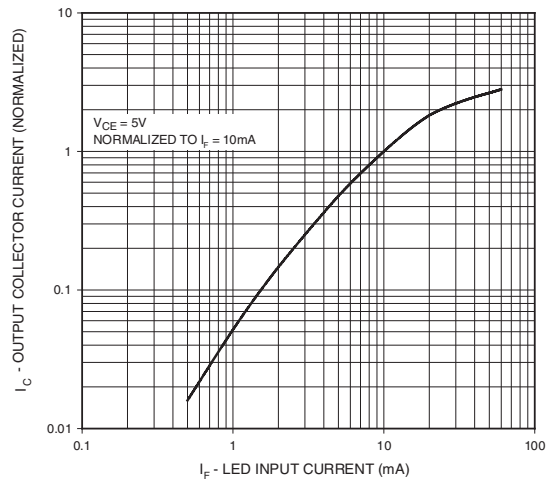


Fig. 3 Output Current vs. Ambient Temperature

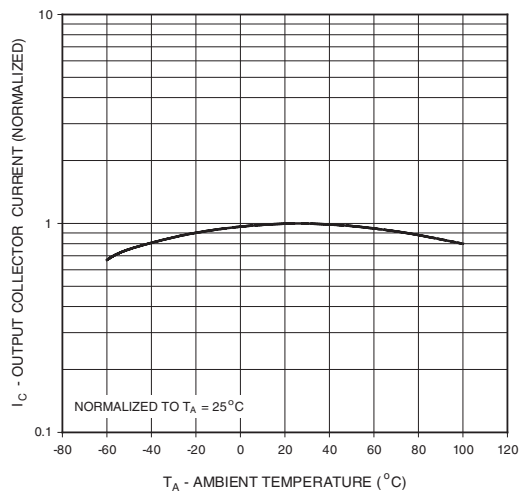


Fig. 4 Output Current vs. Collector - Emitter Voltage

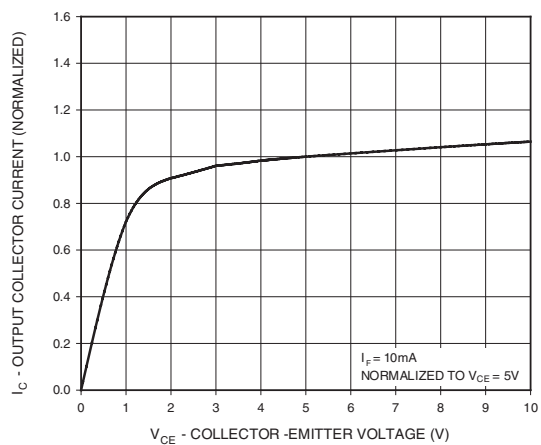


Fig. 5 Dark Current vs. Ambient Temperature

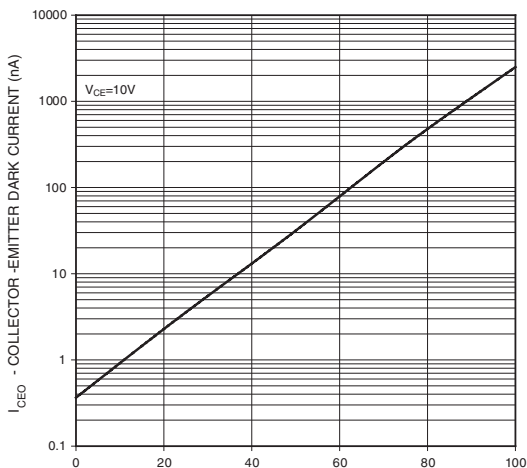
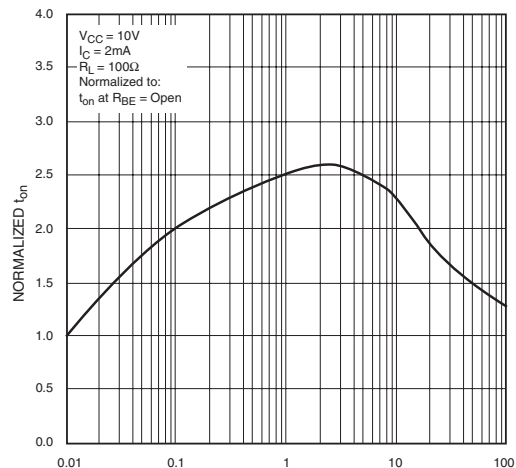


Fig. 6 Normalized t_on vs. R_BE



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Fig. 7 Normalized t_{off} vs. R_{BE}

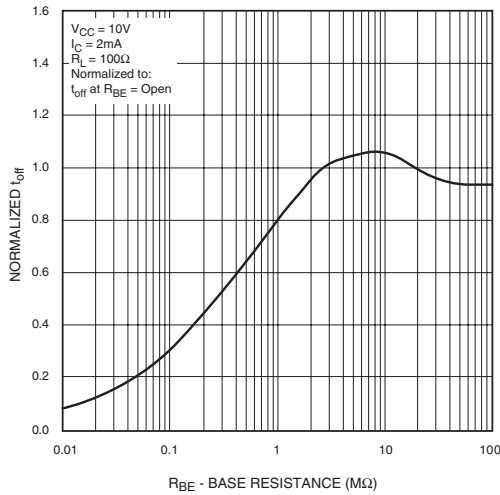


Fig. 8 CTR vs. R_{BE} (Saturated)

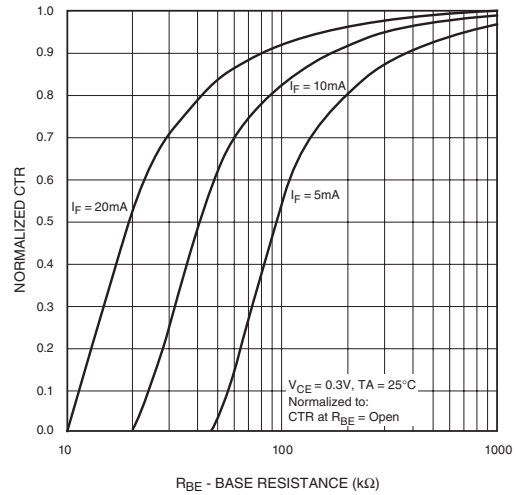
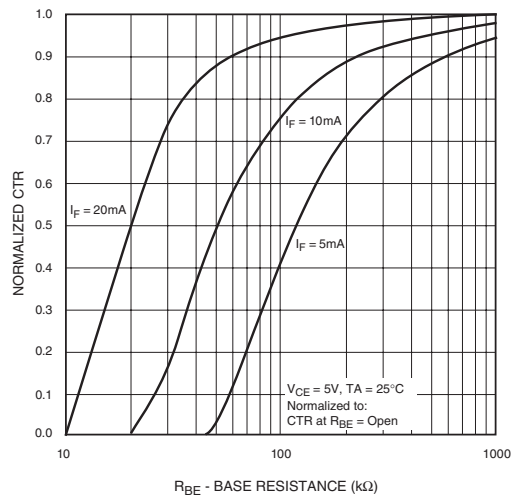


Fig. 9 CTR vs. R_{BE} (Unsaturated)



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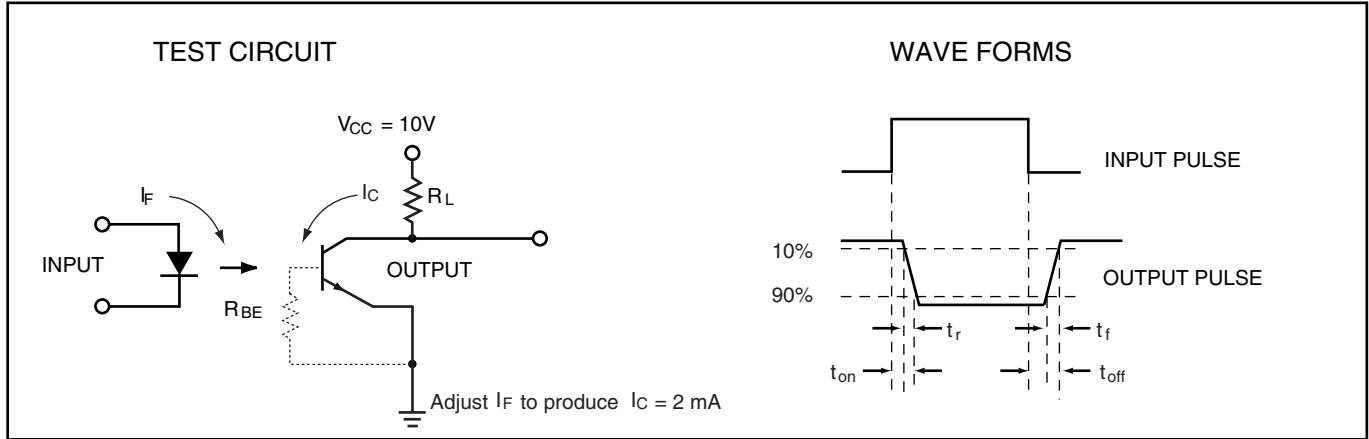
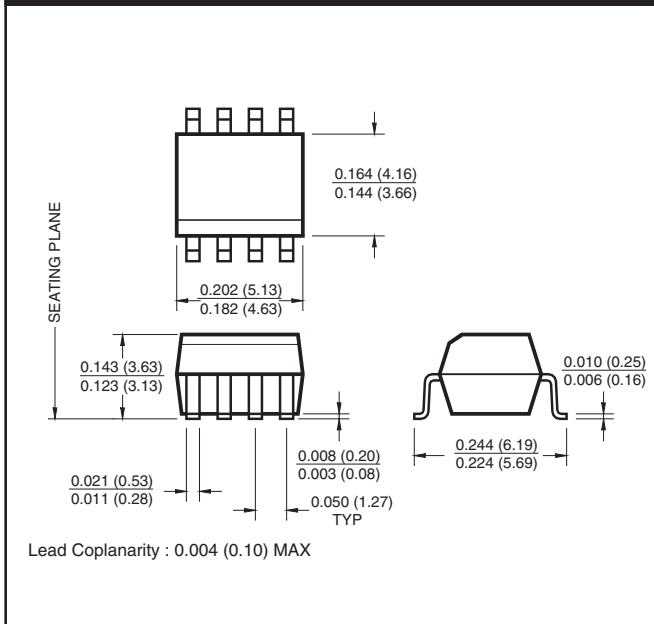
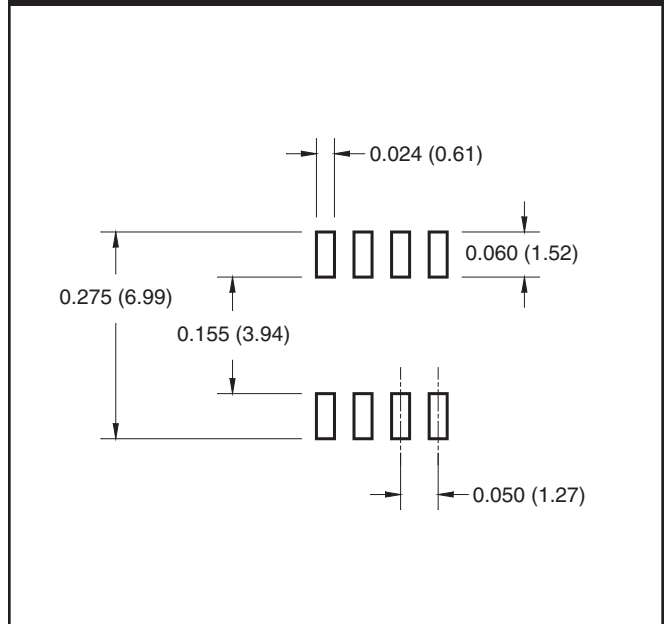


Figure 10. Switching Time Test Circuit and Waveforms

Package Dimensions (Surface Mount)



8-Pin Small Outline



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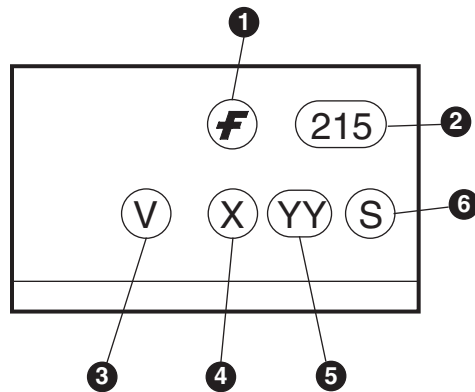
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ORDERING INFORMATION

| Option | Order Entry Identifier | Description |
|--------|------------------------|---|
| V | V | VDE 0084 |
| R1 | R1 | Tape and reel (500 units per reel) |
| R1V | R1V | VDE 0884, Tape and reel (500 units per reel) |
| R2 | R2 | Tape and reel (2500 units per reel) |
| R2V | R2V | VDE 0884, Tape and reel (2500 units per reel) |

MARKING INFORMATION



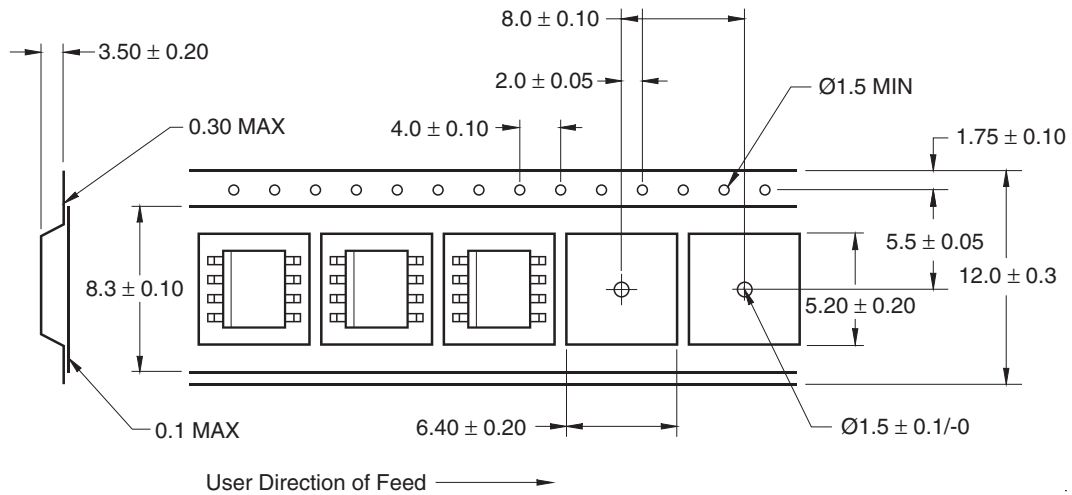
| Definitions | |
|-------------|--|
| 1 | Fairchild logo |
| 2 | Device number |
| 3 | VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table) |
| 4 | One digit year code, e.g., '3' |
| 5 | Two digit work week ranging from '01' to '53' |
| 6 | Assembly package code |

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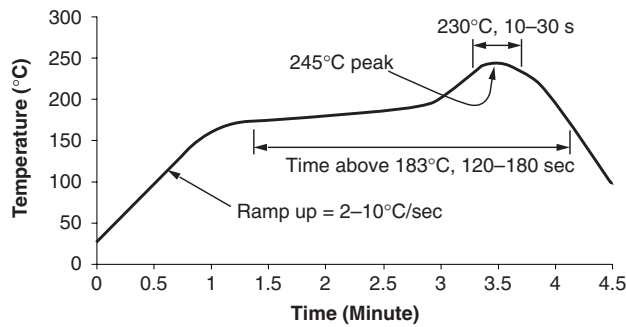
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Carrier Tape Specifications



Reflow Profile



- Peak reflow temperature: 245°C (package surface temperature)
- Time of temperature higher than 183°C for 120-180 seconds
- One time soldering reflow is recommended

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