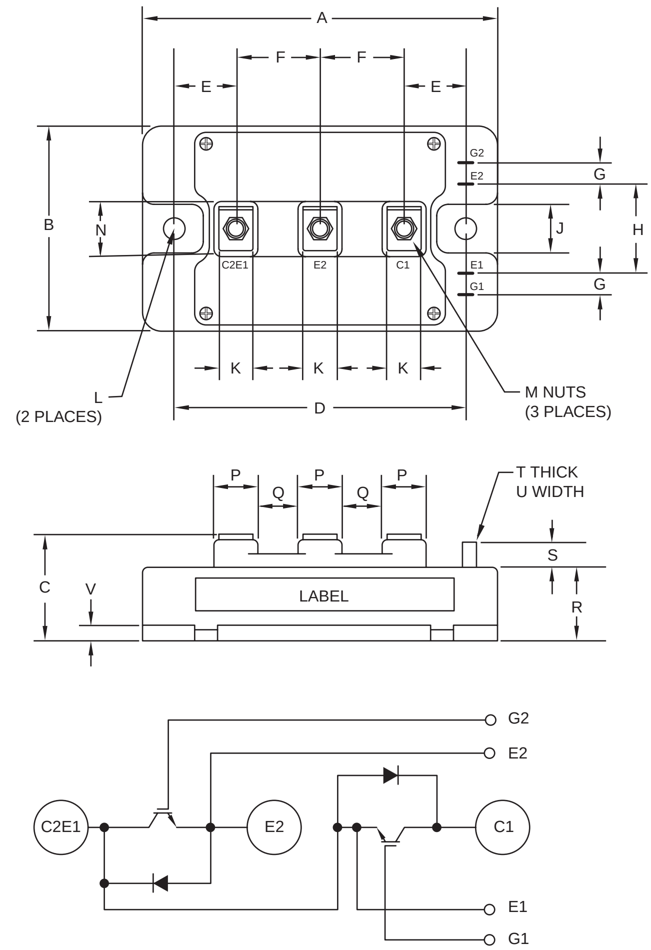
# CM100DY-34A

Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwrx.com

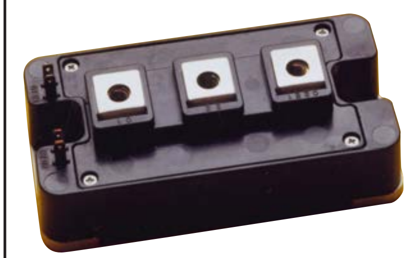
## Dual IGBTMOD™
## A-Series Module
### 100 Amperes/1700 Volts




**Outline Drawing and Circuit Diagram**

| Dimensions | Inches | Millimeters |
|---|---|---|
| A | 3.70 | 94.0 |
| B | 1.89 | 48.0 |
| C | 1.14+0.04/-0.02 | 29.0+1.0/-0.5 |
| D | 3.15±0.01 | 80.0±0.25 |
| E | 0.67 | 17.0 |
| F | 0.91 | 23.0 |
| G | 0.16 | 4.0 |
| H | 0.71 | 18.0 |
| J | 0.51 | 13.0 |
| K | 0.47 | 12.0 |

| Dimensions | Inches | Millimeters |
|---|---|---|
| L | 0.26 Dia. | Dia. 6.5 |
| M | M5 Metric | M5 |
| N | 0.79 | 20.0 |
| P | 0.63 | 16.0 |
| Q | 0.28 | 7.0 |
| R | 0.83 | 21.2 |
| S | 0.30 | 7.5 |
| T | 0.02 | 0.5 |
| U | 0.110 | 2.8 |
| V | 0.16 | 4.0 |



**Description:**
Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of two IGBT Transistors in a half-bridge configuration with each transistor having a reverse-connected super-fast recovery free-wheel diode. All components and interconnects are isolated from the heat sinking baseplate, offering simplified system assembly and thermal management.

**Features:**
- ☐ Low Drive Power
- ☐ Low $V_{CE(sat)}$
- ☐ Discrete Super-Fast Recovery Free-Wheel Diode
- ☐ Isolated Baseplate for Easy Heat Sinking

**Applications:**
- ☐ AC Motor Control
- ☐ UPS
- ☐ Battery Powered Supplies

**Ordering Information:**
Example: Select the complete part module number you desire from the table below -i.e. CM100DY-34A is a 1700V ($V_{CES}$), 100 Ampere Dual IGBTMOD™ Power Module.

| Type | Current Rating Amperes | $V_{CES}$ Volts (x 50) |
|---|---|---|
| CM | 100 | 34 |

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## Absolute Maximum Ratings, $T_j$ = 25°C unless otherwise specified

| Ratings | Symbol | CM100DY-34A | Units |
|---|---|---|---|
| Junction Temperature | $T_j$ | –40 to 150 | °C |
| Storage Temperature | $T_{stg}$ | –40 to 125 | °C |
| Collector-Emitter Voltage (G-E Short) | $V_{CES}$ | 1700 | Volts |
| Gate-Emitter Voltage (C-E Short) | $V_{GES}$ | ±20 | Volts |
| Collector Current (DC, $T_C$ = 108°C)*4 | $I_C$ | 100 | Amperes |
| Peak Collector Current (Pulse Repetition)*2 | $I_{CM}$ | 200 | Amperes |
| Maximum Collector Dissipation ($T_C$ = 25°C, $T_j \leq$ 150°C)*2,*4 | $P_C$ | 960 | Watts |
| Emitter Current ($T_C$ = 25°C) | $I_E$*1 | 100 | Amperes |
| Peak Emitter Current (Pulse Repetition)*2 | $I_{EM}$*1 | 200 | Amperes |
| Mounting Torque, M5 Main Terminal | — | 30 | in-lb |
| Mounting Torque, M6 Mounting | — | 40 | in-lb |
| Weight | — | 310 | Grams |
| Isolation Voltage (Main Terminal to Baseplate, f = 60Hz, AC 1 min.) | $V_{ISO}$ | 3500 | Volts |

## Static Electrical Characteristics, $T_j$ = 25°C unless otherwise specified

| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Collector-Cutoff Current | $I_{CES}$ | $V_{CE} = V_{CES}$, $V_{GE}$ = 0V | — | — | 1.0 | mA |
| Gate Leakage Current | $I_{GES}$ | $V_{GE} = V_{GES}$, $V_{CE}$ = 0V | — | — | 2.0 | μA |
| Gate-Emitter Threshold Voltage | $V_{GE(th)}$ | $I_C$ = 10mA, $V_{CE}$ = 10V | 5.5 | 7.0 | 8.5 | Volts |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C$ = 100A, $V_{GE}$ = 15V, $T_j$ = 25°C*3 | — | 2.2 | 2.8 | Volts |
| | | $I_C$ = 100A, $V_{GE}$ = 15V, $T_j$ = 125°C*3 | — | 2.45 | — | Volts |
| Total Gate Charge | $Q_G$ | $V_{CC}$ = 1000V, $I_C$ = 100A, $V_{GE}$ = 15V | — | 670 | — | nC |
| Emitter-Collector Voltage | $V_{EC}$*1 | $I_E$ = 100A, $V_{GE}$ = 0V*3 | — | — | 3.0 | Volts |

## Dynamic Electrical Characteristics, $T_j$ = 25°C unless otherwise specified

| Characteristics | | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|
| Input Capacitance | | $C_{ies}$ | $V_{CE}$ = 10V, $V_{GE}$ = 0V | — | — | 24.7 | nf |
| Output Capacitance | | $C_{oes}$ | | — | — | 2.8 | nf |
| Reverse Transfer Capacitance | | $C_{res}$ | | — | — | 0.53 | nf |
| Inductive | Turn-on Delay Time | $t_{d(on)}$ | $V_{CC}$ = 1000V, $I_C$ = 100A, | — | — | 200 | ns |
| Load | Rise Time | $t_r$ | $V_{GE1} = V_{GE2}$ = 15V, $R_G$ = 4.8Ω, | — | — | 150 | ns |
| Switch | Turn-off Delay Time | $t_{d(off)}$ | Inductive Load | — | — | 550 | ns |
| Time | Fall Time | $t_f$ | Switching Operation, | — | — | 350 | ns |
| Diode Reverse Recovery Time | | $t_{rr}$*1 | $I_E$ = 100A | — | — | 300 | ns |
| Diode Reverse Recovery Charge | | $Q_{rr}$*1 | | — | 10 | — | μC |

*1 Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).
*2 Pulse width and repetition rate should be such that device junction temperature ($T_j$) does not exceed $T_{j(max)}$ rating.
*3 Pulse width and repetition rate should be such as to cause negligible temperature rise.
*4 Case temperature ($T_C$), and heatsink temperature ($T_f$) measured point is just under the chips.

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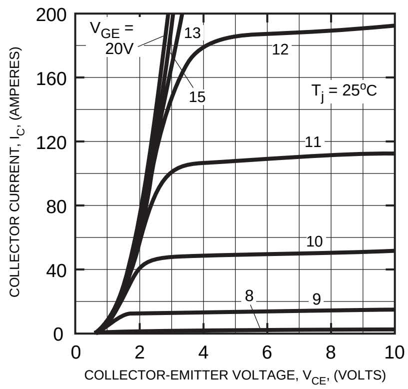
## Thermal and Mechanical Characteristics, $T_j$ = 25°C unless otherwise specified

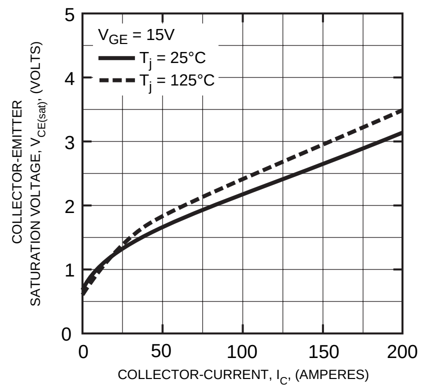
| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Thermal Resistance, Junction to Case | $R_{th(j-c)}Q$ | Per IGBT*4 | — | — | 0.13 | °C/W |
| Thermal Resistance, Junction to Case | $R_{th(j-c)}D$ | Per FWDi*4 | — | — | 0.21 | °C/W |
| Contact Thermal Resistance | $R_{th(c-f)}$ | Thermal Grease Applied*4,*5 | — | — | — | °C/W |
| External Gate Resistance | $R_G$ | | 4.8 | — | 48 | Ω |

*4 Case temperature ($T_C$), and heatsink temperature ($T_f$) measured point is just under the chips.
*5 Typical value is measured by using thermally conductive grease of λ = 0.9 [W/(m • K)].

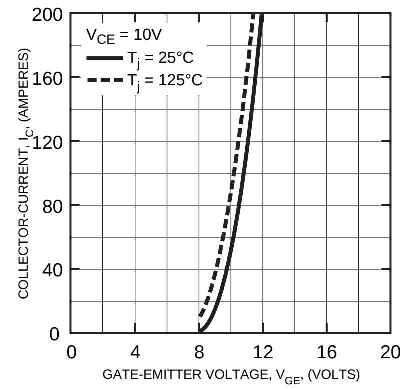
OUTPUT CHARACTERISTICS
(TYPICAL)



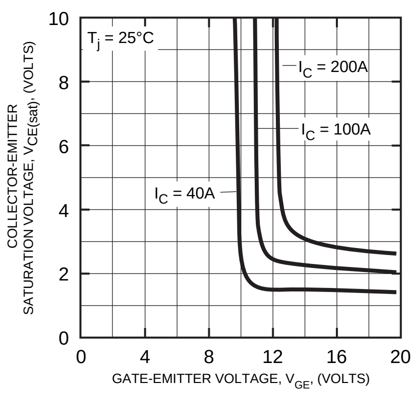

COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



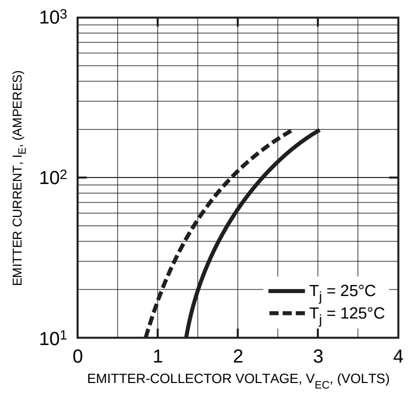

TRANSFER CHARACTERISTICS
(TYPICAL)



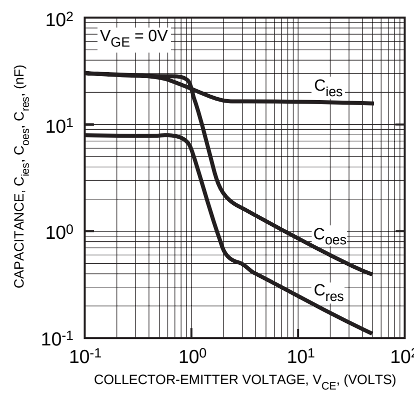

COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)




FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)




CAPACITANCE VS. $V_{CE}$
(TYPICAL)



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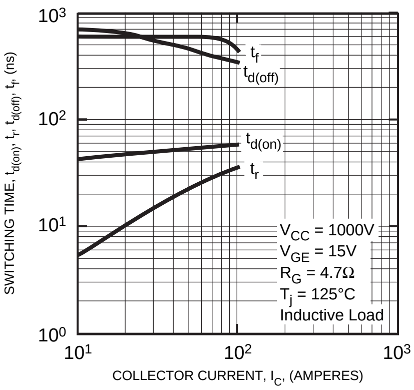
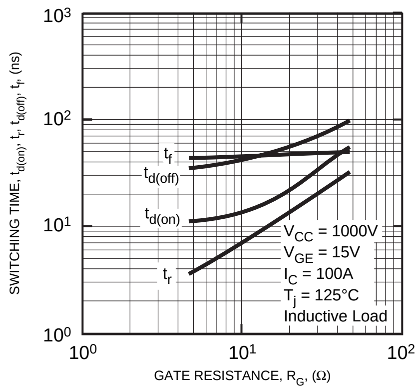
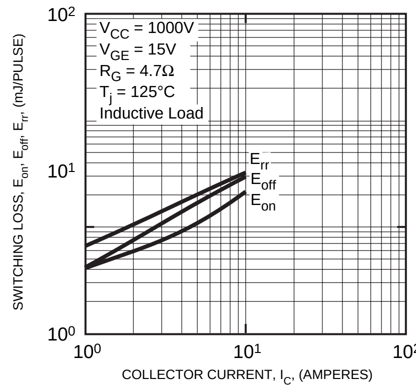
**SWITCHING TIME VS. COLLECTOR CURRENT (TYPICAL)**



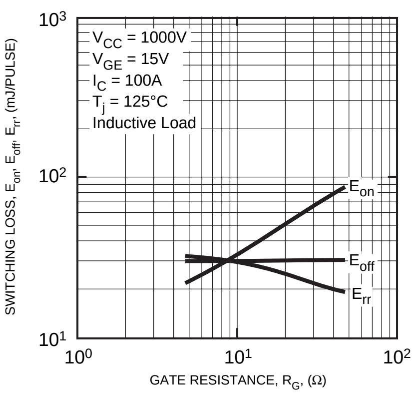

**SWITCHING TIME VS. GATE RESISTANCE (TYPICAL)**



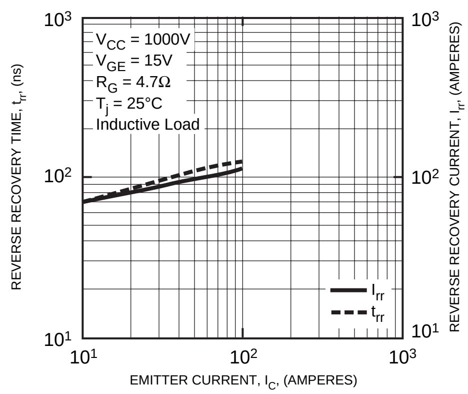

**SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)**



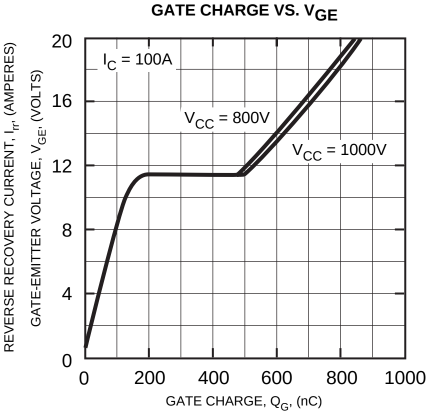

**SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)**




**REVERSE RECOVERY CHARACTERISTICS (TYPICAL)**




**GATE CHARGE VS. $V_{GE}$**




**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & FWDi)**