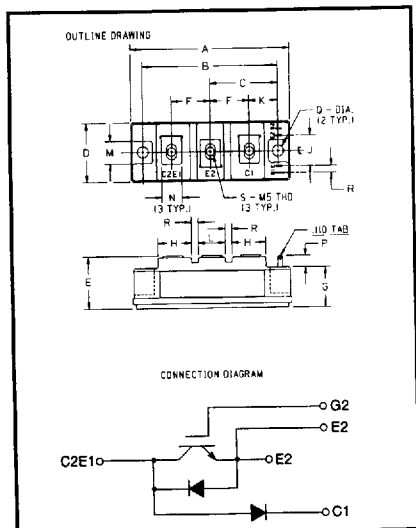
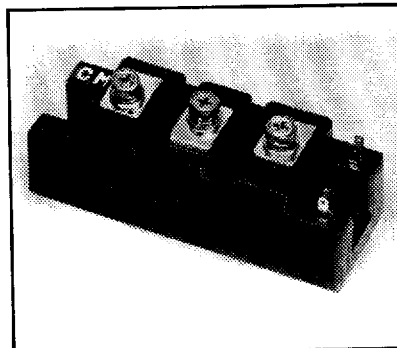


### Chopper IGBTMOD™ E-Series Module 100 Amperes/600 Volts



**CM100E3Y-12E**  
Outline Drawing



**CM100E3Y-12E**  
Chopper IGBTMOD™ E-Series Module  
100 Amperes/600 Volts

#### Description:

Powerex Chopper IGBTMOD™ Modules are designed for use in switching applications. Each module consists of one IGBT Transistor having a reverse-connected super-fast recovery free-wheel diode and an anode-collector 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 (150ns) Free-Wheel Diode
- ☐ High Frequency Operation (15-20kHz)
- ☐ Isolated Baseplate for Easy Heat Sinking

#### Applications:

- ☐ DC Motor Control
- ☐ Boost Regulator

#### Ordering Information:

Example: Select the complete part module number you desire from the table below  
-i.e. CM100E3Y-12E is a 600V ( $V_{CES}$ ), 100 Ampere Chopper IGBTMOD™ Power Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 100                       | 12                        |

| Dimensions | Inches     | Millimeters |
|------------|------------|-------------|
| A          | 3.70       | 94.0        |
| B          | 3.150±0.01 | 80.0±0.25   |
| C          | 1.57       | 40.0        |
| D          | 1.34       | 34.0        |
| E          | 1.22 Max.  | 31.0 Max.   |
| F          | 0.90       | 23.0        |
| G          | 0.85       | 21.5        |
| H          | 0.79       | 20.0        |
| J          | 0.71       | 18.0        |
| K          | 0.67       | 17.0        |
| L          | 0.63       | 16.0        |
| M          | 0.51       | 13.0        |
| N          | 0.47       | 12.0        |
| P          | 0.28       | 7.0         |
| Q          | 0.256 Dia. | Dia. 6.5    |
| R          | 0.16       | 4.0         |
| S          | M5 Metric  | M5          |

**CM100E3Y-12E**  
**Chopper IGBTMOD™ E-Series Module**  
 100 Amperes/600 Volts

**Absolute Maximum Ratings,  $T_J = 25^\circ\text{C}$  unless otherwise specified**

| Ratings                                 | Symbol    | CM100E3Y-12E | Units            |
|-----------------------------------------|-----------|--------------|------------------|
| Junction Temperature                    | $T_J$     | -40 to 150   | $^\circ\text{C}$ |
| Storage Temperature                     | $T_{stg}$ | -40 to 125   | $^\circ\text{C}$ |
| Collector-Emitter Voltage (G-E SHORT)   | $V_{CES}$ | 600          | Volts            |
| Gate-Emitter Voltage                    | $V_{GES}$ | $\pm 20$     | Volts            |
| Collector Current                       | $I_C$     | 100          | Amperes          |
| Peak Collector Current                  | $I_{CM}$  | 200*         | Amperes          |
| Diode Forward Current                   | $I_{FM}$  | 100          | Amperes          |
| Diode Forward Surge Current             | $I_{FM}$  | 200*         | Amperes          |
| Power Dissipation                       | $P_d$     | 400          | Watts            |
| Max. Mounting Torque M5 Terminal Screws | —         | 17           | in-lb            |
| Max. Mounting Torque M6 Mounting Screws | —         | 26           | in-lb            |
| Module Weight (Typical)                 | —         | 190          | Grams            |
| V Isolation                             | $V_{RMS}$ | 2500         | Volts            |

\* Pulse width and repetition rate should be such that device junction temperature does not exceed the device rating.

**Static Electrical Characteristics,  $T_J = 25^\circ\text{C}$  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                 | $I_{GES}$     | $V_{GE} = V_{GES}, V_{CE} = 0V$                     | —    | —    | 0.5   | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{GE(th)}$  | $I_C = 10\text{mA}, V_{CE} = 10V$                   | 3.5  | 5.0  | 6.5   | Volts         |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 100A, V_{GE} = 15V$                          | —    | 2.7  | 3.5** | Volts         |
|                                      |               | $I_C = 100A, V_{GE} = 15V, T_J = 150^\circ\text{C}$ | —    | 2.7  | —     | Volts         |
| Total Gate Charge                    | $Q_G$         | $V_{CC} = 300V, I_C = 100A, V_{GS} = 15V$           | —    | 500  | —     | nC            |
| Diode Forward Voltage                | $V_{FM}$      | $I_E = 100A, V_{GS} = 0V$                           | —    | —    | 2.5   | Volts         |

\*\* Pulse width and repetition rate should be such that device junction temperature rise is negligible.

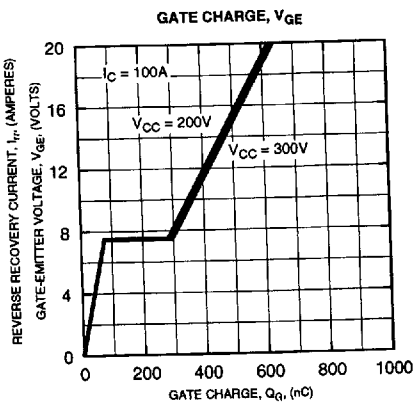
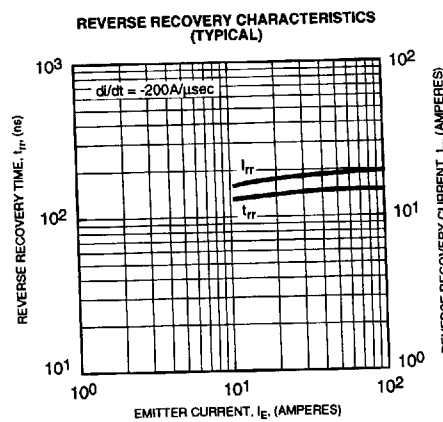
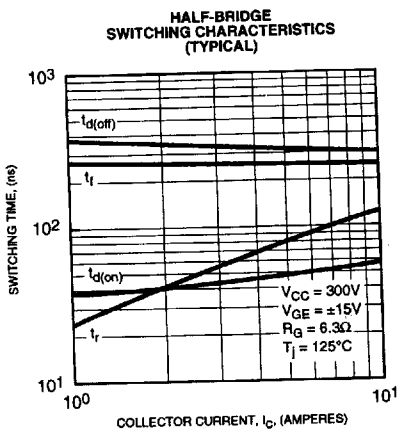
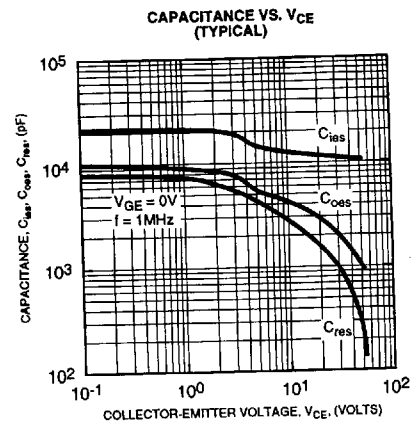
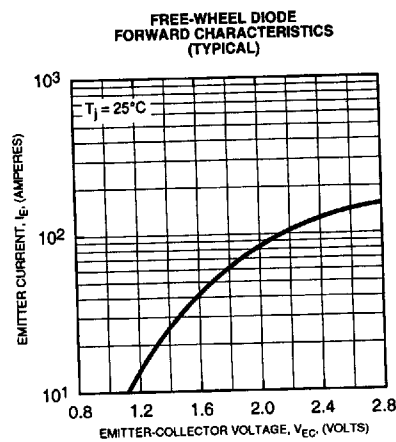
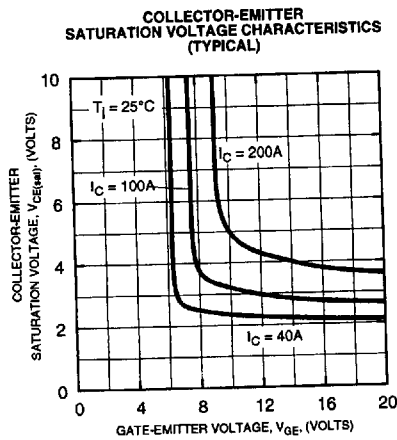
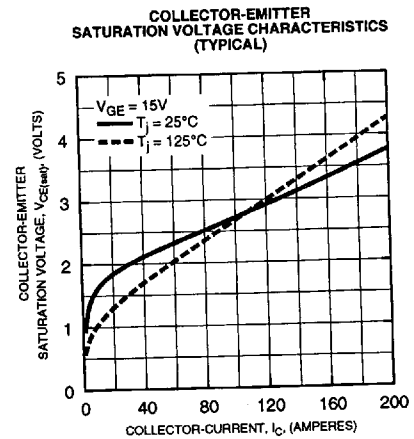
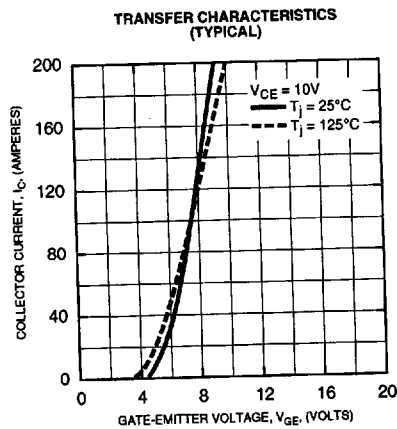
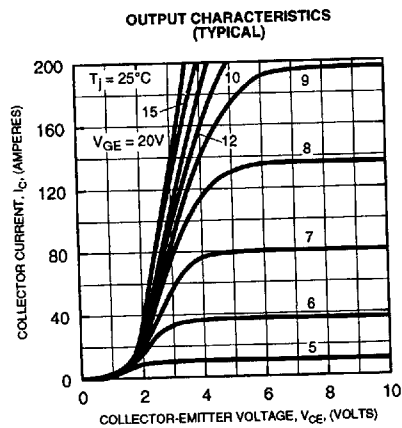
**Dynamic Electrical Characteristics,  $T_J = 25^\circ\text{C}$  unless otherwise specified**

| Characteristics               | Symbol              | Test Conditions                                                       | Min. | Typ. | Max. | Units         |
|-------------------------------|---------------------|-----------------------------------------------------------------------|------|------|------|---------------|
| Input Capacitance             | $C_{ies}$           | $V_{GE} = 0V, V_{CE} = 10V, f = 1\text{MHz}$                          | —    | —    | 20   | nF            |
| Output Capacitance            | $C_{oes}$           |                                                                       | —    | —    | 6    | nF            |
| Reverse Transfer Capacitance  | $C_{res}$           |                                                                       | —    | —    | 4    | nF            |
| Resistive                     | Turn-on Delay Time  | $V_{CC} = 300V, I_C = 100A, V_{GE1} = V_{GE2} = 15V, R_G = 6.3\Omega$ | —    | —    | 150  | ns            |
| Load                          | Rise Time           |                                                                       | —    | —    | 300  | ns            |
| Switch Times                  | Turn-off Delay Time |                                                                       | —    | —    | 400  | ns            |
|                               | Fall Time           |                                                                       | —    | —    | 350  | ns            |
| Diode Reverse Recovery Time   | $t_{rr}$            | $I_E = 100A, di_E/dt = -200A/\mu s$                                   | —    | —    | 200  | ns            |
| Diode Reverse Recovery Charge | $Q_{rr}$            | $I_E = 100A, di_E/dt = -200A/\mu s$                                   | —    | 1.3  | —    | $\mu\text{C}$ |

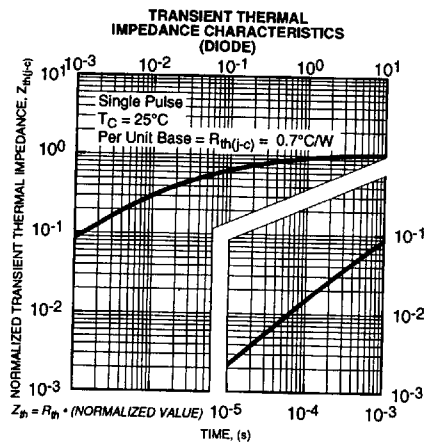
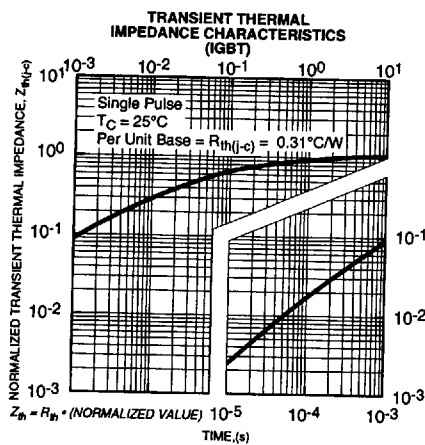
**Thermal and Mechanical Characteristics,  $T_J = 25^\circ\text{C}$  unless otherwise specified**

| Characteristics                      | Symbol        | Test Conditions      | Min. | Typ. | Max. | Units              |
|--------------------------------------|---------------|----------------------|------|------|------|--------------------|
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per IGBT             | —    | —    | 0.31 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per Free Wheel Diode | —    | —    | 0.70 | $^\circ\text{C/W}$ |
| Contact Thermal Resistance           | $R_{th(c-f)}$ | Per Half Module      | —    | —    | 0.15 | $^\circ\text{C/W}$ |

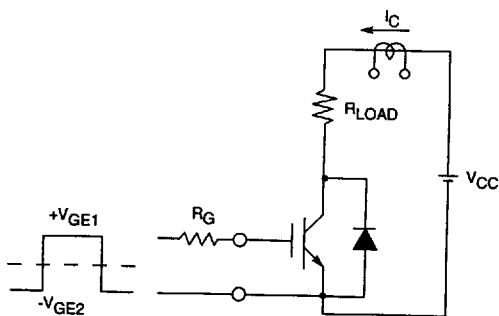
**CM100E3Y-12E**  
**Chopper IGBTMOD™ E-Series Module**  
 100 Amperes/600 Volts



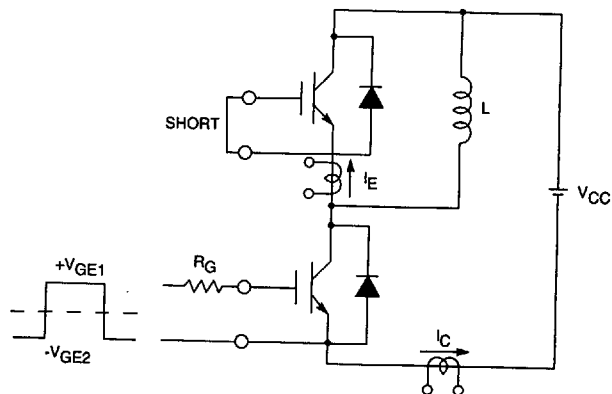
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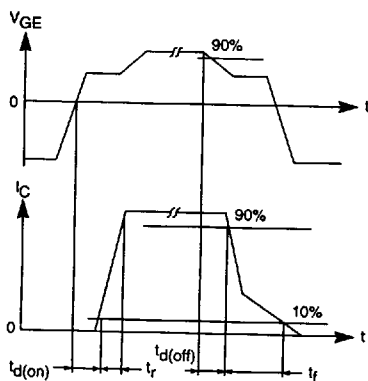
## SWITCHING TIME TEST CIRCUITS & WAVEFORMS



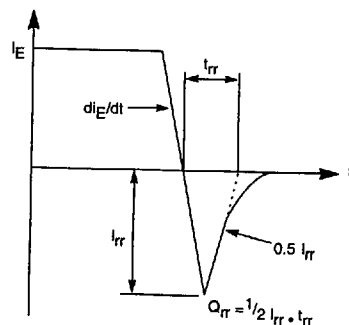
RESISTANCE LOAD SWITCHING TEST CIRCUIT



HALF-BRIDGE SWITCHING TEST CIRCUIT



SWITCHING TIME TEST WAVEFORMS



$t_{rr}, Q_{rr}$  WAVEFORMS