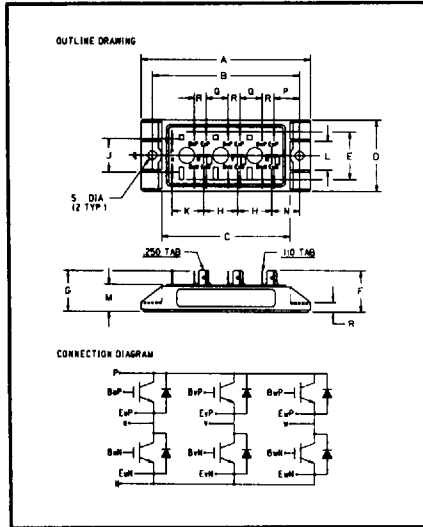


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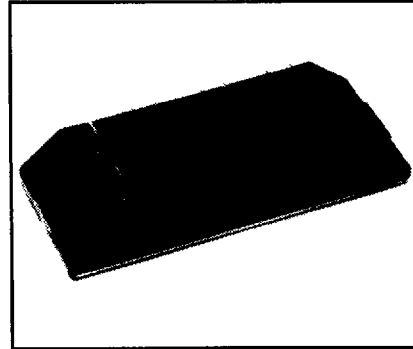
### Six-IGBT IGBTMOD™ E-Series Module 30 Amperes/600 Volts

POWEREX INC



**CM30TF-12E**  
 Outline Drawing

Dimensions	Inches	Millimeters
A	4.21	107.0
B	3.66±0.01	93.0±0.3
C	3.19	81.0
D	1.77	45.0
E	1.18	30.0
F	1.04	26.5
G	1.01	28.2
H	0.85	21.5
J	0.83	21.0
K	0.79	20.0
L	0.71	18.0
M	0.69±0.02	17.5±0.5
N	0.69	17.5
P	0.63	16.0
Q	0.55	14.0
R	0.30	7.5
S	0.22 Dia.	Dia. 5.5



**CM30TF-12E**  
 Six-IGBT IGBTMOD™ E-Series Module  
 30 Amperes/600 Volts

**Description:**

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of six IGBT Transistors in a three phase 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 (150ns) Free-Wheel Diode
- High Frequency Operation (15-20kHz)
- Isolated Baseplate for Easy Heat Sinking

**Applications:**

- AC Motor Control
- Motion/Servo Control
- UPS
- Welding Power Supplies
- Laser Power Supplies

**Ordering Information:**

Example: Select the complete part module number you desire from the table below  
 -i.e. CM30TF-12E is a 600V ( $V_{CES}$ ), 30 Ampere Six-IGBT IGBTMOD™ Power Module.

Type	Current Rating Amperes (30)	$V_{CES}$ Volts (x 50)
CM	30	12

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**CM30TF-12E**  
**Six-IGBT IGBTMOD™ E-Series Module**  
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### Absolute Maximum Ratings, $T_j = 25^\circ\text{C}$ unless otherwise specified

Ratings	Symbol	CM30TF-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	$I_C$	30	Amperes
Peak Collector Current	$I_{CM}$	60*	Amperes
Diode Forward Current	$I_{FM}$	30	Amperes
Diode Forward Surge Current	$I_{FM}$	60*	Amperes
Power Dissipation	$P_d$	150	Watts
Max. Mounting Torque M5 Mounting Screws	-	17	in-lb
Module Weight (Typical)	-	260	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	$V_{GE(th)}$	$I_C = 3mA, V_{CE} = 10V$	3.5	5.0	6.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 30A, V_{GE} = 15V$	-	2.7	3.5**	Volts
		$I_C = 30A, V_{GE} = 15V, T_j = 150^\circ\text{C}$	-	2.7	-	Volts
Total Gate Charge	$Q_G$	$V_{CC} = 300V, I_C = 30A, V_{GS} = 15V$	-	130	-	nC
Diode Forward Voltage	$V_{FM}$	$I_E = 30A, V_{GS} = 0V$	-	-	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	$C_{ies}$		-	-	5.0	nF
Output Capacitance	$C_{oes}$	$V_{GE} = 0V, V_{CE} = 10V, f = 1\text{MHz}$	-	-	1.5	nF
Reverse Transfer Capacitance	$C_{res}$		-	-	1.0	nF
Resistive	Turn-on Delay Time		-	-	100	ns
Load	Rise Time	$V_{CC} = 300V, I_C = 25A,$	-	-	200	ns
	Turn-off Delay Time	$V_{GE1} = V_{GE2} = 15V, R_G = 21\Omega$	-	-	200	ns
Switch Times	Fall Time		-	-	350	ns
	Diode Reverse Recovery Time	$I_E = 30A, di_E/dt = -60A/\mu\text{s}$	-	-	200	ns
Diode Reverse Recovery Charge	$Q_{rr}$	$I_E = 30A, di_E/dt = -60A/\mu\text{s}$	-	0.3	-	$\mu\text{C}$

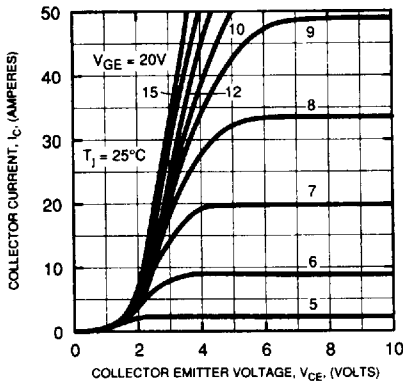
### Thermal and Mechanical Characteristics, $T_j = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	Per IGBT	-	-	0.80	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	Per Free Wheel Diode	-	-	2.00	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per 1/6 Module	-	-	0.35	$^\circ\text{C/W}$

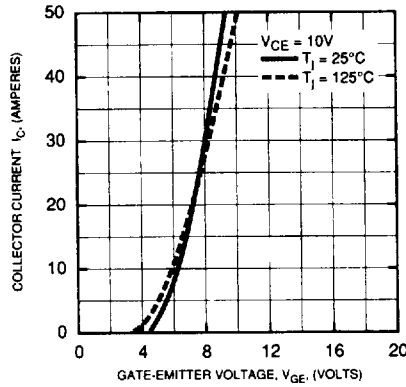
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**CM30TF-12E**  
**Six-IGBT IGBTMOD™ E-Series Module**  
 30 Amperes/600 Volts

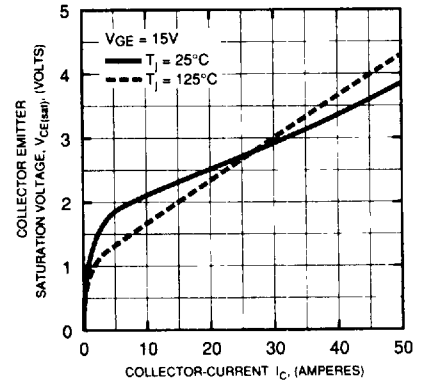
**OUTPUT CHARACTERISTICS (TYPICAL)**



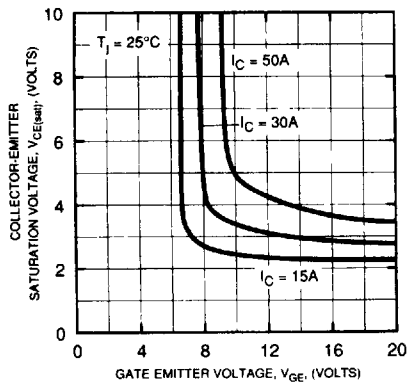
**TRANSFER CHARACTERISTICS (TYPICAL)**



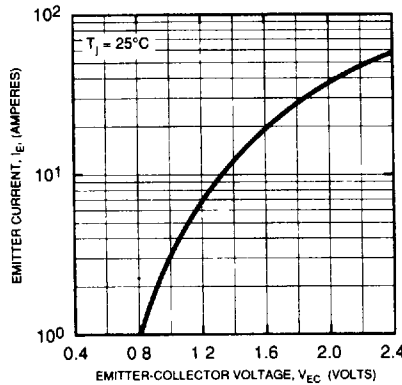
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



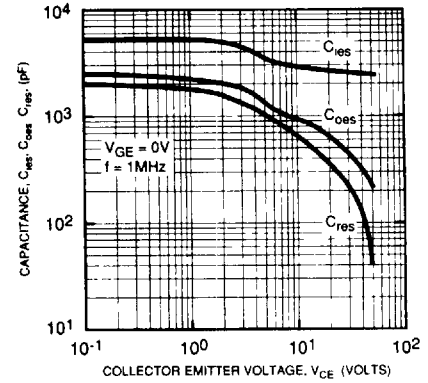
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



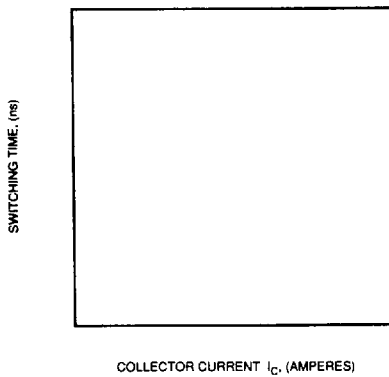
**FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)**



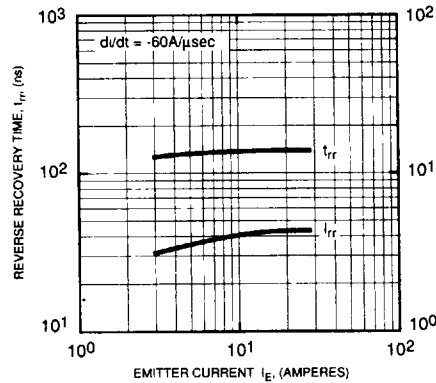
**CAPACITANCE VS.  $V_{CE}$  (TYPICAL)**



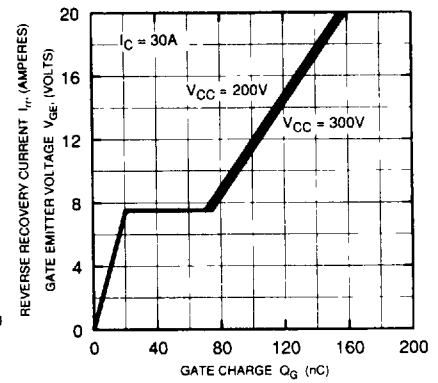
**HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)**



**REVERSE RECOVERY CHARACTERISTICS (TYPICAL)**

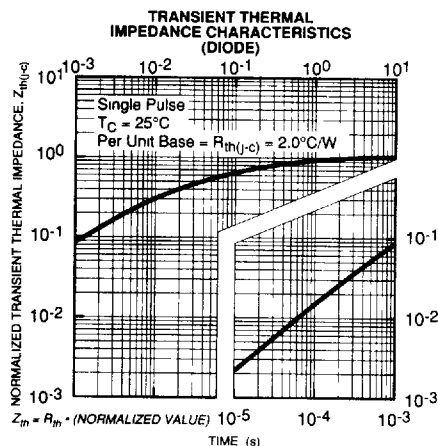
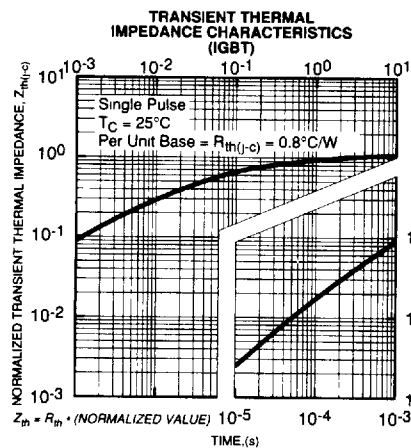


**GATE CHARGE,  $V_{GE}$**

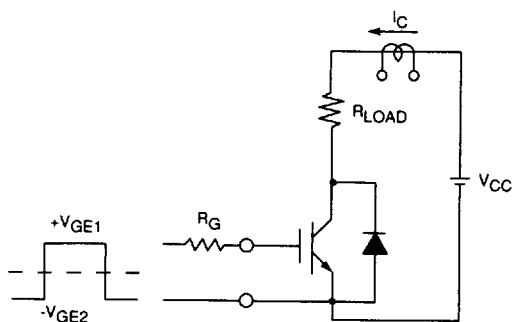


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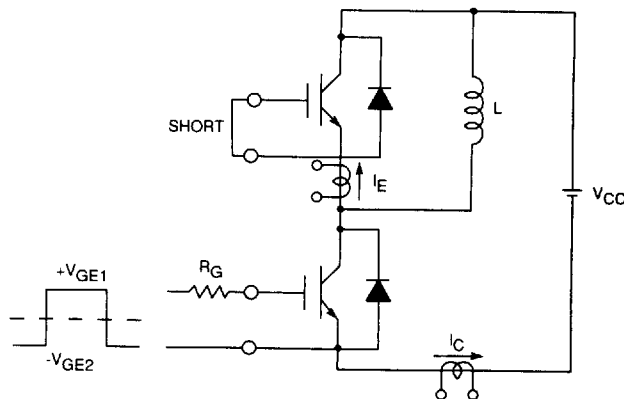
**CM30TF-12E**  
**Six-IGBTMOD™ E-Series Module**  
 30 Amperes/600 Volts



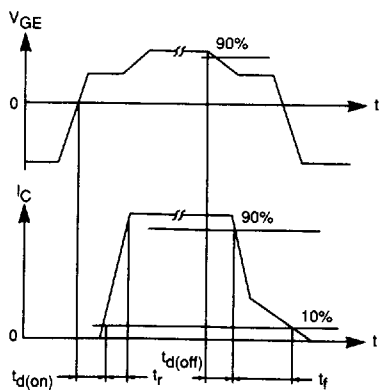
## SWITCHING TIME TEST CIRCUITS & WAVEFORMS



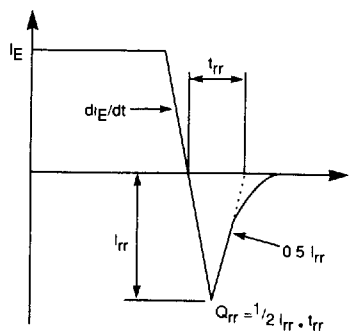
RESISTANCE LOAD SWITCHING TEST CIRCUIT



HALF-BRIDGE SWITCHING TEST CIRCUIT



SWITCHING TIME TEST WAVEFORMS



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