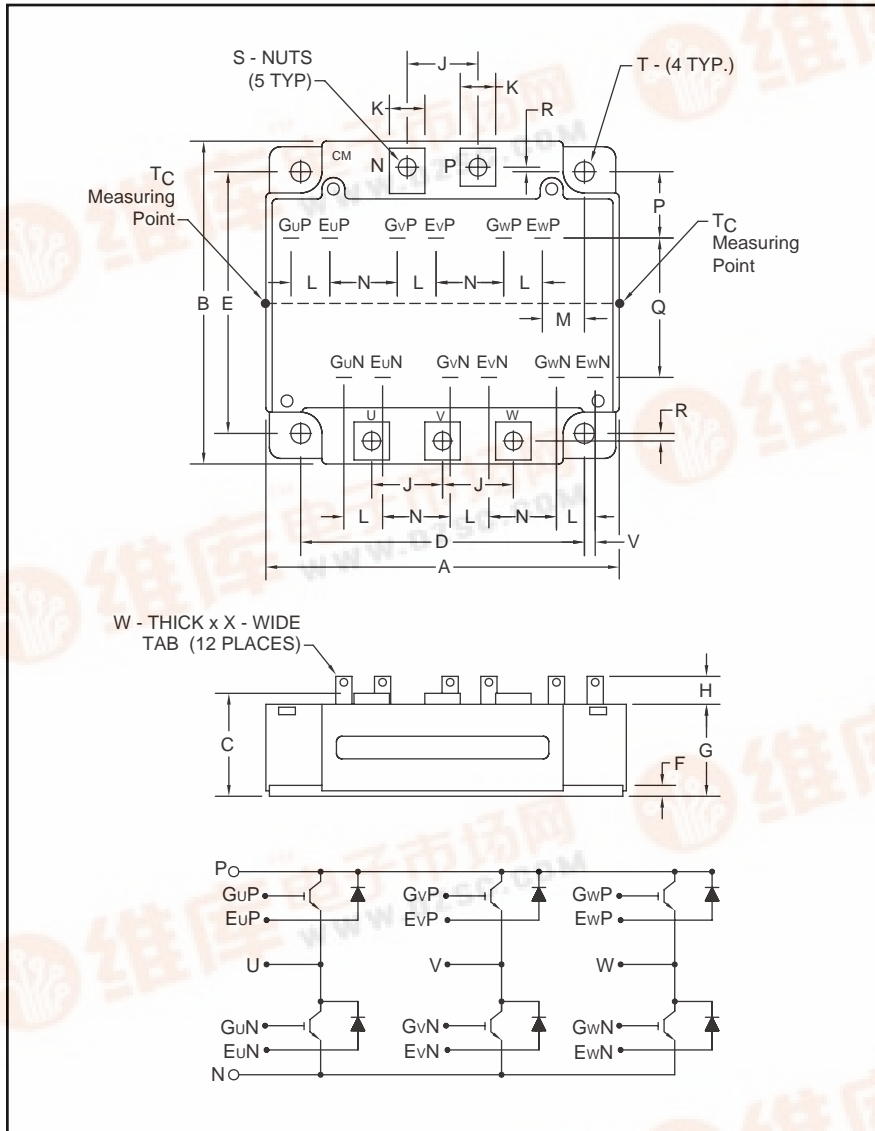




Powerex, Inc., 200 E. Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

CM50TU-34KA

Six IGBTMOD™ KA-Series Module 50 Amperes/1700 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.21	107.0
B	4.02	102.0
C	1.14 +0.04/-0.02	29.0 +1.0/-0.5
D	3.54±0.01	90.0±0.25
E	3.15±0.01	80.0±0.25
F	0.16	4.0
G	1.02	26.0
H	0.31	8.1
J	0.91	23.0
K	0.47	12.0
L	0.43	11.0

Dimensions	Inches	Millimeters
M	0.57	14.4
N	0.85	21.7
P	0.67	17.0
Q	1.91	48.5
R	0.15	3.75
S	M5	M5
T	0.26 Dia.	6.5 Dia.
V	0.03	0.8
W	0.02	0.5
X	0.110	2.79



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 Free-Wheel Diode
- 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 module number you desire from the table - i.e. CM50TU-34KA is a 1700V (V_{CES}), 50 Ampere Six-IGBT IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	50	34





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

Ratings	Symbol	CM50TU-34KA	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}	1700	Volts
Gate-Emitter Voltage (C-E SHORT)	V_{GES}	± 20	Volts
Collector Current ($T_c = 25^\circ\text{C}$)	I_c	50	Amperes
Peak Collector Current ($T_j \leq 150^\circ\text{C}$)	I_{CM}	100*	Amperes
Emitter Current** ($T_c = 25^\circ\text{C}$)	I_E	50	Amperes
Peak Emitter Current**	I_{EM}	100*	Amperes
Maximum Collector Dissipation ($T_c = 25^\circ\text{C}$)	P_c	600	Watts
Mounting Torque, M5 Main Terminal	–	31	in-lb
Mounting Torque, M5 Mounting	–	31	in-lb
Weight	–	680	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{iso}	3500	Volts

* Pulse width and repetition rate should be such that the device junction temperature (T_j) does not exceed $T_{j(\text{max})}$ rating.

**Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

Static Electrical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	I_{CES}	$V_{\text{CE}} = V_{\text{CES}}, V_{\text{GE}} = 0\text{V}$	–	–	1	mA
Gate Leakage Current	I_{GES}	$V_{\text{GE}} = V_{\text{GES}}, V_{\text{CE}} = 0\text{V}$	–	–	0.5	μA
Gate-Emitter Threshold Voltage	$V_{\text{GE(th)}}$	$I_c = 5\text{mA}, V_{\text{CE}} = 10\text{V}$	4.0	5.5	7.0	Volts
Collector-Emitter Saturation Voltage	$V_{\text{CE(sat)}}$	$I_c = 50\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 25^\circ\text{C}$	–	3.2	4.0	Volts
		$I_c = 50\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 125^\circ\text{C}$	–	3.8	–	Volts
Total Gate Charge	Q_G	$V_{\text{CC}} = 1000\text{V}, I_c = 50\text{A}, V_{\text{GE}} = 15\text{V}$	–	225	–	nC
Emitter-Collector Voltage*	V_{EC}	$I_E = 50\text{A}, V_{\text{GE}} = 0\text{V}, T_j = 25^\circ\text{C}$	–	–	4.6	Volts
		$I_E = 50\text{A}, V_{\text{GE}} = 0\text{V}, T_j = 125^\circ\text{C}$	–	2.2	–	Volts

* Pulse width and repetition rate should be such that the device junction temperature (T_j) does not exceed $T_{j(\text{max})}$ rating.

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units	
Input Capacitance	C_{ies}		–	–	7.0	nf	
Output Capacitance	C_{oes}	$V_{\text{CE}} = 10\text{V}, V_{\text{GE}} = 0\text{V}$	–	–	1.2	nf	
Reverse Transfer Capacitance	C_{res}		–	–	0.38	nf	
Resistive	Turn-on Delay Time	$t_{\text{d(on)}}$	$V_{\text{CC}} = 1000\text{V}, I_c = 50\text{A},$	–	–	100	ns
Load	Rise Time	t_r	$V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V},$	–	–	100	ns
Switch	Turn-off Delay Time	$t_{\text{d(off)}}$	$R_G = 6.3\Omega, \text{Resistive}$	–	–	400	ns
Times	Fall Time	t_f	Inductive Load	–	–	800	ns
Diode Reverse Recovery Time	t_{rr}	Switching Operation		–	–	200	ns
Diode Reverse Recovery Charge	Q_{rr}	$I_E = 50\text{A}$		–	3.9	–	μC



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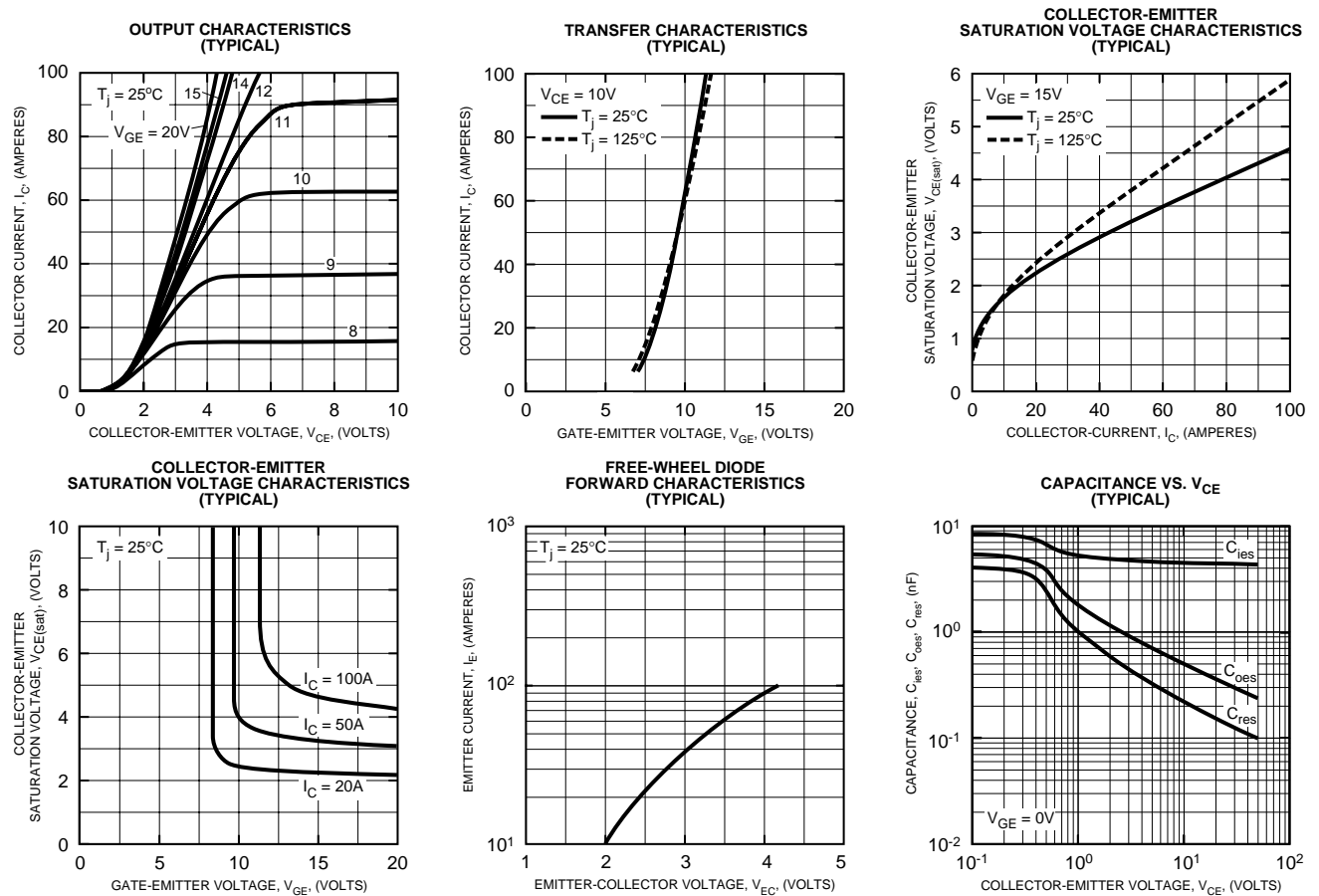
CM50TU-34KA
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Thermal and Mechanical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)Q}$	Per IGBT 1/6 Module	-	-	0.21	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)D}$	Per FWDi 1/6 Module	-	-	0.47	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	-	0.09	-	$^\circ\text{C/W}$
Thermal Resistance	$R_{th(j-c)Q}$	T_c Measured Point	-	-	0.17*	$^\circ\text{C/W}$

(Under Chips - IGBT Part)

* If you use this value, $R_{th(f-a)}$ should be measured just under the chips.

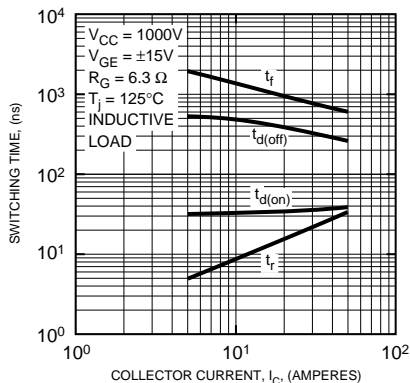




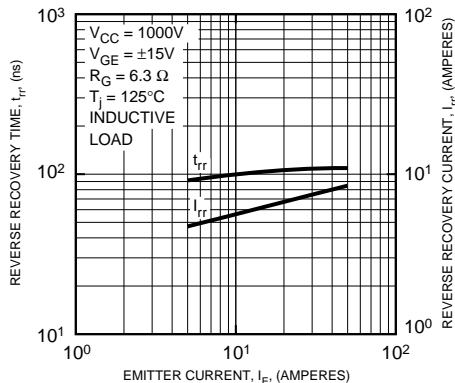
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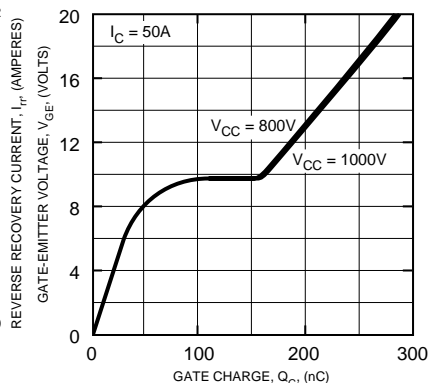
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



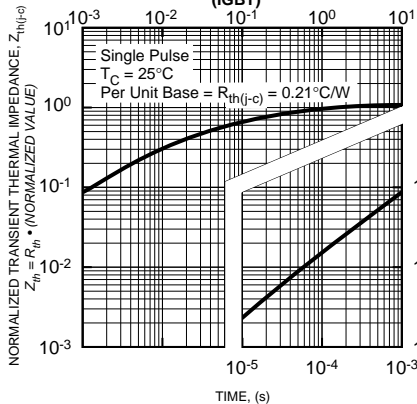
REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



GATE CHARGE, V_{GE}



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWD)

