

CM1000E3U-34NF
Mega Power Chopper IGBTMOD™
 1000 Amperes/1700 Volts

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

Ratings	Symbol	CM1000E3U-34NF	Units
Junction Temperature	T_j	-40 to 150	$^\circ\text{C}$
Storage Temperature ^{*7}	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 DC ($T_C = 104^\circ\text{C}$) ^{*6}	I_C	1000	Amperes
Peak Collector Current (Pulse) ^{*2}	I_{CM}	2000	Amperes
Emitter Current ($T_C = 25^\circ\text{C}$) ^{*4}	I_E^{*1}	75	Amperes
Peak Emitter Current (Pulse) ^{*2}	I_{EM}^{*1}	150	Amperes
Maximum Collector Dissipation ($T_C = 25^\circ\text{C}$) ^{*2,4}	P_C	3900	Watts
Mounting Torque, M6 Mounting Screws (Max.)	–	40	in-lb
Mounting Torque, M6 Main Terminal Screw (Max.)	–	40	in-lb
Weight (Typical)	–	1400	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{iso}	3500	V_{rms}

Clamp Diode Part, $T_j = 25^\circ\text{C}$ unless otherwise specified

Repetitive Peak Reverse Voltage	V_{RRM}	1700	Volts
Forward Current ($T_C = 25^\circ\text{C}$) ^{*4}	I_F	1000	Amperes
Peak Forward Current (Pulse) ^{*2}	I_{FM}	2000	Amperes

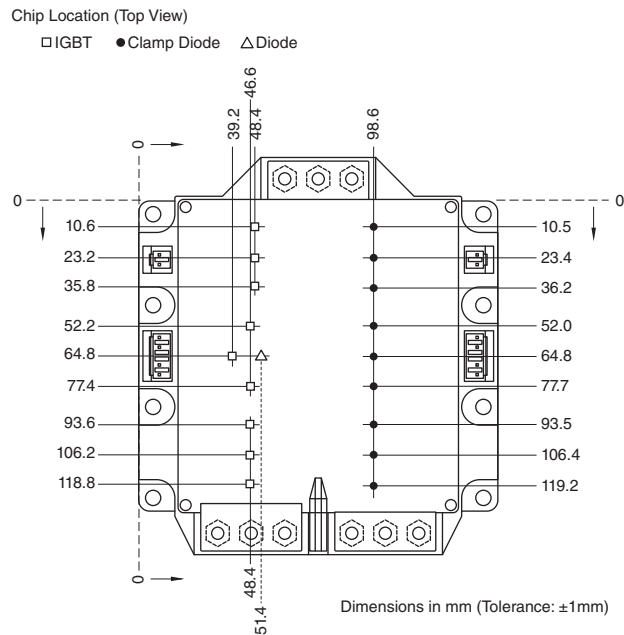
*1 I_E , I_{EM} , and V_{EC} represent ratings and characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

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

*4 Case temperature (T_C) is baseplate side.

*6 Case temperature (T_C) and heatsink temperature (T_f) measured point is just under the chips.

*7 The operation temperature is restrained by the permission temperature of female connector housing.



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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	mA
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}, V_{CE} = 0V$	–	–	0.5	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 100\text{mA}, V_{CE} = 10V$	5.5	7	8.5	Volts
Collector-Emitter Saturation Voltage (Without Lead Resistance)	$V_{CE(sat)}$ (Chip)	$I_C = 1000\text{A}, V_{GE} = 15V, T_j = 25^\circ\text{C}^{*3}$ $I_C = 1000\text{A}, V_{GE} = 15V, T_j = 125^\circ\text{C}^{*3}$	–	2.2 2.45	2.8 –	Volts
Module Lead Resistance	$R_{(lead)}$	$I_C = 1000\text{A}, \text{Terminal-Chip}$	–	0.286	–	$\text{m}\Omega$
Input Capacitance	C_{ies}		–	–	220	nF
Output Capacitance	C_{oes}	$V_{CE} = 10V, V_{GE} = 0V$	–	–	25	nF
Reverse Transfer Capacitance	C_{res}		–	–	4.7	nF
Total Gate Charge	Q_G	$V_{CC} = 1000V, I_C = 1000\text{A}, V_{GE} = 15V$	–	6000	–	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 1000V, I_C = 1000\text{A},$	–	–	600	ns
Turn-on Rise Time	t_r	$V_{GE} = \pm 15V,$	–	–	150	ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 0.47\Omega,$	–	–	900	ns
Turn-off Fall Time	t_f	Inductive Load	–	–	200	ns
Emitter-Collector Voltage ^{*1}	V_{EC}	$I_E = 75\text{A}, V_{GE} = 0V^{*3}$	–	–	2.8	Volts
External Gate Resistance	R_G		0.47	–	4.7	Ω

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Repetitive Peak Reverse Current	I_{RRM}	$V_R = V_{RRM}$	–	–	1	mA
Forward Voltage	V_{FM}	$I_F = 1000\text{A}^{*3}$	–	–	3.0	Volts
Reverse Recovery Time	t_{rr}	$I_F = 1000\text{A}$	–	–	450	ns
Reverse Recovery Charge	Q_{rr}	$I_F = 1000\text{A}$	–	90	–	μC

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 ^{*4}	$R_{th(j-c)Q}$	IGBT	–	–	0.032	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case ^{*4}	$R_{th(j-c)D}$	Clamp	–	–	0.053	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case ^{*6}	$R_{th(j-c')Q}$	IGBT	–	–	0.014	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case ^{*6}	$R_{th(j-c')D}$	Clamp	–	–	0.023	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case ^{*4}	$R_{th(c-f)D}$	Thermal Grease Applied per 1/2 Module ^{*5}	–	0.016	–	$^\circ\text{C}/\text{W}$
Contact Thermal Resistance ^{*6}	$R_{th(c-f)}$	Thermal Grease Applied per 1/2 Module ^{*5}	–	0.012	–	$^\circ\text{C}/\text{W}$

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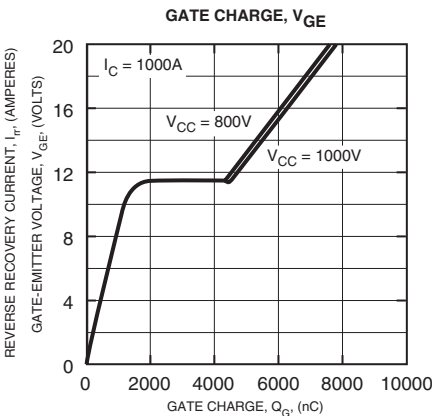
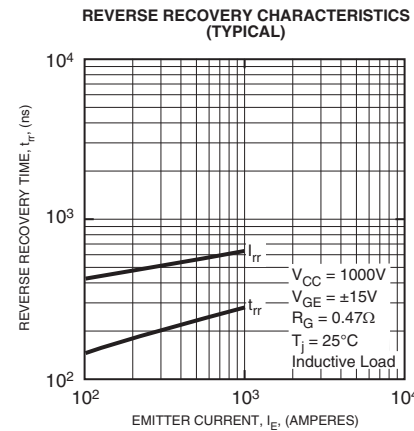
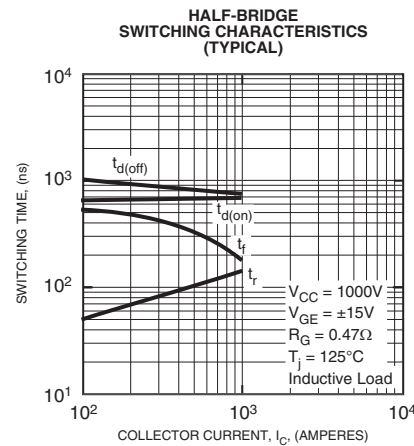
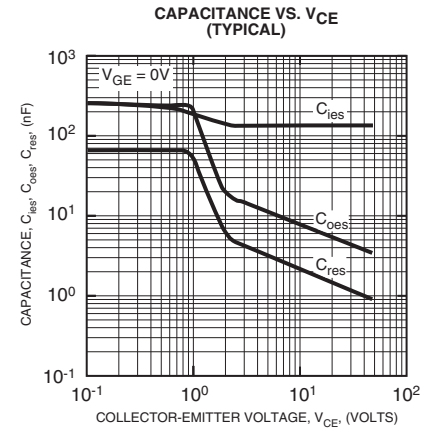
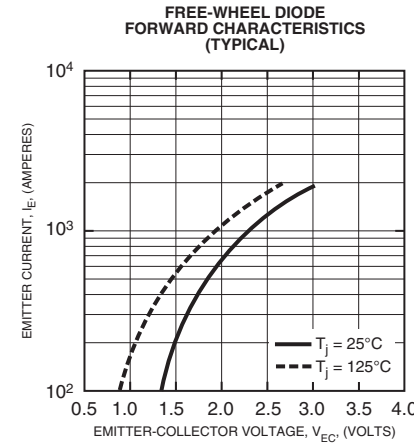
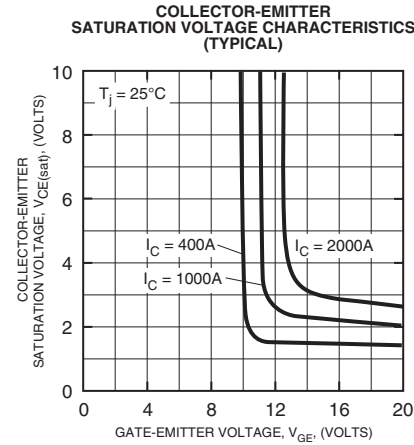
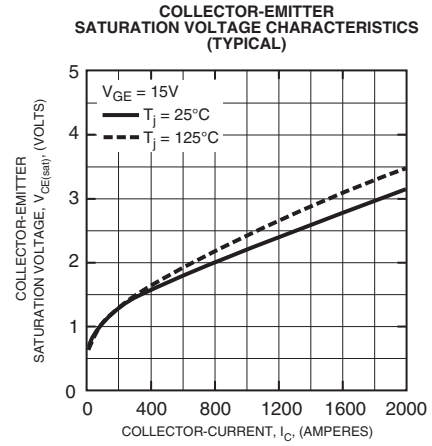
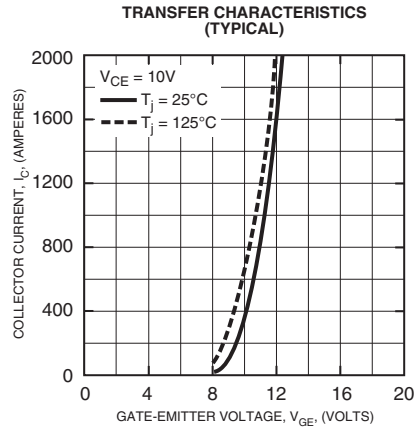
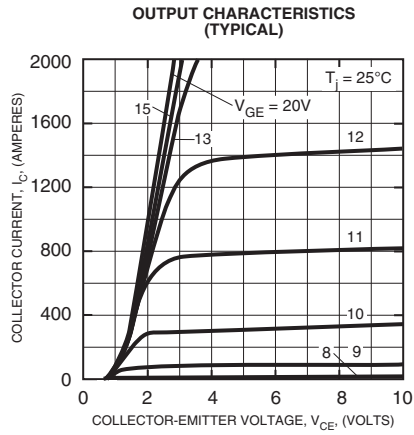
^{*3} Pulse width and repetition rate should be such as to cause negligible temperature rise.

^{*4} Case temperature (T_C) is baseplate side.

^{*5} Typical value is measured by using thermally conductive grease of $\lambda = 0.9 \text{ [W/(m} \cdot \text{K)]}$.

^{*6} Case temperature (T_C) and heatsink temperature (T_f) measured point is just under the chips.

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