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[Powerex Inc.](#)
[CM450DX-24A](#)

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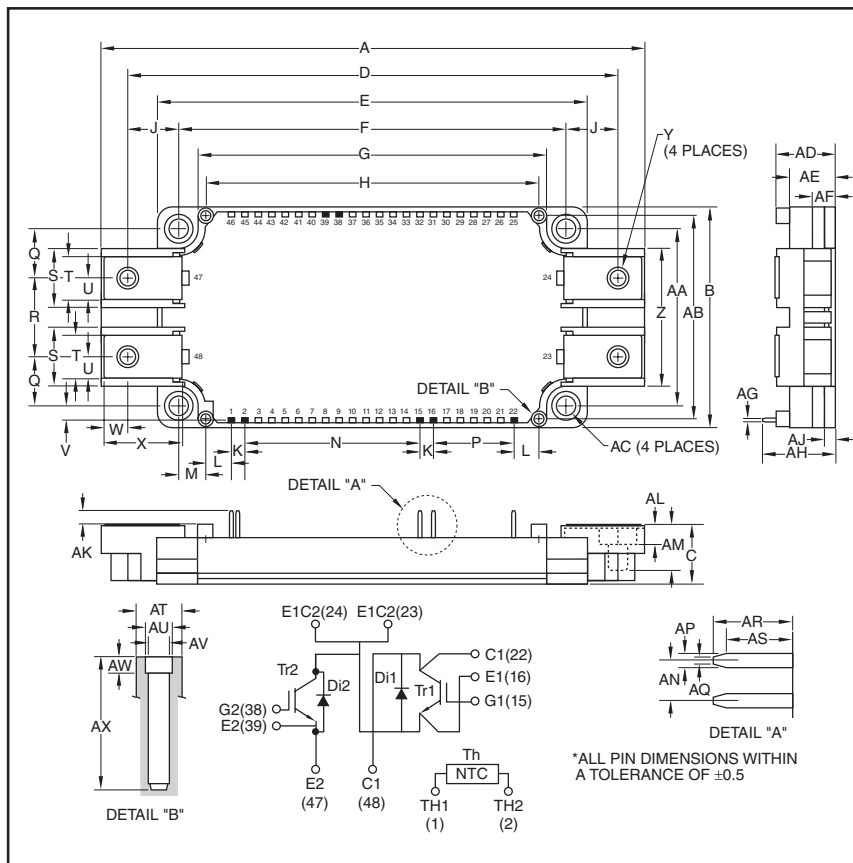
sales@integrated-circuit.com



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

CM450DX-24A

Dual IGBTMOD™ NX-Series Module 450 Amperes/1200 Volts





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Dual IGBTMOD™ NX-Series Module
450 Amperes/1200 Volts

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

Characteristics	Symbol	CM450DX-24A	Units
Power Device Junction Temperature	T_j	-40 to 150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to 125	$^\circ\text{C}$
Mounting Torque, M5 Mounting Screws	—	31	in-lb
Mounting Torque, M6 Main Terminal Screws	—	40	in-lb
Module Weight (Typical)	—	330	Grams
Baseplate Flatness, On Centerline X, Y (See Below)	—	$\pm 0 \sim +100$	μm
Isolation Voltage, AC 1 minute, 60Hz Sinusoidal	V_{ISO}	2500	Volts

Inverter Sector

Collector-Emitter Voltage (G-E Short)	V_{CES}	1200	Volts
Gate-Emitter Voltage (C-E Short)	V_{GES}	± 20	Volts
Collector Current ($T_C = 90^\circ\text{C}$)* ¹	I_C	450	Amperes
Peak Collector Current* ⁴	I_{CM}	900	Amperes
Emitter Current ($T_C = 25^\circ\text{C}$)* ^{1,5}	I_E^{*3}	450	Amperes
Peak Emitter Current (Pulse)* ⁴	I_{EM}^{*3}	900	Amperes
Maximum Collector Dissipation ($T_C = 25^\circ\text{C}$)* ^{1,5}	P_C	2840	Watts

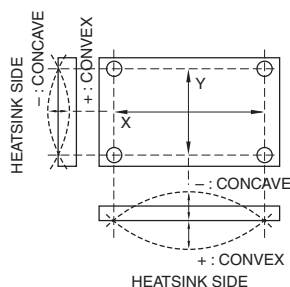
*¹ Case temperature (T_C) and heatsink temperature (T_f) are defined on the surface of the baseplate and heatsink at just under the chip.

*³ I_E , I_{EM} , V_{EC} , t_{rr} and Q_{rr} represent ratings and characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

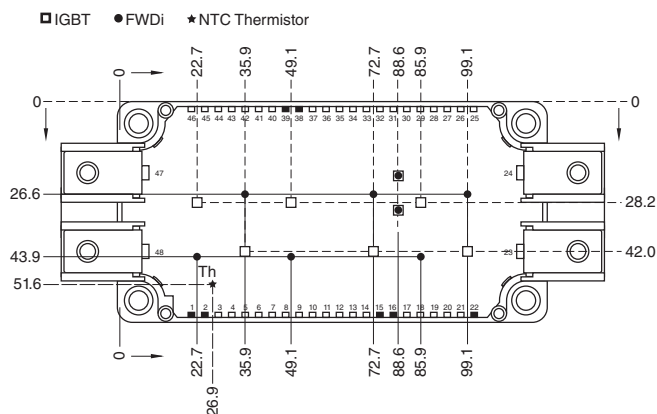
*⁴ Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed $T_{j(max)}$ rating.

*⁵ Junction temperature (T_j) should not increase beyond $T_{j(max)}$ rating.

BASEPLATE FLATNESS MEASUREMENT POINT



CHIP LOCATION (TOP VIEW)



Dimensions in mm (Tolerance: $\pm 1\text{mm}$)



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

Inverter Sector

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector Cutoff Current	I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$	—	—	1.0	mA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 45mA, V_{CE} = 10V$	6	7	8	Volts
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}, V_{CE} = 0V$	—	—	0.5	μA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 450A, V_{GE} = 15V, T_j = 25^\circ\text{C}^{*6}$	—	2.0	2.6	Volts
		$I_C = 450A, V_{GE} = 15V, T_j = 125^\circ\text{C}^{*6}$	—	2.2	—	Volts
		$I_C = 450A, V_{GE} = 15V, \text{Chip}$	—	1.9	—	Volts
Input Capacitance	C_{ies}	$V_{CE} = 10V, V_{GE} = 0V$	—	—	68.0	nF
Output Capacitance	C_{oes}		—	—	5.9	nF
Reverse Transfer Capacitance	C_{res}		—	—	1.4	nF
Total Gate Charge	Q_G	$V_{CC} = 600V, I_C = 450A, V_{GE} = 15V$	—	2000	—	nC
Inductive	Turn-on Delay Time	$V_{CC} = 600V, I_C = 450A,$ $V_{GE} = \pm 15V,$ $R_G = 0.68\Omega, I_E = 450A,$	—	—	650	ns
Load	Turn-on Rise Time		—	—	250	ns
Switch	Turn-off Delay Time		—	—	700	ns
Time	Turn-off Fall Time		—	—	600	ns
Reverse Recovery Time	t_{rr}^{*3}	Inductive Load Switching Operation	—	—	250	ns
Reverse Recovery Charge	Q_{rr}^{*3}		—	14	—	μC
Emitter-Collector Voltage	V_{EC}^{*3}	$I_E = 450A, V_{GE} = 0V^{*6}$	—	2.6	3.4	Volts
		$I_E = 450A, V_{GE} = 0V, \text{Chip}$	—	2.5	—	Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Module Lead Resistance	R_{lead}	Main Terminals-Chip (Per Switch)	—	0.8	—	m Ω
Thermal Resistance, Junction to Case ^{*1}	$R_{th(j-c)Q}$	Per IGBT	—	—	0.044	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case ^{*1}	$R_{th(j-c)D}$	Per FWDi	—	—	0.078	$^\circ\text{C/W}$
Contact Thermal Resistance ^{*1}	$R_{th(c-f)}$	Case to Heatsink (Per 1 Module)	—	0.015	—	$^\circ\text{C/W}$
Internal Gate Resistance	R_{Gint}	Thermal Grease Applied ^{*2}				
		$T_C = 25^\circ\text{C}$	1.4	2.0	2.6	Ω
		$T_C = 125^\circ\text{C}$	2.8	3.0	5.2	Ω
External Gate Resistance	R_G		0.68	—	6.8	Ω

NTC Thermistor Sector, $T_j = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Zero Power Resistance	R	$T_C = 25^\circ\text{C}$	4.85	5.00	5.15	k Ω
Deviation of Resistance	$\Delta R/R$	$T_C = 100^\circ\text{C}, R_{100} = 493\Omega$	-7.3	—	+7.8	%
B Constant	$B(25/50)$	$B = (\ln R_1 - \ln R_2) / (1/T_1 - 1/T_2)^{*7}$	—	3375	—	K
Power Dissipation	P_{25}	$T_C = 25^\circ\text{C}$	—	—	10	mW

^{*1} Case temperature (T_C) and heatsink temperature (T_f) are defined on the surface of the baseplate and heatsink at just under the chip.

^{*2} Typical value is measured by using thermally conductive grease of $\lambda = 0.9 \text{ [W/(m} \cdot \text{K)]}$.

^{*3} $I_E, I_{EM}, V_{EC}, t_{rr}$ and Q_{rr} represent ratings and characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

^{*6} Pulse width and repetition rate should be such as to cause negligible temperature rise.

^{*7} R_1 : Resistance at Absolute Temperature $T_1(K)$, R_2 : Resistance at Absolute Temperature $T_2(K)$, $T(K) = T(^{\circ}\text{C}) + 273.15$

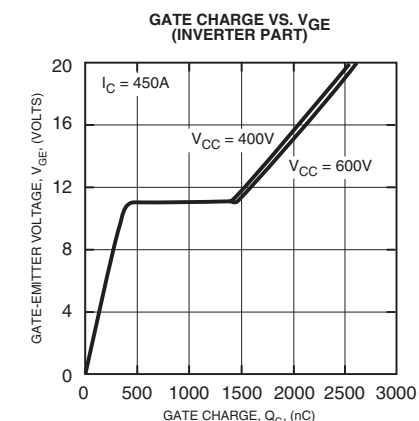
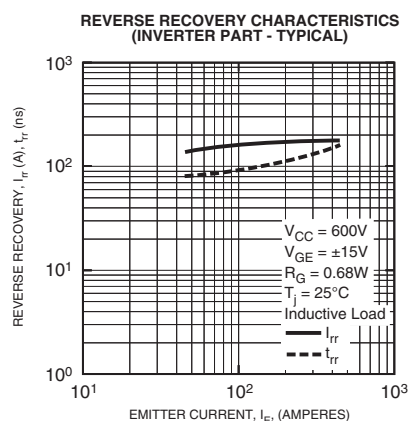
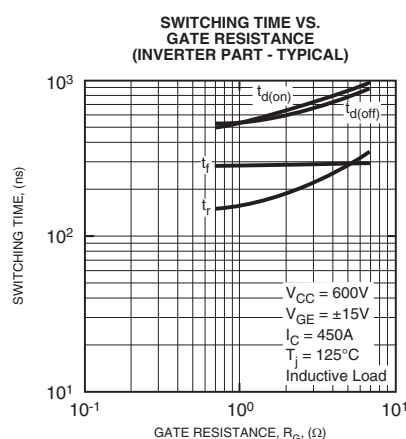
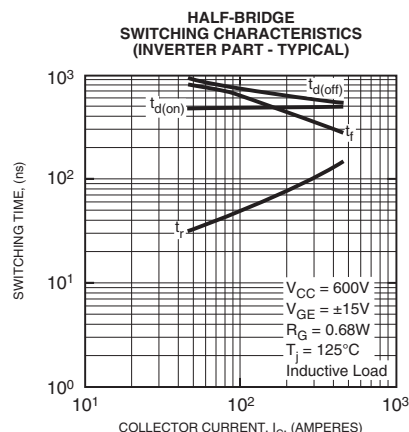
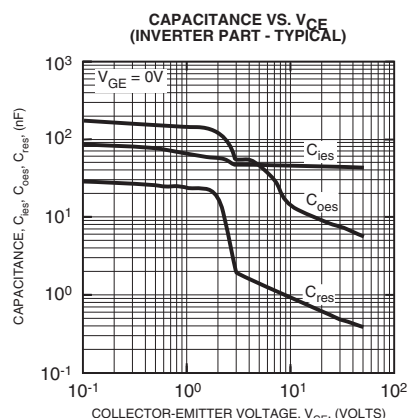
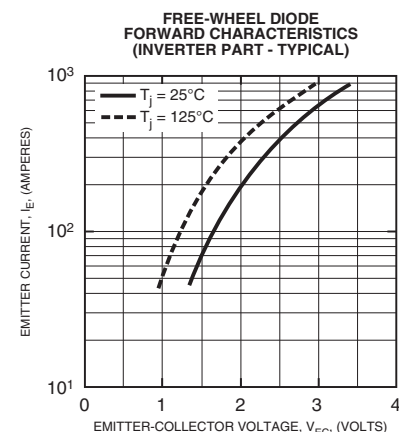
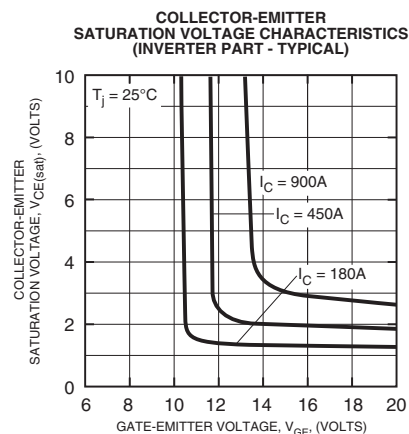
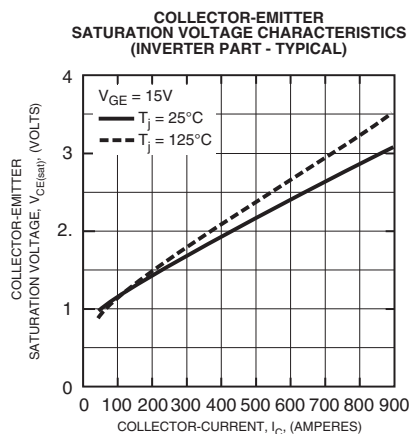
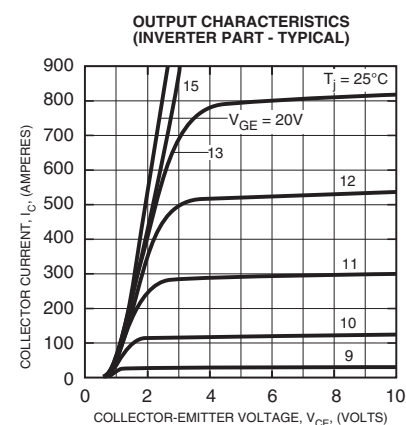


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