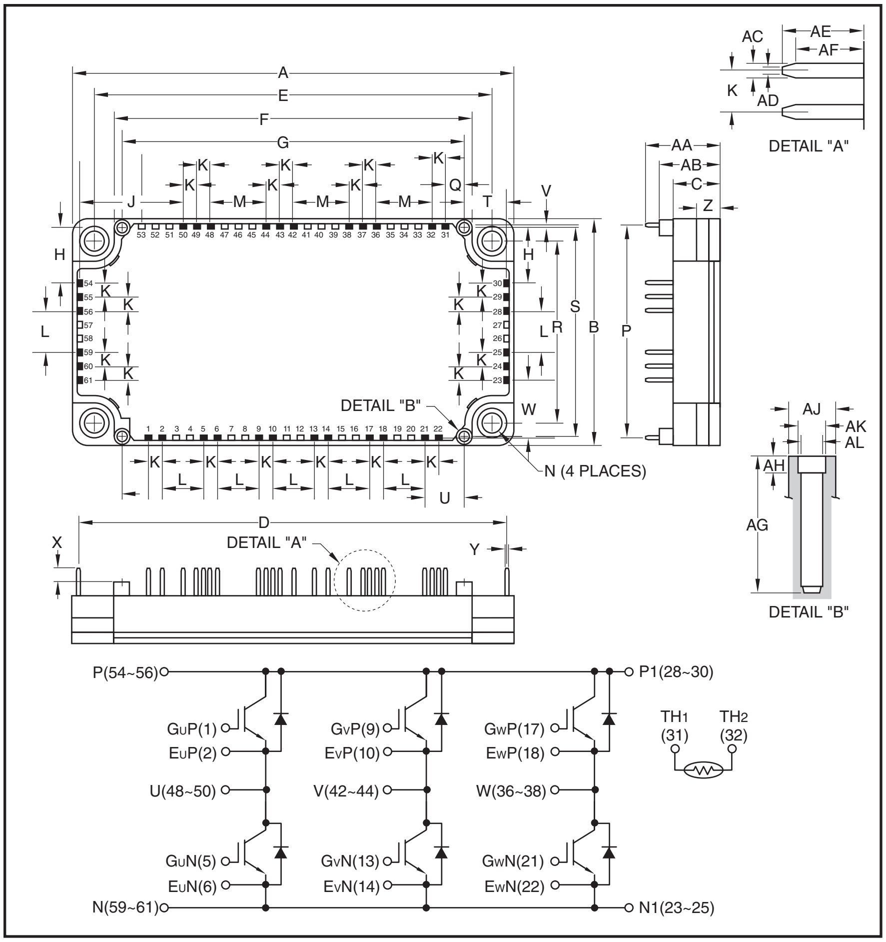
Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwrx.com

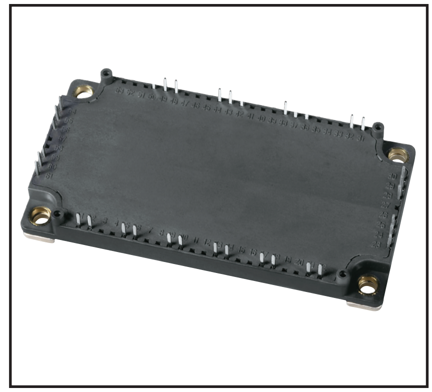
Six IGBTMOD™
NX-S Series Module
75 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.79	121.7
B	2.44	62.0
C	0.51	13.0
D	4.65	118.1
E	4.33±0.02	110.0±0.5
F	3.9	99.0
G	3.72	94.5
H	0.61	15.415
J	1.125	28.575
K	0.15	3.81
L	0.45	11.43
M	0.6	15.24
N	0.22 Dia.	5.5 Dia.
P	2.30	58.4
Q	0.21	5.34
R	1.97±0.02	50.0±0.5
S	2.26	57.5
T	0.465	11.805

Dimensions	Inches	Millimeters
U	0.285	7.245
V	0.018	0.45
W	0.625	15.865
X	0.14	3.5
Y	0.03	0.8
Z	0.28	7.0
AA	0.81	20.5
AB	0.67	17.0
AC	0.03	0.65
AD	0.05	1.15
AE	0.29	7.4
AF	0.05	1.2
AG	0.49	12.5
AH	0.06	1.5
AJ	0.17 Dia.	4.3 Dia.
AK	0.10 Dia.	2.5 Dia.
AL	0.08 Dia.	2.1 Dia.



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
- ☐ Photovoltaic/Fuel Cell

Ordering Information:
Example: Select the complete module number you desire from the table below -i.e. CM75TX-24S is a 1200V (V_{CES}), 75 Ampere Six-IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	75	24

Absolute Maximum Ratings, T_j = 25°C unless otherwise specified

Characteristics	Symbol	CM75TX-24S	Units
Maximum Junction Temperature	$T_{j(max)}$	+175	°C
Operating Power Device Junction Temperature	$T_{j(op)}$	-40 to 150	°C
Storage Temperature	T_{stg}	-40 to 125	°C
Mounting Torque, M5 Mounting Screws	—	31	in-lb
Module Weight (Typical)	—	270	Grams
Isolation Voltage (Terminals to Baseplate, f = 60Hz, AC 1 minute)	V_{ISO}	2500	V_{rms}

Inverter Sector

Collector-Emitter Voltage (V_{GE} = 0V)	V_{CES}	1200	Volts
Gate-Emitter Voltage (V_{CE} = 0V)	V_{GES}	±20	Volts
Collector Current (DC, T_C = 122°C)*1,*5	I_C	75	Amperes
Collector Current (Pulse)*4	I_{CRM}	150	Amperes
Total Power Dissipation (T_C = 25°C)*1,*5	P_{tot}	600	Watts
Emitter Current, Free Wheeling Diode Forward Current (T_C = 25°C)*1,*5	I_E*3	75	Amperes
Emitter Current, Free Wheeling Diode Forward Current (Pulse)*4	I_{ERM}*3	150	Amperes

*1 Case temperature (T_C) and heatsink temperature (T_f) measured point is just under the chips.
*3 Represent ratings and characteristics of the anti-parallel, emitter-to-collector free wheeling 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 maximum junction temperature ($T_{j(max)}$) rating.

Electrical and Mechanical Characteristics, T_j = 25°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	mA
Gate Leakage Current		I_{GES}	$\pm V_{GE} = V_{GES}$, V_{CE} = 0V	—	—	0.5	μA
Gate-Emitter Threshold Voltage		$V_{GE(th)}$	I_C = 7.5mA, V_{CE} = 10V	5.4	6	6.6	Volts
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$ (Chip)	I_C = 75A, V_{GE} = 15V, T_j = 25°C	—	1.7	2.15	Volts
			I_C = 75A, V_{GE} = 15V, T_j = 125°C	—	1.9	—	Volts
			I_C = 75A, V_{GE} = 15V, T_j = 150°C	—	1.95	—	Volts
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$ (Terminal)	I_C = 75A, V_{GE} = 15V, T_j = 25°C*6	—	1.8	2.25	Volts
			I_C = 75A, V_{GE} = 15V, T_j = 125°C*6	—	2.0	—	Volts
			I_C = 75A, V_{GE} = 15V, T_j = 150°C*6	—	2.05	—	Volts
Input Capacitance		C_{ies}	V_{GE} = 0V, V_{CE} = 10V	—	—	7.5	nF
Output Capacitance		C_{oes}		—	—	1.5	nF
Reverse Transfer Capacitance		C_{res}		—	—	0.13	nF
Total Gate Charge		Q_G	V_{CC} = 600V, I_C = 75A, V_{GE} = 15V	—	175	—	nC
Inductive Load Switch Time	Turn-on Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C = 75A, *7 V_{GE} = ±15V, R_G = 36Ω, Inductive Load, I_E = 75A	—	—	300	ns
	Turn-on Rise Time	t_r		—	—	200	ns
	Turn-off Delay Time	$t_{d(off)}$		—	—	600	ns
	Turn-off Fall Time	t_f		—	—	300	ns
Reverse Recovery Time		t_{rr}*3		—	—	300	ns
Reverse Recovery Charge		Q_{rr}*3		—	4.0	—	μC
Turn-on Switching Loss per Pulse		E_{on}	V_{CC} = 600V, I_C (I_E) = 75A, *7 V_{GE} = ±15V, R_G = 36Ω, T_j = 150°C, Inductive Load	—	12.5	—	mJ
Turn-off Switching Loss per Pulse		E_{off}		—	8	—	mJ
Reverse Recovery Loss per Pulse		E_{rec}*3		—	4.5	—	mJ
Emitter-Collector Voltage		V_{EC}*3 (Chip)	I_E = 75A, V_{GE} = 0V, T_j = 25°C	—	1.7	2.15	Volts
			I_E = 75A, V_{GE} = 0V, T_j = 125°C	—	1.7	—	Volts
			I_E = 75A, V_{GE} = 0V, T_j = 150°C	—	1.7	—	Volts
Emitter-Collector Voltage		V_{EC}*3 (Terminal)	I_E = 75A, V_{GE} = 0V, T_j = 25°C*6	—	1.8	2.25	Volts
			I_E = 75A, V_{GE} = 0V, T_j = 125°C*6	—	1.8	—	Volts
			I_E = 75A, V_{GE} = 0V, T_j = 150°C*6	—	1.8	—	Volts

Thermal and Mechanical Characteristics, T_j = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case*1	$R_{th(j-c)}Q$	Per IGBT	—	—	0.25	K/W
Thermal Resistance, Junction to Case*1	$R_{th(j-c)}D$	Per FWDi	—	—	0.4	K/W
Internal Gate Resistance	r_g	Per Switch	—	0	—	Ω

*1 Case temperature (T_C) and heatsink temperature (T_f) measured point is just under the chips.
*3 Represent ratings and characteristics of the anti-parallel, emitter-to-collector free wheeling diode (FWDi).
*6 Pulse width and repetition rate should be such as to cause negligible temperature rise.
*7 Recommended maximum collector supply voltage V_{CC} is $800V_{dc}$.

CM75TX-24S
Six IGBTMOD™ NX-S Series Module
75 Amperes/1200 Volts

NTC Thermistor Sector, T_j = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Zero Power Resistance	R	T_C = 25°C	4.85	5.00	5.15	kΩ
Deviation of Resistance	ΔR/R	T_C = 100°C, R_{100} = 493Ω	–7.3	—	+7.8	%
B Constant	$B_{(25/50)}$	Approximate by Equation*9	—	3375	—	K
Power Dissipation	P_{25}	T_C = 25°C	—	—	10	mW

Module, T_j = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Lead Resistance (Main Terminals-Chip)	R_{lead}	T_C = 25°C (Per Switch)	—	—	2.4	mΩ
Contact Thermal Resistance*1 (Case to Heatsink)	$R_{th(c-f)}$	Thermal Grease Applied (Per 1 Module)*2	—	0.015	—	K/W

*1 Case temperature (T_C) and heatsink temperature (T_f) measured point is just under the chips.
*2 Typical value is measured by using thermally conductive grease of λ = 0.9 [W/(m • K)].
*9 $B_{(25/50)} = \ln\left(\frac{R_{25}}{R_{50}}\right)/\left(\frac{1}{T_{25}} - \frac{1}{T_{50}}\right)$ R_{25}; Resistance at Absolute Temperature T_{25} [K], R_{50}; resistance at Absolute Temperature T_{50} [K],
T_{25} = 25 [°C] + 273.15 = 298.15 [K], T_{50} = 50 [°C] + 273.15 = 323.15 [K]