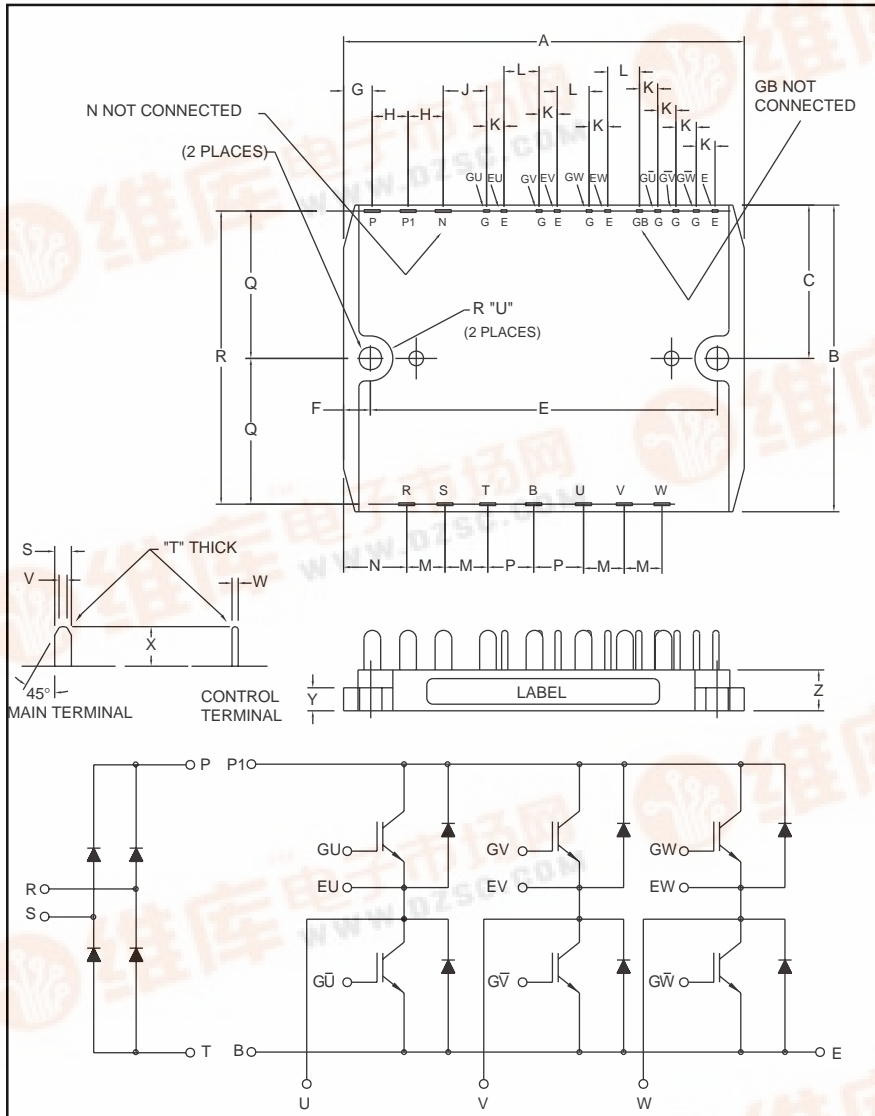




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CM30MD3-12H

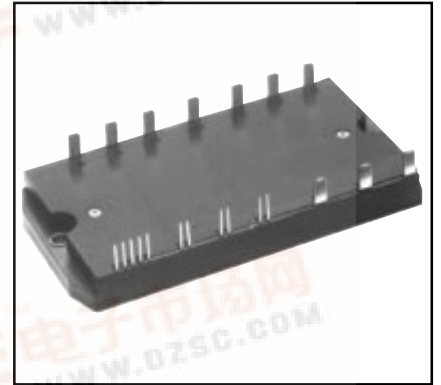
CI Module Single Phase Converter + Three Phase Inverter 30 Amperes/600 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.53	115.0
B	2.36	60.0
C	1.18	30.0
D	0.18	4.5
E	4.13	105.0
F	0.20	5.0
G	0.31	8.0
H	0.59	15.0
J	0.68	17.2
K	0.10	2.54
L	40	10.16

Dimensions	Inches	Millimeters
N	0.51	13.0
P	0.59	15.0
Q	1.14	29.0
R	2.28	58.0
S	0.16	4.0
T	0.02	0.6
U	0.22	5.5
V	0.08	2.0
W	0.02	0.6
X	0.35	9.0
Y	0.25	6.3



Description:

Powerex CI Modules are designed for use in switching applications. Each module consists of a single phase diode converter section and a three phase IGBT inverter section. 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 (70ns) Free-Wheel Diodes
- High Frequency Operation (20-25 kHz)
- Isolated Baseplate for Easy Heat Sinking

Applications:

- AC Motor Control
- Motion/Servo Control
- General Purpose Inverters
- Robotics

Ordering Information:

Example: Select the complete nine digit module part number you desire from the table below - i.e. CM30MD3-12H is a 600V (V_{CES}), 30 Ampere CI Power Module.

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





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CM30MD3-12H

CI Module

Single Phase Converter + Three Phase Inverter

30 Amperes/600 Volts

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

Characteristics	Symbol	CM30MD3-12H	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, M4 Mounting Screws	—	13	in-lb
Module Weight (Typical)	—	100	Grams
Isolation Voltage, AC 1 minute, 60Hz	V_{RMS}	2500	Volts

Converter Part

Repetitive Peak Reverse Voltage	V_{RRM}	800	Volts
Recommended AC Input Voltage	E_a	220	Volts
DC Output Current	I_o	25	Amperes
Surge (Non-repetitive) Forward Current	I_{FSM}	550	Amperes
I^2t for Fusing	I^2t	1.2×10^3	A^2s

IGBT Inverter Part

Collector-Emitter Voltage (G-E Short)	V_{CES}	600	Volts
Gate-Emitter Voltage (C-E Short)	V_{GES}	± 20	Volts
Collector Current	I_c	30	Amperes
Collector Current (Pulse)*	I_{CM}	60	Amperes
Emitter Current**	I_e	30	Amperes
Emitter Current** (Pulse)*	I_{EM}	60	Amperes
Maximum Collector Dissipation	P_c	66	Watts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Converter Sector						
Repetitive Reverse Current	I_{RRM}	$V_R = V_{\text{RRM}}, T_j = 150^\circ\text{C}$	—	—	8	mA
Forward Voltage Drop	V_{FM}	$I_F = 40\text{A}$	—	—	1.6	Volts
Thermal Resistance (Junction-to-Fin)	$R_{\text{th(j-f)}}$	Per Diode	—	—	1.7	$^\circ\text{C/W}$

IGBT Inverter Sector

Collector Cutoff Current	I_{CES}	$V_{\text{CE}} = V_{\text{CES}}, V_{\text{GE}} = 0\text{V}$	—	—	1	mA
Gate-Emitter Threshold Voltage	$V_{\text{GE(th)}}$	$V_{\text{CE}} = 10\text{V}, I_c = 3.0\text{mA}$	4.5	6.0	7.5	Volts
Gate-Emitter Cutoff Current	I_{GES}	$V_{\text{GE}} = V_{\text{GES}}, V_{\text{CE}} = 0\text{V}$	—	—	0.5	μA
Collector-Emitter Saturation Voltage	$V_{\text{CE(sat)}}$	$V_{\text{GE}} = 15\text{V}, I_c = 30\text{A}, T_j = 25^\circ\text{C}$	—	2.1	2.8	Volts
		$V_{\text{GE}} = 15\text{V}, I_c = 30\text{A}, T_j = 150^\circ\text{C}$	—	2.15	—	Volts
Input Capacitance	C_{ies}		—	—	3.0	nF
Output Capacitance	C_{oes}	$V_{\text{GE}} = 0\text{V}, V_{\text{CE}} = 10\text{V}$	—	—	2.4	nF
Reverse Transfer Capacitance	C_{res}		—	—	0.6	nF
Total Gate Charge	Q_g	$V_{\text{CC}} = 300\text{V}, I_c = 30\text{A}, V_{\text{GE}} = 15\text{V}$	—	90	—	nC
Resistive	Turn-on Delay Time	$V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V},$ $V_{\text{CC}} = 300\text{V}, I_c = 30\text{A},$	—	—	120	nS
	Rise Time		t_r	—	—	300
Switching	Turn-off Delay Time	$R_g = 21\Omega,$ Resistive Load	—	—	200	nS
	Fall Time		t_f	—	—	300
Emitter-Collector Voltage	V_{EC}	$I_e = 30\text{A}, V_{\text{GE}} = 0\text{V}$	—	—	2.8	Volts
Reverse Recovery Time	t_{rr}	$I_e = 30\text{A}, V_{\text{GE}} = 0\text{V},$	—	—	110	nS
Reverse Recovery Charge	Q_{rr}	$di_e/dt = -60\text{A}/\mu\text{s}$	—	0.08	—	μC
Thermal Resistance (Junction-to-Fin)	$R_{\text{th(j-f)}}$	Per IGBT	—	—	1.9	$^\circ\text{C/W}$
		Per FWDi	—	—	2.4	$^\circ\text{C/W}$



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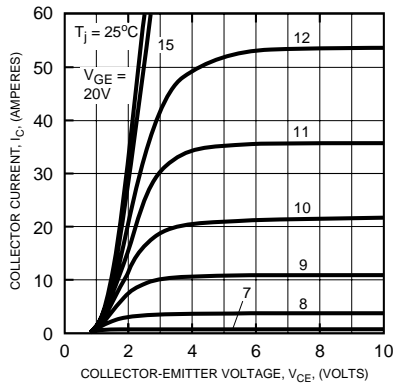
CM30MD3-12H

CI Module

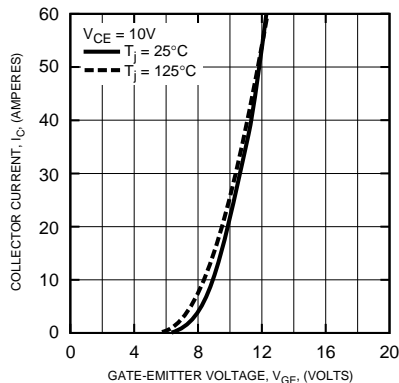
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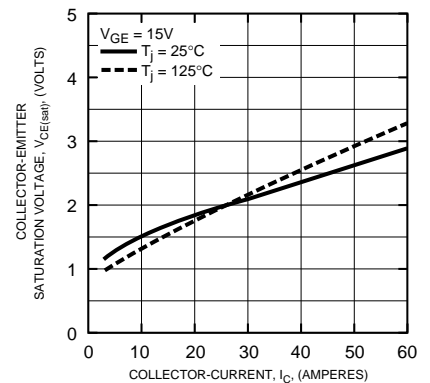
OUTPUT CHARACTERISTICS (TYPICAL)



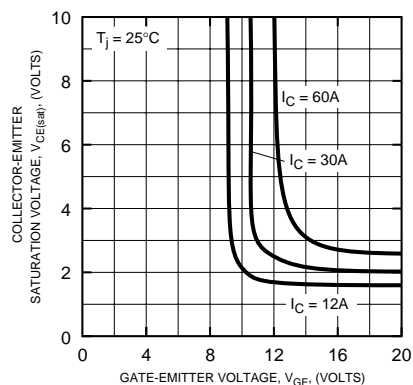
TRANSFER CHARACTERISTICS (TYPICAL)



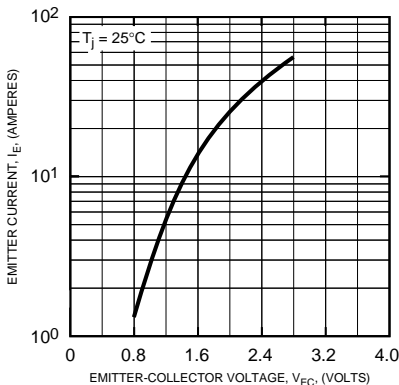
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



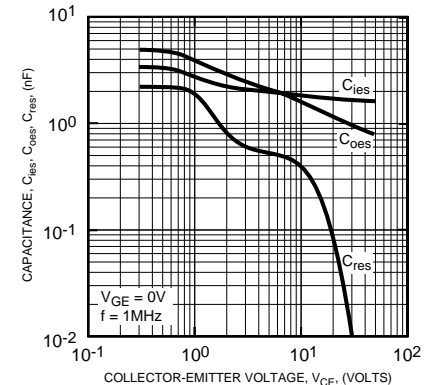
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



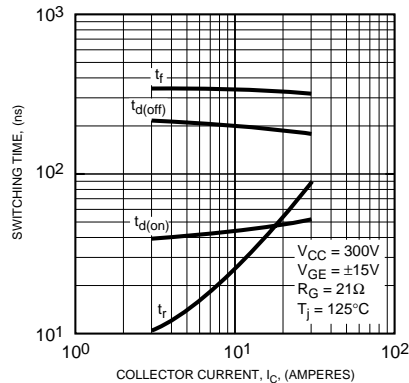
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



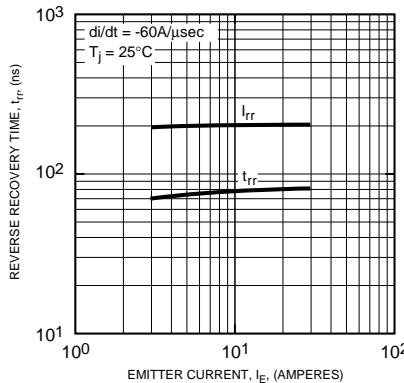
CAPACITANCE VS. VCE (TYPICAL)



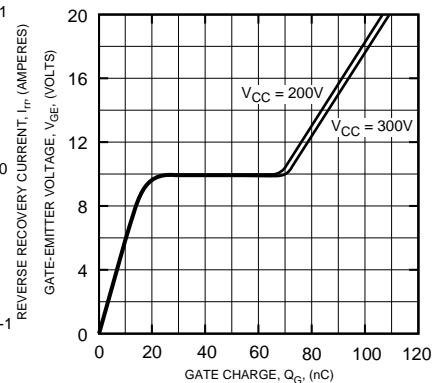
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



GATE CHARGE, VGE





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