T-57-29

PM600HHA060

POWEREX INC 51E D 7294621 0005742 684 PRX

Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272
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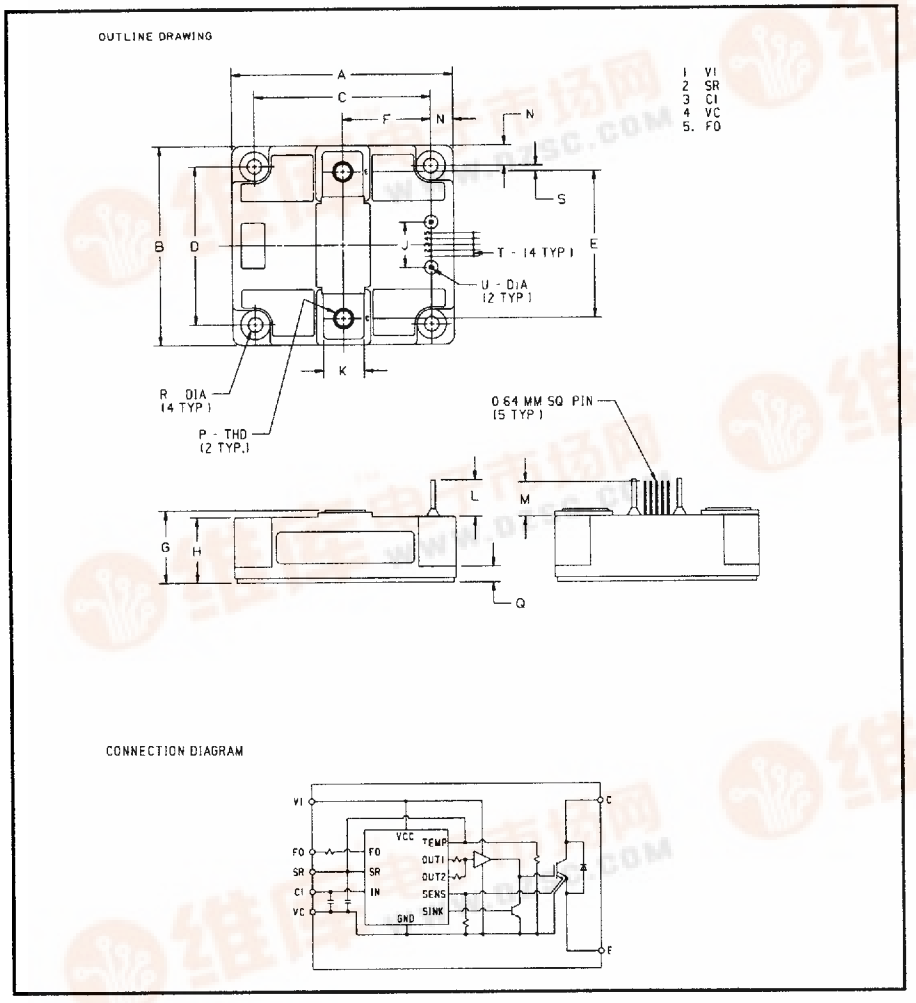
Intellimod™-3 Modules

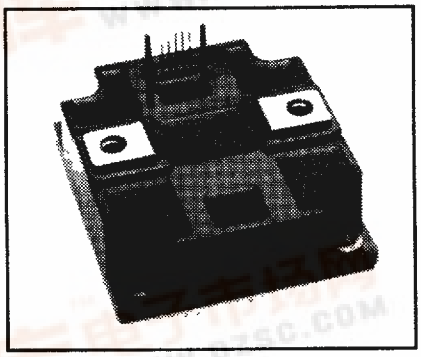
Half-Phase
IGBT Inverter Output
600 Amperes/110-230 Volt Line



110-230 Volt Line, PM600HHA060 Outline Drawing

Dimensions	Inches	Millimeters
A	3.86	98.0
B	3.46	88.0
C	3.15±0.01	80.0±0.25
D	2.76±0.01	70.0±0.25
E	2.56	65.0
F	1.57	40.0
G	1.34+0.04/-0.02	34.0+1.0/-0.5
H	1.16	29.5
J	0.79	20.0
K	0.71	18.0

Dimensions	Inches	Millimeters
L	0.63	16.0
M	0.59	15.0
N	0.35	9.0
P	Metric M8	M8
Q	0.28	7.0
R	0.26 Dia.	6.5 Dia.
S	0.1	2.5
T	0.1	2.54
U	0.08 Dia.	2.0 Dia.



Description
Powerex Intellimod-3 Modules are designed for applications requiring a high frequency (20kHz) output switching inverter. The modules are isolated from the baseplate, consisting of complete drive, control and protection circuitry for the IGBT inverter.

Features:
- ☐ Complete Output Power Circuit
- ☐ Gate Drive Circuit
- ☐ Protection Logic
  - Short Circuit
  - Over-Current
  - Over Temperature
  - Under Voltage

Applications:
- ☐ Inverters
- ☐ Small UPS
- ☐ Motion/Servo Control
- ☐ AC Motor Control

Ordering Information
PM600HHA060

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PM600HHA060
Intellimod-3 Modules
Half-Phase IGBT Inverter Output
600 Amperes/110-230 Volt Line

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

Characteristics	Symbol	PM600HHA060	Units
Power Device Junction Temperature	T_j	-20 to +150	°C
Storage Temperature	T_{STG}	-40 to +125	°C
Case Operating Temperature	T_C	-20 to +100	°C
Mounting Torque, M6 Mounting Screws	—	30	Kg-cm
Mounting Torque, M8 Main Terminal Screws	—	110	Kg-cm
Module Weight (Typical)	—	630	Grams
Supply Voltage Protected by OC and SC (V_D = 13.5 - 16.5V, Inverter Part)	$V_{CC(prot)}$	400	Volts
Isolation Voltage AC 1 minute, 60Hz	V_{RMS}	2500	Volts
Control Sector			
Supply Voltage Applied between (V_1 - V_C)	V_D	20	Volts
Input Voltage Applied between (C_1 - V_C)	V_{CIN}	10	Volts
Fault Output Supply Voltage Applied between (F_O - V_C)	V_{FO}	20	Volts
Fault Output Current (Sink Current at F_O, Terminals)	I_{FO}	20	mA
IGBT Inverter Sector			
Collector-Emitter Voltage	V_{CES}	600	Volts
Collector Current ±	I_C	600	Amperes
Peak Collector Current ±	I_{CP}	1200	Amperes
Collector Dissipation	P_C	2080	Watts

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PM600HHA060
Intellimod-3 Modules
Half-Phase IGBT Inverter Output
600 Amperes/110-230 Volt Line

Electrical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Control Sector						
Overcurrent Trip Level	OC	-20°C ≤ T ≤ 125°C, Fig. 5	740	1000	–	Amperes
Short Circuit Trip Level	SC	-20°C ≤ T ≤ 125°C, Fig. 5	1000	1400	–	Amperes
Over Current Delay Time	$t_{off(OC)}$	V_D = 15V, Fig. 5	–	5	–	µS
Over Temperature Protection	OT	Trip Level	100	110	120	°C
Over Temperature Protection	OT_R	Reset Level	85	95	105	°C
Supply Circuit Under Voltage Protection	UV	Trip Level	11.5	12.0	12.5	Volts
Supply Circuit Under Voltage Protection	UV_R	Reset Level	–	12.5	–	Volts
Supply Voltage	V_D	Applied between V_1 - V_C	13.5	15	16.5	Volts
Circuit Current	I_D	V1 Terminal Current, V_D = 15V, V_{CIN} = 5V	–	23	30	mA
Input On Voltage	$V_{CIN(on)}$	Applied between	1.2	1.5	1.8	Volts
Input Off Voltage	$V_{CIN(off)}$	C_1 - V_C	1.7	2.0	2.3	Volts
PWM Input Frequency	f_{PWM}	3-Ø Sinusoidal	–	15	20	kHz
Dead Time	t_{DEAD}	For each Input Pulse	4.0	–	–	µS
		Using example Interface Circuit*	6.0	–	–	µS
Fault Output Current	$I_{FO(H)}$	V_D = 15V, V_{FO} = 15V	–	–	0.01	mA
	$I_{FO(L)}$	V_D = 15V, V_{FO} = 15V	–	10	15	mA
Minimum Fault Output Pulse Width	t_{FO}	V_D = 15V	1.0	1.8	–	µS
SXR Terminal Output Voltage	V_{SXR}	T_j = 125°C, R_{IN} = 6.8kΩ, (S_R)	4.5	5.1	5.6	Volts

*See Intellimod-3 Applications Data Section 4.3.

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600 Amperes/110-230 Volt Line

Electrical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
IGBT Inverter Sector						
Collector Cutoff Current	I_{CEX}	$V_{CE} = V_{CES}$, T_j = 25°C, Fig. 4	–	–	1	mA
Collector Cutoff Current	I_{CEX}	$V_{CE} = V_{CES}$, T_j = 125°C, Fig. 4	–	–	10.0	mA
Diode Forward Voltage	V_{FM}	$-I_C$ = 600A, V_{CIN} = 5V, Fig. 2	–	1.6	2.5	Volts
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	V_D = 15V, V_{CIN} = 0V, I_C = 600A, Fig. 1	–	2.6	3.5	Volts
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	V_D = 15V, V_{CIN} = 0V, I_C = 600A, T_j = 125 °C, Fig. 1	–	2.4	3.4	Volts
Inductive Load Switching Times	t_{on}	V_D = 15V, V_{CIN} = 0V, V_{CC} = 300V, I_C = 600A, T_j = 125 °C Fig. 3	0.5	1.4	2.5	µS
	t_{rr}		–	0.2	0.4	µS
	$t_{C(on)}$		–	0.5	1.0	µS
	t_{off}		–	2.0	3.0	µS
	$t_{C(off)}$		–	0.5	1.0	µS

Thermal Characteristics

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistances Junction to Case	$R_{th(j-c)Q}$	Inverter IGBT	–	–	0.060	°C/W
	$R_{th(j-c)F}$	Inverter FWD	–	–	0.12	°C/W
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Fin, Thermal Grease Applied	–	–	0.038	°C/W

Recommended Operating Conditions

Characteristics	Symbol	Test Conditions	Value	Units
Supply Voltage	V_{CC}		0 ~ 400	Volts
	V_D	Applied between V_1 - V_C	15±1.5	Volts
Input On Voltage	$V_{CIN(on)}$	Applied between C_1 - V_C	0 ~ 0.8	Volts
Input Off Voltage	$V_{CIN(off)}$		4.0 ~ V_{SXR}	Volts
PWM Input Frequency	f_{PWM}	Using example Interface Circuit *	5 ~ 20	kHz
Minimum Dead Time	t_{DEAD}	Using example Interface Circuit *	6.0	µS

*See Intellimod-3 Applications Data Section 4.3.

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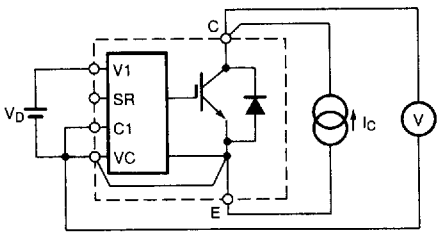

Figure 1 $V_{CE(SAT)}$ Test

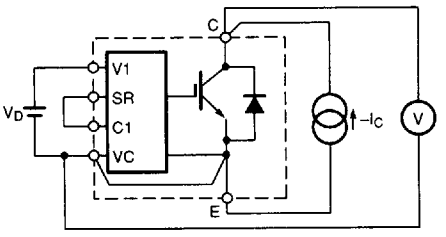

Figure 2 V_{EC} Test

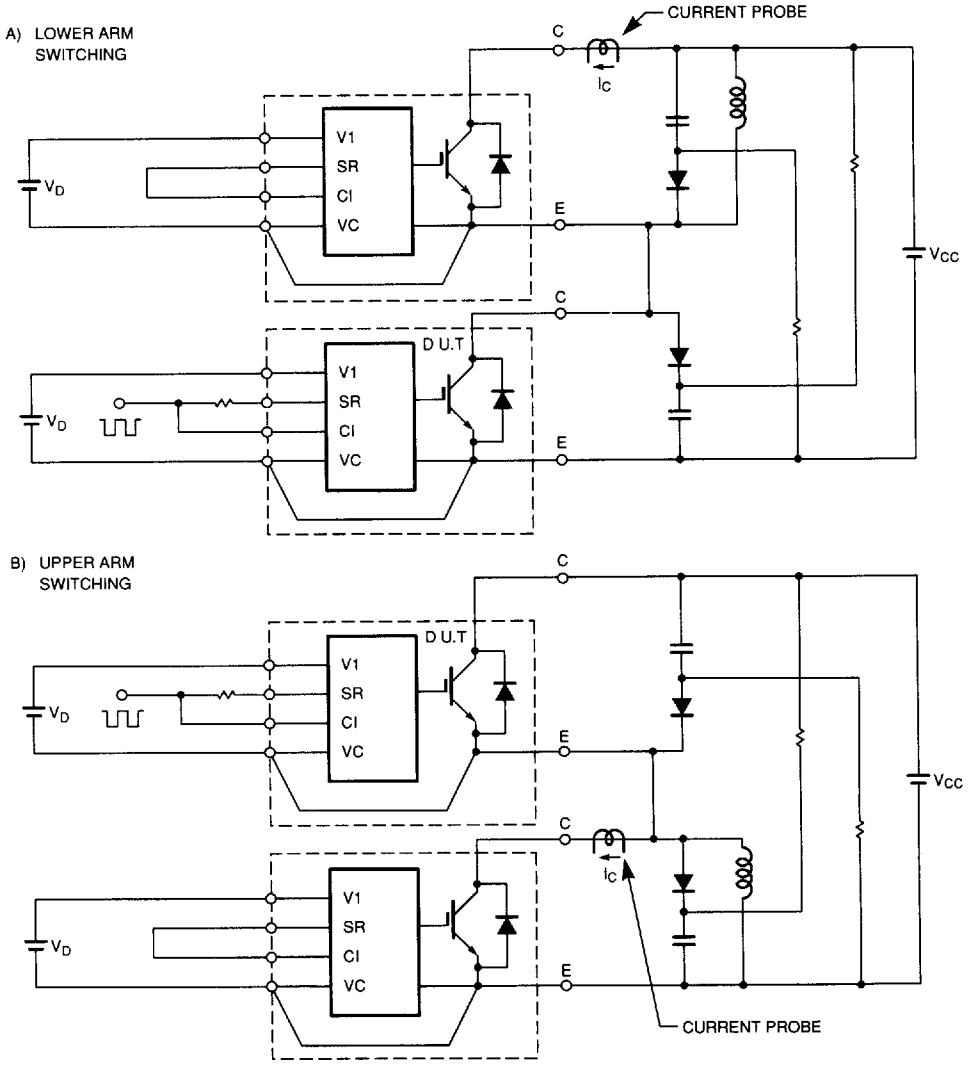

Figure 3 Half Bridge Switching Test and Waveform

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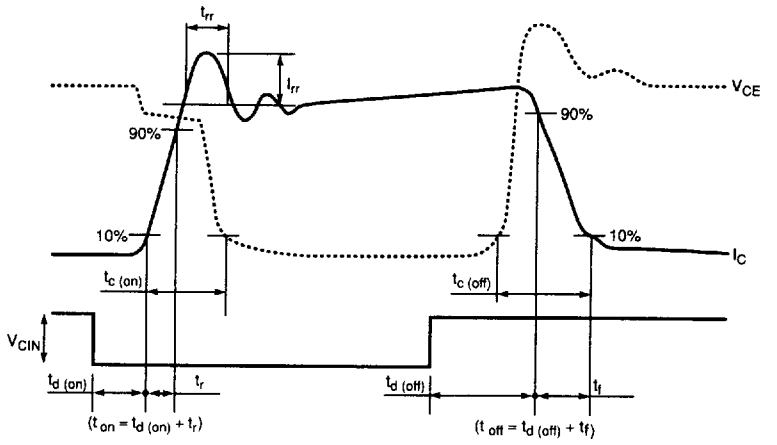

Figure 3 Half Bridge Switching Test and Waveform (Continued)

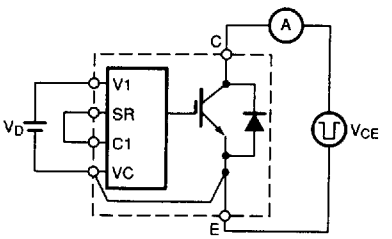

Figure 4 I_{CES} Test

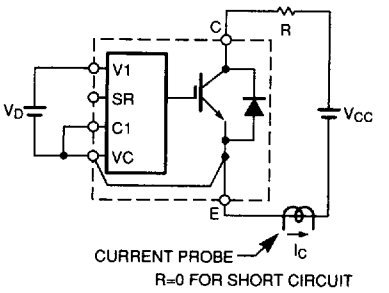

Figure 5 Over Current and Short Circuit Test