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With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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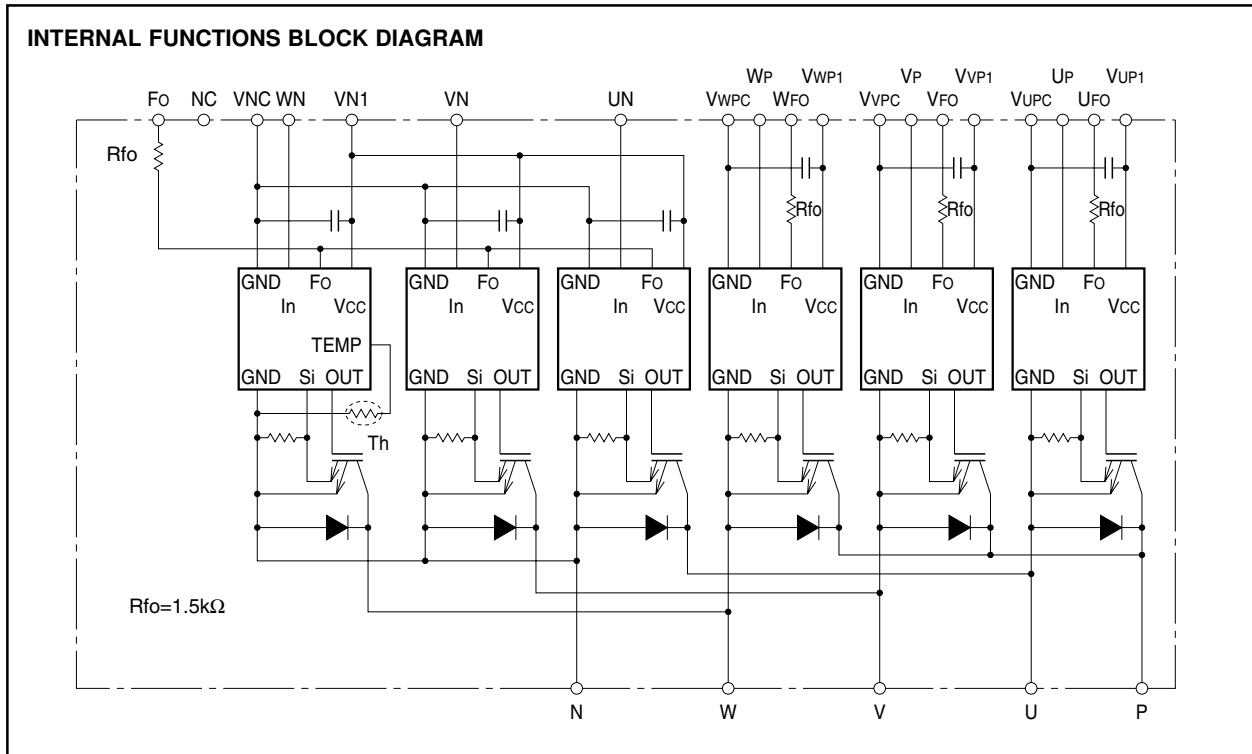
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





# PM150CVA060

FLAT-BASE TYPE  
INSULATED PACKAGE



**MAXIMUM RATINGS** ( $T_j = 25^\circ\text{C}$ , unless otherwise noted)

**INVERTER PART**

Symbol	Parameter	Condition	Ratings	Unit
$V_{CES}$	Collector-Emitter Voltage	$V_D = 15\text{V}$ , $V_{CIN} = 15\text{V}$	600	V
$\pm I_C$	Collector Current	$T_C = 25^\circ\text{C}$	150	A
$\pm I_{CP}$	Collector Current (Peak)	$T_C = 25^\circ\text{C}$	300	A
$P_C$	Collector Dissipation	$T_C = 25^\circ\text{C}$	406	W
$T_j$	Junction Temperature		$-20 \sim +150$	$^\circ\text{C}$

**CONTROL PART**

Symbol	Parameter	Condition	Ratings	Unit
$V_D$	Supply Voltage	Applied between : $V_{UP1}-V_{UPC}$ $V_{VP1}-V_{VPC}$ , $V_{WP1}-V_{WPC}$ , $V_{N1}-V_{NC}$	20	V
$V_{CIN}$	Input Voltage	Applied between : $U_P-V_{UPC}$ , $V_P-V_{VPC}$ , $W_P-V_{WPC}$ $U_N \cdot V_N \cdot W_N-V_{NC}$	20	V
$V_{FO}$	Fault Output Supply Voltage	Applied between : $U_{FO}-V_{UPC}$ , $V_{FO}-V_{VPC}$ , $W_{FO}-V_{WPC}$ $F_O-V_{NC}$	20	V
$I_{FO}$	Fault Output Current	Sink current at $U_{FO}$ , $V_{FO}$ , $W_{FO}$ and $F_O$ terminal	20	mA

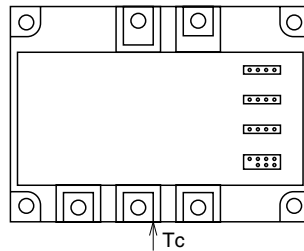
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## TOTAL SYSTEM

Symbol	Parameter	Condition	Ratings	Unit
V <sub>CC(Prot)</sub>	Supply Voltage Protected by SC	V <sub>D</sub> = 13.5 ~ 16.5V, Inverter Part, T <sub>j</sub> = 125°C Start	400	V
V <sub>CC(surge)</sub>	Supply Voltage (Surge)	Applied between : P-N, Surge value or without switching	500	V
T <sub>c</sub>	Module Case Operating Temperature	(Note-1)	-20 ~ +100	°C
T <sub>stg</sub>	Storage Temperature		-40 ~ +125	°C
V <sub>iso</sub>	Isolation Voltage	60Hz, Sinusoidal, Charged part to Base, AC 1 min.	2500	V <sub>rms</sub>

(Note-1) T<sub>c</sub> measurement point is below. (3mm depth at the center of the side of base plate)



## ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25°C, unless otherwise noted)

### INVERTER PART

Symbol	Parameter	Test Condition	Limits			Unit	
			Min.	Typ.	Max.		
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage	V <sub>D</sub> = 15V, I <sub>c</sub> = 150A V <sub>CIN</sub> = 0V	T <sub>j</sub> = 25°C	—	2.35	2.80	V
			T <sub>j</sub> = 125°C	—	2.55	3.05	
V <sub>EC</sub>	FWDi Forward Voltage	-I <sub>c</sub> = 150A, V <sub>D</sub> = 15V, V <sub>CIN</sub> = 15V	—	2.20	3.30	V	
t <sub>on</sub>	Switching Time	V <sub>D</sub> = 15V, V <sub>CIN</sub> = 0V↔15V V <sub>CC</sub> = 300V, I <sub>c</sub> = 150A T <sub>j</sub> = 125°C Inductive Load (upper and lower arm)	—	0.4	0.8	2.1	μs
t <sub>tr</sub>			—	0.2	0.3		
t <sub>c(on)</sub>			—	0.3	1.1		
t <sub>off</sub>			—	1.8	2.9		
t <sub>c(off)</sub>			—	0.6	1.2		
I <sub>CES</sub>	Collector-Emitter Cutoff Current	V <sub>CE</sub> = V <sub>CE(s)</sub> , V <sub>CIN</sub> = 15V	T <sub>j</sub> = 25°C	—	—	1	mA
			T <sub>j</sub> = 125°C	—	—	10	

### CONTROL PART

Symbol	Parameter	Test Condition	Limits			Unit	
			Min.	Typ.	Max.		
I <sub>D</sub>	Circuit Current	V <sub>D</sub> = 15V, V <sub>CIN</sub> = 15V	V <sub>N1</sub> -V <sub>Nc</sub>	—	40	55	mA
			V*P1-V*PC	—	13	18	
V <sub>th(ON)</sub>	Input ON Threshold Voltage	Applied between : UP-VU <sub>PC</sub> , VP-VV <sub>PC</sub> , WP-VW <sub>PC</sub> UN • VN • WN-V <sub>Nc</sub>	1.2	1.5	1.8	V	
V <sub>th(OFF)</sub>	Input OFF Threshold Voltage		1.7	2.0	2.3		
SC	Short Circuit Trip Level	-20 ≤ T <sub>j</sub> ≤ 125°C, V <sub>D</sub> = 15V	210	—	—	A	
t <sub>off(SC)</sub>	Short Circuit Current Delay Time	V <sub>D</sub> = 15V	—	10	—	μs	
OT	Over Temperature Protection	Base-plate Temperature detection, V <sub>D</sub> = 15V	Trip level	111	118	125	°C
			Reset level	—	100	—	
UV	Supply Circuit Under-Voltage Protection	-20 ≤ T <sub>j</sub> ≤ 125°C	Trip level	11.5	12.0	12.5	V
			Reset level	—	12.5	—	
I <sub>FO(H)</sub>	Fault Output Current	V <sub>D</sub> = 15V, V <sub>FO</sub> = 15V	(Note-2)	—	—	0.01	mA
I <sub>FO(L)</sub>			(Note-2)	—	10	15	
t <sub>FO</sub>	Minimum Fault Output Pulse Width	V <sub>D</sub> = 15V	(Note-2)	1.0	1.8	—	ms

(Note-2) Fault output is given only when the internal SC, OT & UV protection.  
Fault output of OT protection operate by lower arm  
Fault output of OT, UV protection given pulse while over level.

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## THERMAL RESISTANCES

Symbol	Parameter	Test Condition	Limits			Unit
			Min.	Typ.	Max.	
R <sub>th(j-c)Q</sub>	Junction to case Thermal Resistances	Inverter IGBT part (per 1/6 module)	—	—	0.308	°C/W
R <sub>th(j-c)F</sub>		Inverter FWDi part (per 1/6 module)	—	—	0.47	
R <sub>th(c-f)</sub>	Contact Thermal Resistance	Case to fin, Thermal grease applied (per 1 module)	—	—	0.022	

## MECHANICAL RATINGS AND CHARACTERISTICS

Symbol	Parameter	Test Condition	Limits			Unit
			Min.	Typ.	Max.	
—	Mounting torque	Mounting part screw : M5	2.5	3.0	3.5	N • m
—	Mounting torque	Main terminal screw : M5	2.5	3.0	3.5	N • m
—	Weight		—	730	—	g

## RECOMMENDED CONDITIONS FOR USE

Symbol	Parameter	Test Condition	Recommended value	Unit
V <sub>CC</sub>	Supply Voltage	Applied across P-N terminals	≤ 400	V
V <sub>D</sub>	Control Supply Voltage	Applied between : V <sub>UP1</sub> -V <sub>UPC</sub> , V <sub>VP1</sub> -V <sub>VPC</sub> V <sub>WP1</sub> -V <sub>WPC</sub> , V <sub>N1</sub> -V <sub>NVC</sub> (Note-3)	15 ± 1.5	V
V <sub>CIN(ON)</sub>	Input ON Voltage	Applied between : U <sub>P</sub> -V <sub>UPC</sub> , V <sub>P</sub> -V <sub>VPC</sub> , W <sub>P</sub> -V <sub>WPC</sub> U <sub>N</sub> • V <sub>N</sub> • W <sub>N</sub> -V <sub>NVC</sub>	≤ 0.8	V
V <sub>CIN(OFF)</sub>	Input OFF Voltage		≥ 4.0	
t <sub>dead</sub>	Arm Shoot-through Blocking Time	For IPM's each input signals	≥ 2.5	μs
f <sub>PWM</sub>	PWM Input Frequency	Using Application Circuit input signal of IPM, 3φ Sinusoidal PWM VVVF inverter	≤ 20	kHz

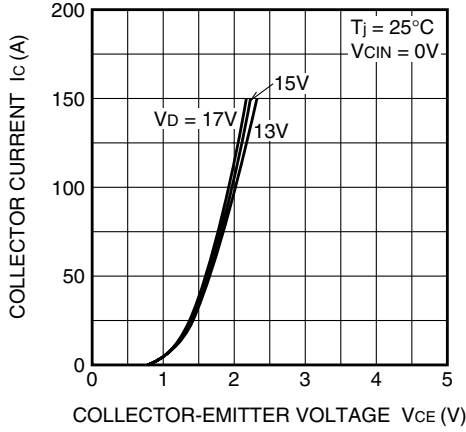
(Note-3) With ripple satisfying the following conditions dv/dt swing ≤ ±5V/μs, Variation ≤ 2V peak to peak

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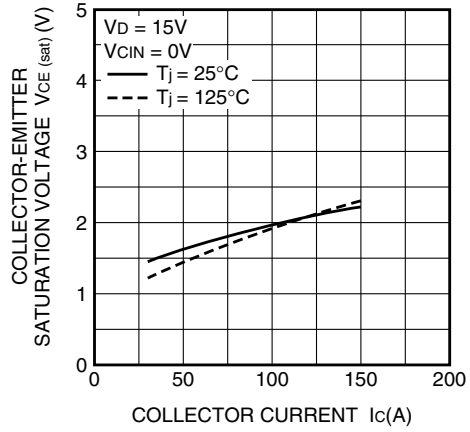
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## PERFORMANCE CURVES

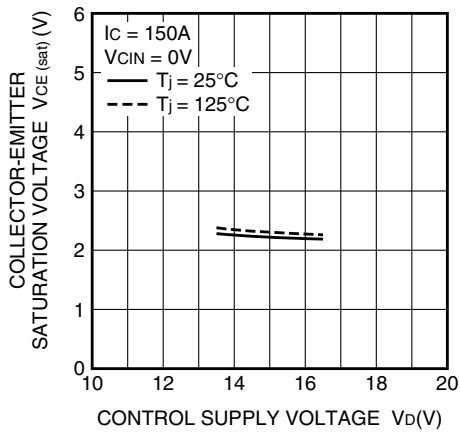
**OUTPUT CHARACTERISTICS (TYPICAL)**



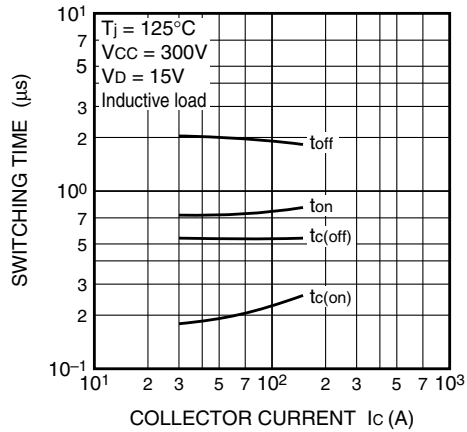
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



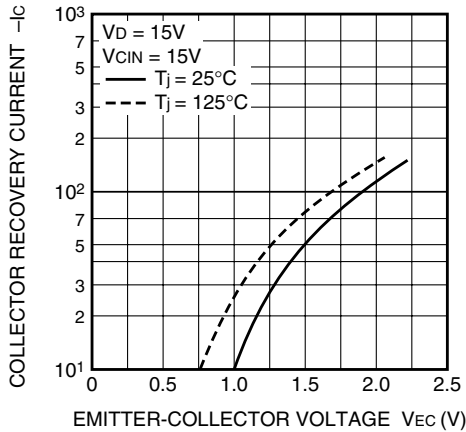
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



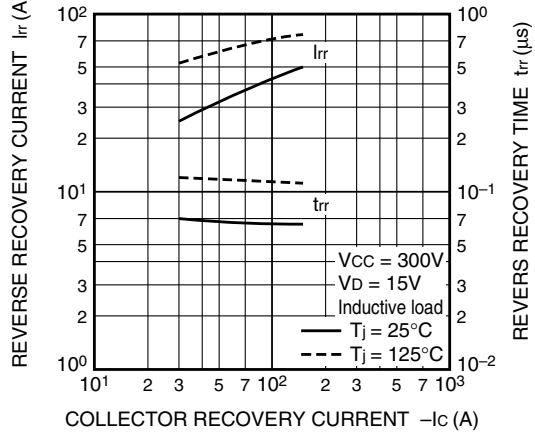
**SWITCHING CHARACTERISTICS (TYPICAL)**



**DIODE FORWARD CHARACTERISTICS (TYPICAL)**



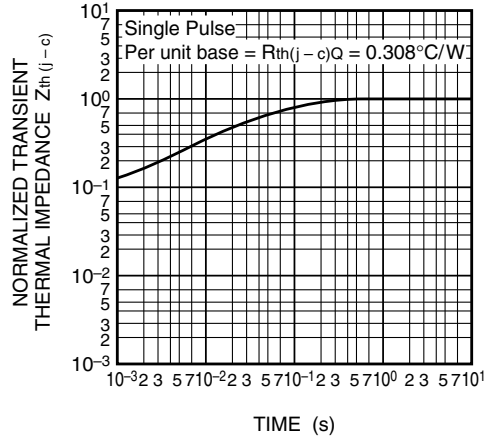
**DIODE REVERSE RECOVERY CHARACTERISTICS (TYPICAL)**



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**TRANSIENT THERMAL  
IMPEDANCE CHARACTERISTICS  
(IGBT per 1 element)**



**TRANSIENT THERMAL  
IMPEDANCE CHARACTERISTICS  
(FWDi per 1 element)**

