

PM75CTK060

FLAT-BASE TYPE
INSULATED PACKAGE

PM75CTK060



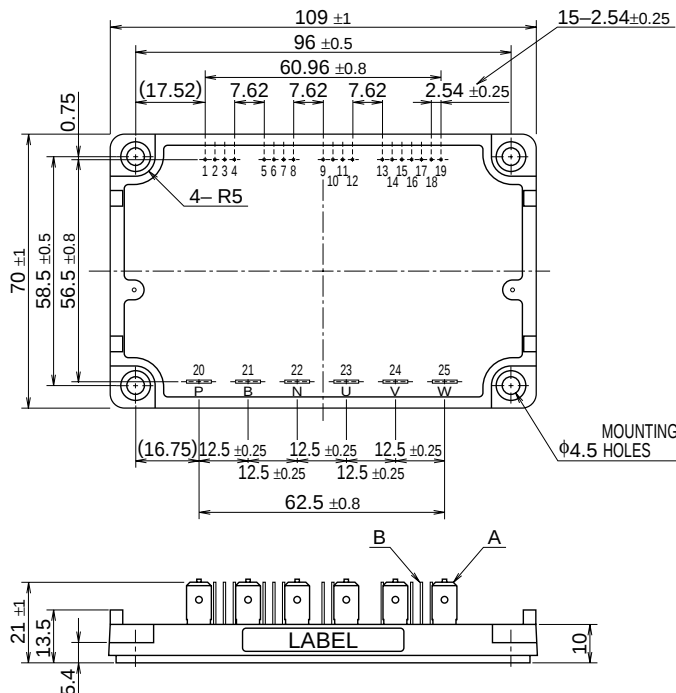
- 600V, 75A Current-sense 6kHz IGBT type inverter
- Built in IGBT gate drive circuit
- Built in Fault OC, SC, OT & UV protection Fault output
- 5.5/7.5kW class inverter application

APPLICATION

Air conditioner, motor control

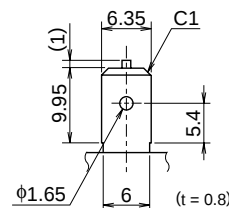
OUTLINE DRAWING

Dimensions in mm

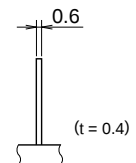


A · B: TERMINAL NAME

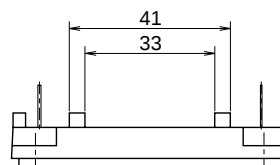
1. VUPC	10. NC	19. FO
2. NC	11. WP	20. P
3. UP	12. VWP1	21. NC
4. VUP1	13. VNC	22. N
5. VVPC	14. VN1	23. U
6. NC	15. NC	24. V
7. VP	16. UN	25. W
8. VVP1	17. VN	
9. VVPC	18. WN	



A : DETAIL



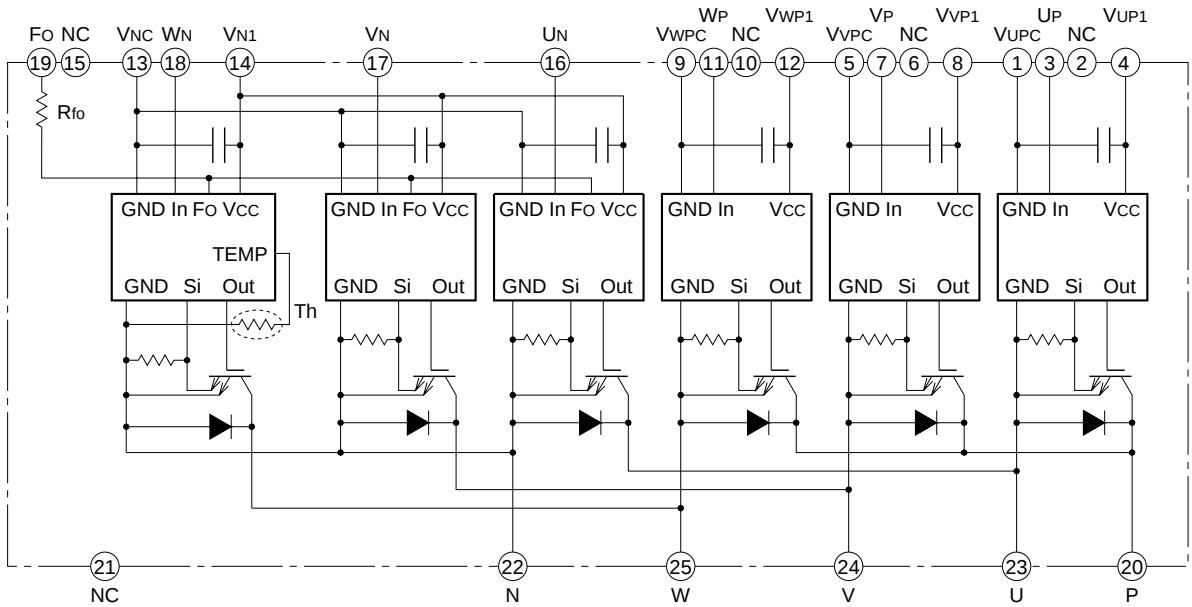
B : DETAIL



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EQUIVALENT CIRCUIT DIAGRAM



MAXIMUM RATINGS (Tj = 25°C, unless otherwise noted)

INVERTER PART

Symbol	Parameter	Conditions	Ratings	Unit
V _{CES}	Collector-emitter voltage	V _D = 15V, I _{CIN} = 10mA	600	V
±I _C	Collector current	T _C = 25°C	75	A
±I _{CP}	Collector current (peak)	T _C = 25°C	150	A
P _C	Collector dissipation	T _C = 25°C	134	W
T _j	Junction temperature		-20 ~ +150	°C

CONTROL PART

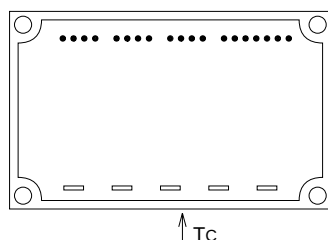
Symbol	Parameter	Conditions	Ratings	Unit
V _D	Supply voltage	Applied between : V _{UP1} -V _{UPC} , V _{VP1} -V _{VP1C} V _{WP1} -V _{WP1C} , V _{N1} -V _{N1C}	20	V
I _{CIN}	Input current	Applied between : U _P -V _{UPC} , V _P -V _{VP1C} , W _P -V _{WP1C} , U _N · V _N · W _N -V _{N1C}	20	mA
V _{FO}	Fault output supply voltage	Applied between : F _O -V _{N1C}	20	V
I _{FO}	Fault output current	Sink current of F _O terminal	20	mA

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TOTAL SYSTEM

Symbol	Parameter	Conditions	Ratings	Unit
V _{CC(Prot)}	Supply voltage protected by OC & SC	V _D = 13.5 ~ 16.5V, Inverter part, T _j = 125°C start	400	V
V _{CC}	Supply voltage	Applied between : P-N, operating time	450	V
V _{CC(surge)}	Supply voltage (surge)	Applied between : P-N, surge and non-operating time	500	V
T _C	Module case operating temperature	(Note 1)	-20 ~ +100	°C
T _{stg}	Storage temperature		-40 ~ +125	°C
V _{iso}	Isolation voltage	60Hz, sinusoidal, AC · 1 min	2500	V _{rms}

Note 1 : T_C measuring point is as shown below.ELECTRICAL CHARACTERISTICS (T_j = 25°C, unless otherwise noted)

INVERTER PART

Symbol	Parameter	Test conditions		Limits			Unit
				Min.	Typ.	Max.	
V _{CE(sat)}	Collector-emitter saturation voltage	V _D = 15V, I _{CIN} = 10mA	I _C = 75A, T _j = 25°C I _C = 75A, T _j = 125°C	—	1.8 1.85	2.7 2.78	V
V _{EC}	FWDi forward voltage	-I _C = 75A, V _D = 15V, I _{CIN} = 0mA		—	2.2	3.3	V
t _{on}	Switching time	V _D = 15V, I _{CIN} = 0mA↔10mA V _{CC} = 300V, I _C = 75A T _j = 125°C (Per 1 arm) Inductive Load		0.6	1.2	2.4	μs
t _{rr}				—	0.15	0.3	μs
t _{c(on)}				—	0.5	1.1	μs
t _{off}				—	2.8	3.6	μs
t _{c(off)}				—	0.6	1.2	μs
I _{CES}	Collector-emitter cutoff current	V _{CE} = V _{CES} , I _{CIN} = 0mA	T _j = 25°C T _j = 125°C	—	—	1 10	mA

CONTROL PART

Symbol	Parameter	Test conditions		Limits			Unit	
				Min.	Typ.	Max.		
ID	Circuit current	VD = 15V, ICIN = 0mA	VN1-VNC	—	40	55	mA	
			VXP1-VXPC	—	13	18		
Ith(ON)	Input on threshold current	Applied between : UP-VUPC, VP-VVPC, WP-VWPC UN · VN · WN-VNC		1	3	5	mA	
Ith(OFF)	Input off threshold current			1	3	5	mA	
OC	Over current trip level	−20°C ≤ Tj ≤ 125°C, VD = 15V		115	161	—	A	
SC	Short circuit trip level	−20°C ≤ Tj ≤ 125°C, VD = 15V		—	241	—	A	
toff(OC)	Over current delay time	VD = 15V		—	10	—	μs	
OT	Over temperature protection	Base-plate	Trip level	100	110	120	°C	
OTr		Temperature detection, VD = 15V	Reset level	—	90	—	°C	
UV	Supply circuit under voltage protection	−20°C ≤ Tj ≤ 125°C		Trip level	11.5	12.0	12.5	V
UVr				Reset level	—	12.5	—	V
Ifo(H)	Fault output current (Note 2)	VD = 15V, VFO = 15V		—	—	0.01	mA	
Ifo(L)				—	10	15	mA	
tFO	Minimum fault output pulse width (Note 2)	VD = 15V		1.0	1.8	—	ms	

Note 2 : Fault output is given only when the internal OC, SC, OT & UV protection.

Fault output of OC, SC protection operate by lower arm.

Fault output of OC, SC protection given pulse.

Fault output of OT, UV protection given pulse while over level. (OT is only N side)

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THERMAL RESISTANCES

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Tye.	Max.	
R _{th(j-c)Q}	Junction to case thermal resistances	Inverter IGBT part, per 1/6 module	—	—	0.93	°C / W
R _{th(j-c)F}		Inverter FWDi part, per 1/6 module	—	—	0.91	°C / W
R _{th(c-f)}	Contact thermal resistance	Case to fin, thermal grease applied, per 1 module	—	—	0.036	°C / W

MECHANICAL RATINGS AND CHARACTERISTICS

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Tye.	Max.	
—	Mounting torque	Mounting screw : M4	0.98	1.18	1.47	N·m
—	Weight		10	12	15	kg·cm
—			—	150	—	g

RECOMMENDED CONDITIONS FOR USE

Symbol	Parameter	Test conditions	Ratings	Unit
V _{CC}	Supply voltage	Applied between : P-N	≤ 400	V
V _D		Applied between : V _{UP1} -V _{UPC} , V _{VP1} -V _{VPC} V _{WP1} -V _{WPC} , V _{UN1} -V _{UNC} (Note 3)	15 ± 1.5	V
I _{CIN(ON)}	Input on current	Applied between : U _P , V _P , W _P , U _N , V _N , W _N	≥ 5	mA
I _{CIN(OFF)}	Input off current		≤ 1	mA
f _{PWM}	PWM input frequency	Using application circuit Opto-coupler's input signal	≤ 8	kHz
t _{dead}	Arm shoot-through blocking time	Using application circuit Opto-coupler's input signal	≥ 3	μs

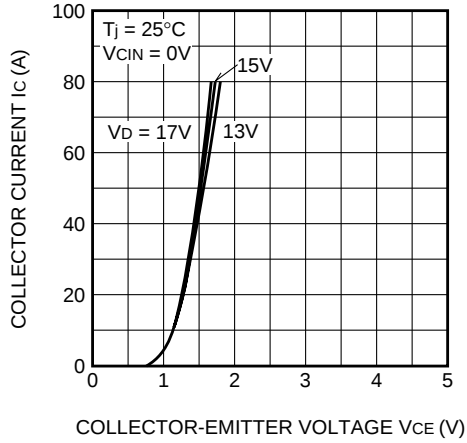
Note 3 : Permissible ripple value : dv/dt ≤ ±5V/μs, V_{ripple} ≤ 2V_{P-P}

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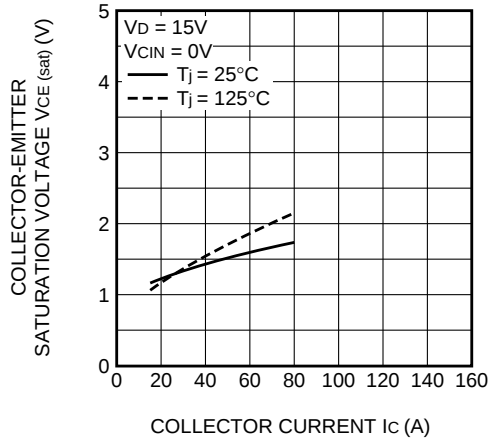
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PERFORMANCE CURVES

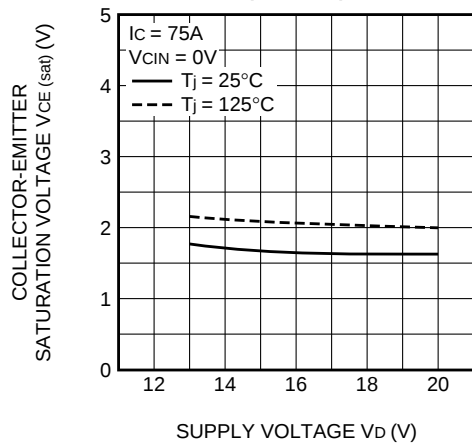
OUTPUT CHARACTERISTICS
(TYPICAL)



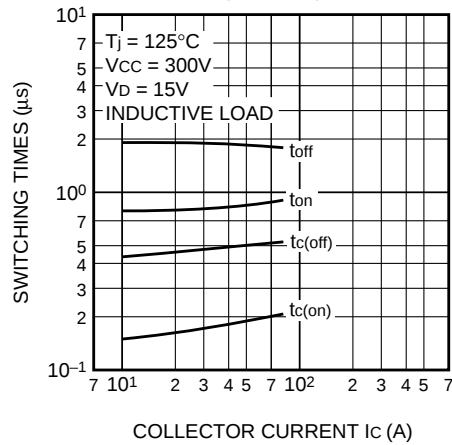
COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)



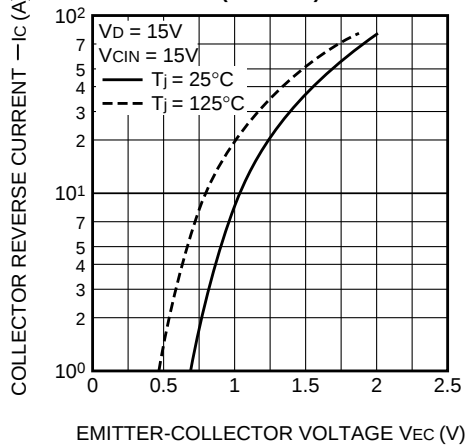
COLLECTOR-EMITTER SATURATION
VOLTAGE VS. SUPPLY VOLTAGE
(TYPICAL)



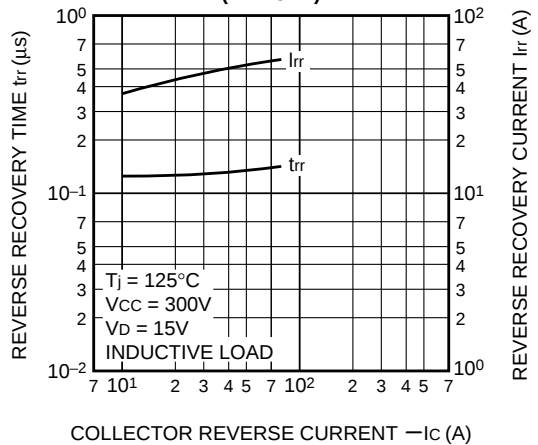
SWITCHING TIME VS.
COLLECTOR CURRENT
(TYPICAL)



FREE-WHEEL DIODE FORWARD
CHARACTERISTICS
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS
OF FREE-WHEEL DIODE
(TYPICAL)



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