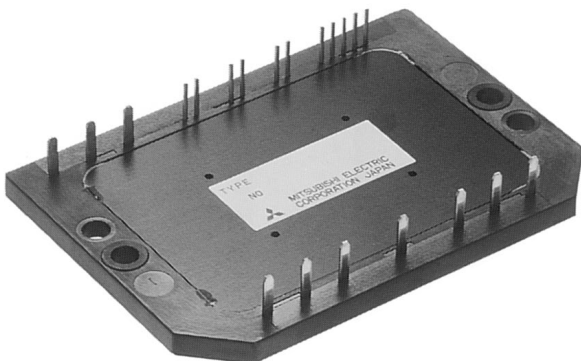


CM15MD-12H

MEDIUM POWER SWITCHING USE
INSULATED TYPE

CM15MD-12H



- IC 15A
- VCES 600V
- Insulated Type
- CIB Module
- 3φ Inverter+3φ Converter+Brake
- UL Recognized

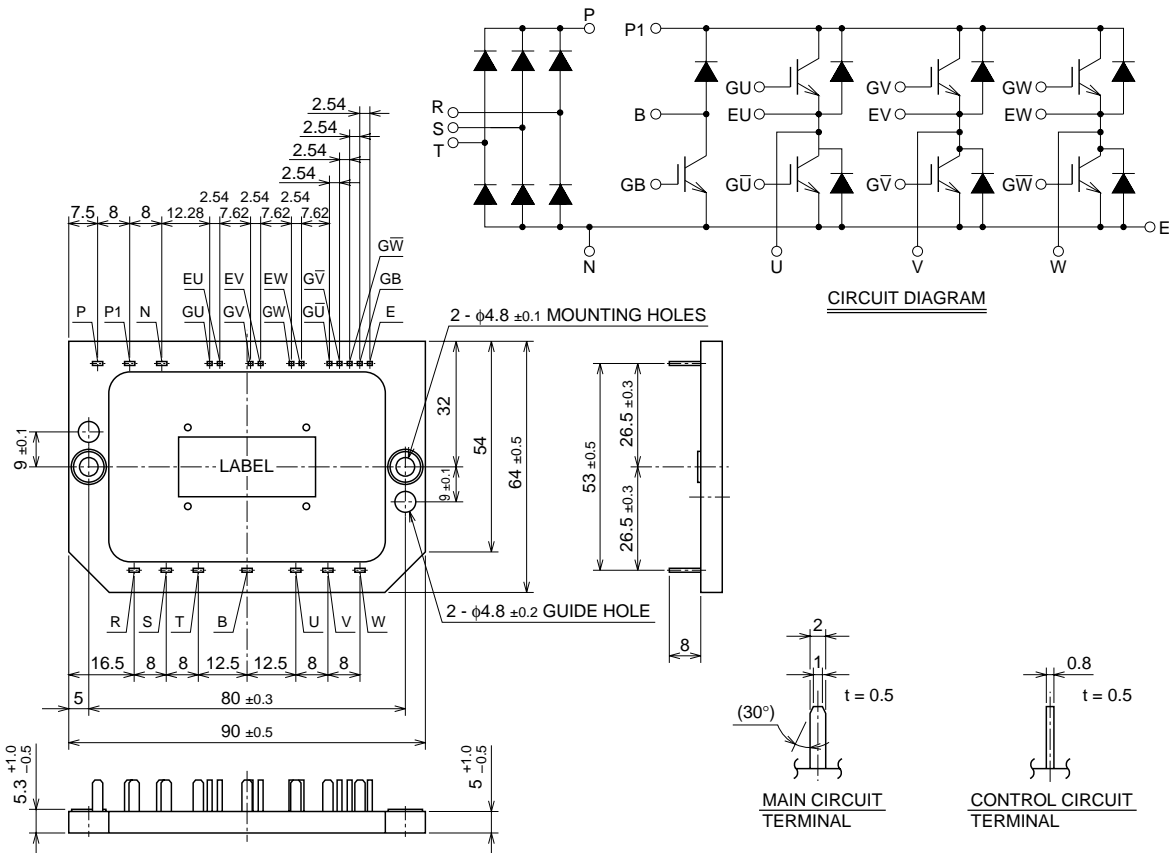
Yellow Card No. E80276 (N)
File No. E80271

APPLICATION

AC & DC motor controls, General purpose inverters, Servo controls, NC, Robotics

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



Note. Not use the guiding holes to mount on the cooling fin.

CM15MD-12H

MEDIUM POWER SWITCHING USE
INSULATED TYPE**MAXIMUM RATINGS** ($T_j = 25^\circ\text{C}$)
INVERTER PART

Symbol	Parameter	Condition	Rating	Unit
V _{CES}	Collector-emitter voltage	G – E Short	600	V
V _{GES}	Gate-emitter voltage	C – E Short	±20	V
I _C	Collector Current	T _C = 25°C	15	A
I _{CM}		PULSE (Note. 2)	30	A
I _E (Note. 1)	Emitter Current	T _C = 25°C	15	A
I _{EM} (Note. 1)		PULSE (Note. 2)	30	A
P _C (Note. 3)	Maximum collector dissipation	T _f = 25°C	45	W

BRAKE PART

Symbol	Parameter	Condition	Rating	Unit
V _{CES}	Collector-emitter voltage	G – E Short	600	V
V _{GES}	Gate-emitter voltage	C – E Short	±20	V
I _C	Collector Current	T _C = 25°C	15	A
I _{CM}		PULSE (Note. 2)	30	A
P _C (Note. 3)	Maximum Collector dissipation	T _f = 25°C	45	W
V _{RRM}	Repetitive peak reverse voltage	Clamp diode part	600	V
I _{FM} (Note. 3)	Forward current	Clamp diode part	15	A

CONVERTER PART

Symbol	Parameter	Condition	Rating	Unit
V _{RRM}	Repetitive peak reverse voltage		800	V
E _a	Recommended AC input voltage		220	V
I _O	DC output current	3 ϕ rectifying circuit	15	A
I _{FSM}	Surge (non-repetitive) forward current	1 cycle at 60Hz, peak value Non-repetitive	150	A
I ² t	I ² t for fusing	Value for one cycle of surge current	93	A ² s

COMMON RATING

Symbol	Parameter	Condition	Rating	Unit
T _j	Junction temperature		-40 ~ +150	°C
T _{stg}	Storage temperature		-40 ~ +125	°C
V _{iso}	Isolation voltage	AC 1 min.	2500	V
—	Mounting torque	Mounting M4 screw	1.47 ~ 1.96	N · m
—	Weight	Typical value	60	g

CM15MD-12H

MEDIUM POWER SWITCHING USE
INSULATED TYPEELECTRICAL CHARACTERISTICS (T_j = 25°C)
INVERTER PART

Symbol	Parameter	Test conditions	Limits			Unit	
			Min.	Typ.	Max.		
ICES	Collector cutoff current	VCE = VCES, VGE = 0V	—	—	1	mA	
VGE(th)	Gate-emitter threshold voltage	IC = 1.5mA, VCE = 10V	4.5	6	7.5	V	
IGES	Gate-emitter cutoff current	VGE = VGES, VCE = 0V	—	—	0.5	μA	
VCE(sat)	Collector-emitter saturation voltage	IC = 15A, VGE = 15V (Note. 4)	T _j = 25°C	—	2.1	2.8	V
			T _j = 150°C	—	2.15	—	
Cies	Input capacitance	VCE = 10V VGE = 0V	—	—	1.5	nF	
Co _{es}	Output capacitance		—	—	1.2	nF	
C _{res}	Reverse transfer capacitance		—	—	0.3	nF	
QG	Total gate charge	VCC = 300V, IC = 15A, VGE = 15V	—	45	—	nC	
t _d (on)	Turn-on delay time	VCC = 300V, IC = 15A	—	—	120	ns	
t _r	Turn-on rise time	VGE1 = VGE2 = 15V	—	—	300	ns	
t _d (off)	Turn-off delay time	RG = 42Ω	—	—	200	ns	
t _f	Turn-off fall time	Resistive load	—	—	300	ns	
VEC (Note. 1)	Emitter-collector voltage	IE = 15A, VGE = 0V	—	—	2.8	V	
t _{rr} (Note. 1)	Reverse recovery time	IE = 15A, VGE = 0V	—	—	110	ns	
Q _{rr} (Note. 1)	Reverse recovery charge	die / dt = -30A / μs	—	0.04	—	μC	
R _{th(j-f)Q} (Note. 5)	Thermal resistance	IGBT part, Per 1/6 module	—	—	2.8	°C/W	
R _{th(j-f)R} (Note. 5)		FWDi part, Per 1/6 module	—	—	3.5	°C/W	

BRAKE PART

Symbol	Parameter	Condition	Limits			Unit	
			Min.	Typ.	Max.		
ICES	Collector cutoff current	VCE = VCES, VGE = 0V	—	—	1	mA	
VGE(th)	Gate-emitter threshold voltage	IC = 1.5mA, VCE = 10V	4.5	6	7.5	V	
IGES	Gate-emitter cutoff current	VGE = VGES, VCE = 0V	—	—	0.5	μA	
VCE(sat)	Collector-to-emitter saturation voltage	IC = 15A, VGE = 15V (Note. 4)	T _j = 25°C	—	2.1	2.8	V
			T _j = 150°C	—	2.15	—	
Cies	Input capacitance	VCE = 10V VGE = 0V	—	—	1.5	nF	
Co _{es}	Output capacitance		—	—	1.2	nF	
C _{res}	Reverse transfer capacitance		—	—	0.3	nF	
QG	Total gate charge	VCC = 300V, IC = 15A, VGE = 15V	—	45	—	nC	
V _{FM}	Forward voltage drop	IF = 15A, Clamp diode part	—	—	1.5	V	
R _{th(j-f)Q} (Note. 5)	Thermal resistance	IGBT part	—	—	2.8	°C/W	
R _{th(j-f)R} (Note. 5)		Clamp diode part	—	—	3.6	°C/W	

CONVERTER PART

Symbol	Parameter	Condition	Limits			Unit
			Min.	Typ.	Max.	
IRRM	Repetitive reverse current	VR = VRRM, T _j = 150°C	—	—	8	mA
V _{FM}	Forward voltage drop	IF = 15A	—	—	1.5	V
R _{th(j-f)} (Note. 5)	Thermal resistance	Per 1/6 module	—	—	3.6	°C/W

Note 1. IE, VEC, t_{rr}, Q_{rr} & die/dt represent characteristics of the anti-parallel, emitter to collector free-wheel diode.

2. Pulse width and repetition rate should be such that the device junction temp. (T_j) does not exceed T_{jmax} rating.

3. Junction temperature (T_j) should not increase beyond 150°C.

4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

5. Thermal resistance is specified under following conditions.

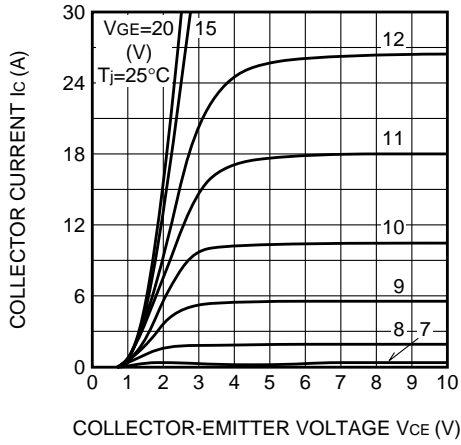
- The conductive grease applied, between module and fin.
- Al plate is used as fin.

CM15MD-12H

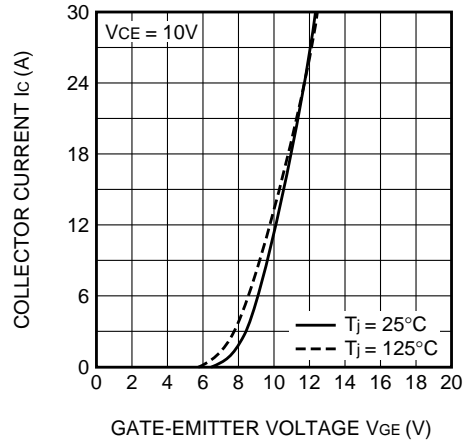
MEDIUM POWER SWITCHING USE
INSULATED TYPE

PERFORMANCE CURVES

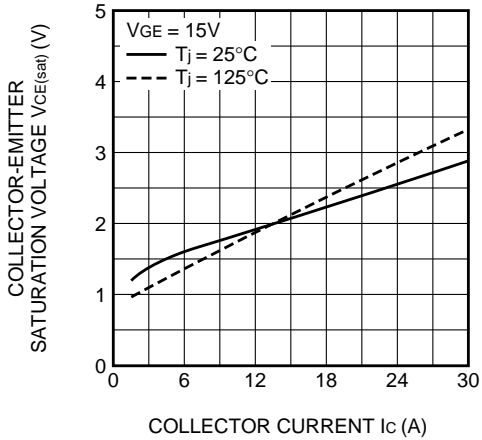
OUTPUT CHARACTERISTICS (TYPICAL)



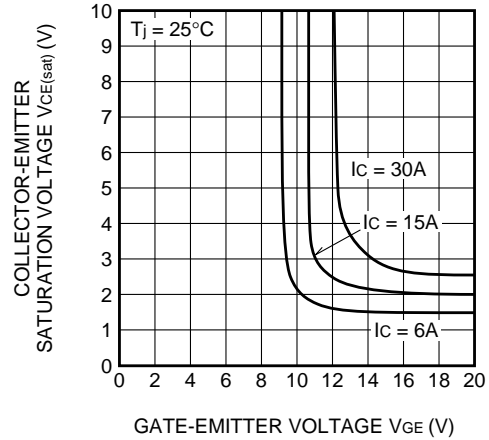
TRANSFER CHARACTERISTICS (TYPICAL)



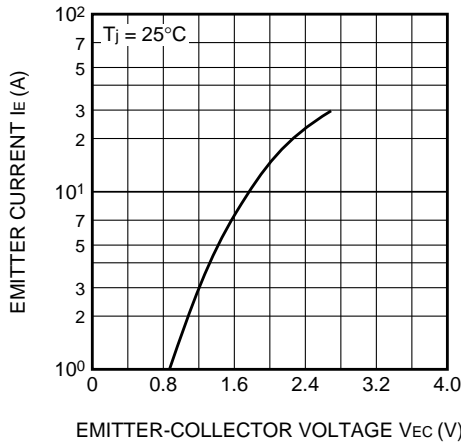
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



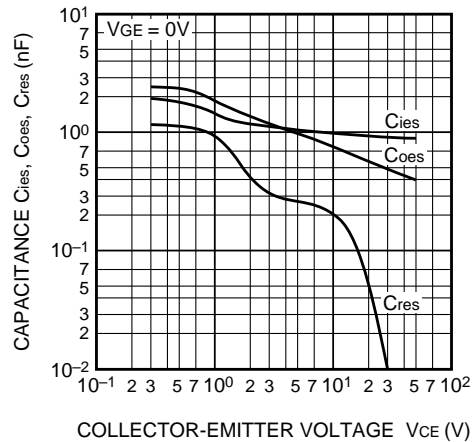
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



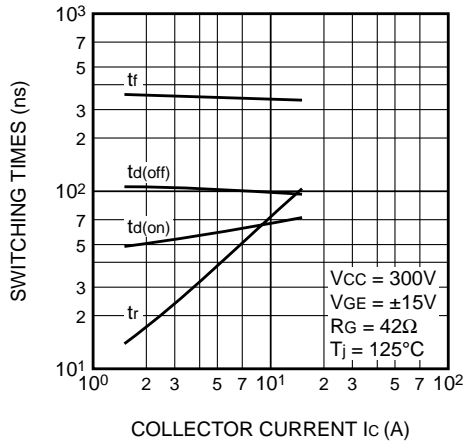
CAPACITANCE VS. Vce (TYPICAL)



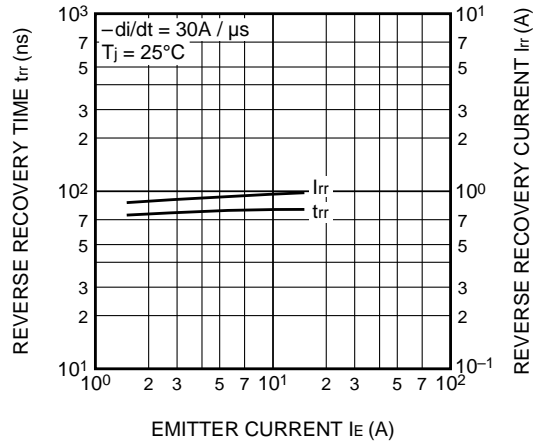
CM15MD-12H

MEDIUM POWER SWITCHING USE
INSULATED TYPE

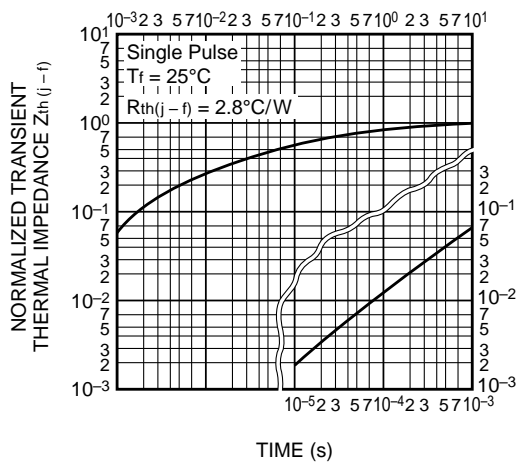
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



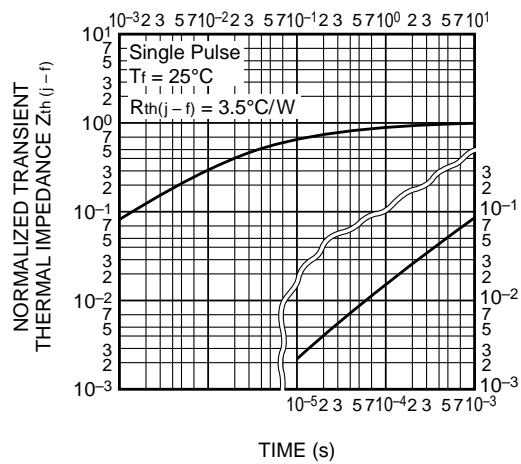
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



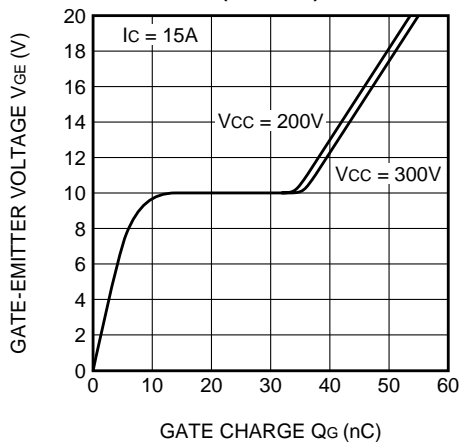
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi part)



V_{GE} - GATE CHARGE (TYPICAL)





LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.