

CM50TU-24H

MEDIUM POWER SWITCHING USE
INSULATED TYPE

CM50TU-24H



- Ic 50A
- VCES 1200V
- Insulated Type
- 6-elements in a pack
- UL Recognized

Yellow Card No. E80276

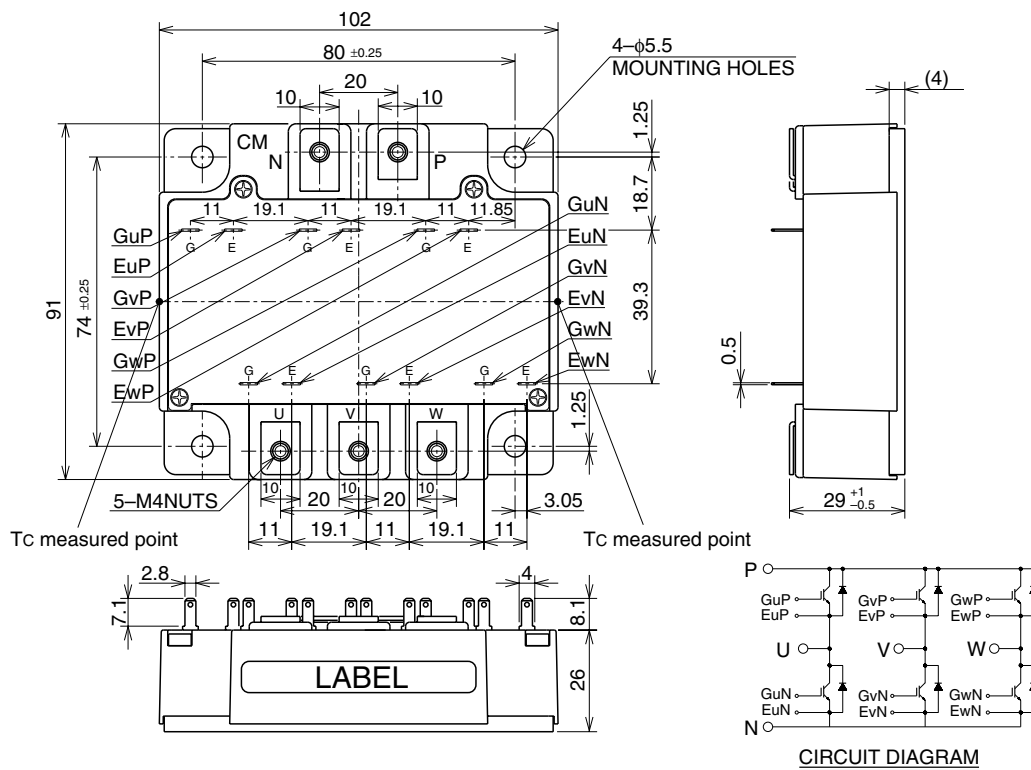
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APPLICATION

UPS, NC machine, AC-Drive control, Servo, Welders

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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MAXIMUM RATINGS (T_j = 25°C, unless otherwise specified)

Symbol	Item	Conditions	Ratings	Unit
V _{CES}	Collector-emitter voltage	V _{GE} = 0V	1200	V
V _{GES}	Gate-emitter voltage	V _{CE} = 0V	±20	V
I _C	Collector current	T _C = 25°C	50	A
I _{CM}		Pulse (Note 1)	100	A
I _E (Note 2)	Emitter current	T _C = 25°C	50	A
I _{EM} (Note 2)		Pulse (Note 1)	100	A
P _C (Note 3)	Maximum collector dissipation	T _C = 25°C	400	W
T _j	Junction temperature	—	−40 ~ +150	°C
T _{stg}	Storage temperature	—	−40 ~ +125	°C
V _{iso}	Isolation voltage	Charged part to base plate, f = 60Hz, AC 1 minute	2500	Vrms
—	Mounting torque	Main terminals M4 screw	1.3 ~ 1.7	N·m
		Mounting M5 screw	2.5 ~ 3.5	N·m
—	Weight	Typical value	570	g

ELECTRICAL CHARACTERISTICS (T_j = 25°C, unless otherwise specified)

Symbol	Item	Test Conditions		Limits			Unit
				Min	Typ	Max	
ICES	Collector cutoff current	VCE = VCES, VGE = 0V		—	—	1	mA
VGE(th)	Gate-emitter threshold voltage	IC = 5mA, VCE = 10V		4.5	6	7.5	V
IGES	Gate-leakage current	±VGE = VGES, VCE = 0V		—	—	0.5	μA
VCE(sat)	Collector-emitter saturation voltage	IC = 50A, VGE = 15V	(Note 4) TJ = 25°C TJ = 125°C	—	2.9	3.7	V
				—	2.85	—	
Cies	Input capacitance	VCE = 10V VGE = 0V		—	—	7.5	nF
Coes	Output capacitance			—	—	2.6	nF
Cres	Reverse transfer capacitance			—	—	1.5	nF
QG	Total gate charge	VCC = 600V, IC = 50A, VGE = 15V		—	187	—	nC
td (on)	Turn-on delay time	VCC = 600V, IC = 50A VGE = ±15V RG = 6.3Ω Resistive load		—	—	80	ns
tr	Turn-on rise time			—	—	200	ns
td (off)	Turn-off delay time			—	—	150	ns
tf	Turn-off fall time			—	—	350	ns
VEC(Note 2)	Emitter-collector voltage	IE = 50A, VGE = 0V		—	—	3.2	V
t _{rr} (Note 2)	Reverse recovery time	IE = 50A, die / dt = −100A / μs		—	—	300	ns
Q _{rr} (Note 2)	Reverse recovery charge			—	0.28	—	μC
Rth(j-c)Q	Thermal resistance (Note 5)	Junction to case, IGBT part (Per 1/6 module)		—	—	0.31	K/W
Rth(j-c)R		Junction to case, FWDi part (Per 1/6 module)		—	—	0.7	K/W
Rth(c-f)	Contact thermal resistance	Case to heat sink, conductive grease applied (Per 1/6 module) (Note 6)		—	0.11	—	K/W

Note 1. Pulse width and repetition rate should be such that the device junction temperature (T_j) does not exceed T_{jmax} rating.

2. I_E, V_{EC}, t_{rr}, Q_{rr} & die/dt represent characteristics of the anti-parallel, emitter-collector free-wheel diode.

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. Case temperature (T_C) measured point is shown in page OUTLINE DRAWING.

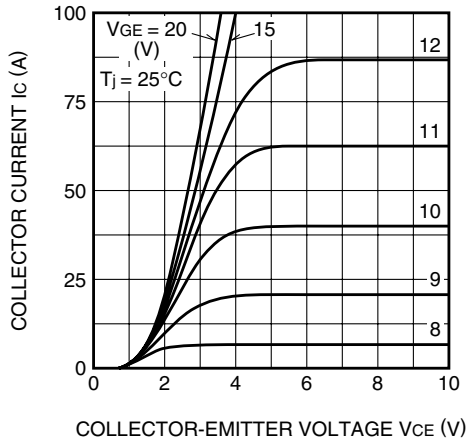
6. Typical value is measured by using thermally conductive grease of λ = 0.9[W/(m · K)].

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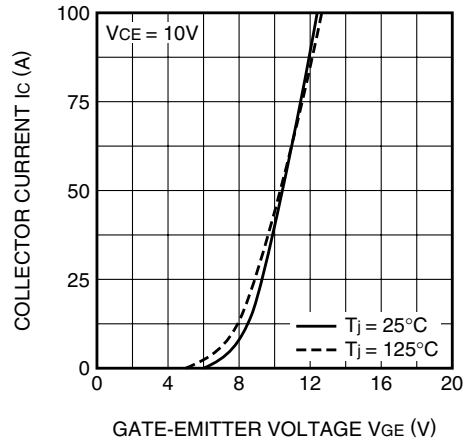
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PERFORMANCE CURVES

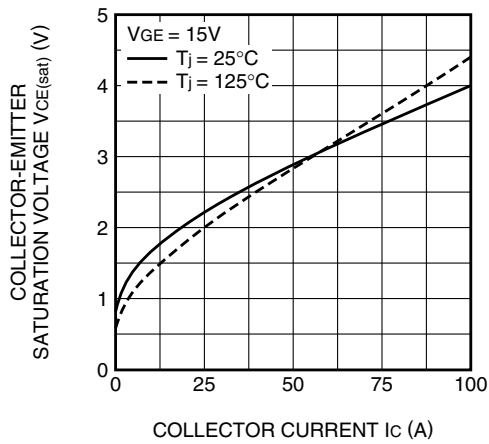
OUTPUT CHARACTERISTICS
(TYPICAL)



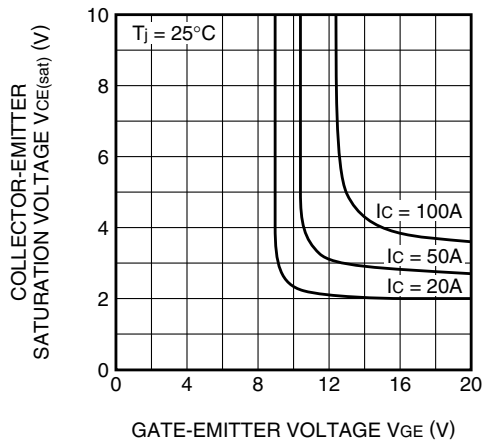
TRANSFER CHARACTERISTICS
(TYPICAL)



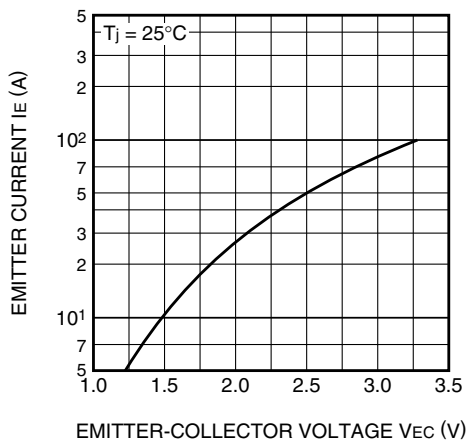
COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)



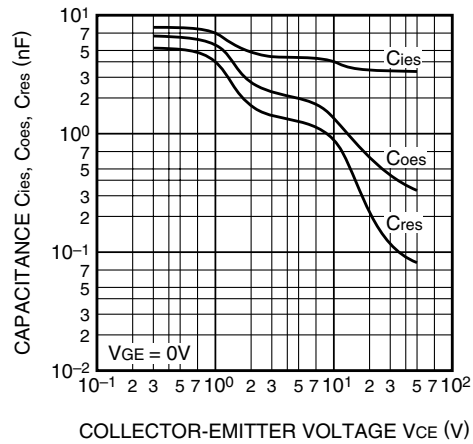
COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)



FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



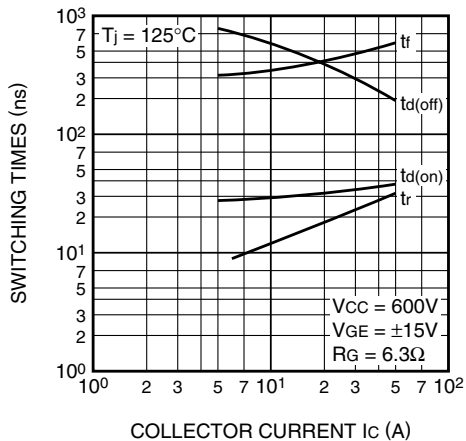
CAPACITANCE CHARACTERISTICS
(TYPICAL)



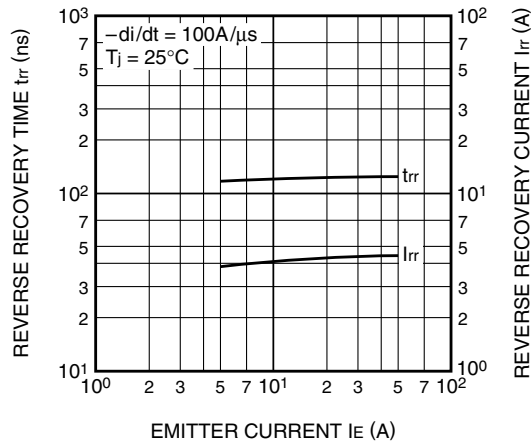
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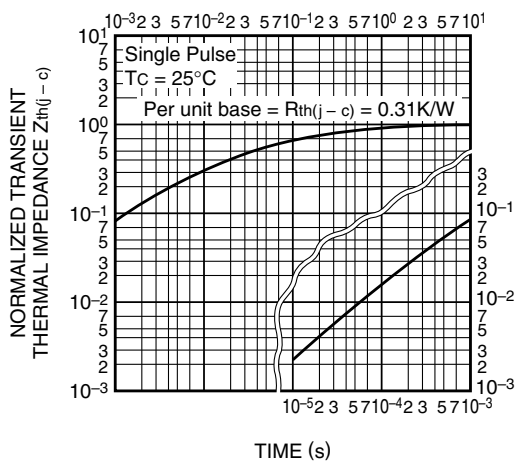
HALF-BRIDGE
SWITCHING TIME CHARACTERISTICS
(TYPICAL)



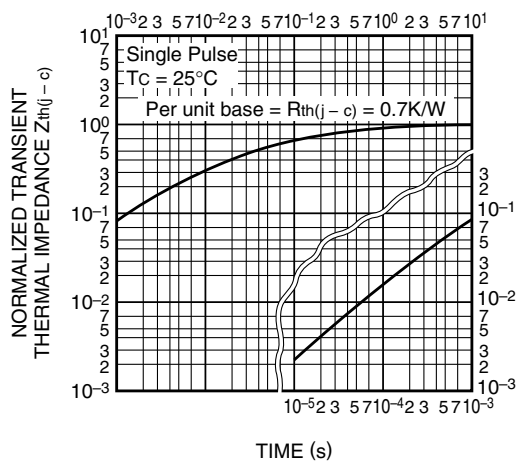
REVERSE RECOVERY CHARACTERISTICS
OF FREE-WHEEL DIODE
(TYPICAL)



TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(IGBT part)



TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(FWDi part)



GATE CHARGE CHARACTERISTICS
(TYPICAL)

