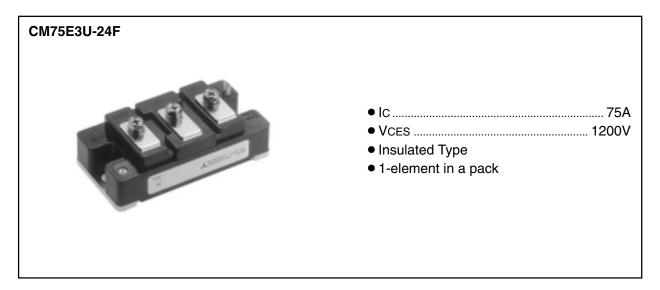
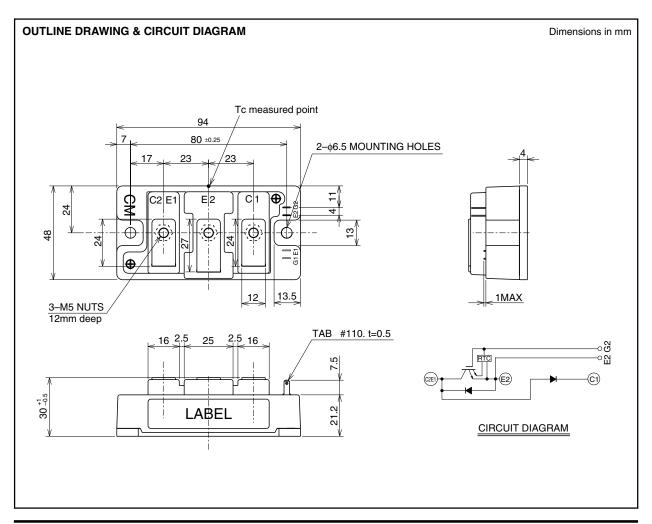
**HIGH POWER SWITCHING USE** 



### **APPLICATION**

**Brake** 



#### **HIGH POWER SWITCHING USE**

#### MAXIMUM RATINGS (Tj = 25°C)

Symbol	Parameter	Conditions			Ratings	Unit
VCES	Collector-emitter voltage	G-E Short			1200	V
VGES	Gate-emitter voltage	C-E Short		±20	V	
Ic	Callagtan augment	Tc = 25°C			75	Α
Ісм	Collector current	Pulse (Note			150	Α
IE (Note 1)	Funitha a commant	Tc = 25°C			75	Α
IEM (Note 1)	Emitter current	Pulse (Note 2			150	Α
PC (Note 3)	Maximum collector dissipation	Tc = 25°C			450	W
VRRM	Repetitive peak reverse voltage	Clamp diode part			1200	V
lF	Forward current	Tc = 25°C Clamp diode part			75	Α
IFМ	Forward current	Pulse	Clamp diode part	(Note 2)	150	Α
Tj	Junction temperature				<b>−</b> 40 ~ +150	°C
Tstg	Storage temperature				<b>−</b> 40 ~ +125	°C
Viso	Isolation voltage	Charged part to base	plate, AC 1 min.	2500	V	
_	Torque strength	Main Terminal M5			2.5 ~ 3.5	N•m
		Mounting holes M6			3.5 ~ 4.5	N•m
_	Weight	Typical value		310	g	

### **ELECTRICAL CHARACTERISTICS (Tj = 25°C)**

Symbol	Dawa wa atau	Test conditions		Limits			
	Parameter			Min.	Тур.	Max.	Unit
ICES	Collector cutoff current	VCE = VCES, VGE = 0V			_	1	mA
VGE(th)	Gate-emitter threshold voltage	Ic = 7.5mA, VcE = 10V		5	6	7	V
IGES	Gate leakage current	VGE = VCES, VCE = 0V		_	_	20	μA
VCE(sat)	Collector-emitter saturation voltage	$T_j = 25^{\circ}C$ IC = 75A, VGE = 15V			1.8	2.4	V
		Tj = 125°C	10 - 70A, VGL - 13V	_	1.9	_	, v
Cies	Input capacitance	VCE = 10V VGE = 0V		_	_	29	nF
Coes	Output capacitance			_	_	1.3	nF
Cres	Reverse transfer capacitance			_	_	0.75	nF
QG	Total gate charge	VCC = 600V, IC = 75A, VGE = 15V		_	825	_	nC
td(on)	Turn-on delay time			_	_	100	ns
tr	Turn-on rise time	Vcc = 600V, Ic = 75A VGE1 = VGE2 = 15V RG = $4.2\Omega$ , Inductive load switching operation IE = 75A		_	_	50	ns
td(off)	Turn-off delay time			_	_	400	ns
tf	Turn-off fall time			_	_	300	ns
trr (Note 1)	Reverse recovery time			_	_	150	ns
Qrr (Note 1)	Reverse recovery charge			_	3.1	_	μC
VEC(Note 1)	Emitter-collector voltage	IE = 75A, VGE = 0V		_	_	3.2	V
Rg	External gate resistance			4.2	_	42	Ω
Rth(j-c)Q	Thermal resistance*1	IGBT part		_	_	0.28	°C/W
Rth(j-c)R	Thermal resistance	FWDi part		_	_	0.47	°C/W
Rth(j-c')Q	Thermal resistance	Tc measured point is just under the chips		_	_	0.22 <sup>*3</sup>	°C/W
VFM	Forward voltage drop	IF = 75A, Clamp diode part		_	_	3.2	V
trr	Reverse recovery time	IF = 75A VCC = 600V, VGE1 = VGE2 = 15V		_	_	150	ns
Qrr	Reverse recovery charge	RG = 4.2 $\Omega$ , Inductive load switching operation, Clamp diode part			3.1	_	μC
Rth(j-c)R	Thermal resistance*1	Clamp diode part			_	0.47	°C/W
Rth(c-f)	Contact thermal resistance	Case to fin, Thermal compound applied*2 (1/2 module)			0.07	_	°C/W

Note 1. IE, VEC, trr, Qrr, die/dt represent characteristics of the anti-parallel, emitter to collector free-wheel diode (FWDi).

2. Pulse width and repetition rate should be such that the device junction temp. (Tj) does not exceed Tjmax rating.



<sup>3.</sup> Junction temperature (Tj) should not increase beyond 150°C.

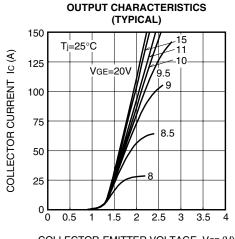
\*1: To measured point is indicated in OUTLINE DRAWING.

\*2: Typical value is measured by using Shin-etsu Silicone "G-746".

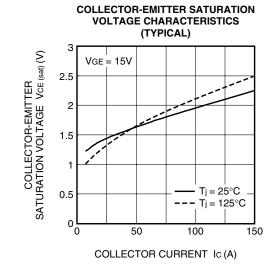
\*3: If you use this value, Rth(f-a) should be measured just under the chips.

#### HIGH POWER SWITCHING USE

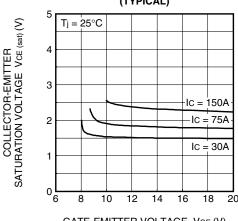
#### **PERFORMANCE CURVES**





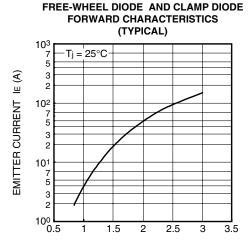


**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS** (TYPICAL)



GATE-EMITTER VOLTAGE VGE (V)

CAPACITANCE-VCE



EMITTER-COLLECTOR VOLTAGE VEC (V)

CHARACTERISTICS (TYPICAL) 102 CAPACITANCE Cies, Coes, Cres (nF) 5 3 10<sup>1</sup>

= 0V

7 5

3

2

3

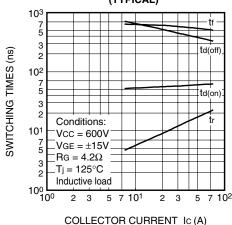
2

 $10^{-1}$ 

100

 $10^{-1}$  2 3 5 7 100 2 3 5 7 101 2 3 5 7 102 COLLECTOR-EMITTER VOLTAGE VCE (V)

#### HALF-BRIDGE **SWITCHING CHARACTERISTICS** (TYPICAL)

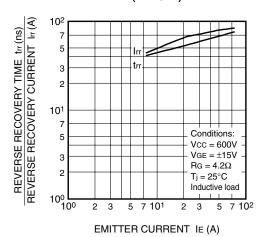




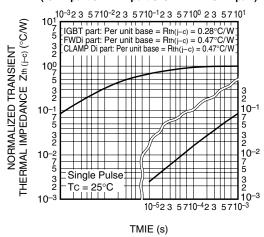


#### **HIGH POWER SWITCHING USE**

# REVERSE RECOVERY CHARACTERISTICS OF CLAMP DIODE (TYPICAL)



# TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part & FWDi part & CLAMP DIODE part)



#### GATE CHARGE CHARACTERISTICS

