

2MBI200VH-120-50

IGBT Modules

IGBT MODULE (V series) 1200V / 200A / 2 in one package

■ Features

- High speed switching
- Voltage drive
- Low Inductance module structure

■ Applications

- Inverter for Motor Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply
- Industrial machines, such as Welding machines

■ Maximum Ratings and Characteristics

● Absolute Maximum Ratings (at Tc=25°C unless otherwise specified)

Items		Symbols	Conditions		Maximum ratings	Units	
Inverter	Collector-Emitter voltage	V _{CE}			1200	V	
	Gate-Emitter voltage	V _{GE}			±20	V	
	Collector current	I _c	Continuous	T _c =100°C	200	A	
				T _c =25°C	240		
		I _c pulse	1ms	400			
		-I _c		200			
		-I _c pulse	1ms	400			
	Collector power dissipation	P _c	1 device		1110	W	
Junction temperature		T _j			175	°C	
Operating junction temperature (under switching conditions)		T _{jop}			150		
Case temperature		T _c			125		
Storage temperature		T _{stg}			-40 ~ +125		
Isolation voltage		between terminal and copper base (*1)		V _{iso}	AC : 1min.	4000	VAC
Screw torque	Mounting (*2)	-				6.0	N m
	Terminals (*3)					5.0	

Note *1: All terminals should be connected together during the test.

Note *2: Recommendable Value : 3.0-6.0 Nm (M5 or M6)

Note *3: Recommendable Value : 2.5-5.0 Nm (M6)

● Electrical characteristics (at Tj= 25°C unless otherwise specified)

Items		Symbols	Conditions		Characteristics			Units
					min.	typ.	max.	
Inverter	Zero gate voltage collector current	I _{CE}	V _{GE} = 0V, V _{CE} = 1200V		-	-	2.0	mA
	Gate-Emitter leakage current	I _{GES}	V _{CE} = 0V, V _{GE} = ±20V		-	-	400	nA
	Gate-Emitter threshold voltage	V _{GE (th)}	V _{CE} = 20V, I _C = 200mA		6.0	6.5	7.0	V
	Collector-Emitter saturation voltage	V _{CE (sat)} (terminal)	V _{GE} = 15V I _C = 200A	T _J =25°C	-	1.95	2.40	V
				T _J =125°C	-	2.25	-	
				T _J =150°C	-	2.30	-	
		V _{CE (sat)} (chip)		T _J =25°C	-	1.75	2.15	
				T _J =125°C	-	2.05	-	
			T _J =150°C	-	2.10	-		
	Internal gate resistance	R _{g(int)}	-		-	3.8	-	Ω
	Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz		-	18.2	-	nF
	Turn-on time	ton	V _{CC} = 600V, I _C = 200A V _{GE} = ±15V, R _G = 2.7Ω		-	0.60	-	μsec
		tr			-	0.20	-	
	Turn-off time	tr (i)			-	0.05	-	
		toff	T _J = 150°C, L _s =30nH	-	0.80	-		
	tf		-	0.08	-			
Forward on voltage	V _F (terminal)	V _{GE} = 0V I _F = 200A	T _J =25°C	-	1.85	2.30	V	
			T _J =125°C	-	2.00	-		
			T _J =150°C	-	1.95	-		
	V _F (chip)		T _J =25°C	-	1.70	2.15		
			T _J =125°C	-	1.85	-		
		T _J =150°C	-	1.80	-			
Reverse recovery time	trr	I _F = 200A		-	0.15	-	μsec	

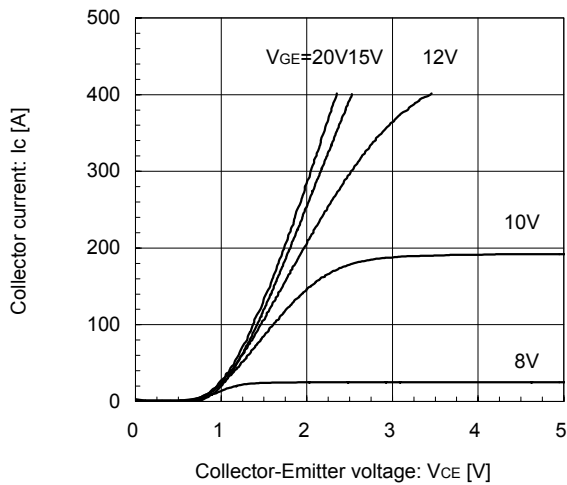
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	IGBT FWD	-	-	0.135	°C/W
Contact thermal resistance (1device) (*4)	R _{th(c-f)}	with Thermal Compound	-	0.0250	-	

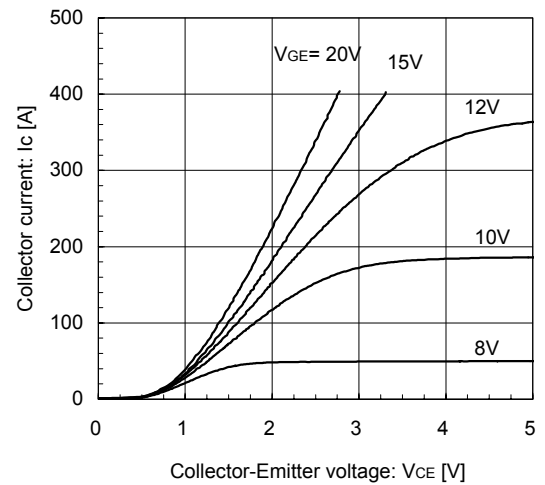
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

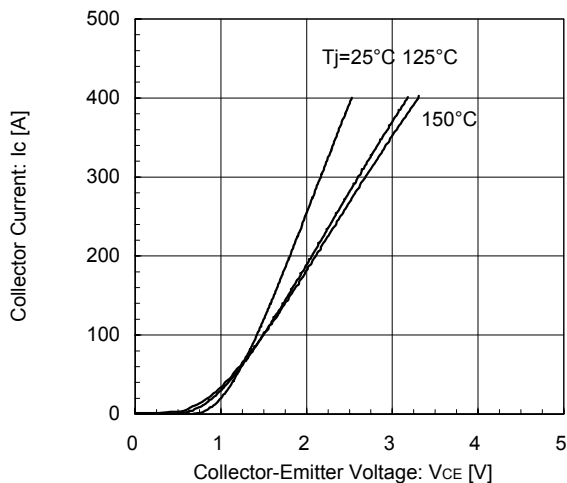
Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C}$ / chip



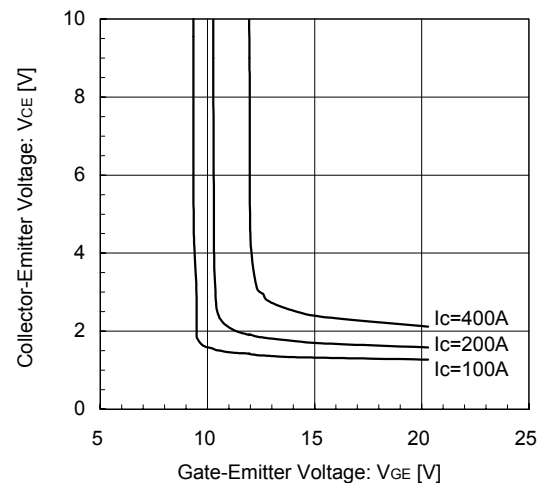
Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 150^\circ\text{C}$ / chip



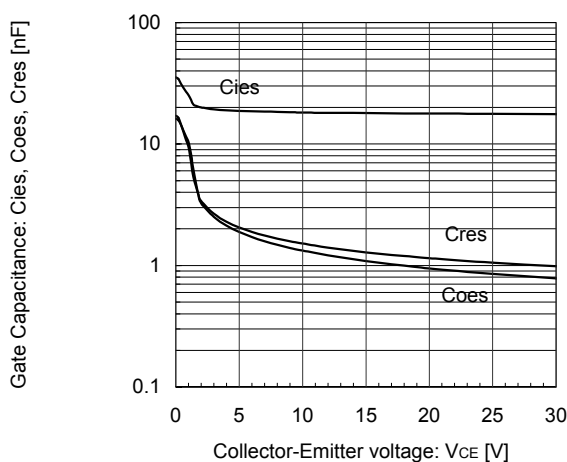
Collector current vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 15\text{V}$ / chip



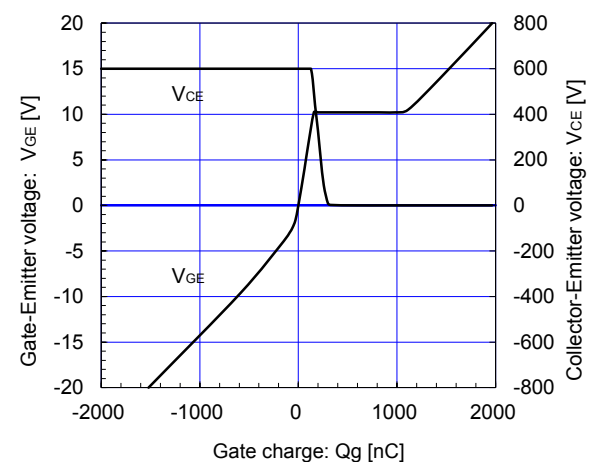
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C}$ / chip



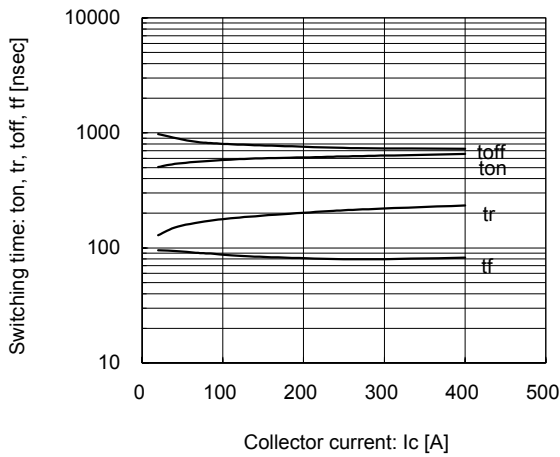
Gate Capacitance vs. Collector-Emitter Voltage (typ.)
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$



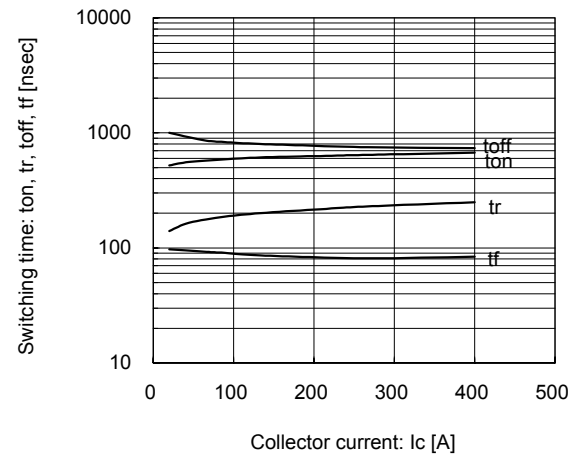
Dynamic Gate Charge (typ.)
 $V_{CC} = 600\text{V}$, $I_C = 200\text{A}$, $T_j = 25^\circ\text{C}$



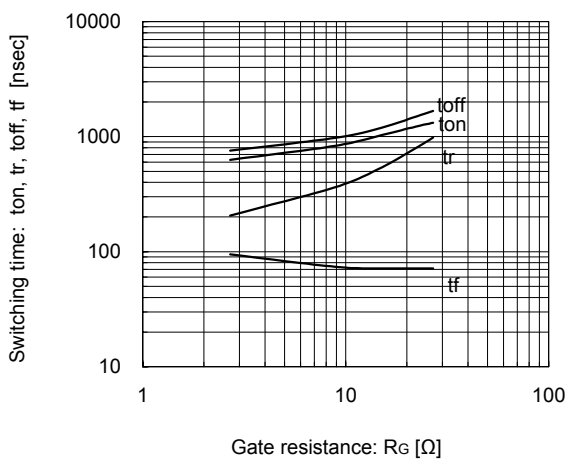
Switching time vs. Collector current (typ.)

 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=2.7\Omega$, $T_J=125^\circ C$ 

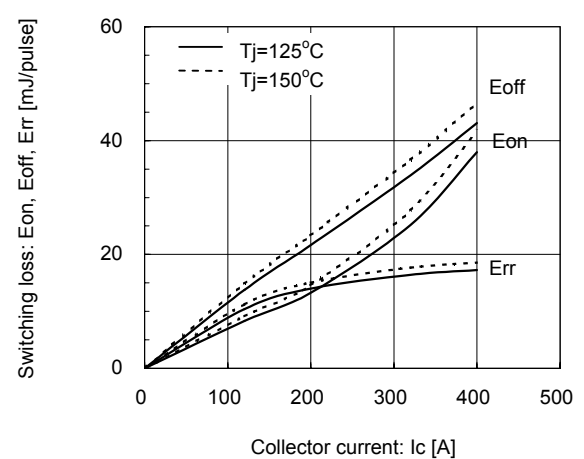
Switching time vs. Collector current (typ.)

 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=2.7\Omega$, $T_J=150^\circ C$ 

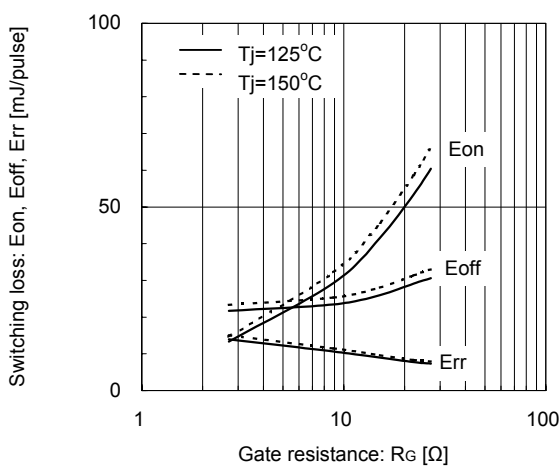
Switching time vs. Gate resistance (typ.)

 $V_{CC}=600V$, $I_C=200A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$ 

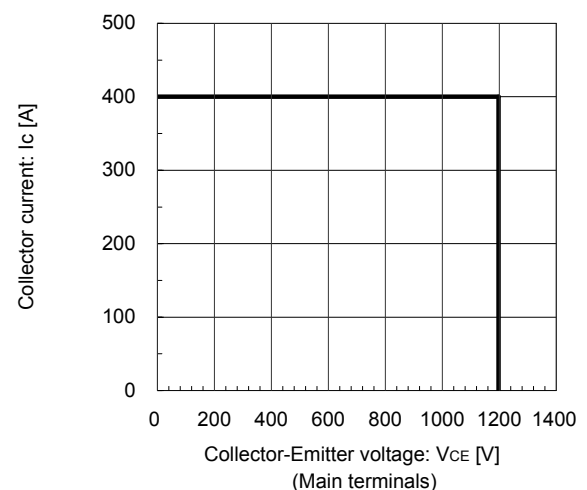
Switching loss vs. Collector current (typ.)

 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=2.7\Omega$, $T_J=125^\circ C$, $150^\circ C$ 

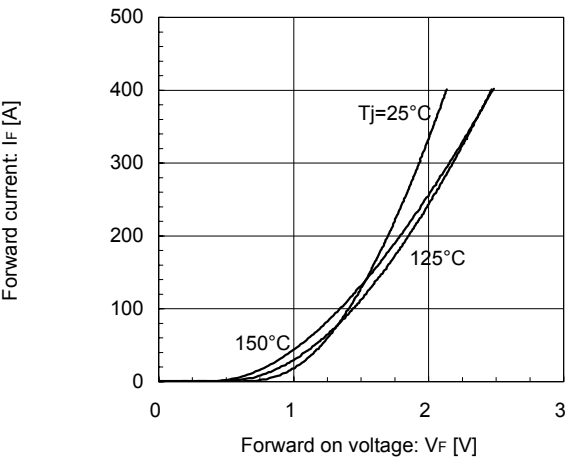
Switching loss vs. Gate resistance (typ.)

 $V_{CC}=600V$, $I_C=200A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$, $150^\circ C$ 

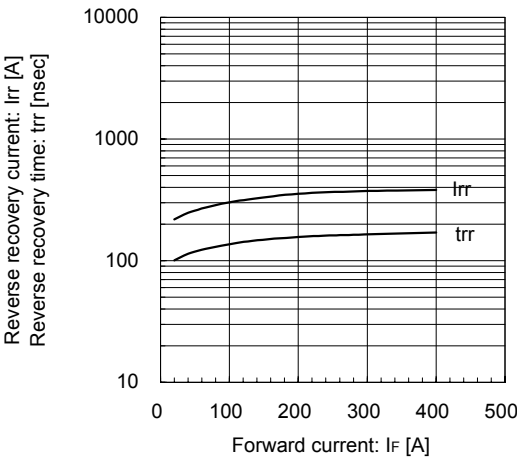
Reverse bias safe operating area (max.)

 $+V_{GE}=15V$, $-V_{GE}=15V$, $R_G=2.7\Omega$, $T_J=150^\circ C$ 

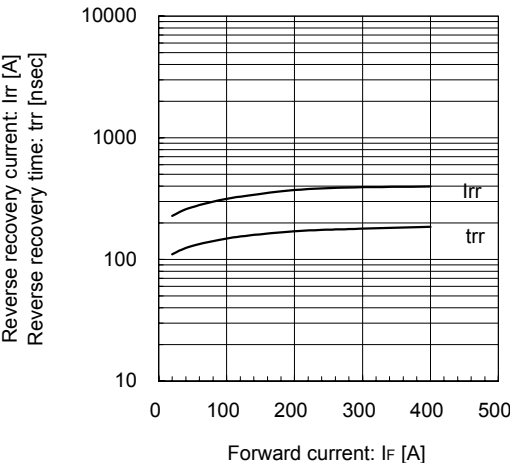
Forward Current vs. Forward Voltage (typ.)
chip



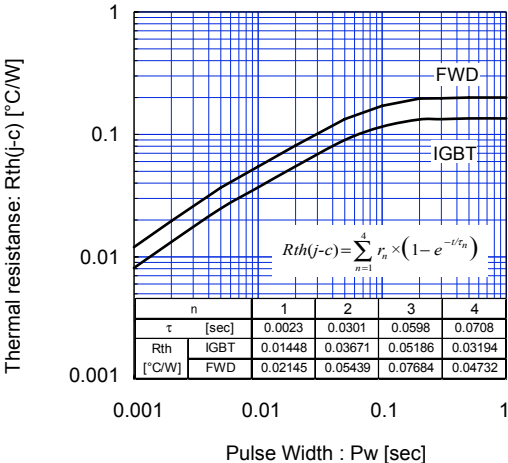
Reverse Recovery Characteristics (typ.)
VCC=600V, VGE=±15V, RG=2.7Ω, TJ=125°C



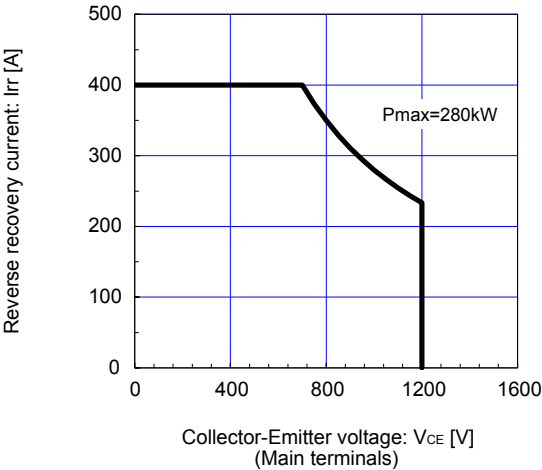
Reverse Recovery Characteristics (typ.)
VCC=600V, VGE=±15V, RG=2.7Ω, TJ=150°C



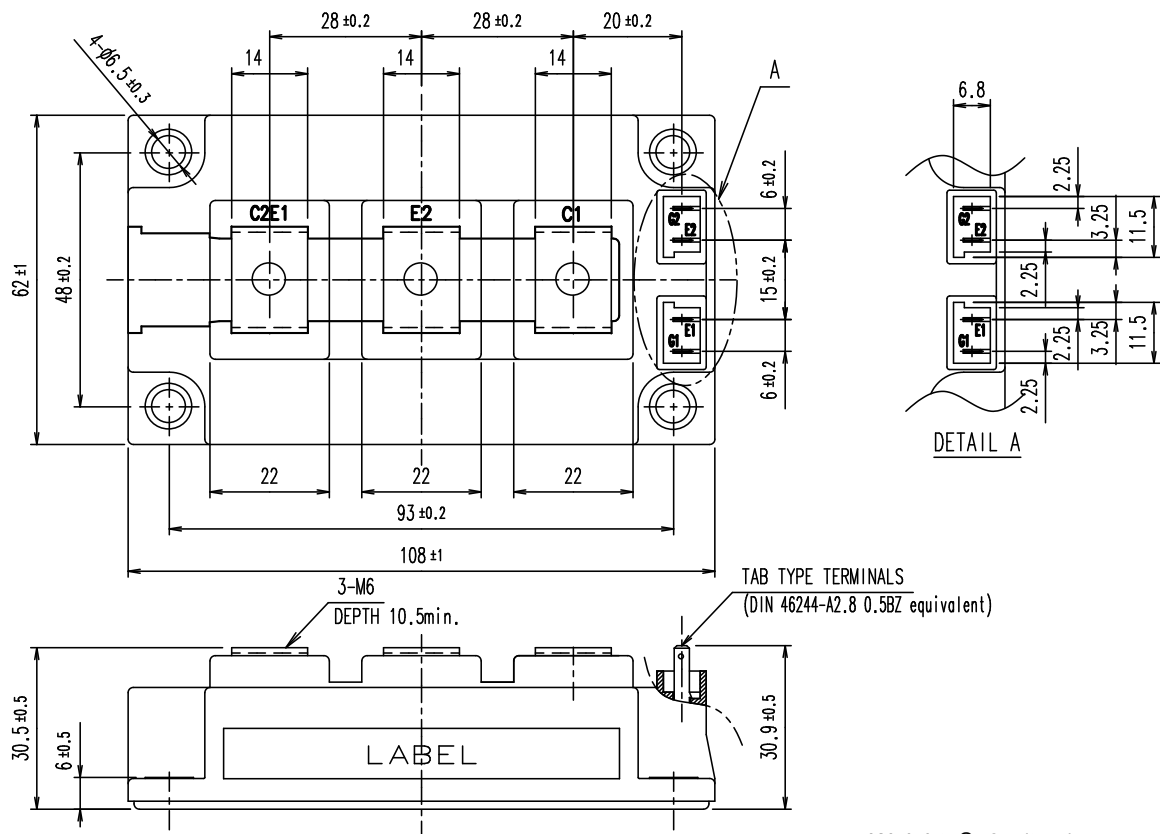
Transient Thermal Resistance (max.)



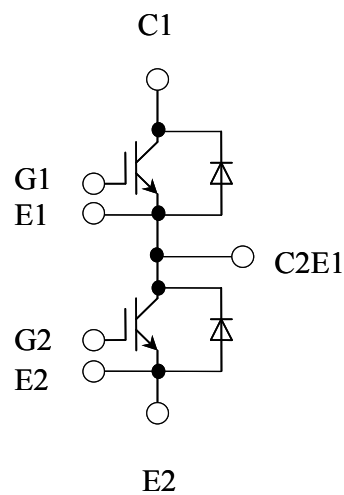
FWD safe operating area (max.)
TJ=150°C



■ Outline Drawings (Unit: mm)



■ Equivalent Circuit



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IGBT Modules

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