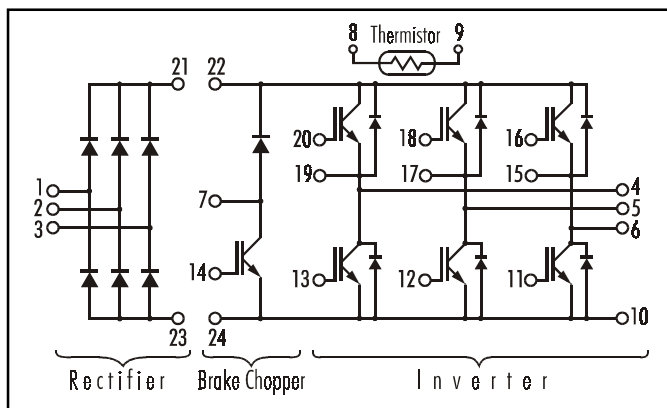


Power Integrated Module (PIM)

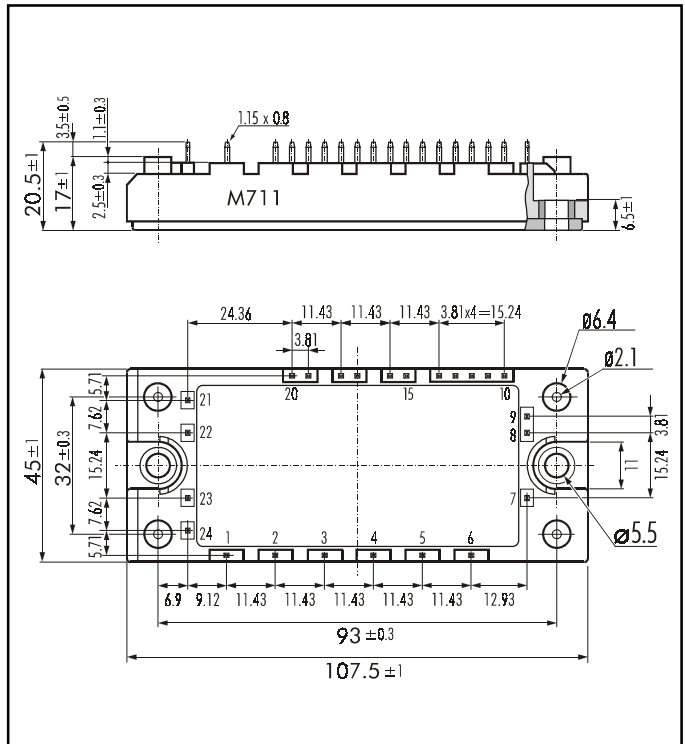
■ Features

- NPT-Technology
- Solderable Package
- Square SC SOA at $10 \times I_C$
- High Short Circuit Withstand-Capability
- Small Temperature Dependence of the Turn-Off Switching Loss
- Low Losses And Soft Switching

■ Equivalent Circuit



■ Outline Drawing

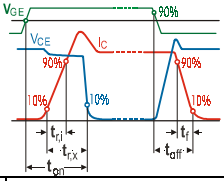


■ Absolute Maximum Ratings ($T_c=25^\circ\text{C}$)

Items		Symbols	Test Conditions		Ratings	Units
Inverter	Collector-Emitter Voltage	V _{CES}			1200	V
	Gate -Emitter Voltage	V _{GES}			± 20	
	Collector Current	I _C	Continuous	25°C / 80°C	15 / 10	A
		I _{C PULSE}	1ms	25°C / 80°C	30 / 20	
		-I _{C PULSE}			10	
Collector Power Dissipation		P _C	1 device		75	W
Rectifier	Repetitive Peak Reverse Voltage	V _{RRM}			1600	V
	Average Output Current	I _O	50Hz/60Hz sinus wave		10	A
	Surge Current (Non Repetitive)	I _{FSM}	T _j =150°C, 10 ms, sinus wave		105	
	I ² t (Non Repetitive)				55	A ² s
Brake Chopper	Collector-Emitter Voltage	V _{CES}			1200	V
	Gate –Emitter Voltage	V _{GES}			± 20	
	Collector Current	I _C	Continuous	25°C / 80°C	15 / 10	A
		I _{C PULSE}	1ms	25°C / 80°C	30 / 20	
	Collector Power Dissipation		P _C	1 device		75
Repetitive Peak Reverse Voltage		V _{RRM}			1200	V
Operating Junction Temperature		T _i			+150	°C
Storage Temperature		T _{Stg}			-40 ~ +125	
Isolation Voltage		V _{ISO}	A.C. 1min.		2500	V
Mounting Screw Torque*					3.5	Nm

Note: *:Recommendable Value; 2.5 ~ 3.5 Nm (M5)

■ Electrical Characteristics($T_J=25^{\circ}\text{C}$)

	Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Inverter IGBT	Zero Gate Voltage Collector Current	I_{CES}	$V_{GE}=0\text{V}$ $V_{CE}=1200\text{V}$			1.0	mA
	Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0\text{V}$ $V_{GE}=\pm 20\text{V}$			200	nA
	Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=20\text{V}$ $I_C=10\text{mA}$	5.5	7.2	8.5	V
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15\text{V}$ $I_C = 10\text{A}$		2.1 2.15	2.7	
	Input Capacitance	C_{ies}	$f=1\text{MHz}$, $V_{GE}=0\text{V}$, $V_{CE}=10\text{V}$		1200		pF
	Turn-on Time	t_{on}	$V_{CC} = 600\text{V}$ $I_C = 10\text{A}$ $V_{GE} = \pm 15\text{V}$ $R_G = 120\Omega$ Inductive Load 		0.35	1.2	μs
		$t_{r,x}$			0.25	0.6	
	Turn-off Time	$t_{r,i}$			0.10		
		t_{off}			0.45	1.0	
		t_f			0.08	0.3	
FRD	Diode Forward On-Voltage	V_F	$I_F=10\text{A}$		2.3 2.35		V
	Reverse Recovery Time	t_{rr}	$I_F=10\text{A}$			350	ns
Rectifier	Forward Voltage	V_{FM}	$I_F=10\text{A}$		1.1 1.2		V
	Reverse Current	I_{RRM}	$V_R=1600\text{V}$			1.0	mA
Brake Chopper	Zero Gate Voltage Collector Current	I_{CES}	$V_{GE}=0\text{V}$ $V_{CE}=1200\text{V}$			1.0	mA
	Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0\text{V}$ $V_{GE}=\pm 20\text{V}$			200	nA
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=10\text{V}$ $I_C=10\text{A}$		2.10 2.20	2.6	V
	Turn-on Time	t_{on}	$V_{CC} = 600\text{V}$ $I_C = 10\text{A}$ $V_{GE} = \pm 15\text{V}$ $R_G = 120\Omega$		0.35	1.2	μs
		$t_{r,x}$			0.25	0.6	
	Turn-off Time	t_{off}			0.45	1.0	
		t_f			0.08	0.3	
	Reverse Current	I_{RRM}	$V_R=1200\text{V}$			1.0	mA
NTC	Resistance	R	$T= 25^{\circ}\text{C}$		5000		Ω
			$T=100^{\circ}\text{C}$	465	495	520	
	B Value	B	$T=25 / 50^{\circ}\text{C}$	3305	3375	3450	K

■ Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance (1 device)	$R_{th(j-c)}$	Inverter IGBT			1.67	$^{\circ}\text{C/W}$
		Inverter FRD			2.78	
		Brake IGBT			1.67	
		Rectifier Diode			1.85	
Contact Thermal Resistance	$R_{th(c-f)}$	With Thermal Compound		0.05		

