

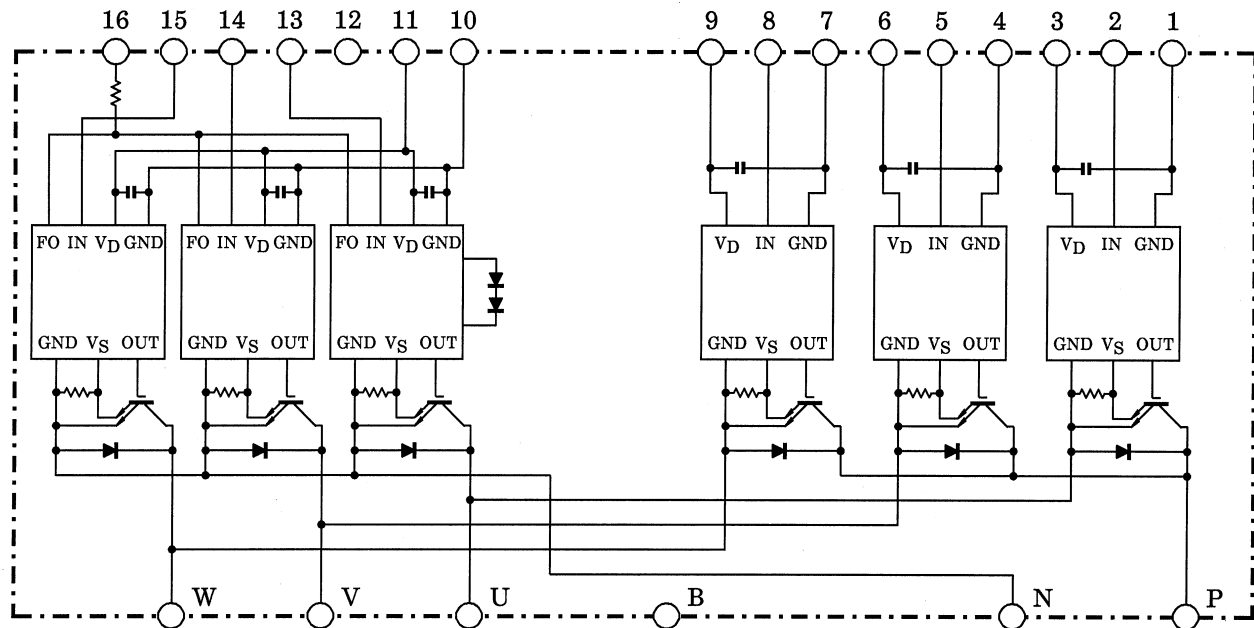
MIG75J101H

High Power Switching Applications

Motor Control Applications

- Integrates inverter & control circuits (igbt drive units, protection units for over-current, under-voltage & over-temperature) in one package.
- The electrodes are isolated from case.
- High speed type IGBT : $V_{CE(sat)} = 2.5 \text{ V (Max.)}$
 $t_{off} = 3.0 \mu\text{s (Max.)}$
 $t_{rr} = 0.30 \mu\text{s (Max.)}$
- Outline : TOSHIBA 2-110A1A
- Weight : 520 g

Equivalent Circuit



- | | | | | | |
|------------|------------|--------------|-------------|---------------|--------------|
| 1. GND (U) | 2. IN (U) | 3. V_D (U) | 4. GND (V) | 5. IN (V) | 6. V_D (V) |
| 7. GND (W) | 8. IN (W) | 9. V_D (W) | 10. GND (L) | 11. V_D (L) | 12. OPEN |
| 13. IN (X) | 14. IN (Y) | 15. IN (Z) | 16. FO | | |

Maximum Ratings ($T_j = 25^\circ\text{C}$)

Stage	Characteristic	Condition	Symbol	Ratings	Unit
Inverter	Supply voltage	P-N power terminal	V_{CC}	450	V
	Collector-emitter voltage	—	V_{CES}	600	V
	Collector current	$T_c = 25^\circ\text{C}$, DC	I_C	75	A
	Forward current	$T_c = 25^\circ\text{C}$, DC	I_F	75	A
	Collector power dissipation	$T_c = 25^\circ\text{C}$	P_C	235	W
	Junction temperature	—	T_j	150	$^\circ\text{C}$
Control	Control supply voltage	V_D -GND terminal	V_D	20	V
	Input voltage	IN-GND terminal	V_{IN}	20	V
	Fault output voltage	FO-GND (L) terminal	V_{FO}	20	V
	Fault output current	FO sink current	I_{FO}	14	mA
Module	Operating temperature	—	T_C	$-20 \sim +100$	$^\circ\text{C}$
	Storage temperature range	—	T_{stg}	$-40 \sim +125$	$^\circ\text{C}$
	Isolation voltage	AC 1 minute	V_{ISO}	2500	V
	Screw torque	M5	—	3	Nm

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

a. Inverter Stage

Characteristic	Symbol	Test Condition		Min	Typ.	Max	Unit
Collector cut-off current	I_{CEX}	$V_{CEX} = 600\text{V}$	$T_j = 25^\circ\text{C}$	—	—	1	mA
			$T_j = 125^\circ\text{C}$	—	—	20	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_D = 15\text{V}$, $I_C = 75\text{A}$ $V_{IN} = 15\text{V} \rightarrow 0\text{V}$	$T_j = 25^\circ\text{C}$	—	2.0	2.5	V
			$T_j = 125^\circ\text{C}$	—	2.0	—	
Forward voltage	V_F	$I_F = 75\text{A}$		—	2.1	3.0	V
Switching time	t_{on}	$V_{CC} = 300\text{V}$, $I_C = 75\text{A}$ $V_D = 15\text{V}$, $V_{IN} = 15\text{V} \leftrightarrow 0\text{V}$ Inductive load (Note 1)		—	1.0	2.0	μs
	t_{off}			—	1.2	3.0	
	t_f			—	0.2	0.5	
	t_{rr}			—	0.1	0.3	

b. Control Stage ($T_j = 25^\circ\text{C}$)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Control circuit current	High side	I_D (H)	$V_D = 15\text{ V}$	—	8	—	mA
	Low side	I_D (L)		—	24	—	
Input-on signal voltage		V_{IN} (on)	$V_D = 15\text{ V}$, $I_C = 75\text{ mA}$	1.3	1.5	1.7	V
Input-off signal voltage		V_{IN} (off)	$V_D = 15\text{ V}$, $I_C = 75\text{ mA}$	2.2	2.5	2.8	V
Fault output current	Protection	I_{FO} (on)	$V_D = 15\text{ V}$	8	10	12	mA
	Normal	I_{FO} (off)		—	—	1	
Over current protection trip level	Inverter	OC	$V_D = 15\text{ V}$, $T_j = 125^\circ\text{C}$	105	150	—	A
Short circuit protection trip level	Inverter	SC	$V_D = 15\text{ V}$, $T_j = 125^\circ\text{C}$	157	225	—	A
Over current cut-off time		t_{off} (OC)	$V_D = 15\text{ V}$	—	5	—	μs
Over temperature protection	Trip level	OT	Case temperature	110	118	125	$^\circ\text{C}$
	Reset level	OTr		—	98	—	
Control supply under voltage protection	Trip level	UV	—	11.0	12.0	12.5	V
	Reset level	UVr		—	12.5	—	
Fault output pulse width		t_{FO}	$V_D = 15\text{ V}$	1	2	3	ms

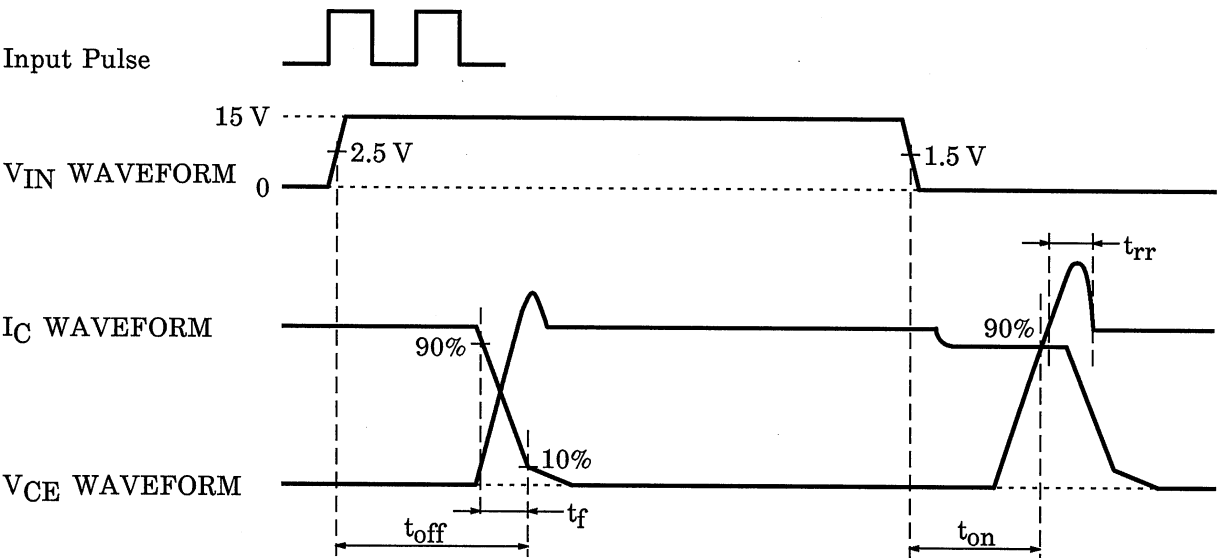
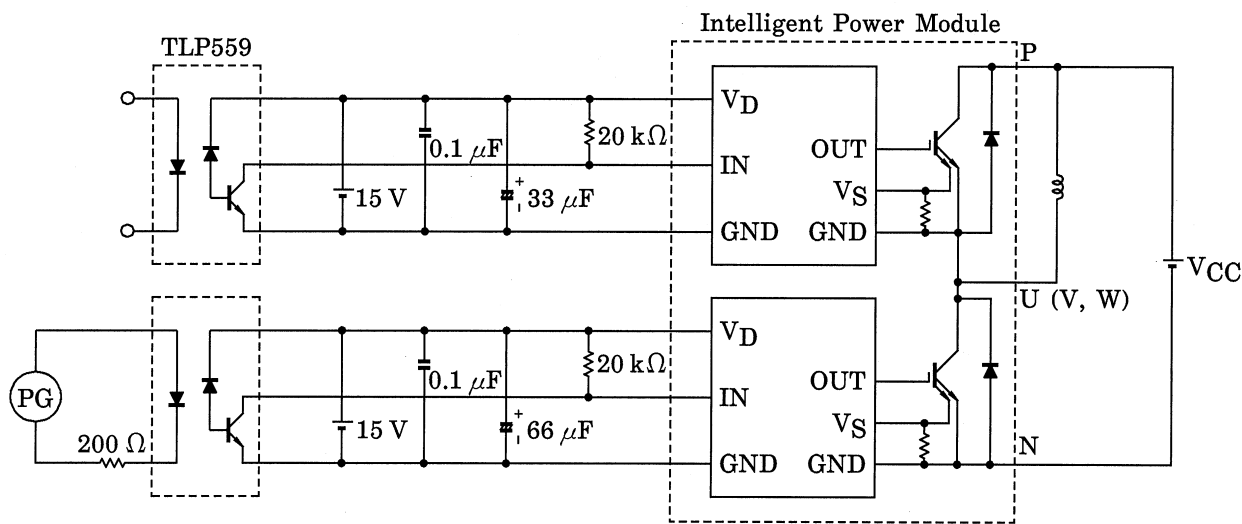
*1: Duty = 50%

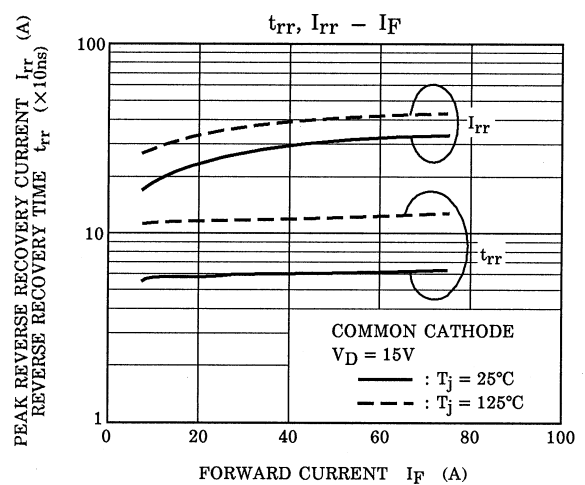
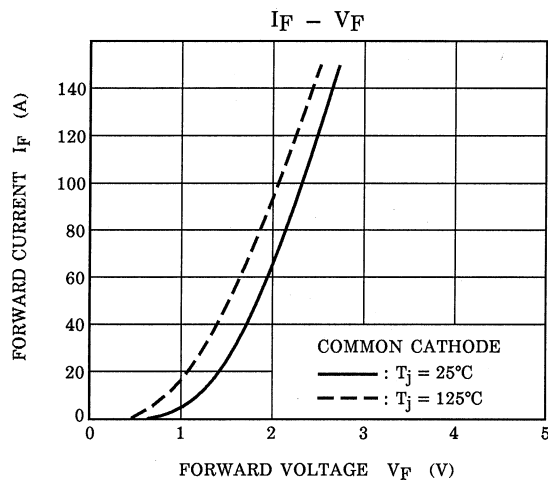
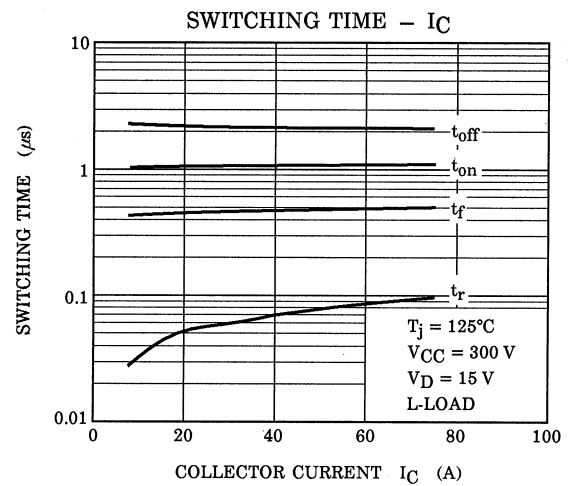
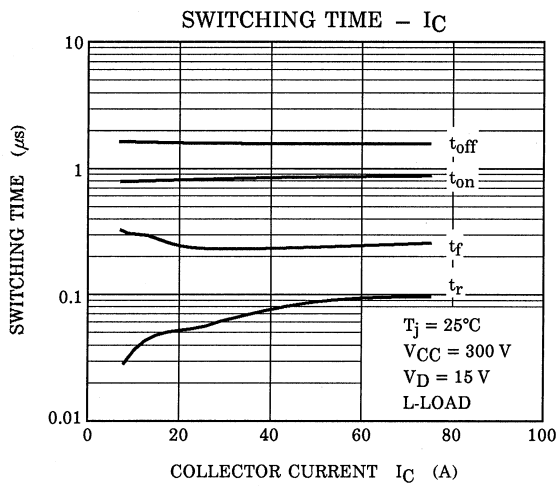
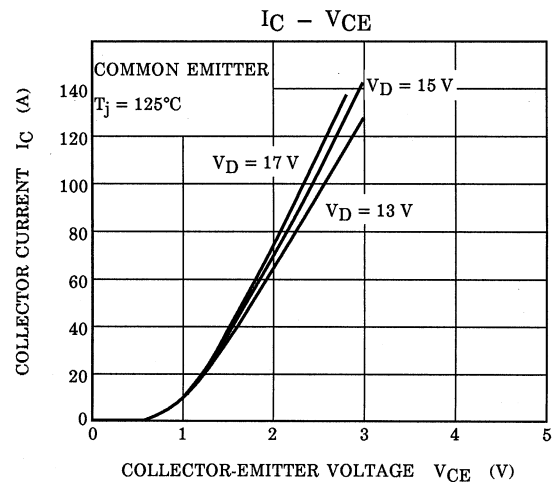
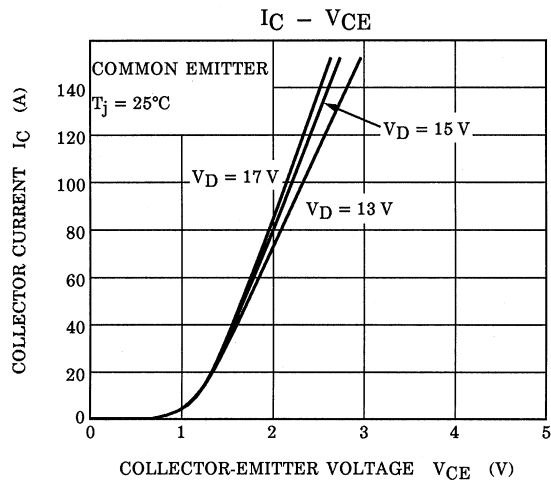
*2: Duty = 50% (all elements) & fault output current (sink)

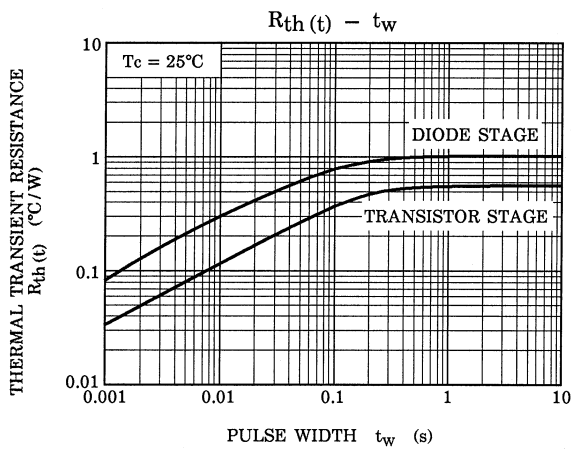
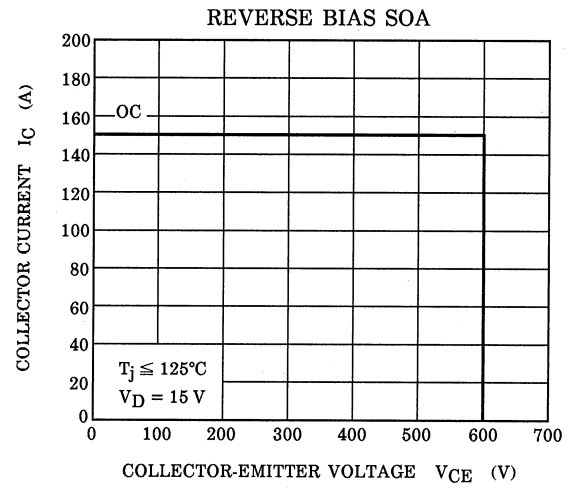
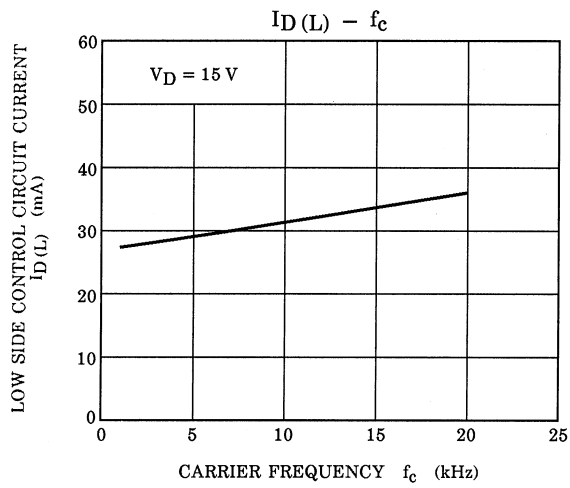
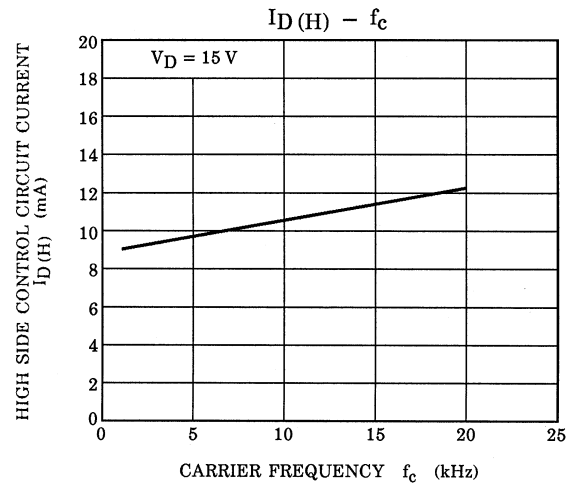
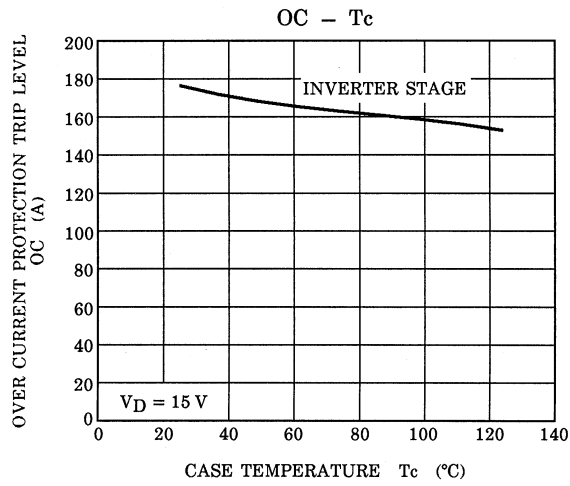
d. Thermal Resistance (T_j = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Junction to case thermal resistance	R _{th (j-c)}	Inverter IGBT stage	—	—	0.553	°C / W
		Inverter FRD stage	—	—	1.000	
		—	—	—	—	
		—	—	—	—	
Case to fin thermal resistance	R _{th (c-f)}	Compound is applied	—	0.05	—	°C / W

Note 1: Switching time test circuit & timing chart



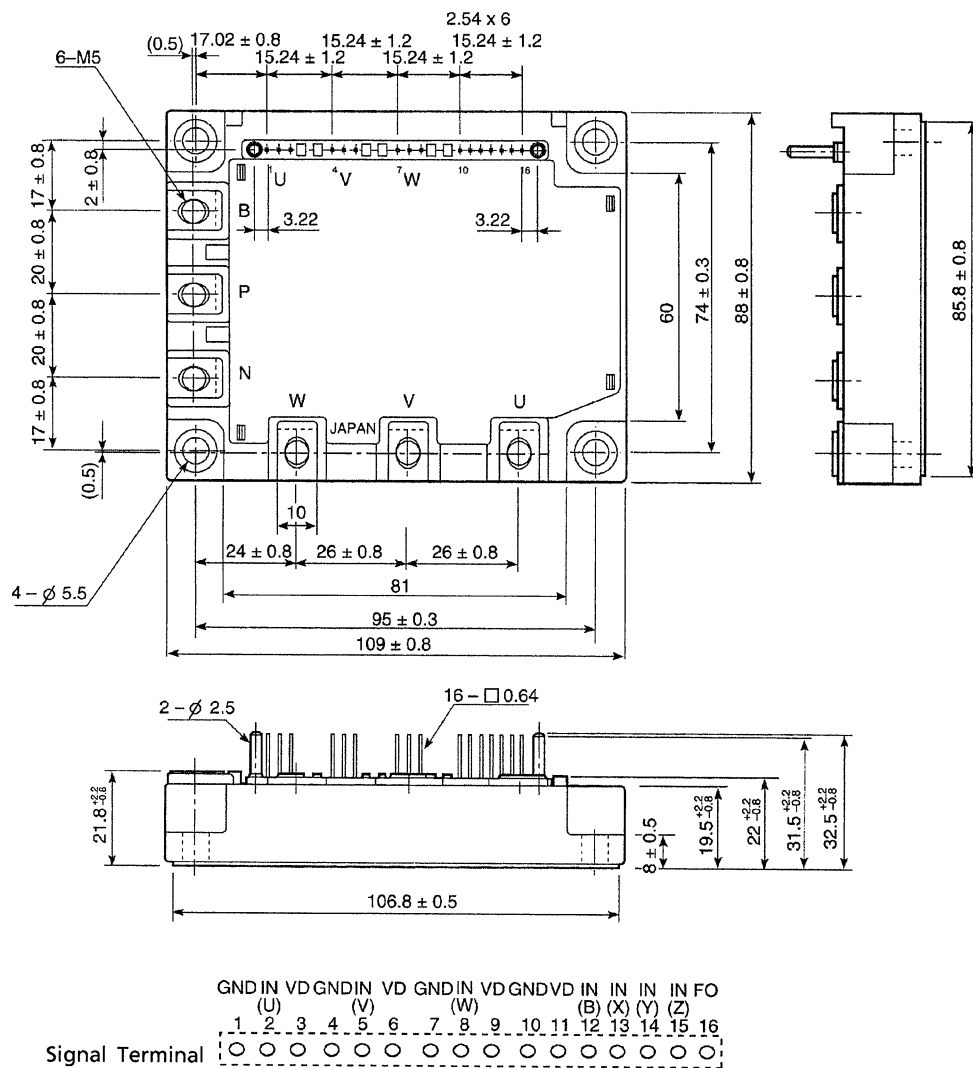




Package Dimensions

TOSHIBA 2-110A1A

Unit: mm



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