

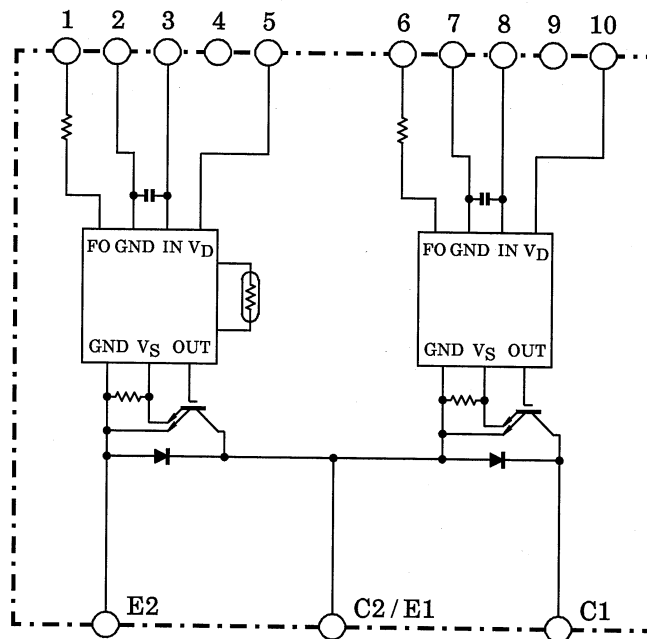
MIG150Q101H

High Power Switching Applications

Motor Control Applications

- Integrates inverter power & 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 : $V_{CE(sat)} = 3.5 \text{ V (Max.)}$
 $t_{off} = 3.8 \mu\text{s (Max.)}$
 $t_{rr} = 0.24 \mu\text{s (Max.)}$
- Package Dimensions : TOSHIBA 2-121A1A
- Weight : 510 g

Equivalent Circuit



- | | | | | |
|-----------|------------|-----------|---------|---------------|
| 1. FO (L) | 2. GND (L) | 3. IN (L) | 4. Open | 5. V_D (L) |
| 6. FO (H) | 7. GND (H) | 8. IN (H) | 9. Open | 10. V_D (H) |

Maximum Ratings (T_j = 25°C)

Stage	Characteristic	Condition	Symbol	Ratings	Unit
Inverter	Supply voltage	P-N power terminal	V _{CC}	900	V
	Collector-emitter voltage	—	V _{CES}	1200	V
	Collector current	T _c = 25°C, DC	I _C	150	A
	Forward current	T _c = 25°C, DC	I _F	150	A
	Collector power dissipation	T _c = 25°C	P _C	1200	W
	Junction temperature	—	T _j	150	°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 ~ +100	°C
	Storage temperature range	—	T _{stg}	-40 ~ +125	°C
	Isolation voltage	AC 1 minute	V _{ISO}	2500	V
	Screw torque	M6	—	3	N·m

Electrical Characteristics (T_j = 25°C)

a. Inverter Stage

Characteristic	Symbol	Test Condition		Min	Typ.	Max	Unit
Collector cut-off current	I _{CE}	V _{CE} = 1200 V	T _j = 25°C	—	—	2	mA
			T _j = 125°C	—	—	40	
Collector-emitter saturation voltage	V _{CE (sat)}	V _D = 15 V, I _C = 150 A V _{IN} = 3 V → 0 V	T _j = 25°C	—	2.7	3.5	V
			T _j = 125°C	—	2.6	—	
Forward voltage	V _F	I _F = 150 A		—	2.0	2.5	V
Switching time	t _{on}	V _{CC} = 600 V, I _C = 150 A V _D = 15 V, V _{IN} = 3 V ↔ 0 V Inductive load (Attached 1)		0.8	1.5	2.2	μs
	t _{c(on)}			—	0.5	1.0	
	t _{rr}			—	0.16	0.24	
	t _{off}			—	3.3	3.8	
	t _{c(off)}			—	0.4	0.8	

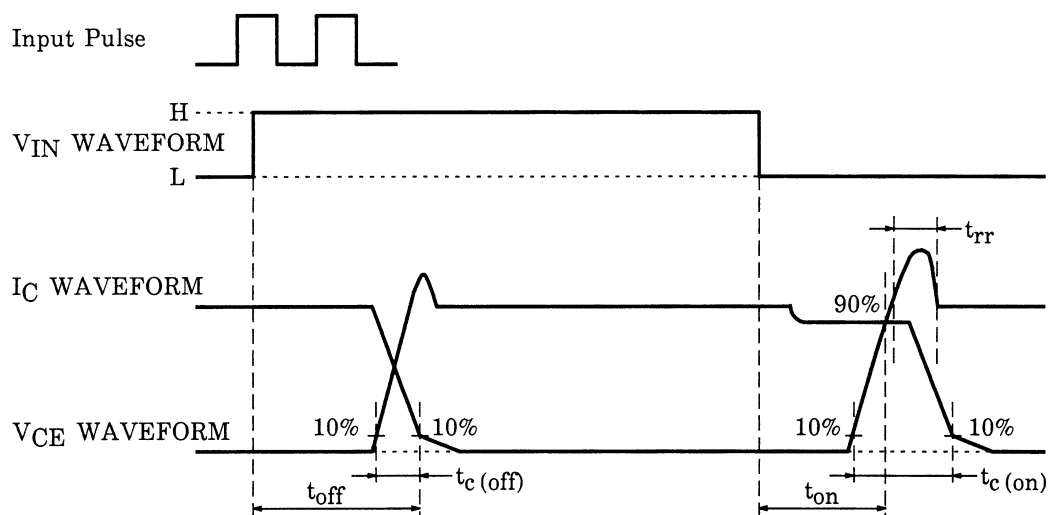
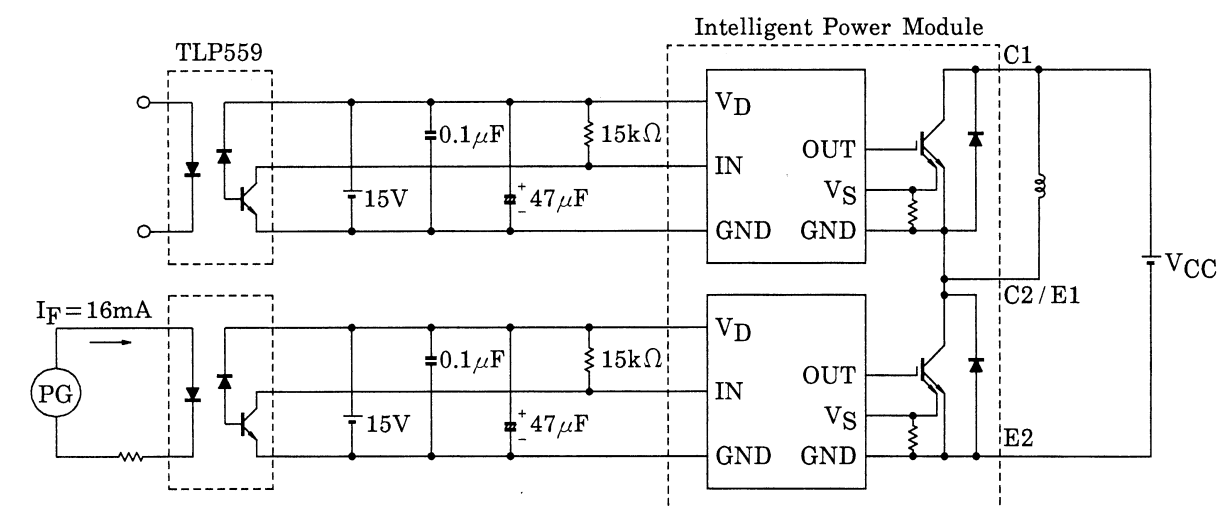
b. Control Stage ($T_j = 25^\circ\text{C}$)

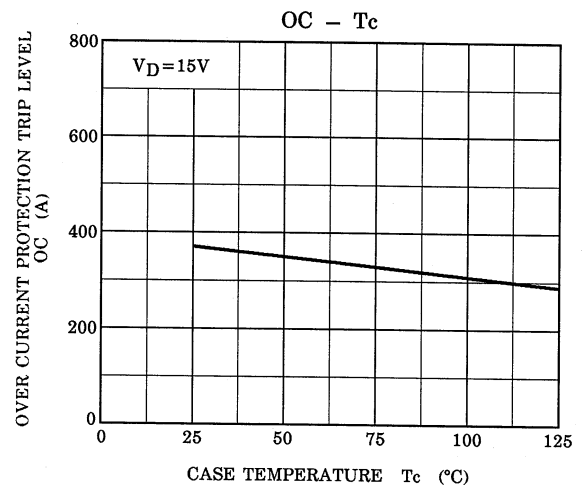
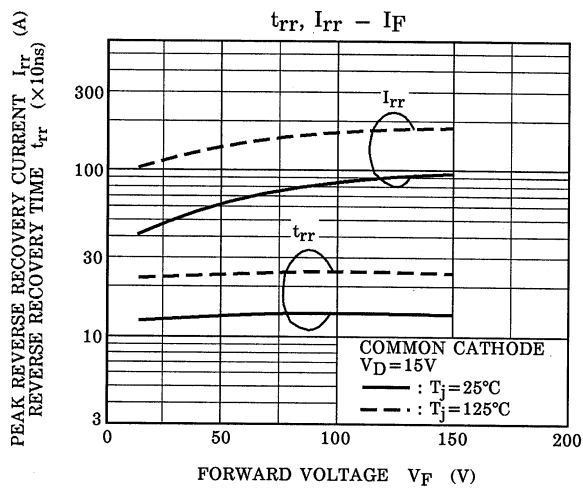
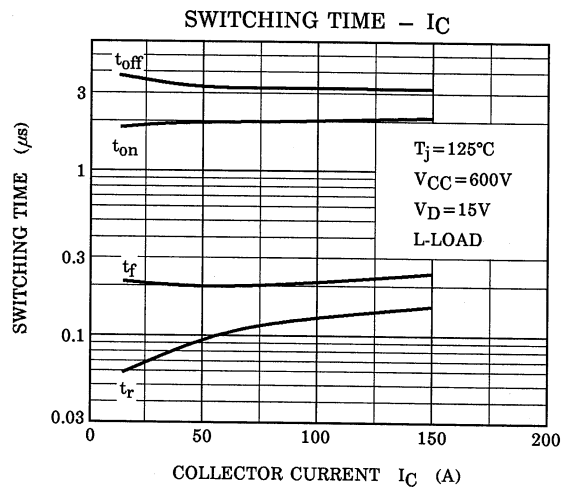
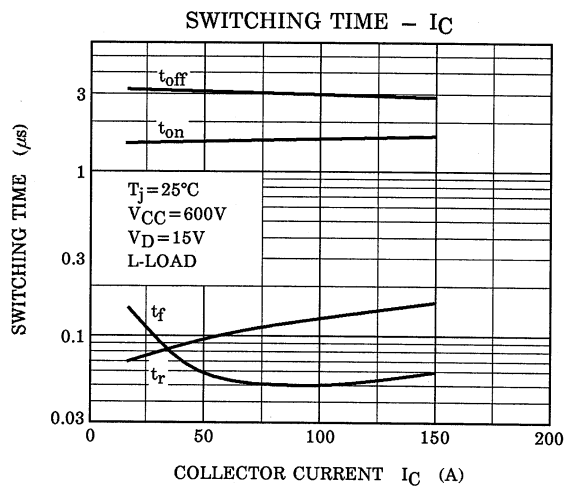
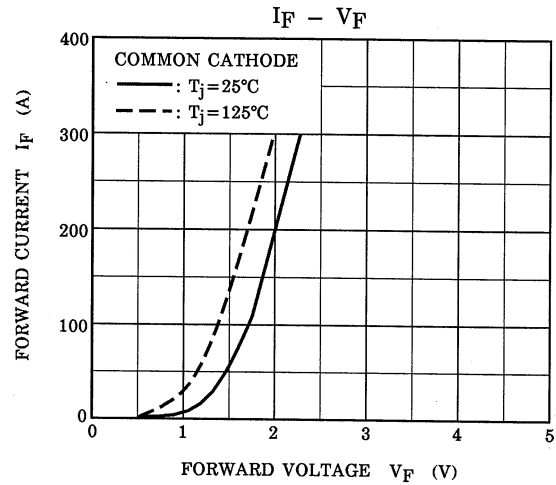
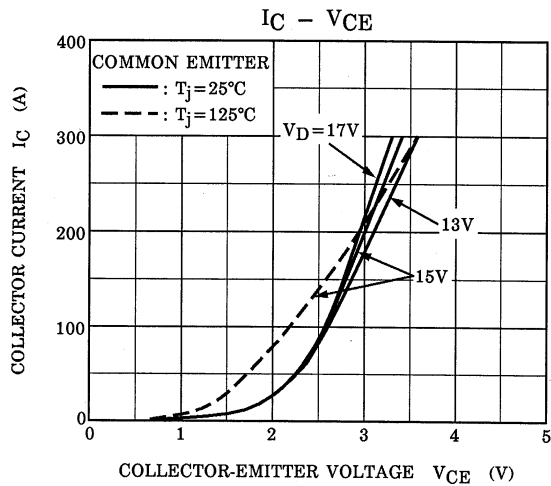
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Control circuit current		I_D	$V_D = 15\text{ V}$	—	20	30	mA
Input-on signal voltage		$V_{IN (on)}$	$V_D = 15\text{ V}$, $I_C = 150\text{ mA}$	0.9	1.1	1.3	V
Fault output current	Protection	$I_{FO (on)}$	$V_D = 15\text{ V}$	8	10	12	mA
	Normal	$I_{FO (off)}$		—	—	1	
Over current protection trip level		OC	$V_D = 15\text{ V}$, $T_j = 125^\circ\text{C}$	210	300	—	A
Short current protection trip level		SC	$V_D = 15\text{ V}$, $T_j = 125^\circ\text{C}$	315	450	—	A
Over current cut-off time		$t_{off (OC)}$	$V_D = 15\text{ V}$	—	10	—	μs
Over temperature protection	Trip level	OT	Case temperature	111	118	125	$^\circ\text{C}$
	Reset level	OTr		93	100	107	
Control supply under voltage protection	Trip level	UV	—	11.3	12.0	12.7	V
	Reset level	UVr		11.8	12.5	13.2	
Fault output pulse width		t_{FO}	$V_D = 15\text{ V}$	1	2	3	ms

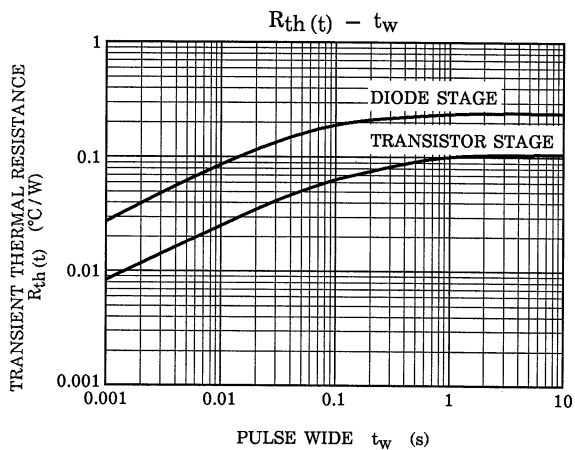
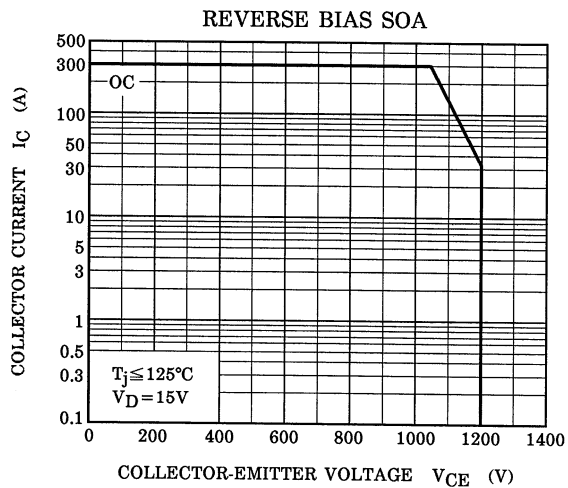
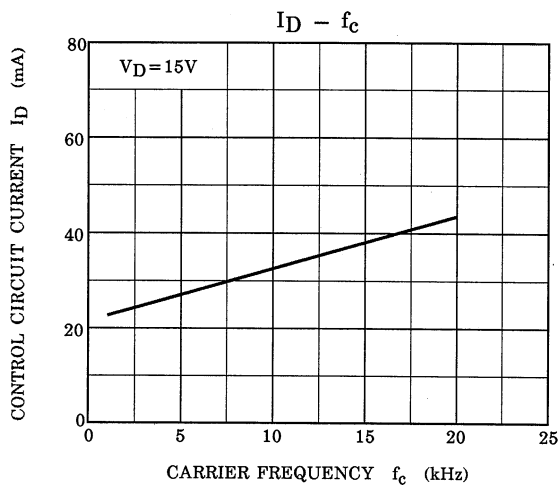
c. Thermal Resistance ($T_j = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Junction to case thermal resistance	$R_{th (j-c)}$	IGBT	—	—	0.104	$^\circ\text{C} / \text{W}$
		FRD	—	—	0.25	
Case to fin thermal resistance	$R_{th (c-f)}$	Compound is applied	—	0.03	—	$^\circ\text{C} / \text{W}$

Note 1: Switching time test circuit & timing chart

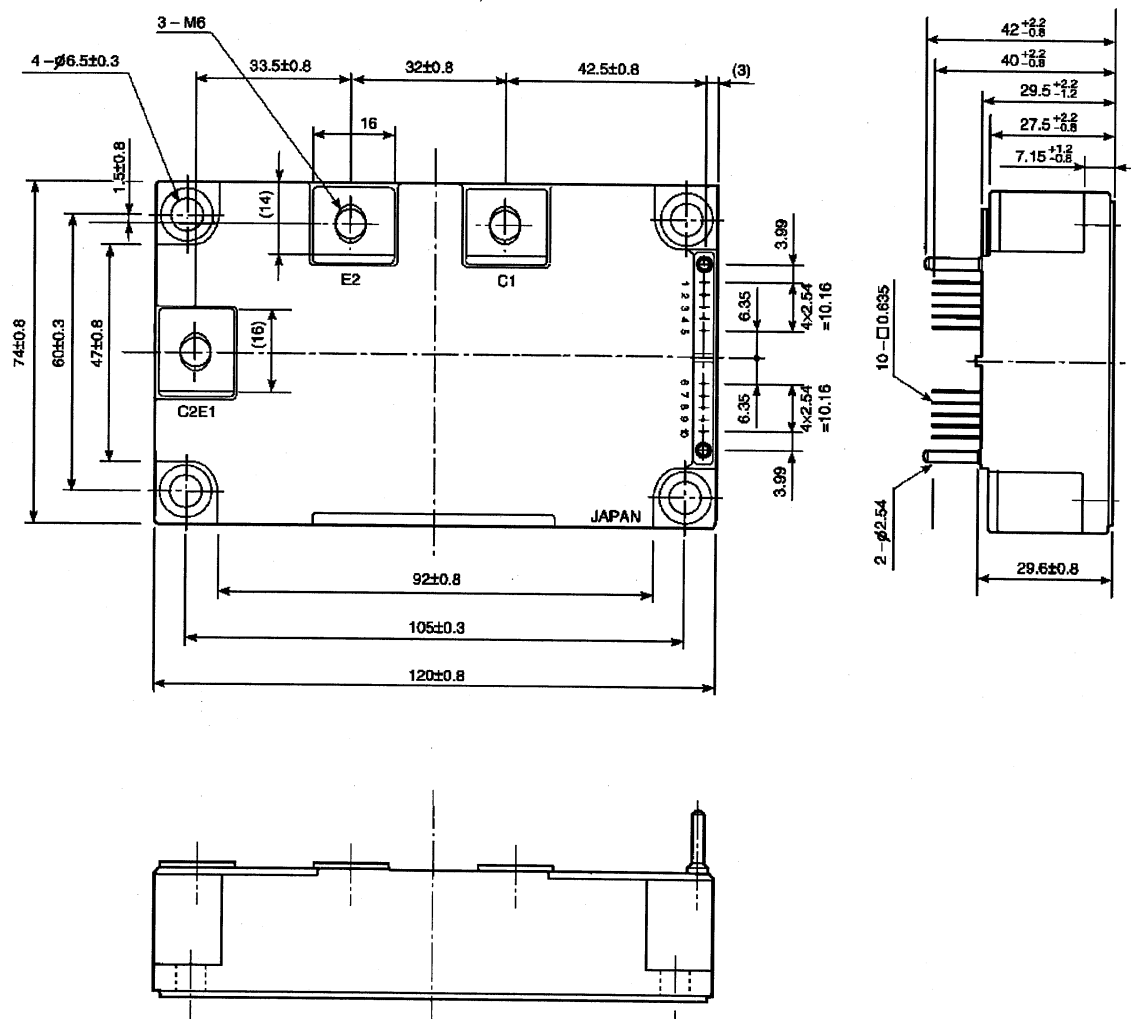






Package Dimensions: TOSHIBA 2-121A1A

Unit: mm



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