MG30G2CL3

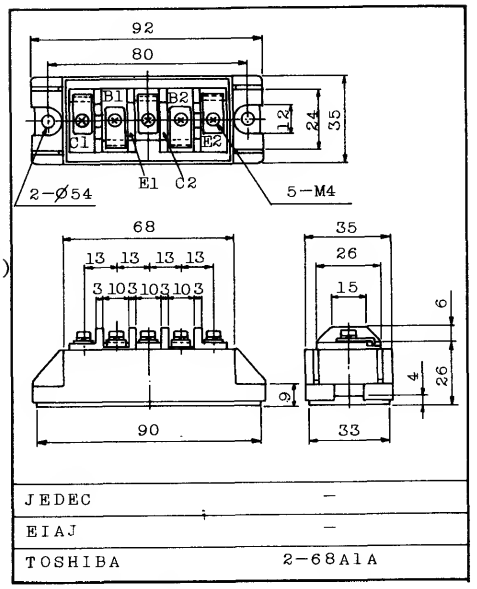
SILICON NPN TRIPLE DIFFUSED TYPE
(DARLINGTON POWER MODULE)

HIGH POWER SWITCHING APPLICATIONS.
MOTOR CONTROL APPLICATIONS.

FEATURES:

. The Collector is Isolated from Case.
. 2 Power Transistor and 2 Free Wheeling Diods are Built-in to 1 Package.
. High DC Current Gain : h_{FE}=100(Min.) (I_C=30A)
. Low Saturation Voltage : $V_{CE(sat)}$=2V(Max.)(I_C=30A)
. High Speed : t_f=2μs(Max.) (I_C=30A)

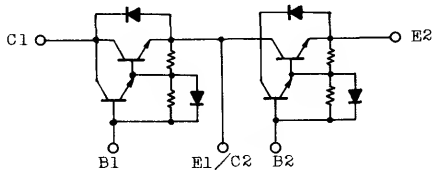
Unit in mm



JEDEC	—
EIAJ	—
TOSHIBA	2-68A1A

Weight : 210g

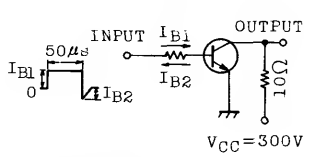
EQUIVALENT CIRCUIT

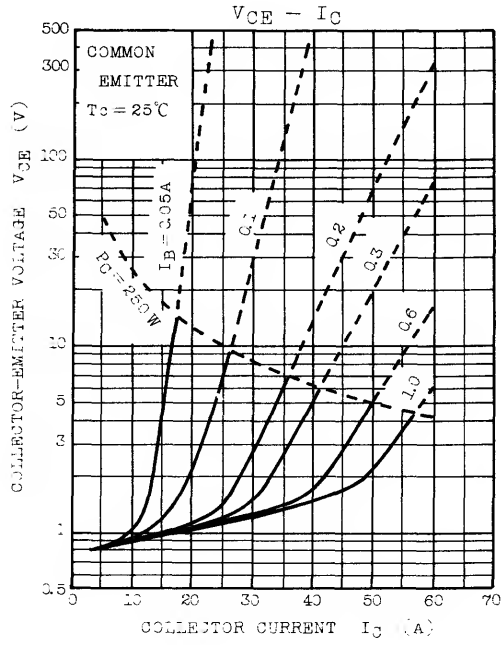


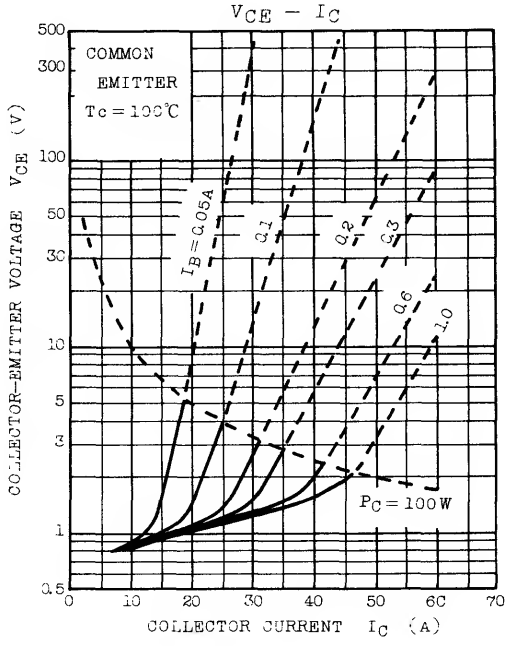
MAXIMUM RATINGS (Ta=25°C)

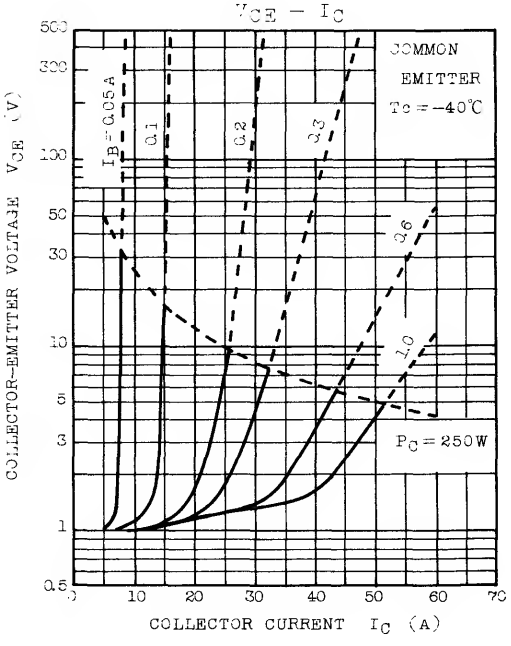
CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Base Voltage		V_{CBO}	600	V
Collector-Emitter Voltage		V_{CEO}	600	V
Collector-Emitter Sustaining Voltage		$V_{CEO(SUS)}$	450	V
Emitter-Base Voltage		V_{EBO}	6	V
Collector Current	DC	I_C	30	A
	1ms	I_C	60	A
	DC	$-I_C$	30	A
Base Current		I_B	2.0	A
Collector Power Dissipation (Tc=25°C)		P_C	250	W
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	-40~125	°C
Isolation Voltage		V_{Isol}	2000 (AC 1 Minute)	V
Screw Torque (Terminal/Mounting)			20/30	kg·cm

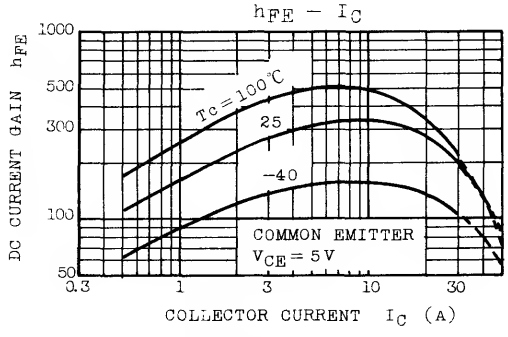
ELECTRICAL CHARACTERISTICS (Ta=25°C)

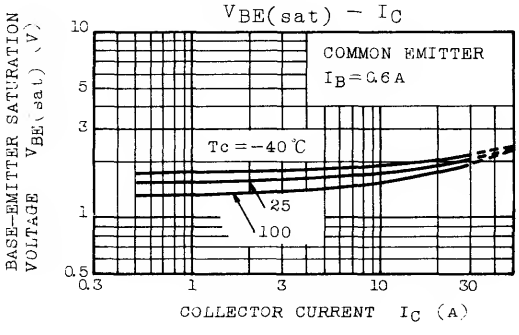
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		I_{CBO}	V_{CB}=600V, I_E=0	-	-	1.0	mA
Emitter Cut-off Current		I_{EBO}	V_{EB}=6V, I_C=0	-	-	200	mA
Collector-Emitter Sustaining Voltage		$V_{CEO(SUS)}$	I_C=0.5A, L=40mH	450	-	-	V
DC Current Gain		h_{FE}	V_{CE}=5V, I_C=30A	100	-	-	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	I_C=30A, I_B=0.6A	-	-	2.0	V
Base-Emitter Saturation Voltage		$V_{BE(sat)}$		-	-	2.5	V
Emitter-Collector Voltage		V_{ECO}	I_E=30A, I_B=0	-	-	1.5	V
Reverse Recovery Time		t_{rr}	$-I_C$=30A, V_{EB}=3V V_{CE}=300V	-	-	2.0	μs
Collector Output Capacitance		C_{ob}	V_{CB}=50V, I_E=0, f=1MHz	-	350	-	pF
Switching Time	Turn-on Tome	t_{on}	 $I_{B1}=-I_{B2}=0.6$A DUTY CYCLE=0.5%	-	-	1.0	μs
	Storage Time	t_{stg}		-	-	12	
	Fall Time	t_f		-	-	2.0	
Thermal Resistance (Junction to Case)		$R_{th(j-c)}$	Transistor	-	-	0.5	°C/W
			Diode	-	-	1.8	

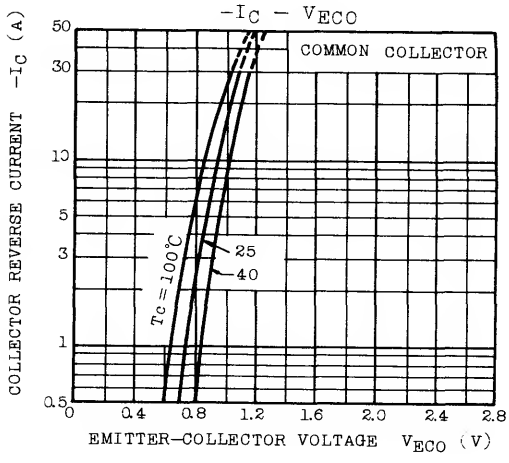

V_{CE} – I_C
COMMON EMITTER
T_C = 25°C
I_B = 0.05A
0.1
0.2
0.3
0.6
1.0
P_C = 250W
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)
COLLECTOR CURRENT I_C (A)

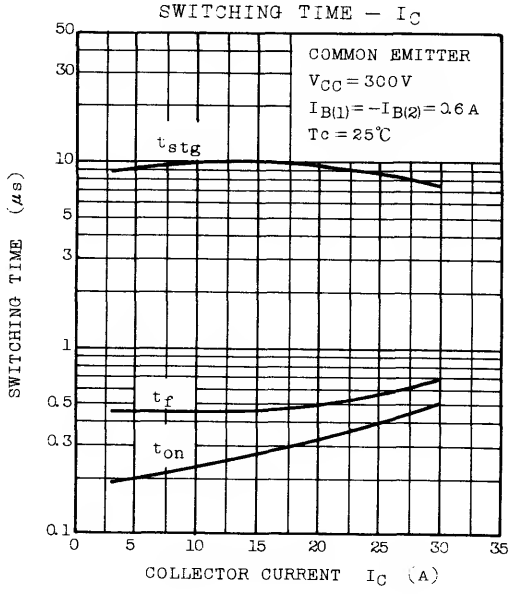

V_{CE} – I_C
COMMON EMITTER
T_C = 100°C
I_B = 0.05A
0.1
0.2
0.3
0.6
1.0
P_C = 100W
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)
COLLECTOR CURRENT I_C (A)

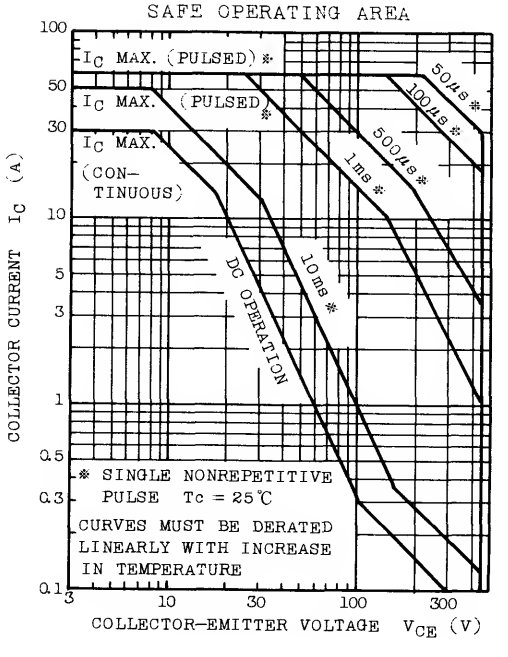

V_{CE} – I_C
COMMON EMITTER
T_C = –40°C
I_B = 0.05A
0.1
0.2
0.3
0.6
1.0
P_C = 250W
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)
COLLECTOR CURRENT I_C (A)

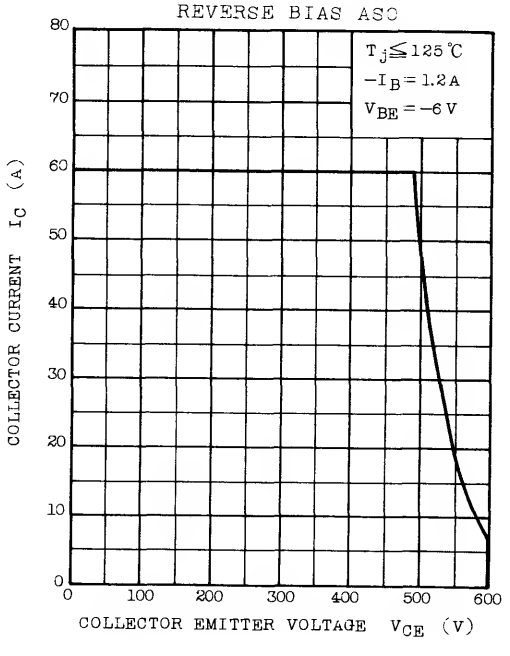

h_{FE} – I_C
T_C = 100°C
25
–40
COMMON EMITTER
V_{CE} = 5V
DC CURRENT GAIN h_{FE}
COLLECTOR CURRENT I_C (A)


$V_{BE(sat)}$ – I_C
COMMON EMITTER
I_B = 0.6A
T_C = –40°C
25
100
BASE-EMITTER SATURATION VOLTAGE $V_{BE(sat)}$ (V)
COLLECTOR CURRENT I_C (A)


$-I_C - V_{ECO}$
COMMON COLLECTOR
COLLECTOR REVERSE CURRENT $-I_C$ (A)
50
30
10
5
3
1
0.5
$T_c = 100°C$
25
40
0
0.4
0.8
1.2
1.6
2.0
2.4
2.8
EMITTER–COLLECTOR VOLTAGE V_{ECO} (V)


SWITCHING TIME – I_C
COMMON EMITTER
$V_{CC} = 300$ V
$I_{B(1)} = -I_{B(2)} = 0.6$ A
$T_c = 25°C$
SWITCHING TIME (μs)
50
30
10
5
3
1
0.5
0.3
0.1
t_{stg}
t_f
t_{on}
0
5
10
15
20
25
30
35
COLLECTOR CURRENT I_C (A)


SAFE OPERATING AREA
COLLECTOR CURRENT I_C (A)
100
50
30
10
5
3
1
0.5
0.3
0.1
I_C MAX. (PULSED) *
I_C MAX. (PULSED) *
I_C MAX. (CONTINUOUS)
50μs *
100μs *
500μs *
1ms *
10ms *
DC OPERATION
* SINGLE NONREPETITIVE PULSE $T_c = 25°C$
CURVES MUST BE DERATED LINEARLY WITH INCREASE IN TEMPERATURE
3
10
30
100
300
COLLECTOR–EMITTER VOLTAGE V_{CE} (V)


REVERSE BIAS ASO
$T_j \leqq 125°C$
$-I_B = 1.2$ A
$V_{BE} = -6$ V
COLLECTOR CURRENT I_C (A)
80
70
60
50
40
30
20
10
0
0
100
200
300
400
500
600
COLLECTOR EMITTER VOLTAGE V_{CE} (V)