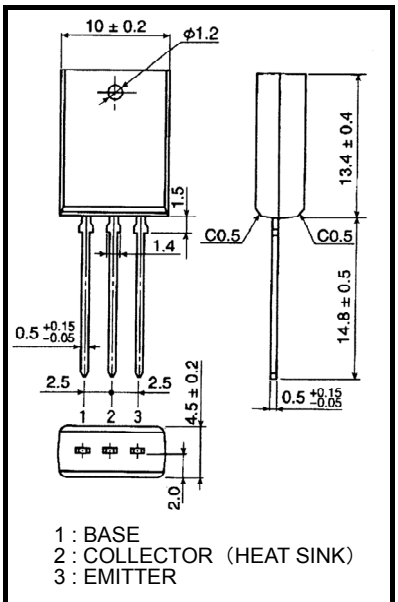
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

2SC6077

○ Power Amplifier Applications
○ Power Switching Applications

- Low collector saturation voltage: $V_{CE\ (sat)}$ = 0.5 V (max) (I_C = 1A)
- High-speed switching: t_{stg} = 0.4 μs (typ)

Unit: mm



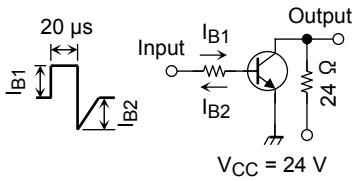
JEDEC	―
JEITA	―
TOSHIBA	2-10T1A

Weight:1.5g(typ)

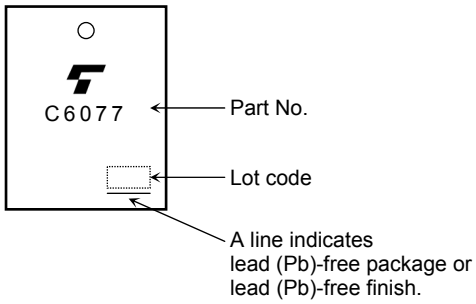
Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	160	V
Collector-emitter voltage		V_{CEX}	160	V
		V_{CEO}	80	V
Emitter-base voltage		V_{EBO}	9	V
Collector current	DC	I_C	3.0	A
	Pulse	I_{CP}	5.0	A
Base current		I_B	1.0	A
Collector power dissipation		P_C	1.8	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55～150	°C

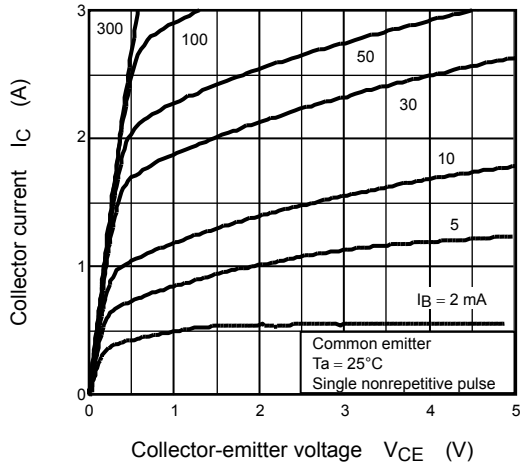
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Conditions	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 160 V, I_E = 0	―	―	1.0	uA
Emitter cut-off current		I_{EBO}	V_{EB} = 9 V, I_C = 0	―	―	1.0	uA
Collector-emitter breakdown voltage		$V_{(BR)\ CEO}$	I_C = 10 mA, I_B = 0	80	―	―	V
DC current gain		$h_{FE\ (1)}$	V_{CE} = 2 V, I_C = 1 mA	150	―	―	
		$h_{FE\ (2)}$	V_{CE} = 2 V, I_C = 0.5 A	180	―	450	
		$h_{FE\ (3)}$	V_{CE} = 2 V, I_C = 1 A	100	―	―	
Collector emitter saturation voltage		$V_{CE\ (sat)\ (1)}$	I_C = 0.5 A, I_B = 50 mA	―	―	0.3	V
		$V_{CE\ (sat)\ (2)}$	I_C = 1 A, I_B = 100 mA	―	―	0.5	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 1 A, I_B = 100 mA	―	―	1.5	V
Transition frequency		f_T	V_{CE} = 2 V, I_C = 0.5 A	―	150	―	MHz
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0,f = 1MHz	―	14	―	pF
Switching time	Rise time	t_r		―	0.05	―	us
	Storage time	t_{stg}		―	0.4	―	
	Fall time	t_f	I_{B1} = −I_{B2} = 100 mA Duty cycle ≦1%	―	0.15	―	

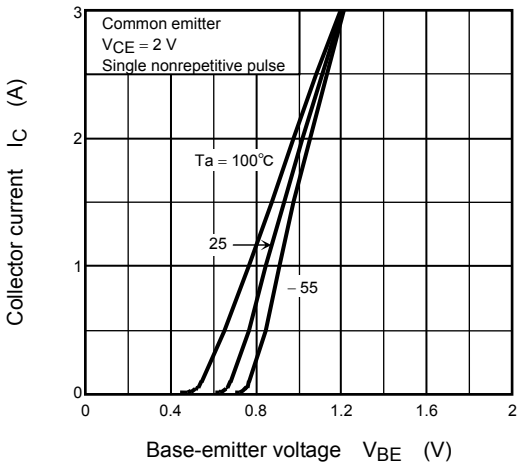
Marking


C6077
Part No.
Lot code
A line indicates
lead (Pb)-free package or
lead (Pb)-free finish.

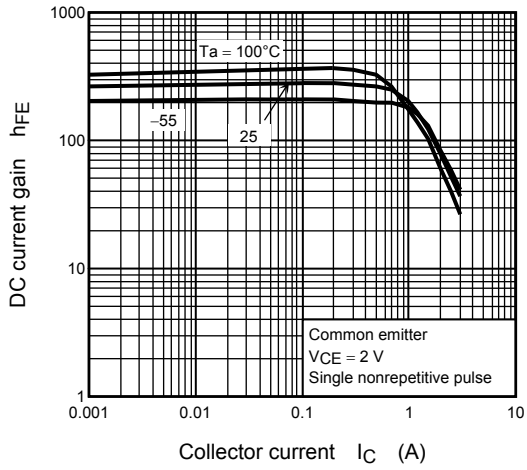
$I_C - V_{CE}$



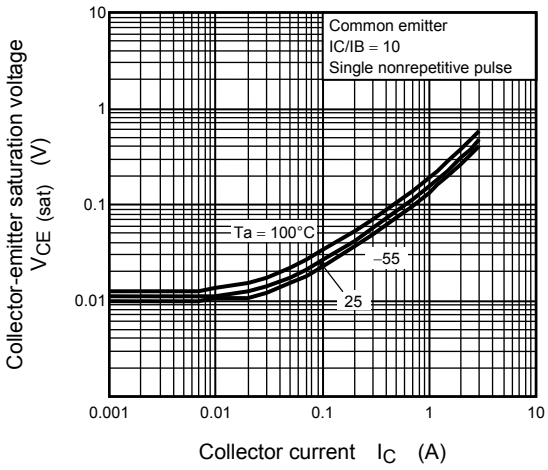
$I_C - V_{BE}$



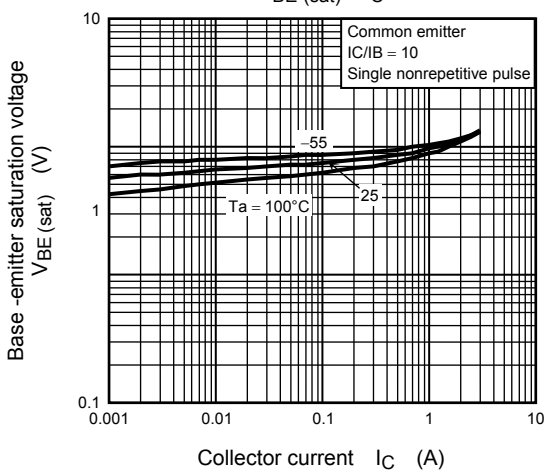
$h_{FE} - I_C$

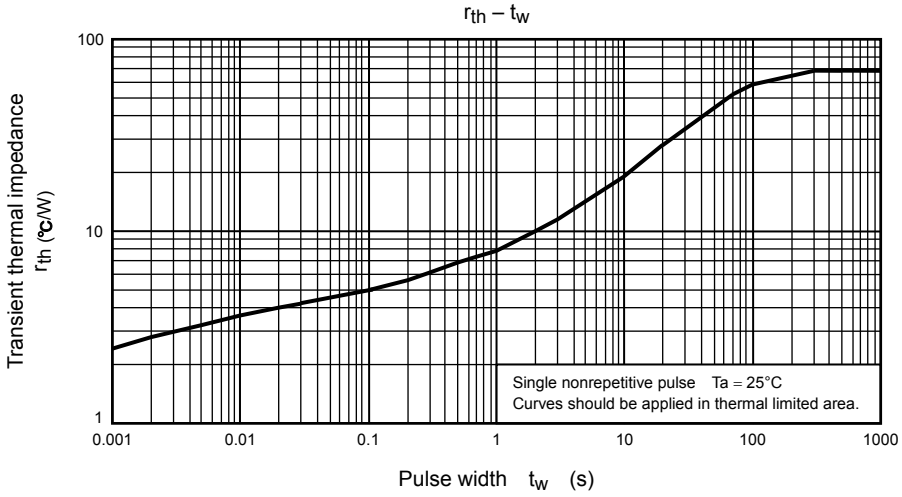


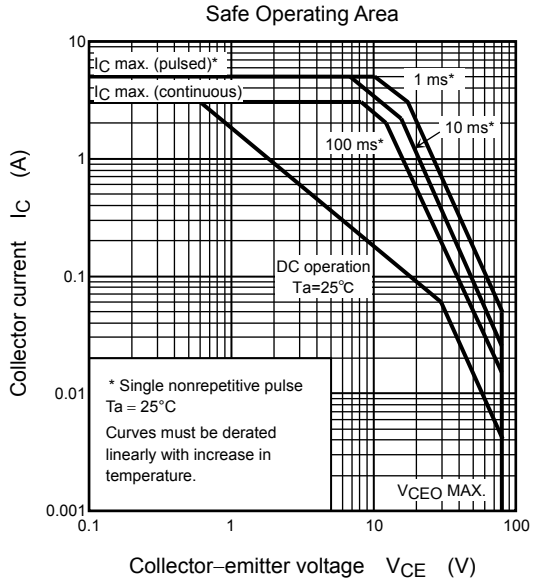
$V_{CE\ (sat)} - I_C$



$V_{BE\ (sat)} - I_C$




$r_{th} - t_w$
Transient thermal impedance r_{th} (°C/W)
100
10
1
0.001
0.01
0.1
1
10
100
1000
Single nonrepetitive pulse Ta = 25°C
Curves should be applied in thermal limited area.
Pulse width t_w (s)


Safe Operating Area
Collector current I_C (A)
10
1
0.1
0.01
0.001
0.1
1
10
100
I_C max. (pulsed)*
I_C max. (continuous)
1 ms*
10 ms*
100 ms*
DC operation
Ta=25°C
* Single nonrepetitive pulse
Ta = 25°C
Curves must be derated
linearly with increase in
temperature.
V_{CEO} MAX.
Collector–emitter voltage V_{CE} (V)

RESTRICTIONS ON PRODUCT USE

20070701-EN

- The information contained herein is subject to change without notice.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc.
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.).These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in his document shall be made at the customer’s own risk.
- The products described in this document shall not be used or embedded to any downstream products of which manufacture, use and/or sale are prohibited under any applicable laws and regulations.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patents or other rights of TOSHIBA or the third parties.
- Please contact your sales representative for product-by-product details in this document regarding RoHS compatibility. Please use these products in this document in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances. Toshiba assumes no liability for damage or losses occurring as a result of noncompliance with applicable laws and regulations.