Ordering number : EN3094B

2SA1708/2SC4488

Bipolar Transistor
(-)100V, (-)1A, Low V_{CE}(sat), (PNP)NPN Single NMP

ON Semiconductor®
http://onsemi.com

Features
- Adoption of FBET, MBIT processes
- High breakdown voltage, large current capacity
- Fast switching speed

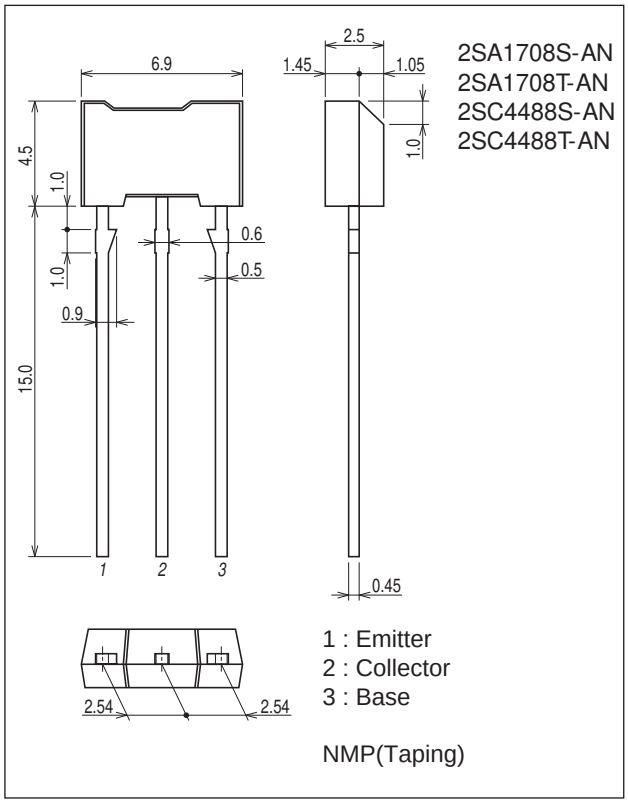
( )2SA1708

Specifications
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–)120	V
Collector-to-Emitter Voltage	V_{CEO}		(–)100	V
Emitter-to-Base Voltage	V_{EBO}		(–)6	V
Collector Current	I_C		(–)1	A
Collector Current (Pulse)	I_{CP}		(–)2	A
Collector Dissipation	P_C		1	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		–55 to +150	°C

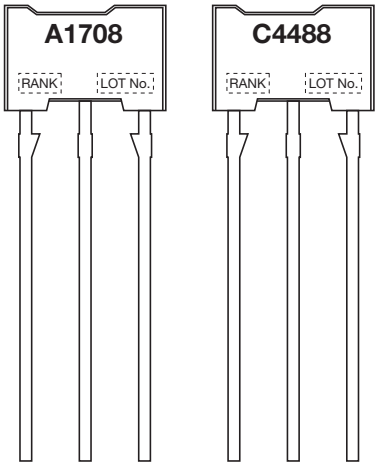
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions
unit : mm (typ)
7540-001

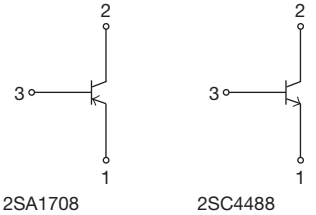


Product & Package Information
- Package : NMP(Taping)
- JEITA, JEDEC : SC-71
- Minimum Packing Quantity : 2,500 pcs./box

Marking(NMP(Taping))



Electrical Connection



Electrical Characteristics at Ta=25°C

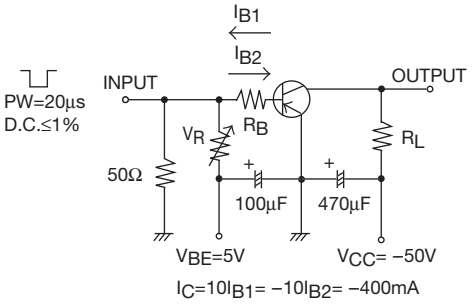
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(−)100V, I_E=0A			(−)100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(−)4V, I_C=0A			(−)100	nA
DC Current Gain	h_{FE}	V_{CE}=(−)5V, I_C=(−)100mA	140*		400*	
Gain-Bandwidth Product	f_T	V_{CE}=(−)10V, I_C=(−)100mA		120		MHz
Output Capacitance	Cob	V_{CB}=(−)10V, f=1MHz		(13)8.5		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=(−)400mA, I_B=(−)40mA		(−0.2)0.1	(−0.6)0.4	V
Base-to-Emitter Saturation Voltage	V_{BE}(sat)			(−)0.85	(−)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(−)10μA, I_E=0A	(−)120			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(−)1mA, R_{BE}=∞	(−)100			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=(−)10μA, I_C=0A	(−)6			V
Turn-ON Time	t_{on}	See specified Test Circuit.		(80)80		ns
Storage Time	t_{stg}			(700)850		ns
Fall Time	t_f			(40)50		ns

* : The 2SA1708/2SC4488 are classified by 100mA h_{FE} as follows :

Rank	S	T
h_{FE}	140 to 280	200 to 400

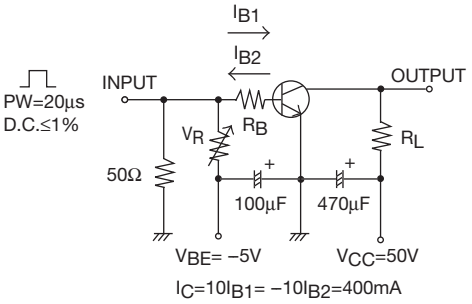
Switching Time Test Circuit

2SA1708



I_C=10I_{B1}= −10I_{B2}= −400mA

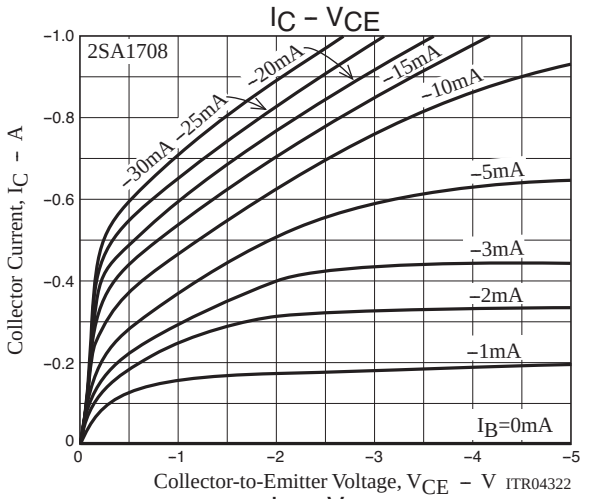
2SC4488

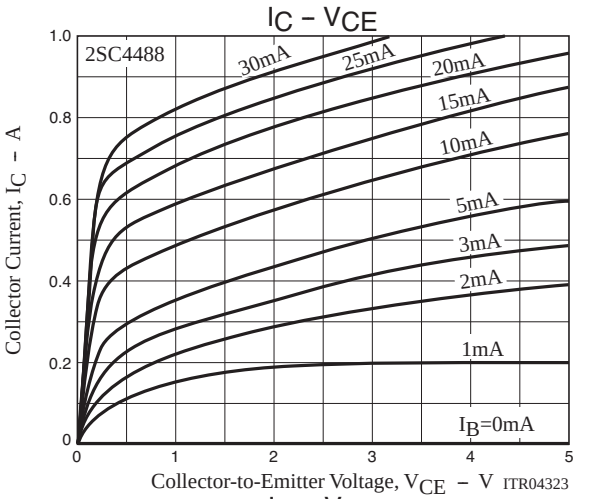


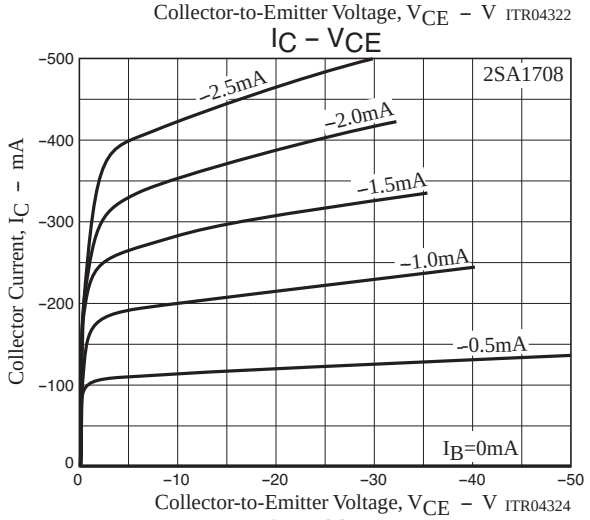
I_C=10I_{B1}= −10I_{B2}=400mA

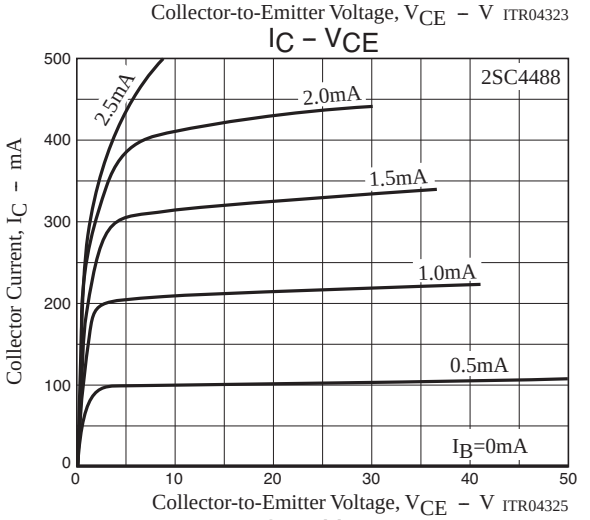
Ordering Information

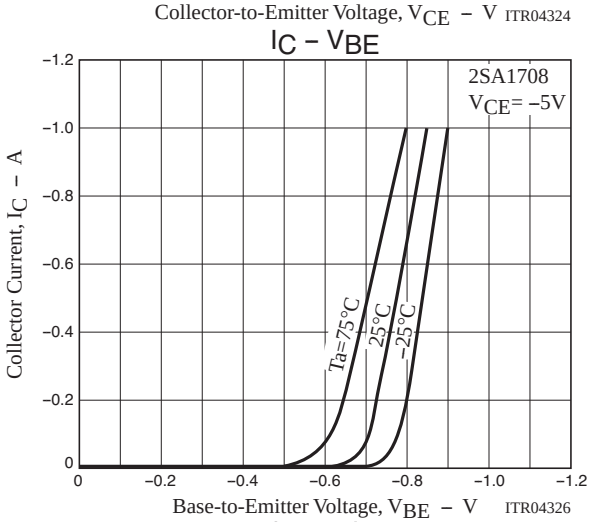
Device	Package	Shipping	memo
2SA1708S-AN	NMP(Taping)	2,500pcs./box	Pb Free
2SA1708T-AN	NMP(Taping)	2,500pcs./box	
2SC4488S-AN	NMP(Taping)	2,500pcs./box	
2SC4488T-AN	NMP(Taping)	2,500pcs./box	

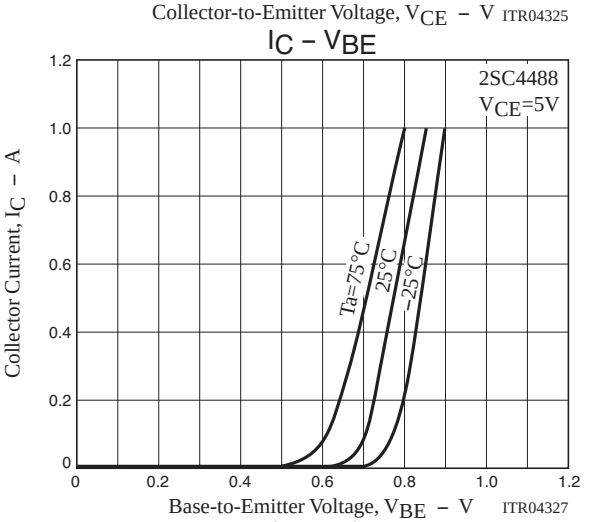

IC – VCE
2SA1708
–30mA
–25mA
–20mA
–15mA
–10mA
–5mA
–3mA
–2mA
–1mA
IB=0mA
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR04322

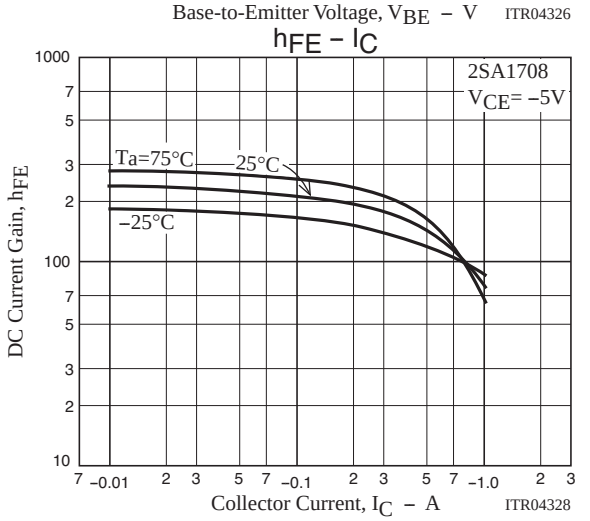

IC – VCE
2SC4488
30mA
25mA
20mA
15mA
10mA
5mA
3mA
2mA
1mA
IB=0mA
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR04323

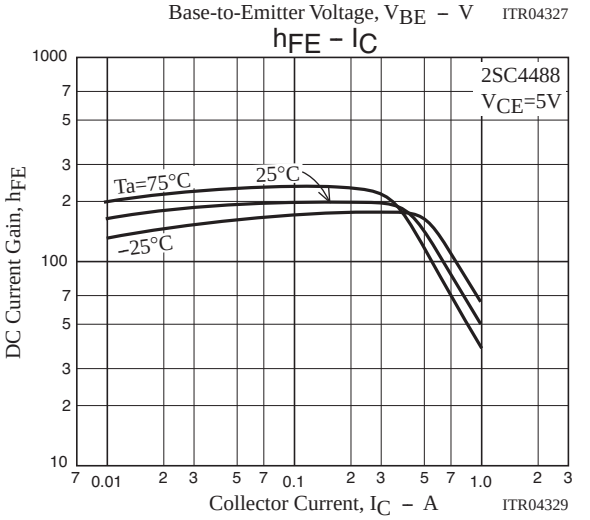

IC – VCE
2SA1708
–2.5mA
–2.0mA
–1.5mA
–1.0mA
–0.5mA
IB=0mA
Collector Current, IC – mA
Collector-to-Emitter Voltage, VCE – V
ITR04324

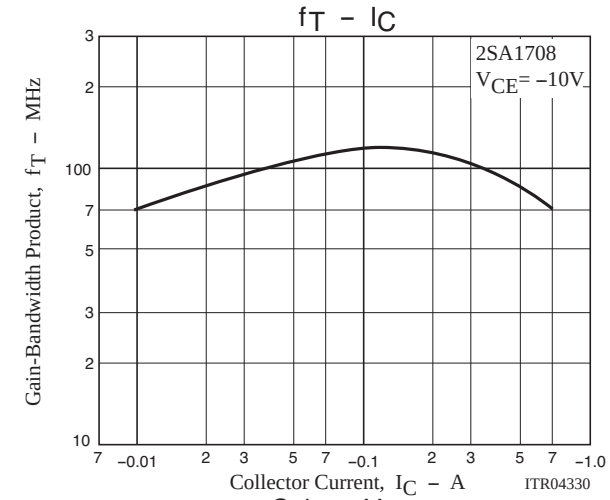

IC – VCE
2SC4488
2.5mA
2.0mA
1.5mA
1.0mA
0.5mA
IB=0mA
Collector Current, IC – mA
Collector-to-Emitter Voltage, VCE – V
ITR04325

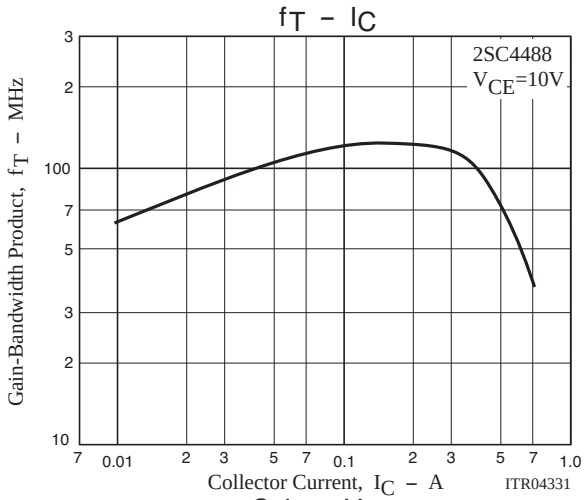

IC – VBE
2SA1708
VCE= –5V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR04326

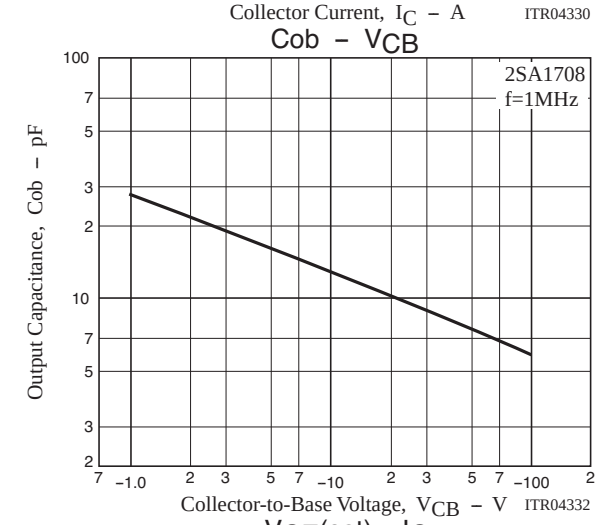

IC – VBE
2SC4488
VCE=5V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR04327

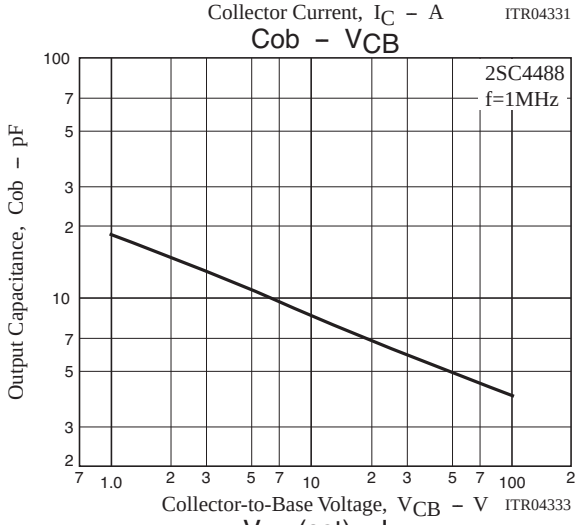

hFE – IC
2SA1708
VCE= –5V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
ITR04328

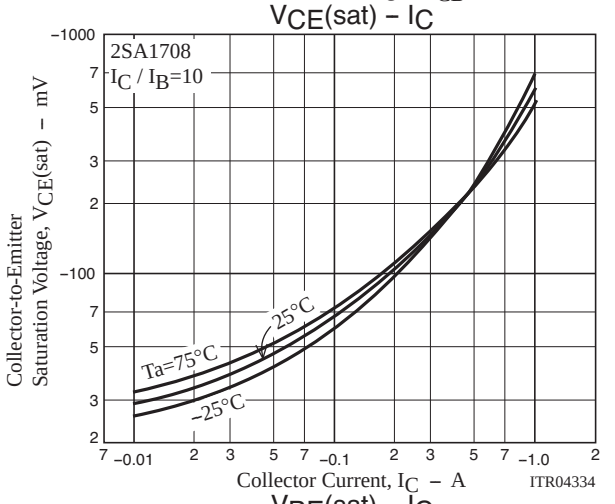

hFE – IC
2SC4488
VCE=5V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
ITR04329

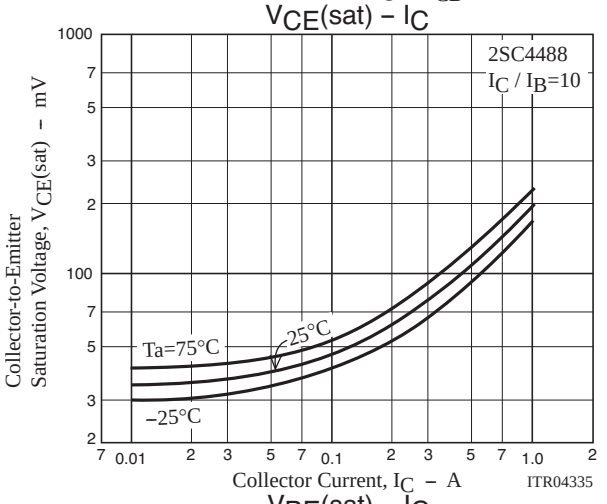

fT – IC
2SA1708
VCE= –10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
ITR04330

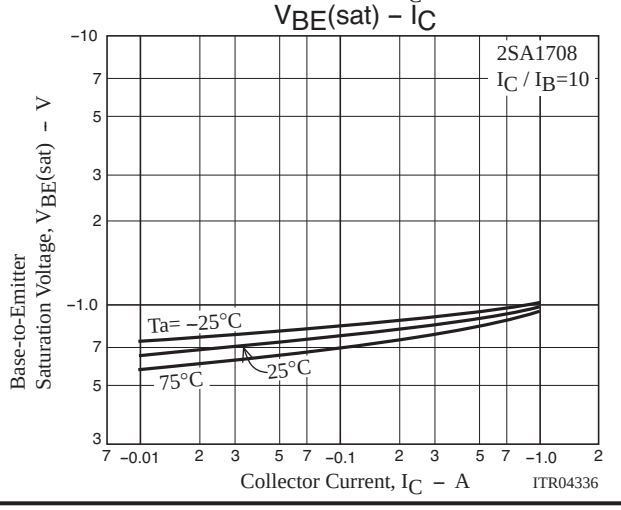

fT – IC
2SC4488
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
ITR04331

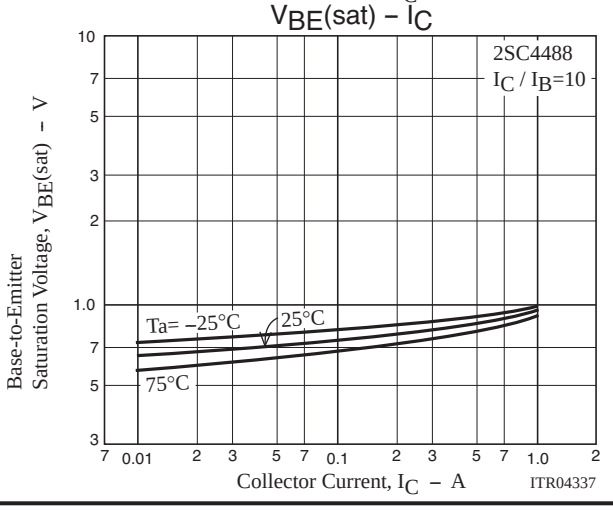

Cob – VCB
2SA1708
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR04332

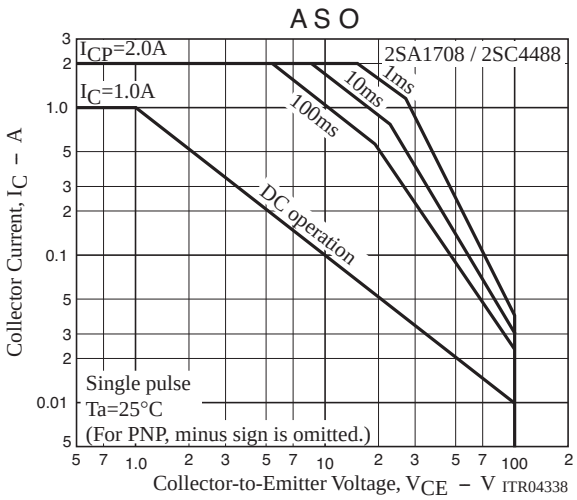

Cob – VCB
2SC4488
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR04333

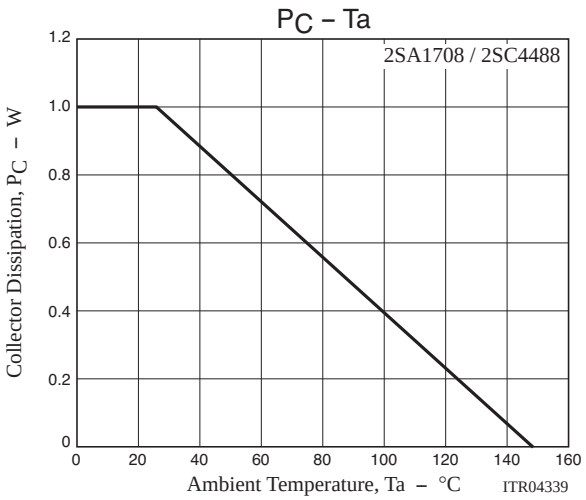

VCE(sat) – IC
2SA1708
IC / IB=10
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
ITR04334


VCE(sat) – IC
2SC4488
IC / IB=10
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
ITR04335


VBE(sat) – IC
2SA1708
IC / IB=10
Ta= –25°C
25°C
75°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
ITR04336


VBE(sat) – IC
2SC4488
IC / IB=10
Ta= –25°C
25°C
75°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
ITR04337


A S O
2SA1708 / 2SC4488
I_{CP}=2.0A
I_C=1.0A
1ms
10ms
100ms
DC operation
Single pulse
Ta=25°C
(For PNP, minus sign is omitted.)
Collector Current, I_C – A
Collector-to-Emitter Voltage, V_{CE} – V
ITR04338


P_C – Ta
2SA1708 / 2SC4488
Collector Dissipation, P_C – W
Ambient Temperature, Ta – °C
ITR04339

Bag Packing Specification

2SA1708S-AN, 2SA1708T-AN, 2SC4488S-AN, 2SC4488T-AN

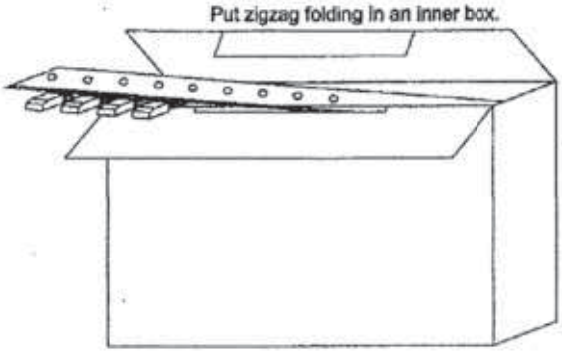
NMP (Zigzag folding)

Storage package Outline name	Package type	Maximum Number of devices contained (pcs.)		Packing format	
		Inner box No.	Storage quantity	Outer box (C—6)	Outer box (C—8)
NMP	AN/AZ	C—3 Inner box Dimensions :mm(external) 330×45×125	2,500	8 inner boxes contained(20,000pcs.) Outer box Dimensions:mm(external) 585×345×195	4 inner boxes contained(10,000pcs.) Outer box Dimensions:mm(external) 345×300×195

1. Packing format

Packing method

Put zigzag folding in an inner box.



2. Bar code label

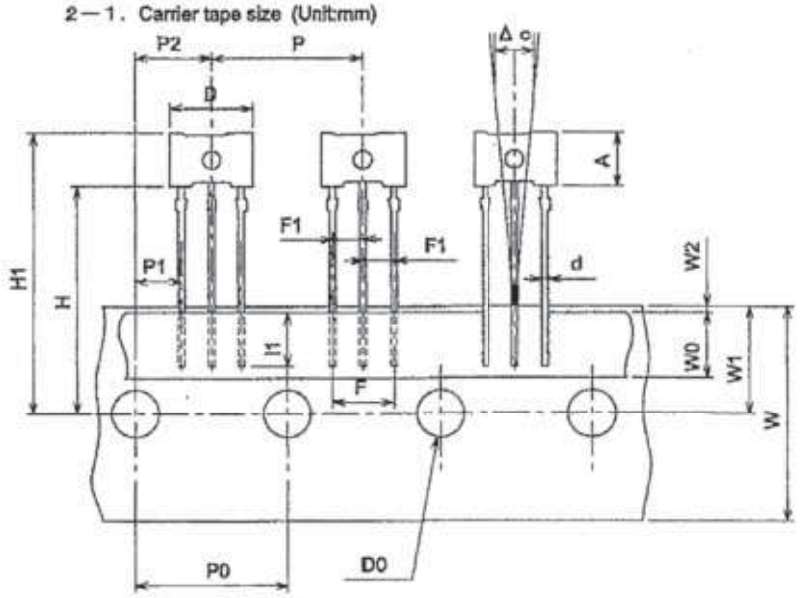
(Unit : mm)

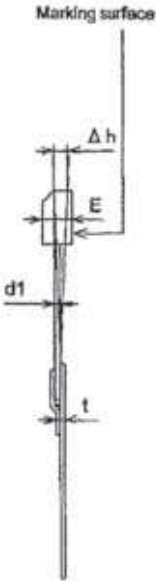


*LEAD FREE 1:
Lead-free External terminal surface treatment product.

2. Taping specifications

2—1. Carrier tape size (Unit:mm)





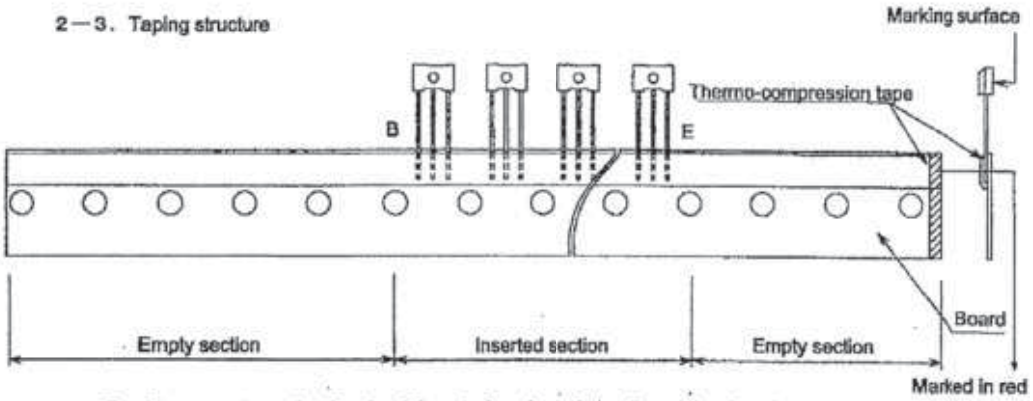
2—2. Taping size standard

Unit:mm

Item	Symbol	Standard	Tolerance
Work piece outside diameter	D	6.9	±0.2
	E	2.5	±0.2
Work piece height	A	4.5	±0.2
Lead wire diameter	d	0.5	±0.1
Lead wire thickness	d1	0.45	±0.1
Bonded lead wire	I1	3.0MIN	
Pitch between products	P	12.7	±0.5
Pitch between perforations	P0	12.7	±0.2
Total pitch for 21 perforations	P0×20	254.0	±1.0
Distance between lead wire	F	5.0	+0.8 -0.2
Lead wire pitch distance	F1	2.54	+0.4 -0.1
Displacement of perforations	P1	3.81	±0.3
	P2	6.35	±0.3
Displacement of tape	W2	0～0.5	

Item	Symbol	Standard	Tolerance
Tape width	W	18.0	±0.5
Adhesive tape	W0	6.0	±0.5
Displacement of perforations	W1	9.0	±0.5
Work piece bottom surface position	H	19.0	+1.0 -0.5
Work piece upper limit position	H1	23.5	±1.0
Perforations diameter	D0	ϕ4.0	±0.2
Tape thickness (total thickness)	t	0.6	±0.2
Product inclination	Δc	0	±0.7
Product inclination	Δh	0	±1.0

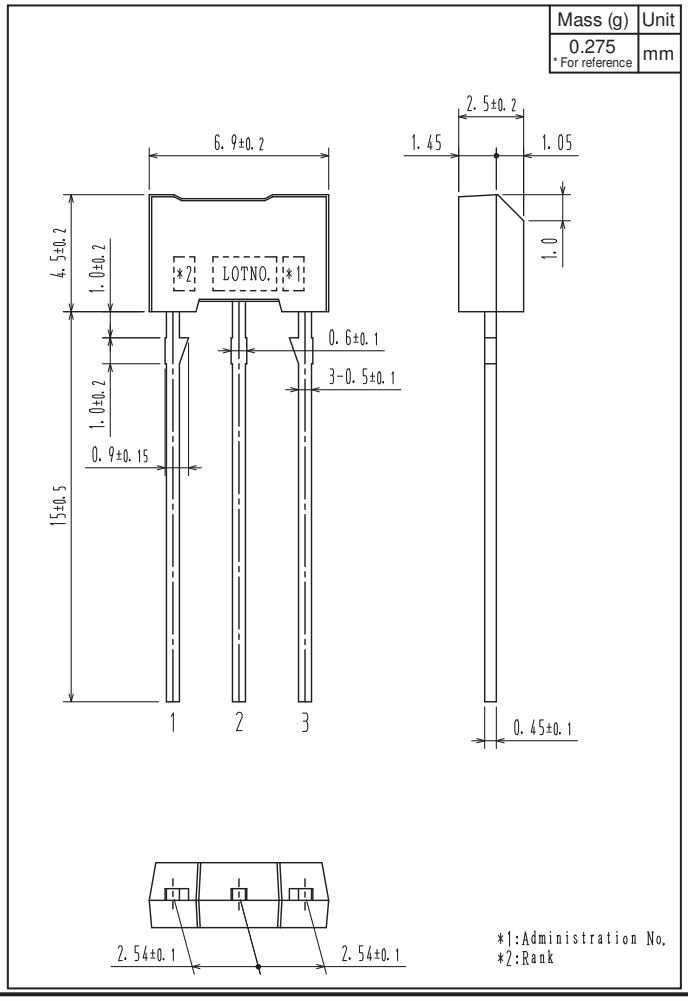
2—3. Taping structure



- Provide an empty section for about three to five pieces in leading and end portions of the tape.
- Provide an empty section in the fold-back portion.
- Provide marking in red to the E-side end of the board.

Outline Drawing

2SA1708S-AN, 2SA1708T-AN, 2SC4488S-AN, 2SC4488T-AN



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