Ordering number : EN2063C

2SB1143/2SD1683

Bipolar Transistor
(–)50V, (–)4A, Low V_{CE}(sat), (PNP)NPN Single TO-126ML

ON Semiconductor®
http://onsemi.com

Applications

・ Voltage regulators, relay drivers, lamp drivers, electrical equipment

Features

・ Adoption of FBET, MBIT processes
・ Large current capacity and wide ASO
・ Low saturation voltage

Specifications ( ): 2SB1143

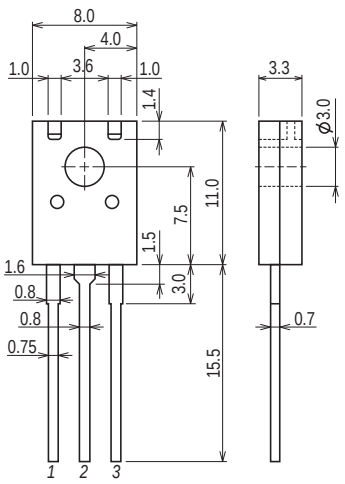
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–)60	V
Collector-to-Emitter Voltage	V_{CEO}		(–)50	V
Emitter-to-Base Voltage	V_{EBO}		(–)6	V
Collector Current	I_C		(–)4	A
Collector Current (Pulse)	I_{CP}		(–)6	A
Collector Dissipation	P_C		1.5	W
		Tc=25°C	10	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)
7516A-002



2SB1143S
2SB1143T
2SD1683S
2SD1683T

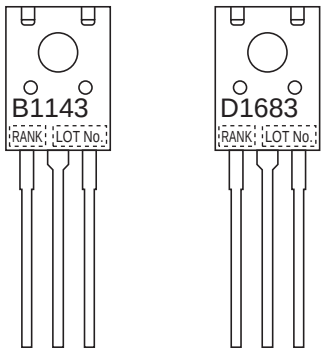
1 : Emitter
2 : Collector
3 : Base

TO-126ML

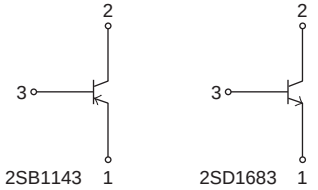
Product & Package Information

• Package : TO-126ML
• JEITA, JEDEC : TO-126
• Minimum Packing Quantity : 200 pcs./bag

Marking



Electrical Connection



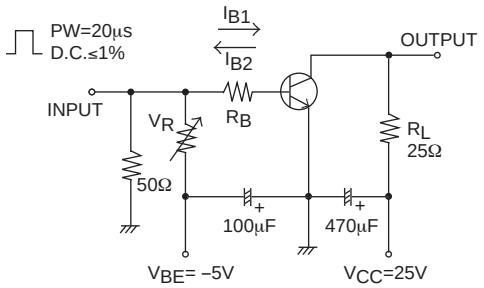
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(−)40V, I_E=0A			(−)1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(−)4V, I_C=0A			(−)1	μA
DC Current Gain	$h_{FE}1$	V_{CE}=(−)2V, I_C=(−)100mA	100*		560*	
	$h_{FE}2$	V_{CE}=(−)2V, I_C=(−)3A	40			
Gain-Bandwidth Product	f_T	V_{CE}=(−)10V, I_C=(−)50mA		150		MHz
Output Capacitance	Cob	V_{CB}=(−)10V, f=1MHz		(39)25		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=(−)2A, I_B=(−)100mA		(−350)190	(−700)500	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=(−)2A, I_B=(−)100mA		(−)0.94	(−)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(−)10μA, I_E=0A	(−)60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(−)1mA, R_{BE}=∞	(−)50			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.		(70)70		ns
Storage Time	t_{stg}			(450)650		ns
Fall Time	t_f			(30)35		ns

* : The 2SB1143/2SD1683 are classified by 100mA h_{FE} as follows :

Rank	R	S	T	U
h_{FE}	100 to 200	140 to 280	200 to 400	280 to 560

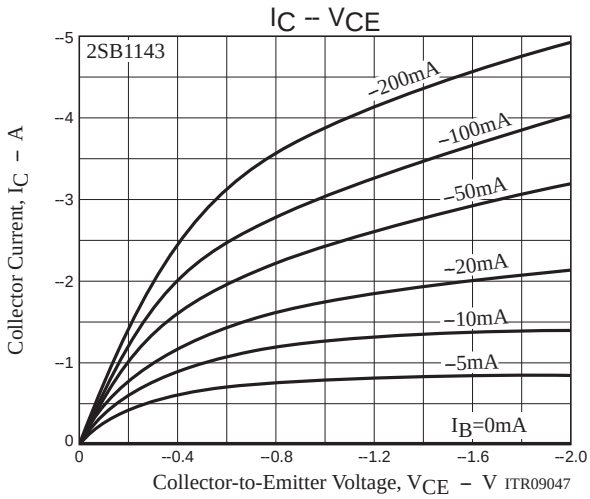
Switching Time Test Circuit

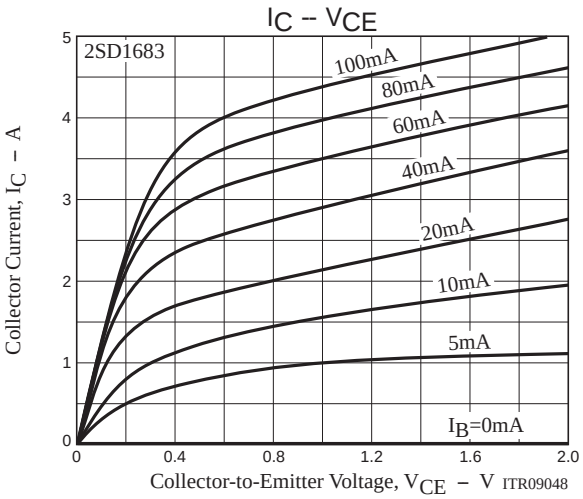


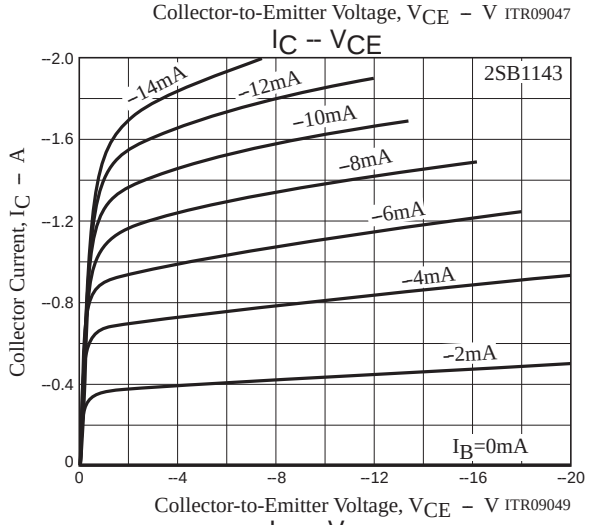
I_C=10I_{B1}= −10I_{B2}=1A
(For PNP, the polarity is reversed.)

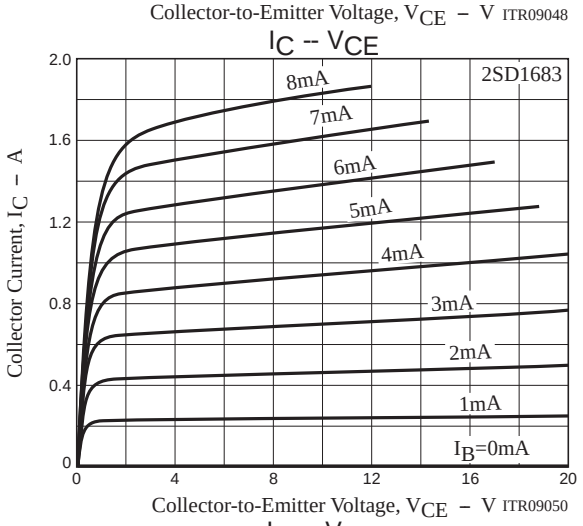
Ordering Information

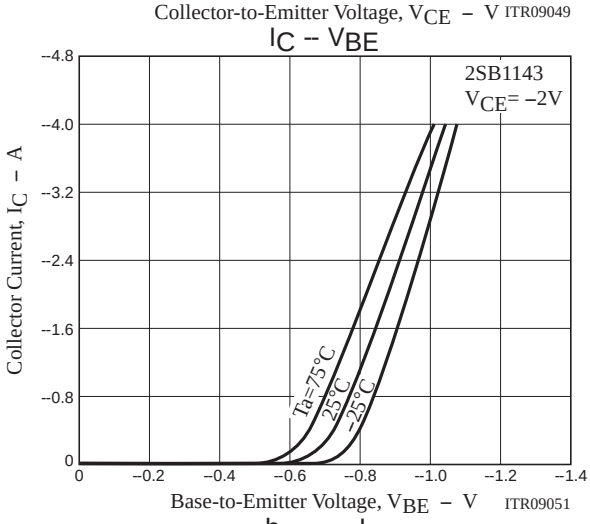
Device	Package	Shipping	memo
2SB1143S	TO-126ML	200pcs./bag	Pb Free
2SB1143T	TO-126ML	200pcs./bag	
2SD1683S	TO-126ML	200pcs./bag	
2SD1683T	TO-126ML	200pcs./bag	

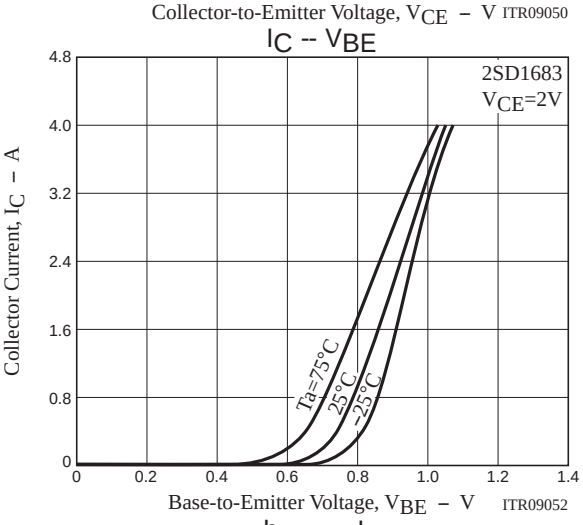

IC – VCE
2SB1143
–200mA
–100mA
–50mA
–20mA
–10mA
–5mA
IB=0mA
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR09047

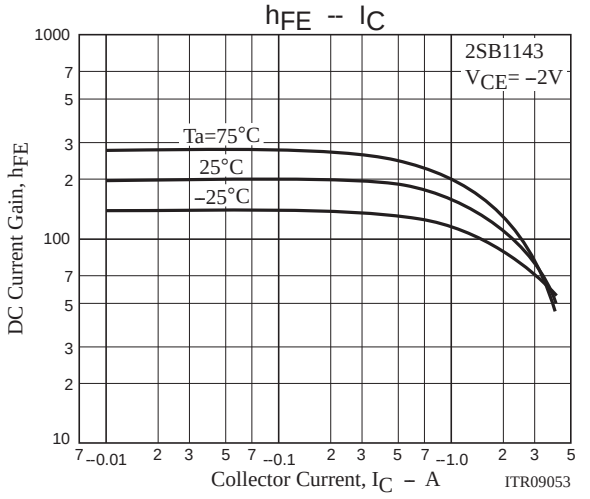

IC – VCE
2SD1683
100mA
80mA
60mA
40mA
20mA
10mA
5mA
IB=0mA
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR09048

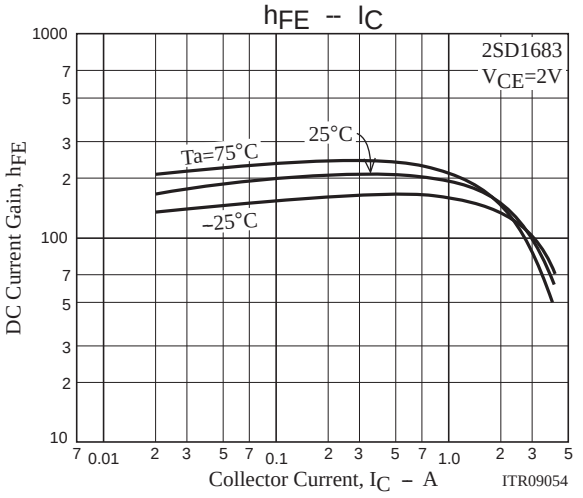

IC – VCE
2SB1143
–14mA
–12mA
–10mA
–8mA
–6mA
–4mA
–2mA
IB=0mA
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR09049

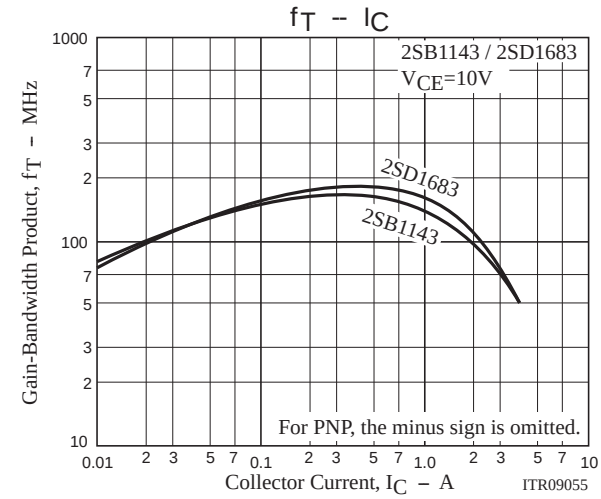

IC – VCE
2SD1683
8mA
7mA
6mA
5mA
4mA
3mA
2mA
1mA
IB=0mA
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR09050

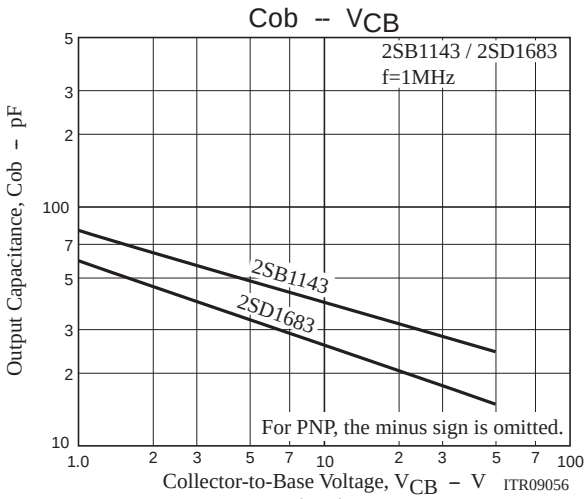

IC – VBE
2SB1143
VCE= –2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR09051

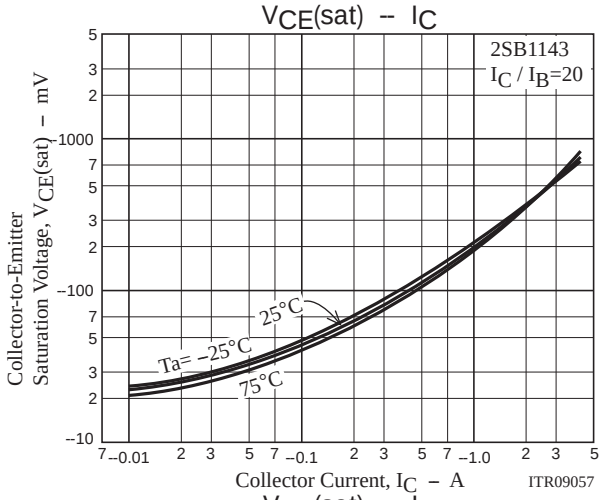

IC – VBE
2SD1683
VCE=2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR09052

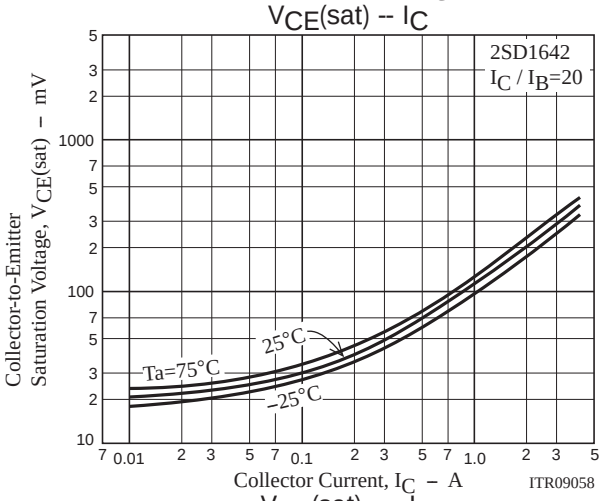

hFE – IC
2SB1143
VCE= –2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
ITR09053

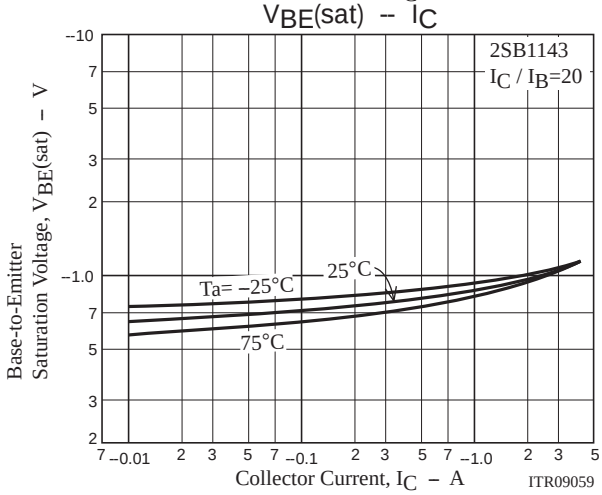

hFE – IC
2SD1683
VCE=2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
ITR09054

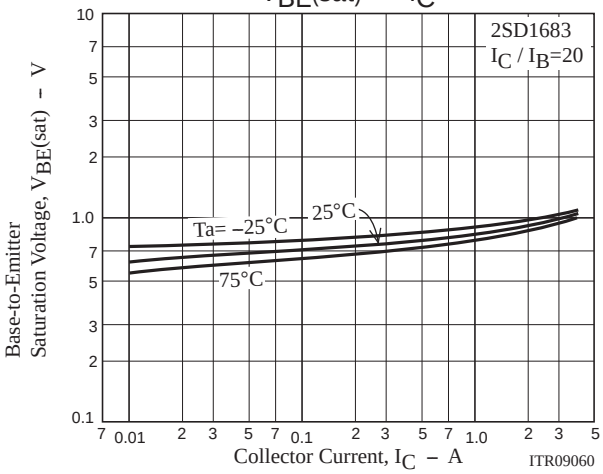

fT -- IC
2SB1143 / 2SD1683
VCE=10V
2SD1683
2SB1143
For PNP, the minus sign is omitted.
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
ITR09055

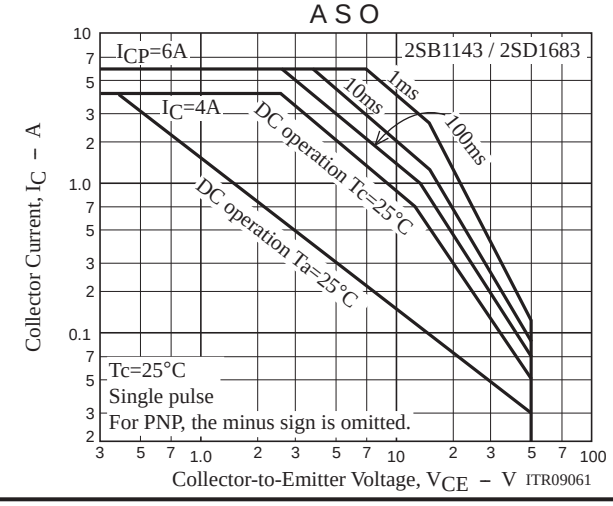

Cob -- VCB
2SB1143 / 2SD1683
f=1MHz
2SB1143
2SD1683
For PNP, the minus sign is omitted.
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR09056

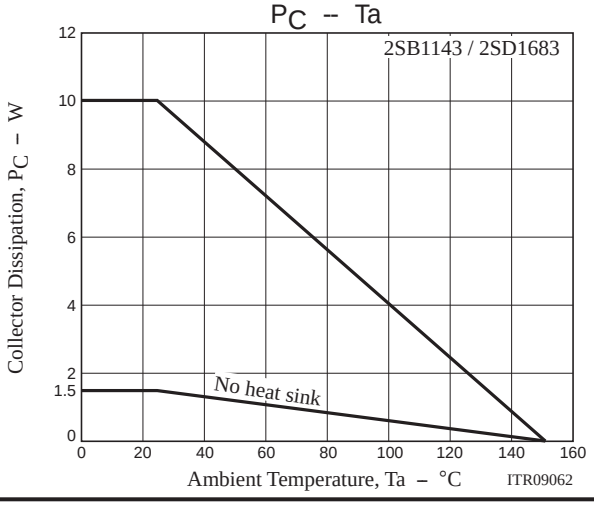

VCE(sat) -- IC
2SB1143
IC / IB=20
25°C
Ta= –25°C
75°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
ITR09057


VCE(sat) -- IC
2SD1642
IC / IB=20
25°C
Ta=75°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
ITR09058


VBE(sat) -- IC
2SB1143
IC / IB=20
25°C
Ta= –25°C
75°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
ITR09059


VBE(sat) -- IC
2SD1683
IC / IB=20
25°C
Ta= –25°C
75°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
ITR09060


A S O
2SB1143 / 2SD1683
ICP=6A
IC=4A
1ms
10ms
100ms
DC operation Tc=25°C
DC operation Ta=25°C
Tc=25°C
Single pulse
For PNP, the minus sign is omitted.
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR09061


PC -- Ta
2SB1143 / 2SD1683
No heat sink
Collector Dissipation, PC – W
Ambient Temperature, Ta – °C
ITR09062

Bag Packing Specification

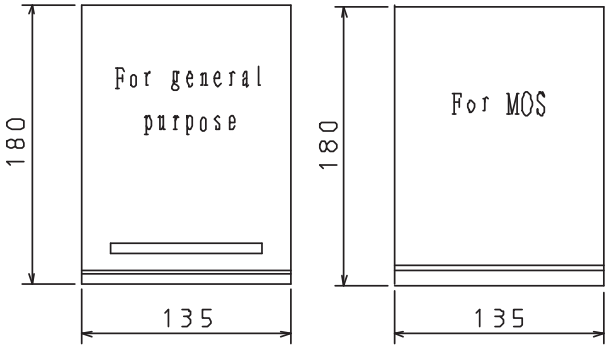
2SB1143S, 2SB1143T, 2SD1683S, 2SD1683T

1. Packing Format

Package Name	Maximum Number of devices contained (pcs)			Packing format	
	Bag	Inner box	Outer box	Inner BOX	Outer BOX
TO-126ML	200	4,000	12,000	B-1 20 bags contained Dimensions:mm (external) 445×225×55	A-2 3 inner boxes contained Dimensions:mm (external) 470×250×190

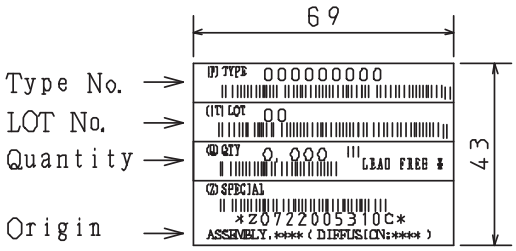
2. Bag dimensions

(unit:mm)



3. Bag label, Inner box label

(unit:mm)



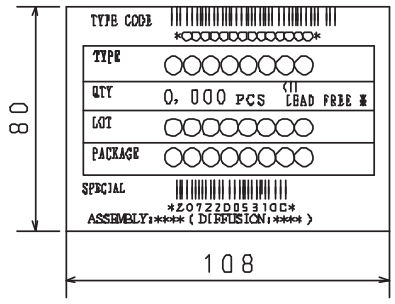
NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

4. Outer box label

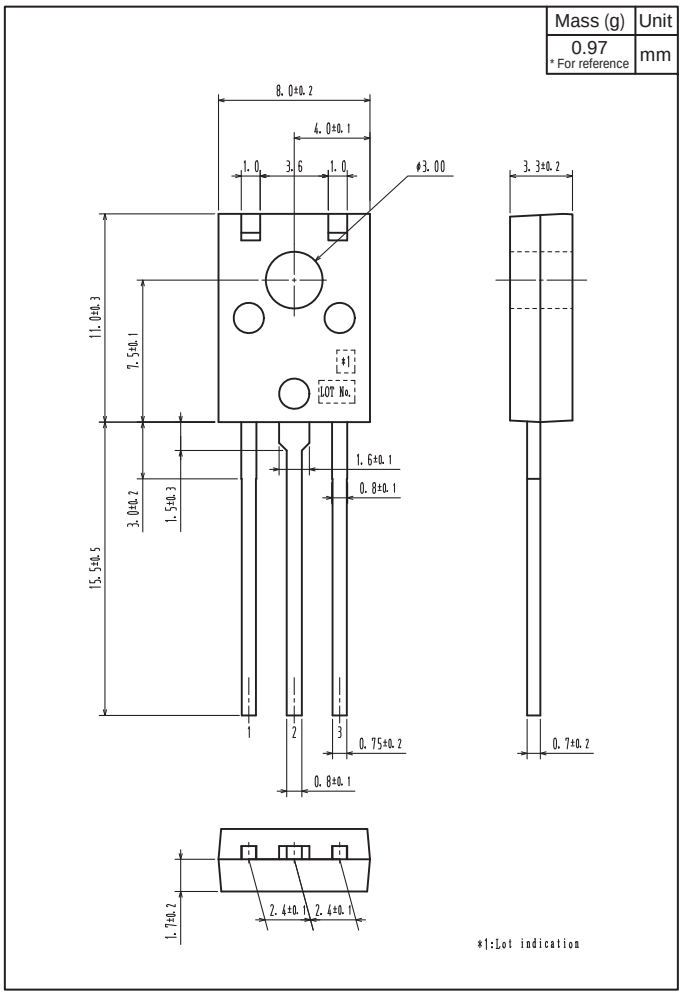
(unit:mm)

It is a label at the time of factory shipments. The form of a label may change in physical distribution process.



Outline Drawing

2SB1143S, 2SB1143T, 2SD1683S, 2SD1683T



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