Ordering number : EN2115C

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

NPN Epitaxial Planar Silicon Transistor

2SD1805 — High-Current Switching Applications

Applications

- Strobes, voltage regulators, relay drivers, lamp drivers

Features

- Low saturation voltage
- Large current capacity
- Fast switching time
- Small and slim package making it easy to make 2SD1805-applied sets smaller

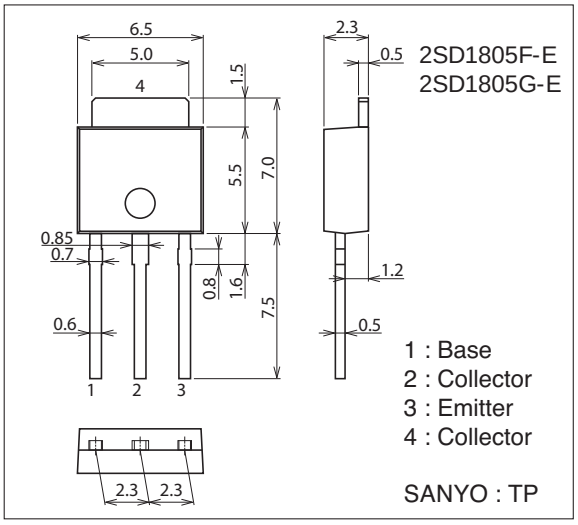
Specifications

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}		20	V
Emitter-to-Base Voltage	V_{EBO}		6	V
Collector Current	I_C		5	A
Collector Current (Pulse)	I_{CP}		8	A
Collector Dissipation	P_C		1	W
		Tc=25°C	15	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C

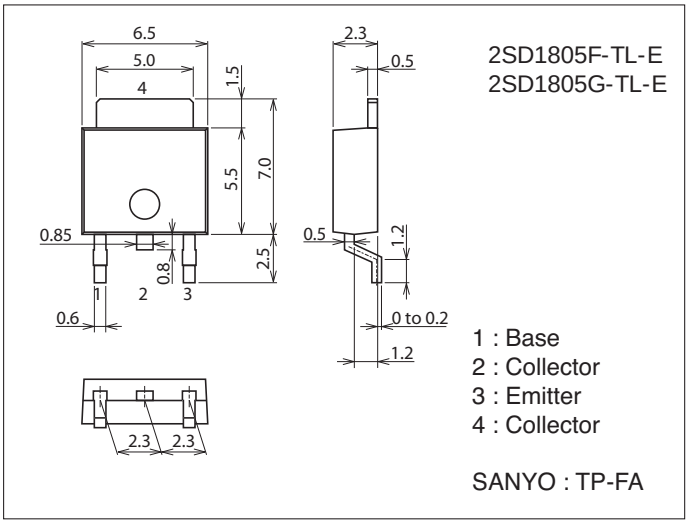
Package Dimensions unit : mm (typ)

7518-003



Package Dimensions unit : mm (typ)

7003-003

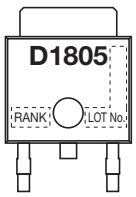


Product & Package Information

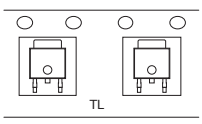
- Package : TP
- JEITA, JEDEC : SC-64, TO-251
- Minimum Packing Quantity : 500 pcs./bag

- Package : TP-FA
- JEITA, JEDEC : SC-63, TO-252
- Minimum Packing Quantity : 700 pcs./reel

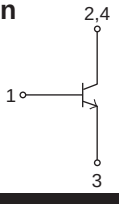
Marking (TP, TP-FA)



Packing Type (TP-FA) : TL



Electrical Connection



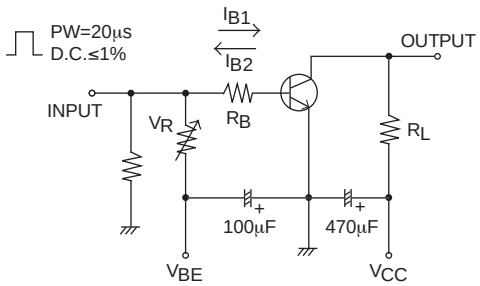
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=50V, I_E=0A			100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0A			100	nA
DC Current Gain	$h_{FE}1$	V_{CE}=2V, I_C=500mA	120*		560*	
	$h_{FE}2$	V_{CE}=2V, I_C=3A	95			
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=50mA		120		MHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		45		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=3A, I_B=60mA		220	500	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=3A, I_B=60mA			1.5	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}=∞	20			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		30		ns
Storage Time	t_{stg}			300		ns
Fall Time	t_f			40		ns

* : The 2SD1805 is classified by 500mA h_{FE} as follows.

Rank	E	F	G
h_{FE}	120 to 200	160 to 320	280 to 560

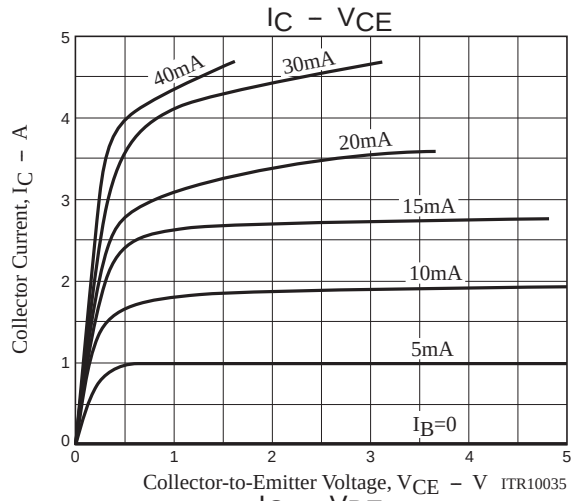
Switching Time Test Circuit

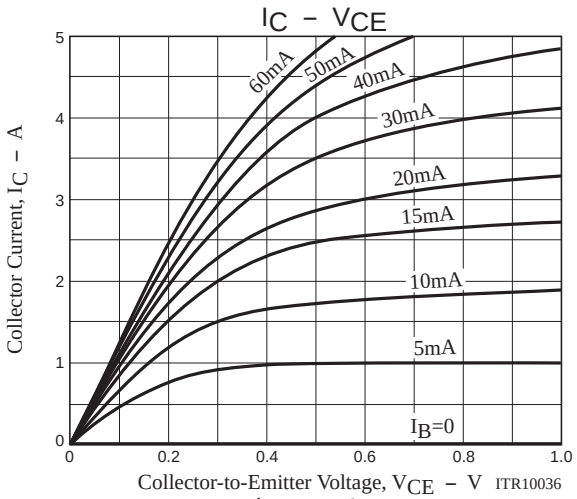


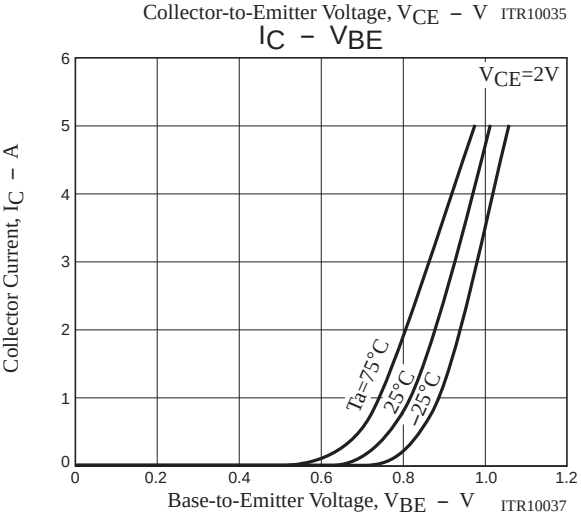
I_C=10I_{B1}= −10I_{B2}=2A, V_{CC}=10V

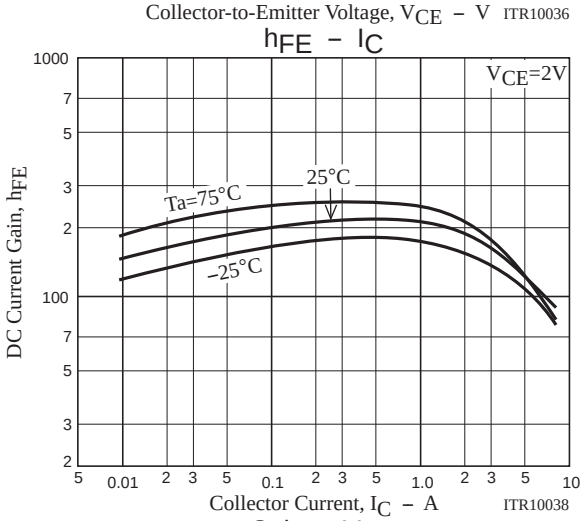
Ordering Information

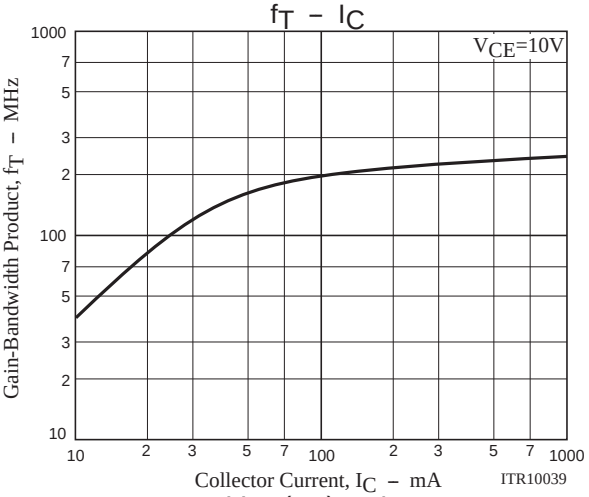
Device	Package	Shipping	memo
2SD1805F-E	TP	500pcs./bag	Pb Free
2SD1805G-E	TP	500pcs./bag	
2SD1805F-TL-E	TP-FA	700pcs./reel	
2SD1805G-TL-E	TP-FA	700pcs./reel	

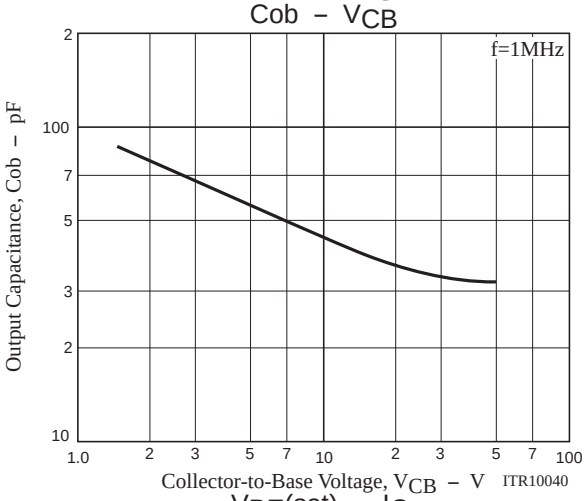

IC – VCE
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR10035
40mA
30mA
20mA
15mA
10mA
5mA
IB=0

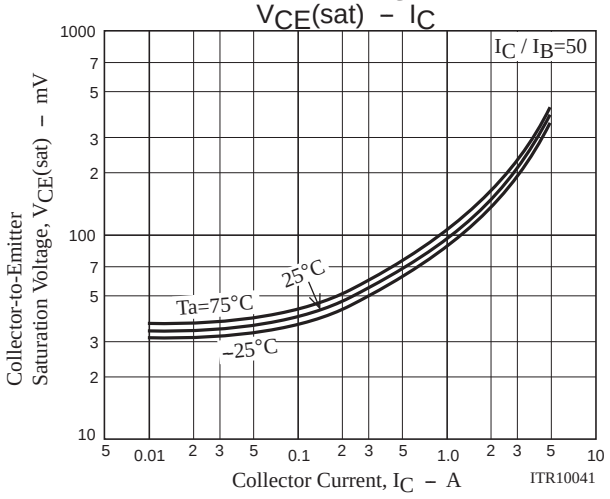

IC – VCE
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR10036
60mA
50mA
40mA
30mA
20mA
15mA
10mA
5mA
IB=0

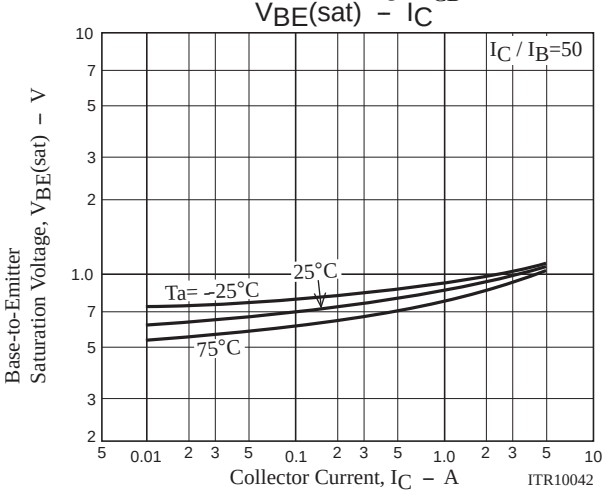

IC – VBE
VCE=2V
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR10037
Ta=75°C
25°C
–25°C

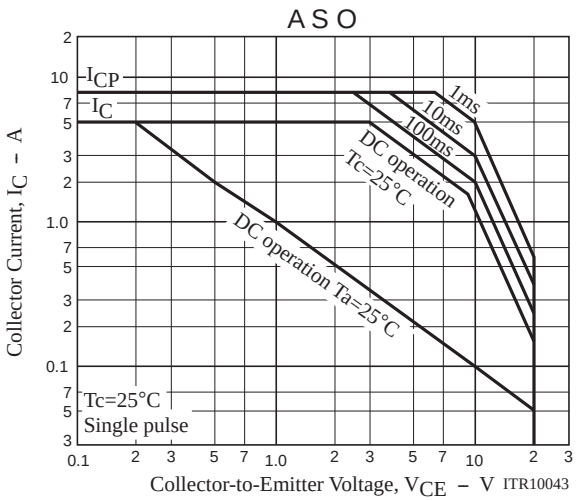

hFE – IC
VCE=2V
DC Current Gain, hFE
Collector Current, IC – A
ITR10038
Ta=75°C
25°C
–25°C

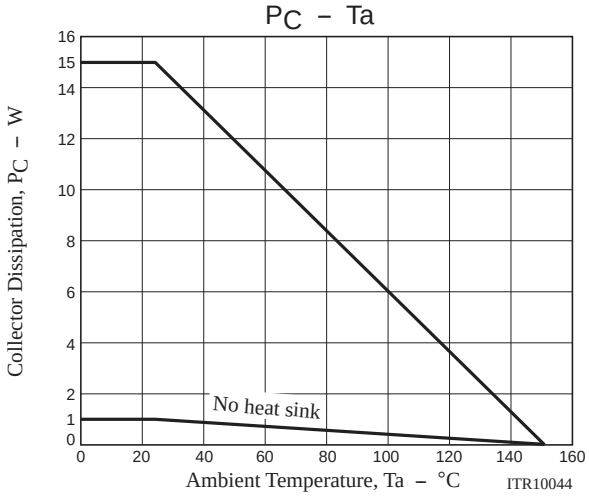

fT – IC
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
ITR10039


Cob – VCB
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR10040


VCE(sat) – IC
IC / IB=50
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
ITR10041
Ta=75°C
25°C
–25°C


VBE(sat) – IC
IC / IB=50
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
ITR10042
Ta= –25°C
25°C
75°C


ASO
Collector Current, I_C – A
I_{CP}
I_C
1ms
10ms
100ms
DC operation
Tc=25°C
DC operation Ta=25°C
Tc=25°C
Single pulse
Collector-to-Emitter Voltage, V_{CE} – V
ITR10043


P_C – Ta
Collector Dissipation, P_C – W
No heat sink
Ambient Temperature, Ta – °C
ITR10044

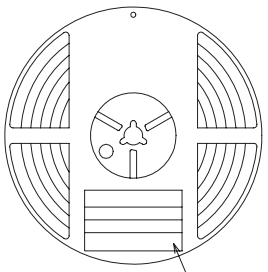
Taping Specification

2SD1805F-TL-E, 2SD1805G-TL-E

Packing Format

Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
TP-FA	TP	700	2,100	12,600	3 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

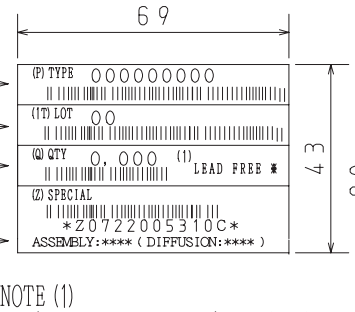
Packing method



Reel label

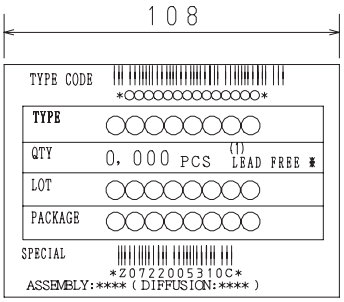
Reel label, Inner box label

(unit:mm)



Outer box label

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

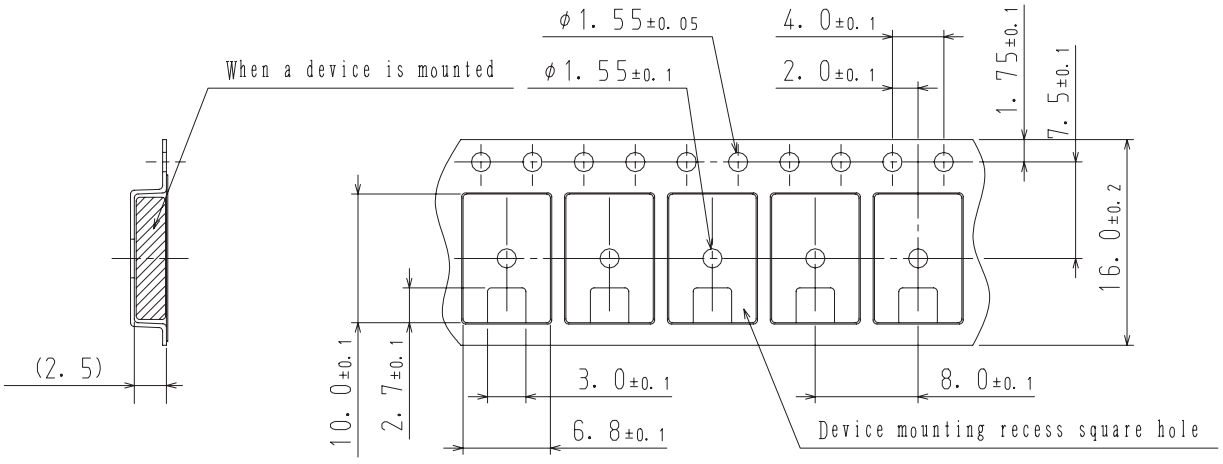


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

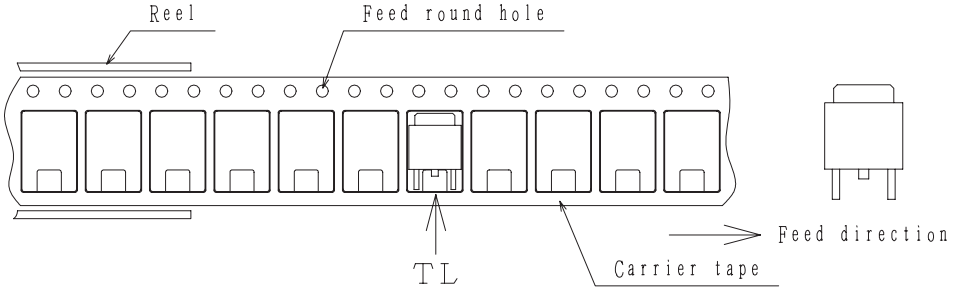
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

Taping configuration

1. Carrier tape size (unit:mm)



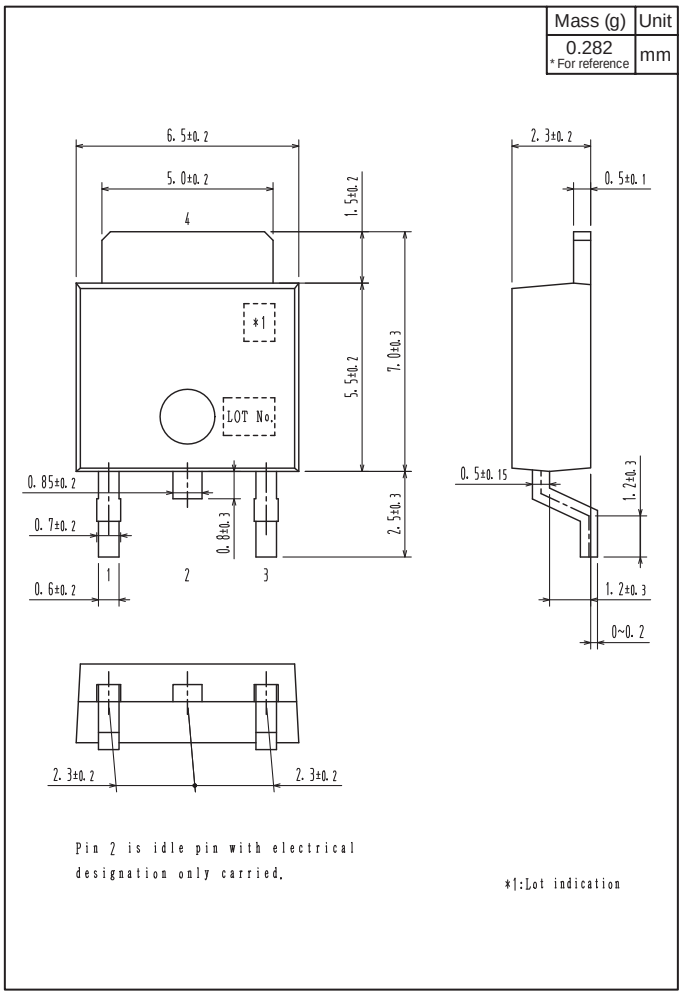
2. Device placement direction



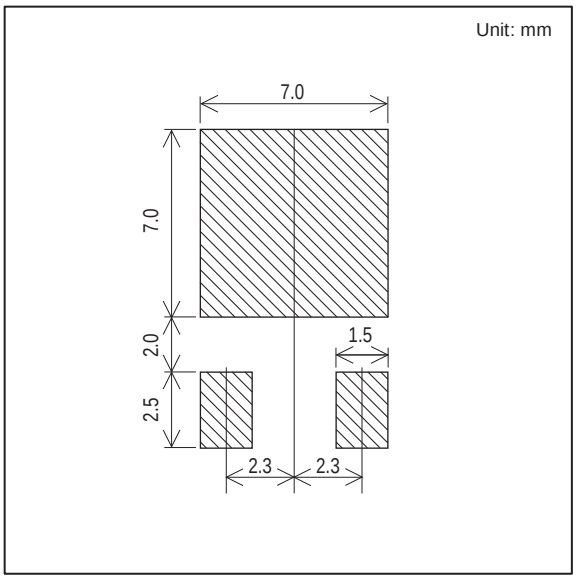
Those with one electrode terminal on the feed hole side·····TL

Outline Drawing

2SD1805F-TL-E, 2SD1805G-TL-E



Land Pattern Example



Bag Packing Specification

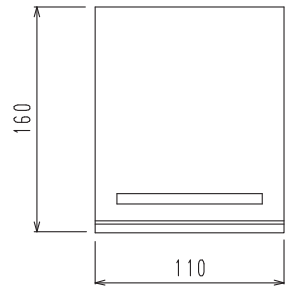
2SD1805F-E, 2SD1805G-E

1. Packing Format

Package Name	Maximum Number of devices contained (pcs)			
	Bag	Inner box	Outer box	
TP		B-1	A-1	A-2
	500	10,000	50,000	30,000
	Packing format (Dimensions: mm (external))			
	Inner box		Outer box	
	B-1		A-1	A-2
	445×225×55		470×250×300	470×250×190

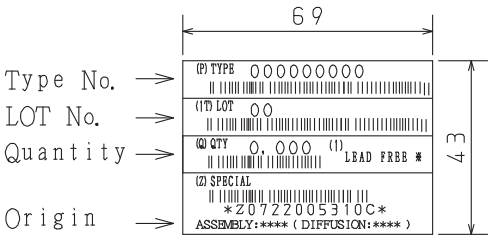
2. Bag dimensions

(unit: mm)



3. Bag label, Inner box label

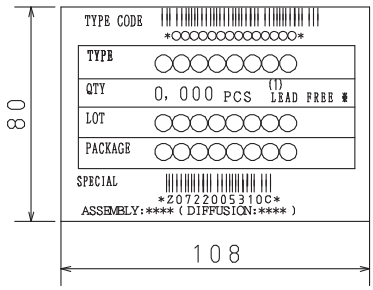
(unit: mm)



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.



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

Outline Drawing

2SD1805F-E, 2SD1805G-E