Ordering number : EN2115C

2SD1805

Bipolar Transistor
20V, 5A, Low V_{CE}(sat), NPN Single TP/TP-FA

ON Semiconductor®

http://onsemi.com

Applications
- Strobes, voltage regulators, relay drivers, lamp drivers

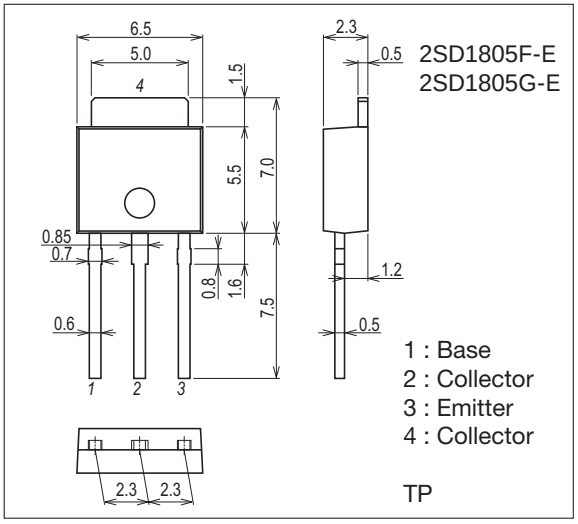
Features
- Low saturation voltage
- Large current capacity
- Fast switching time
- Small and slim package making it easy to make 2SD1805-applied sets smaller

Specifications
Absolute Maximum Ratings at Ta=25°C

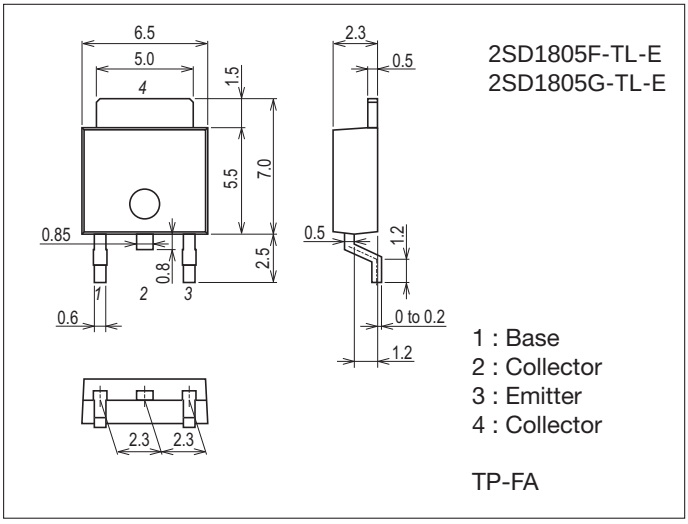
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		60	V
Collector-to-Emitter Voltage	V_{CEO}		20	V
Emitter-to-Base Voltage	V_{EBO}		6	V
Collector Current	I_C		5	A
Collector Current (Pulse)	I_{CP}		8	A
Collector Dissipation	P_C		1	W
		Tc=25°C	15	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C

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)
7518-003



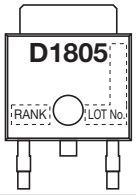
Package Dimensions unit : mm (typ)
7003-003



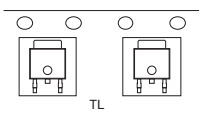
Product & Package Information
- Package : TP
- JEITA, JEDEC : SC-64, TO-251
- Minimum Packing Quantity : 500 pcs./bag

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

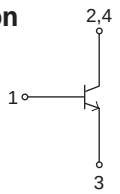
Marking (TP, TP-FA)



Packing Type (TP-FA) : TL



Electrical Connection



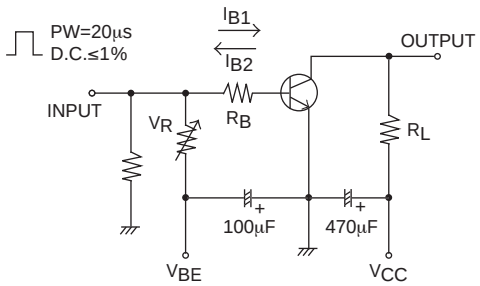
Electrical Characteristics at Ta=25°C

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

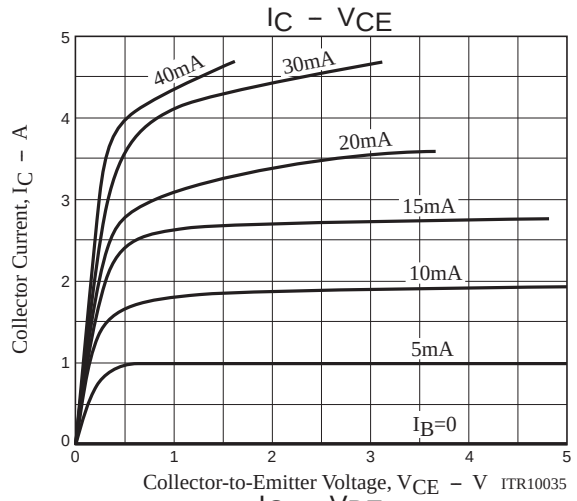
Switching Time Test Circuit

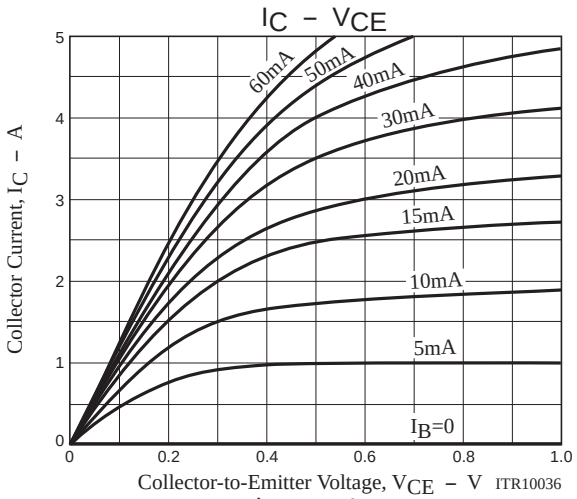


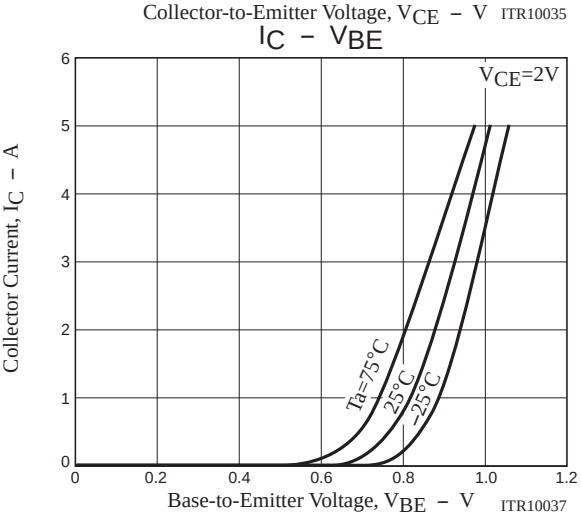
I_C=10I_{B1}= −10I_{B2}=2A, V_{CC}=10V

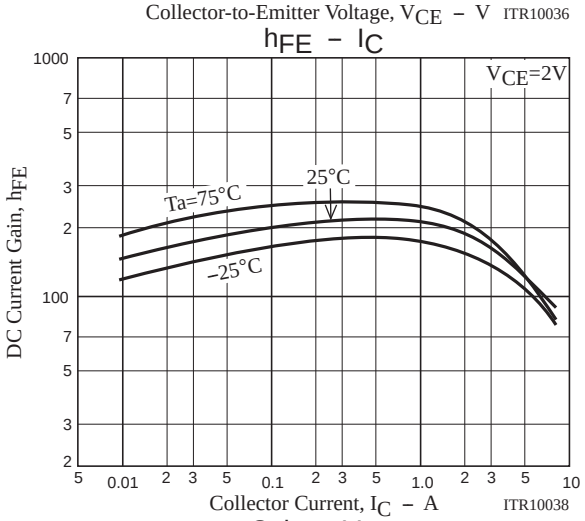
Ordering Information

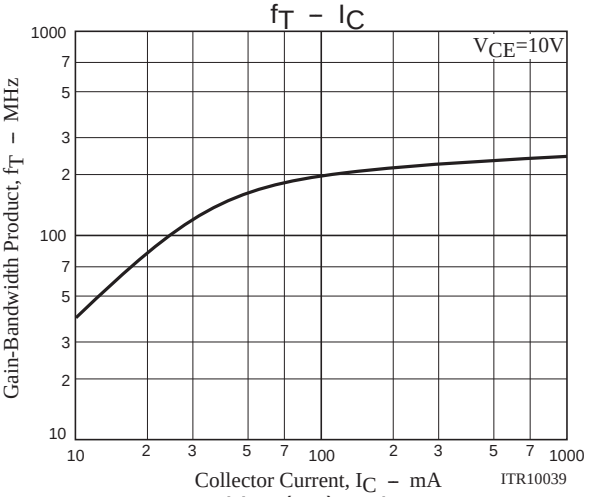
Device	Package	Shipping	memo
2SD1805F-E	TP	500pcs./bag	Pb Free
2SD1805G-E	TP	500pcs./bag	
2SD1805F-TL-E	TP-FA	700pcs./reel	
2SD1805G-TL-E	TP-FA	700pcs./reel	

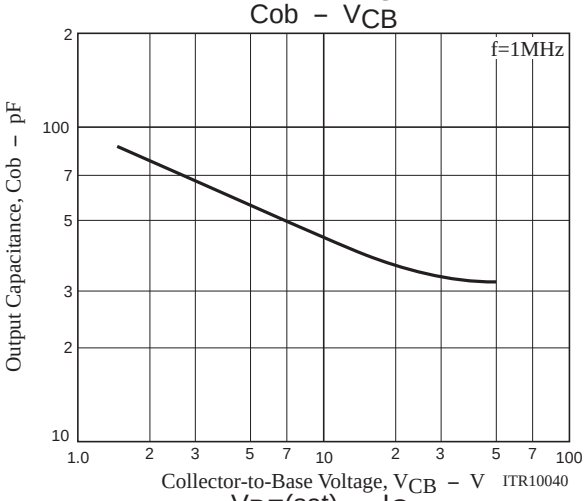

IC – VCE
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR10035
40mA
30mA
20mA
15mA
10mA
5mA
IB=0

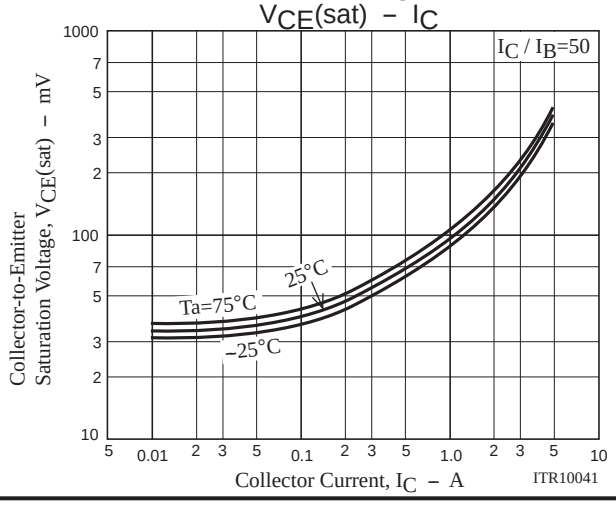

IC – VCE
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR10036
60mA
50mA
40mA
30mA
20mA
15mA
10mA
5mA
IB=0

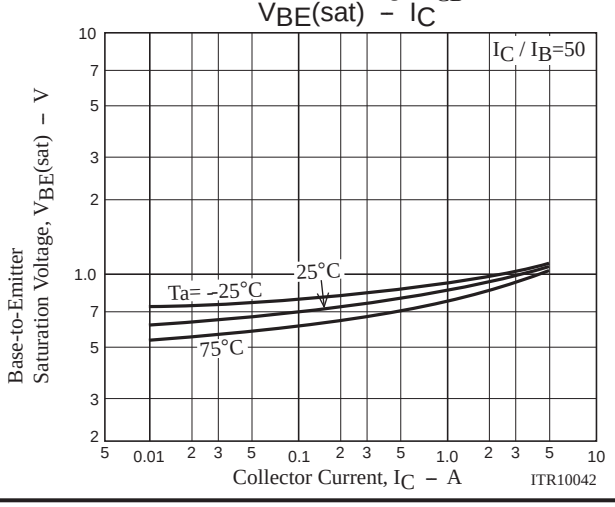

IC – VBE
VCE=2V
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR10037
Ta=75°C
25°C
–25°C

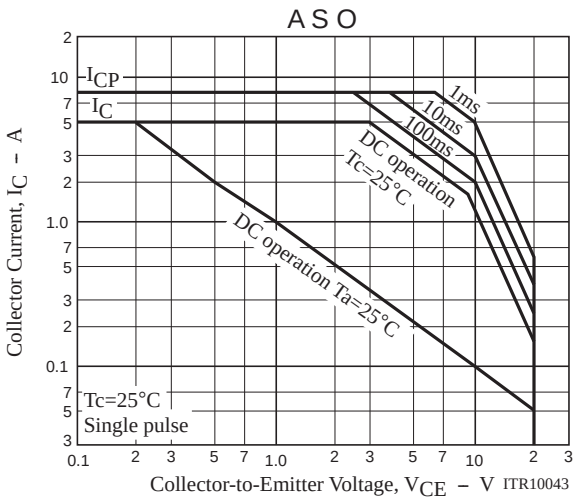

hFE – IC
VCE=2V
DC Current Gain, hFE
Collector Current, IC – A
ITR10038
Ta=75°C
25°C
–25°C

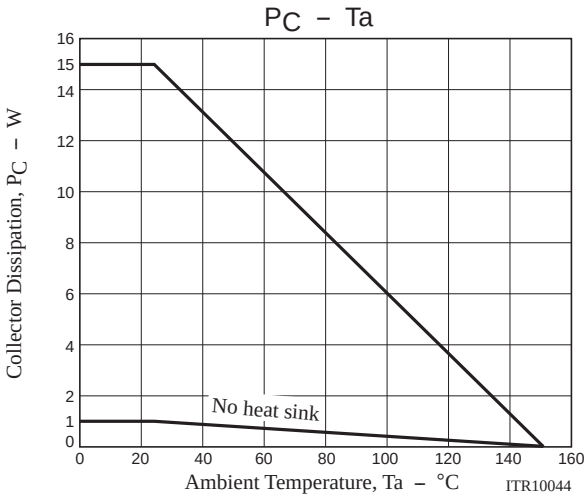

fT – IC
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
ITR10039


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

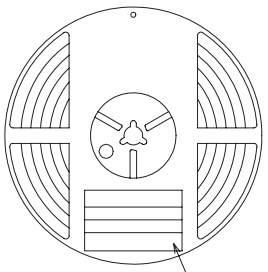
Taping Specification

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

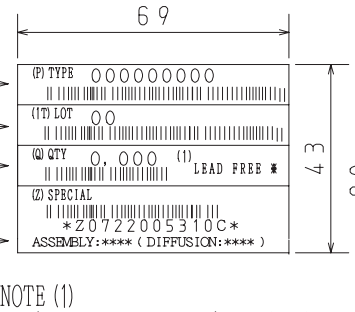
Packing method



Reel label

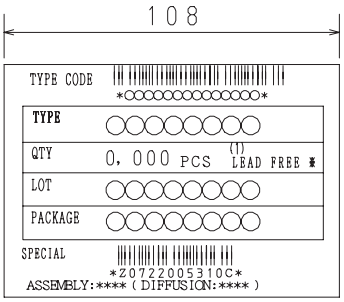
Reel label, Inner box label

(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.

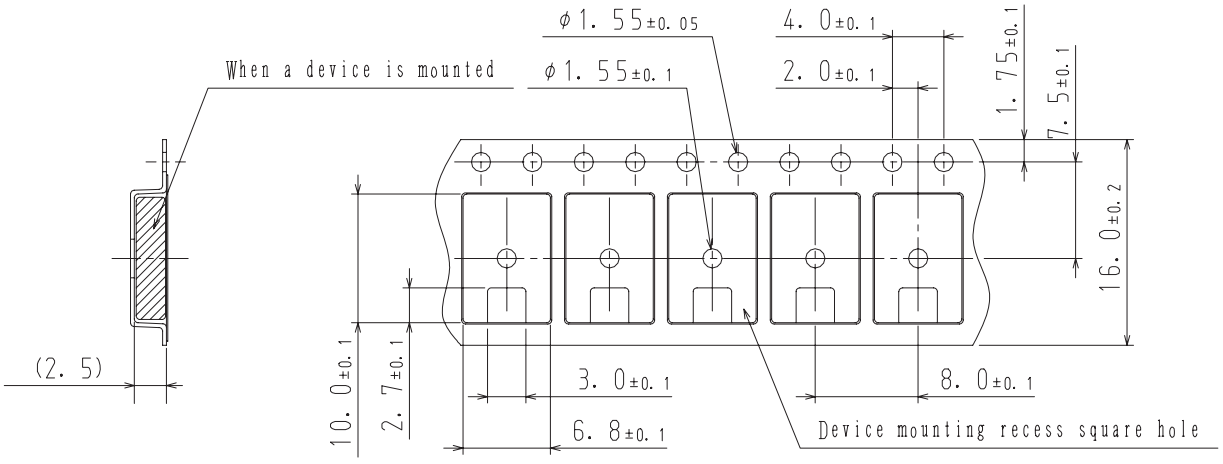


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

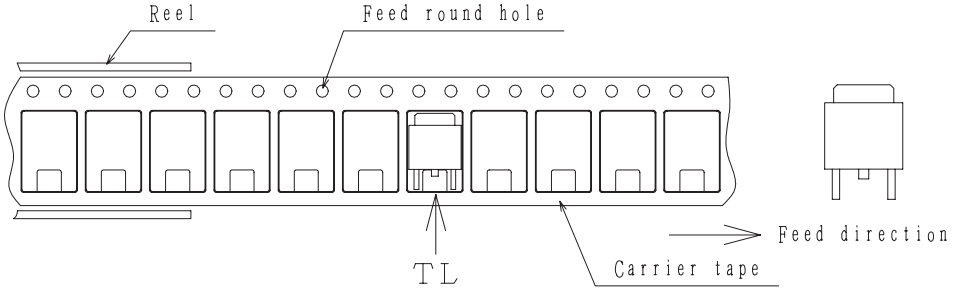
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

Taping configuration

1. Carrier tape size (unit:mm)



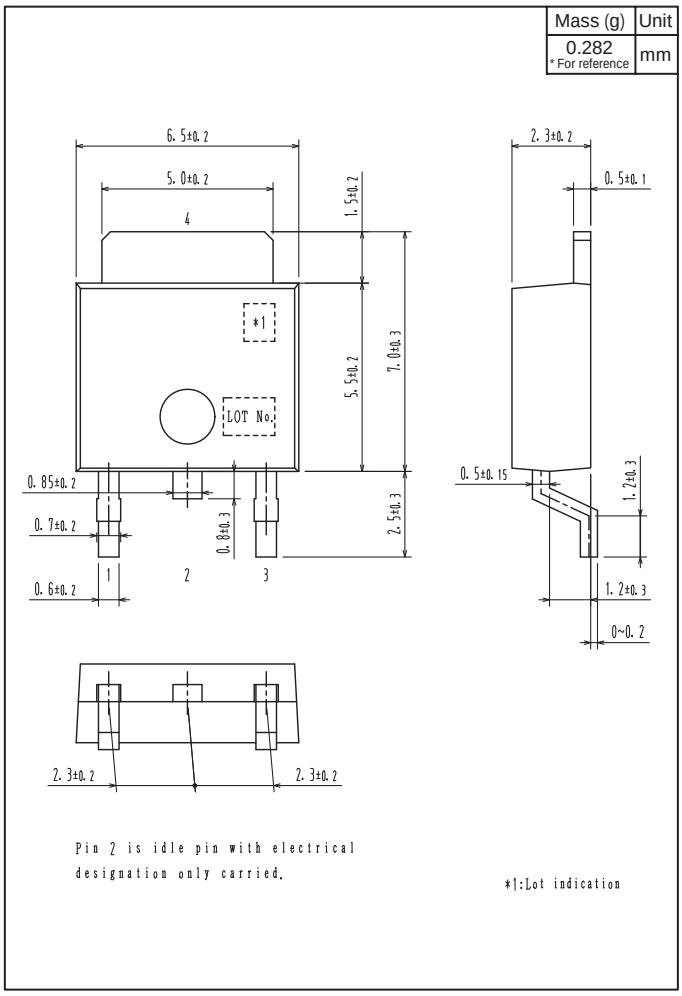
2. Device placement direction



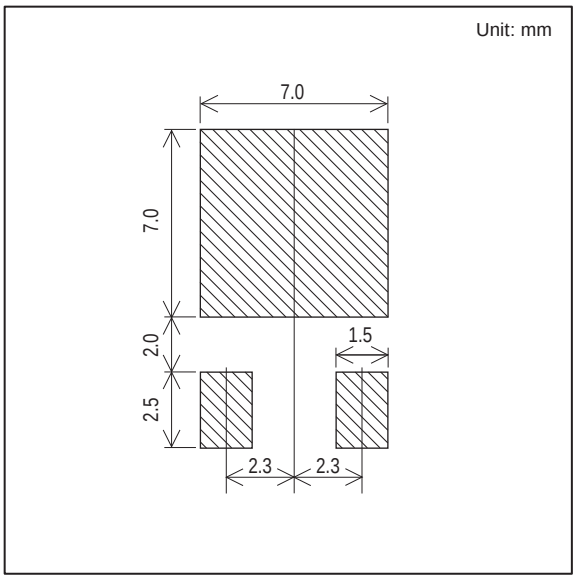
Those with one electrode terminal on the feed hole side·····TL

Outline Drawing

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



Land Pattern Example



Bag Packing Specification

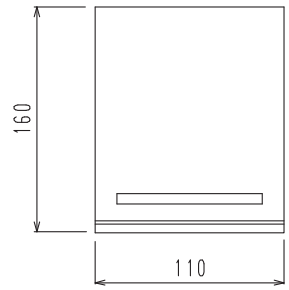
2SD1805F-E, 2SD1805G-E

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

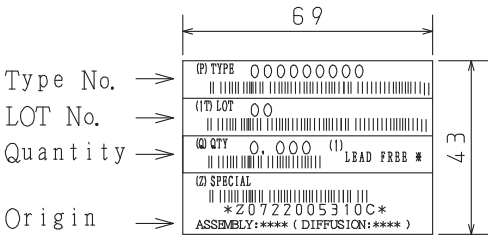
2. Bag dimensions

(unit: mm)



3. Bag label, Inner box label

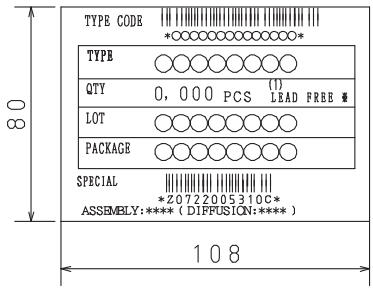
(unit: mm)



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.

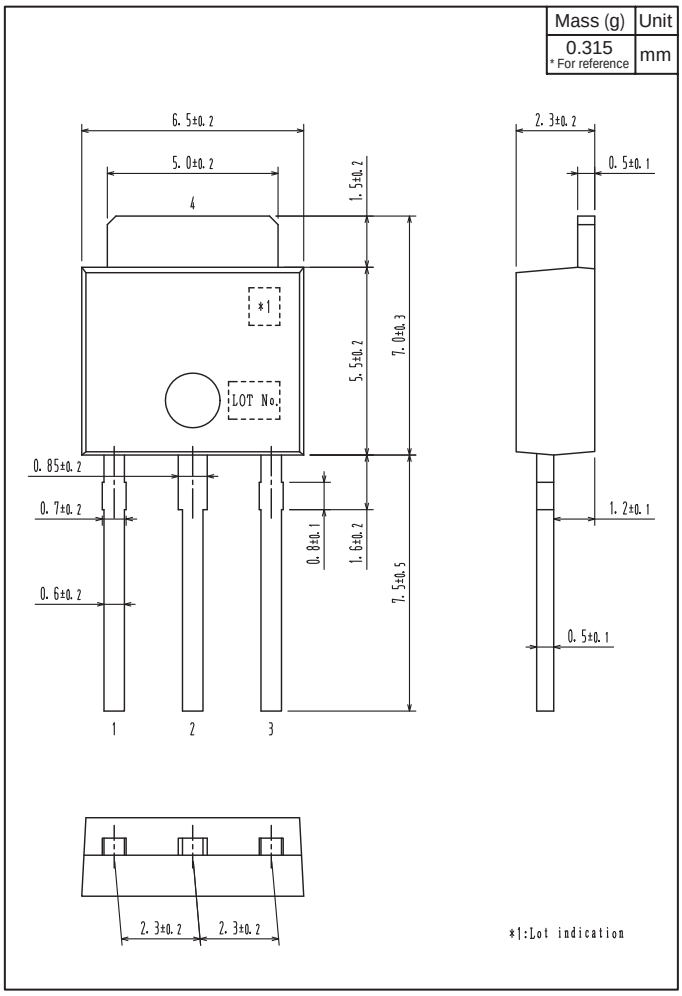


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

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

Outline Drawing

2SD1805F-E, 2SD1805G-E



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