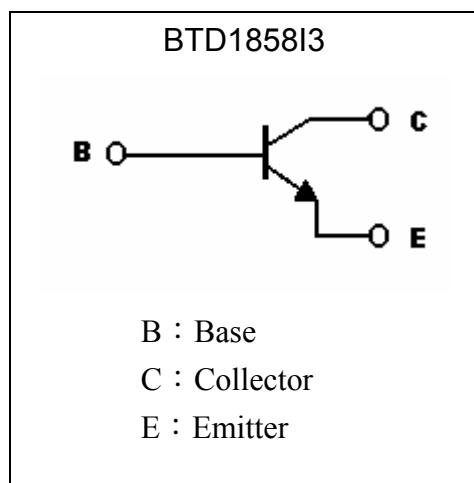
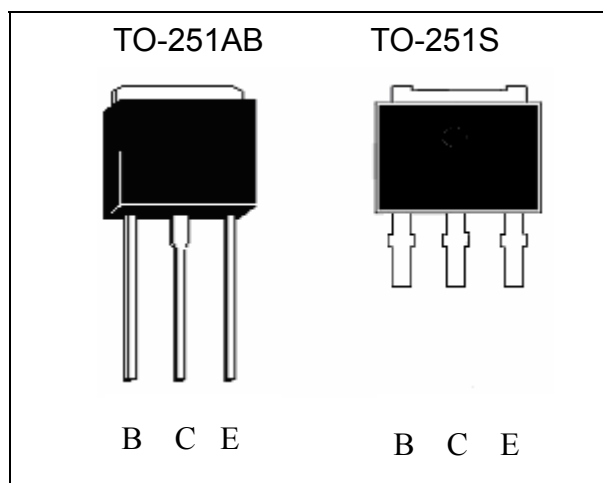


Silicon NPN Epitaxial Planar Transistor

BTD1858I3

Description

- High BV_{CEO}
- High current capability
- Pb-free lead plating package

Symbol

Outline

Absolute Maximum Ratings ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	180	V
Collector-Emitter Voltage	V_{CEO}	160	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current (DC)	I_C	1.5	A
Collector Current (Pulse)	I_{CP}	3 (Note)	A
Power Dissipation @ $T_A=25^\circ\text{C}$	P_D	1	W
Power Dissipation @ $T_C=25^\circ\text{C}$	P_D	15	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	8.33	$^\circ\text{C/W}$
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55~+150	$^\circ\text{C}$

 Note : Single Pulse , $P_w \leq 380\mu\text{s}$, Duty $\leq 2\%$.



Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV _{CB0}	180	-	-	V	I _C =50μA, I _E =0
BV _{CEO}	160	-	-	V	I _C =1mA, I _B =0
BV _{EBO}	5	-	-	V	I _E =50μA, I _C =0
I _{CBO}	-	-	1	μA	V _{CB} =160V, I _E =0
I _{EBO}	-	-	1	μA	V _{EB} =4V, I _C =0
*V _{CE(sat)}	-	0.15	0.3	V	I _C =1A, I _B =100mA
*V _{CE(sat)}	-	-	0.4	V	I _C =1A, I _B =50mA
*V _{BE(on)}	-	-	0.8	V	V _{CE} =5V, I _C =5mA
h _{FE1}	180	-	560	-	V _{CE} =5V, I _C =200mA
h _{FE2}	30	-	-	-	V _{CE} =5V, I _C =500mA
f _T	-	140	-	MHz	V _{CE} =5V, I _C =150mA
Cob	-	27	-	pF	V _{CB} =10V, I _E =0, f=1MHz

*Pulse Test: Pulse Width ≤380μs, Duty Cycle ≤2%

Classification of hFE 1

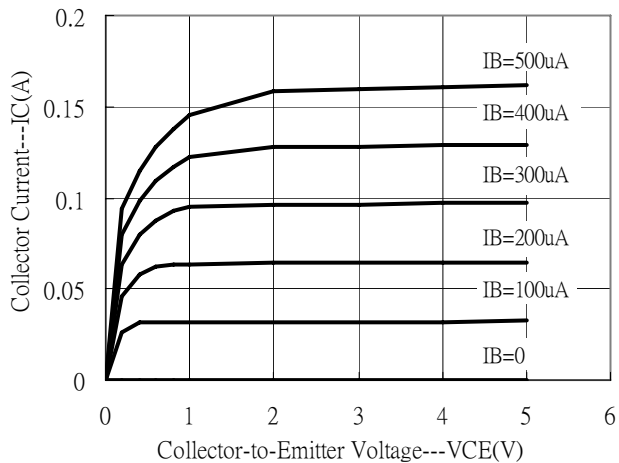
Rank	Q	R
Range	180~390	270~560

Ordering Information

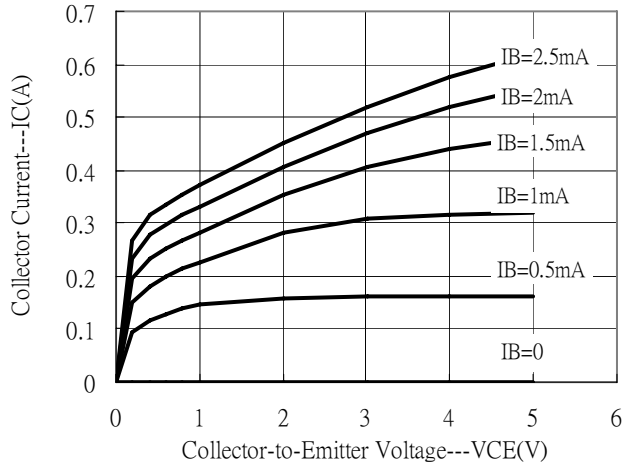
Device	HFE rank	Package	Shipping
BTD1858I3-Q-UB-S	Q	TO-251AB (Pb-free lead plating)	80 pcs / tube, 50 tubes / box
BTD1858I3-R-UB-S	R	TO-251AB (Pb-free lead plating)	80 pcs / tube, 50 tubes / box
BTD1858I3S-Q-UB-S	Q	TO-251S (Pb-free lead plating)	80 pcs / tube, 50 tubes / box
BTD1858I3S-R-UB-S	R	TO-251S (Pb-free lead plating)	80 pcs / tube, 50 tubes / box
BTD1858I3-Q-UB-G	Q	TO-251AB (Pb-free lead plating and halogen-free package)	80 pcs / tube, 50 tubes / box
BTD1858I3-R-UB-G	R	TO-251AB (Pb-free lead plating and halogen-free package)	80 pcs / tube, 50 tubes / box
BTD1858I3S-Q-UB-G	Q	TO-251S (Pb-free lead plating and halogen-free package)	80 pcs / tube, 50 tubes / box
BTD1858I3S-R-UB-G	R	TO-251S (Pb-free lead plating and halogen-free package)	80 pcs / tube, 50 tubes / box

Characteristic Curves

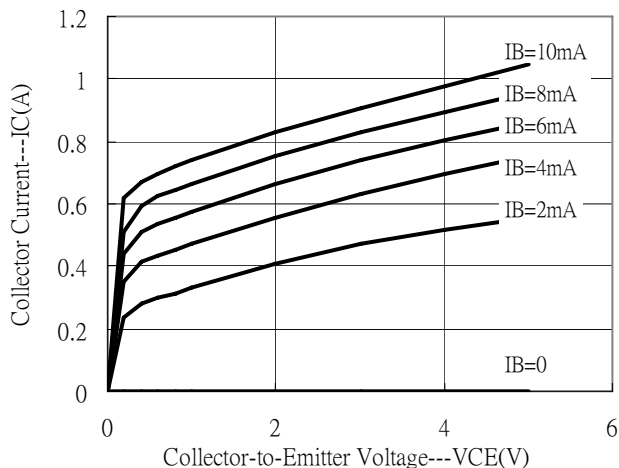
Output Characteristics



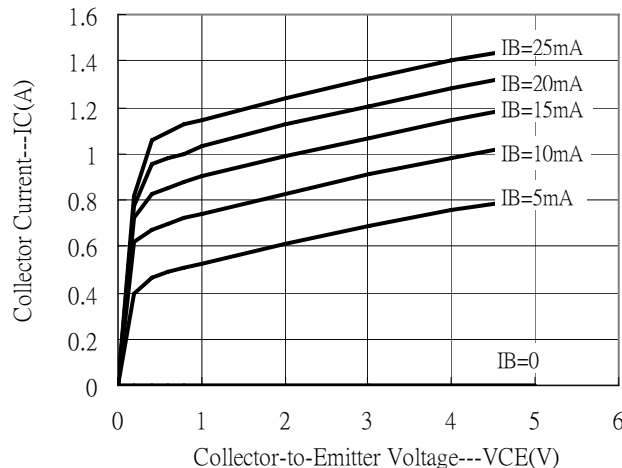
Output Characteristics



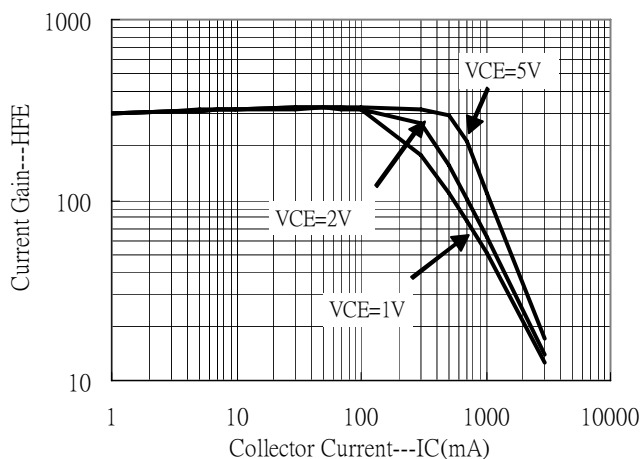
Output Characteristics



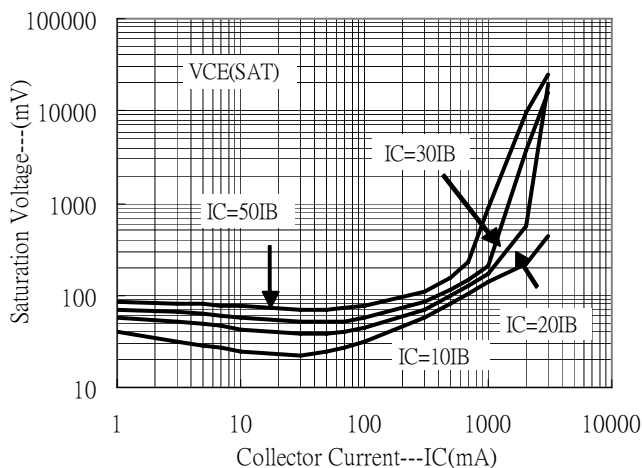
Output Characteristics



Current Gain vs Collector Current



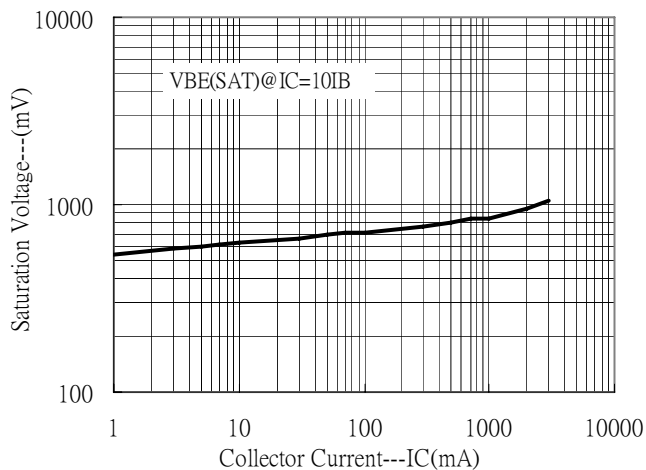
Saturation Voltage vs Collector Current



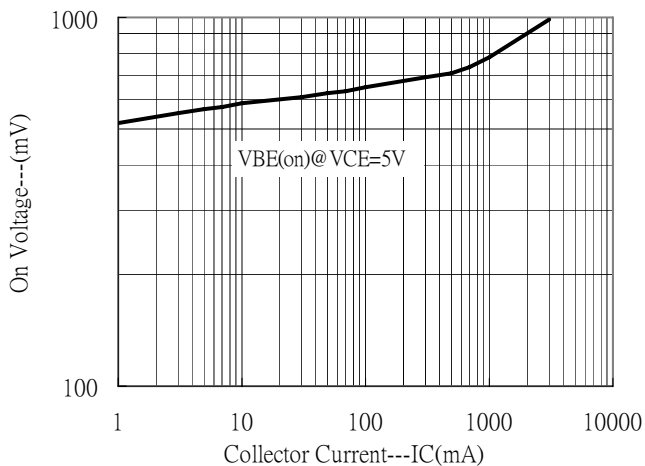


Characteristic Curves(Cont.)

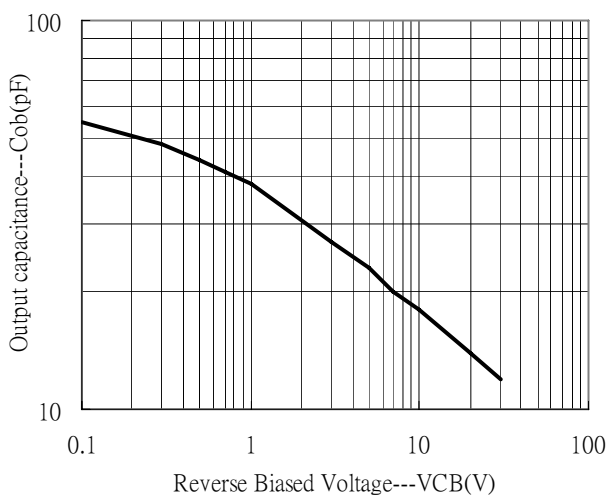
Saturation Voltage vs Collector Current



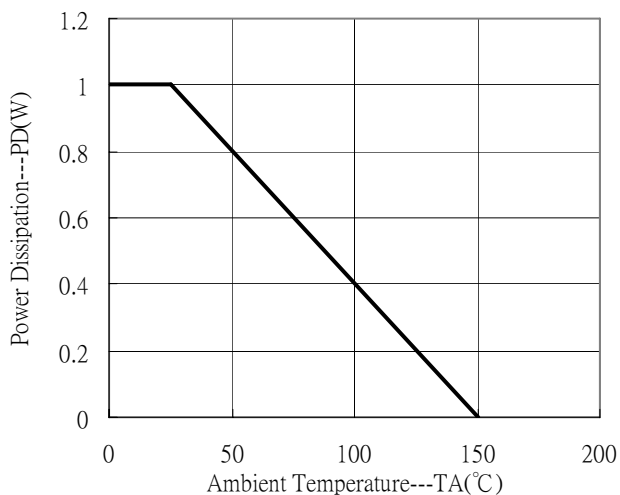
On Voltage vs Collector Current



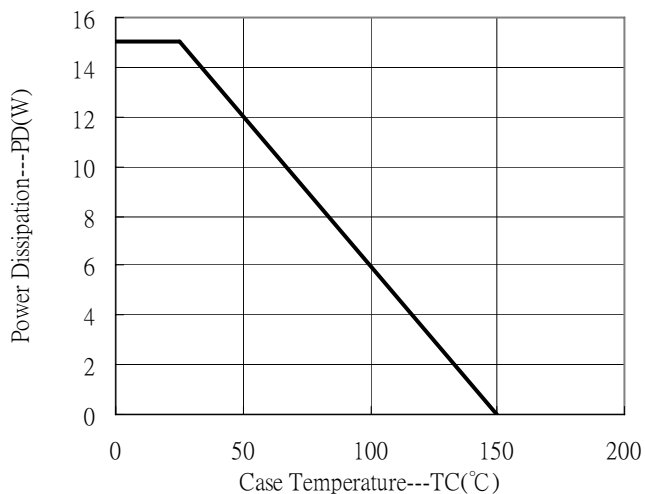
Output Capacitance vs Reverse Biased Voltage



Power Derating Curve



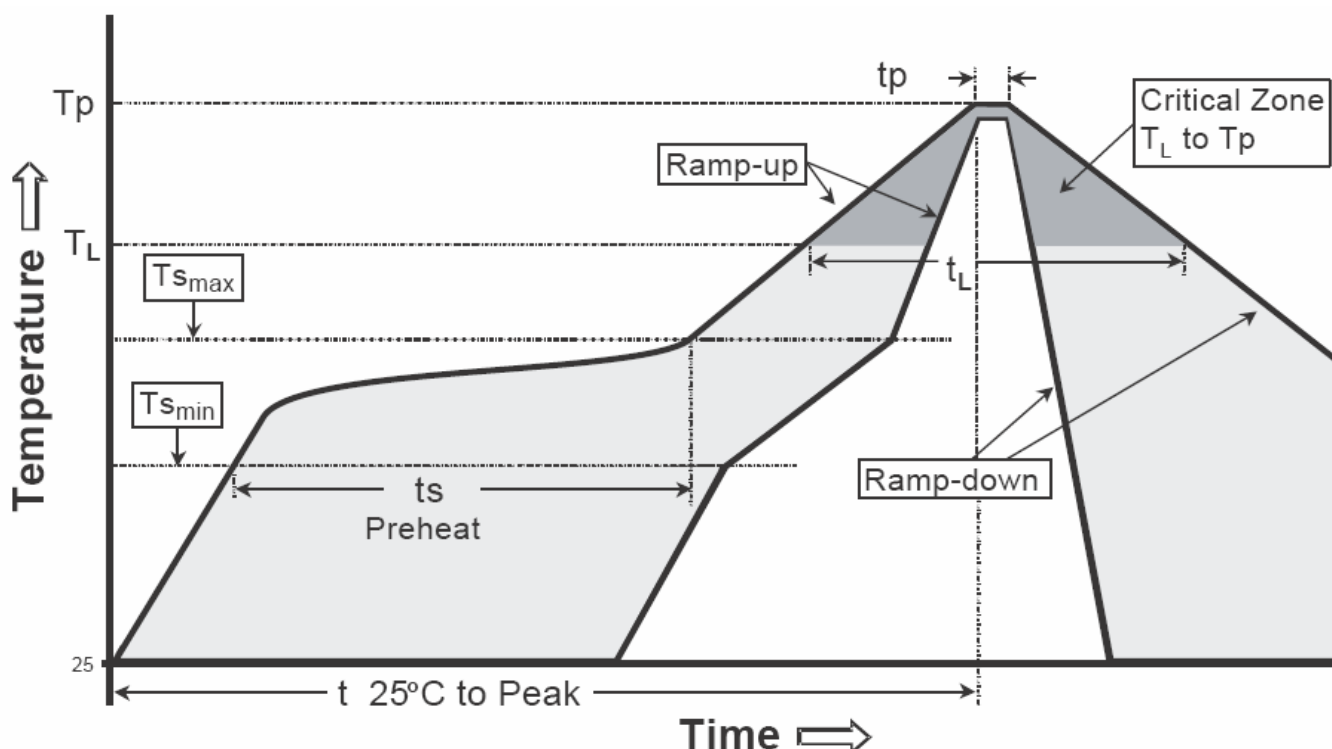
Power Derating Curve



Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

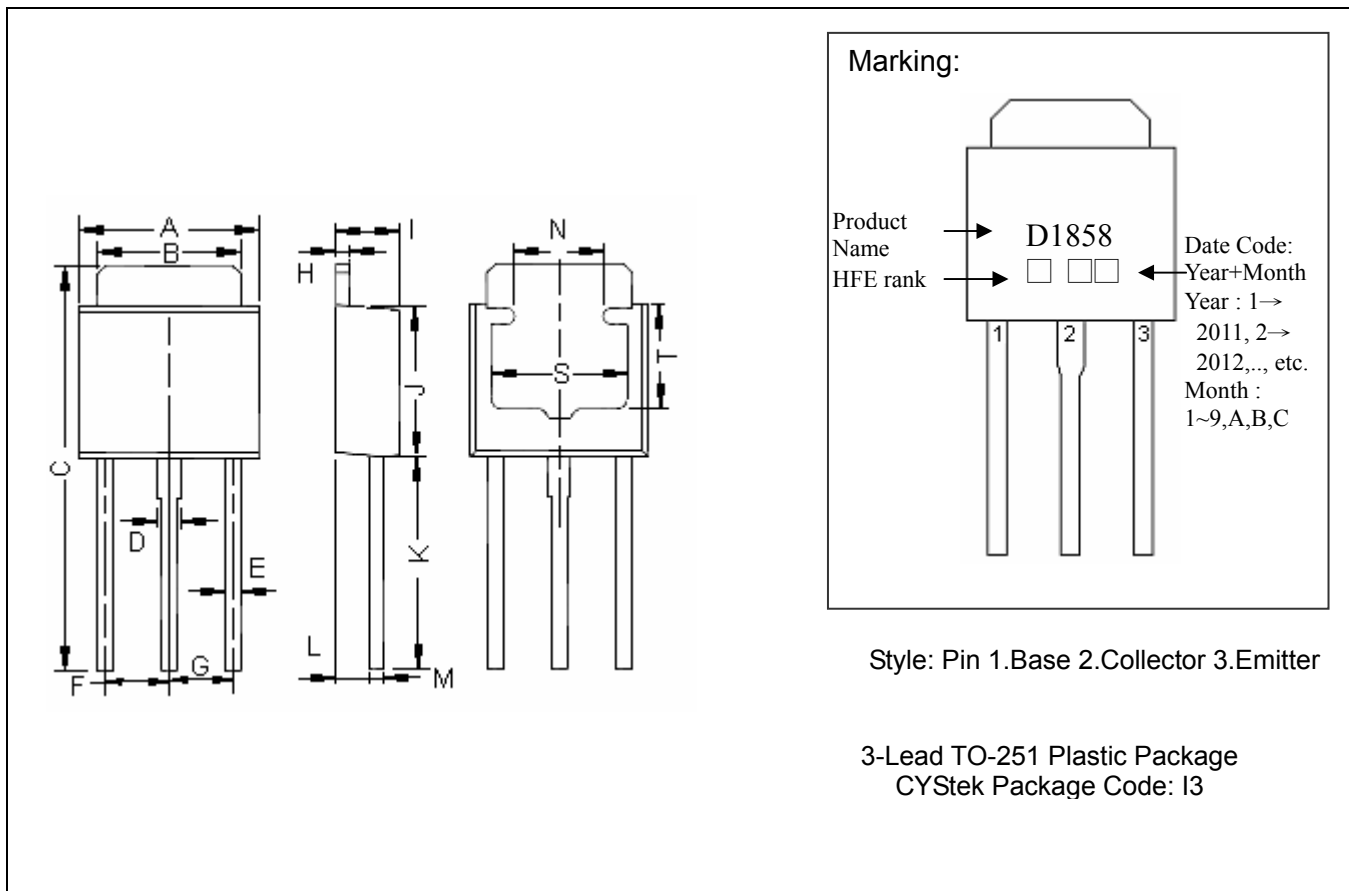
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T _{s min})	100°C	150°C
-Temperature Max(T _{s max})	150°C	200°C
-Time(t _{s min} to t _{s max})	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T _L)	183°C	217°C
- Time (t _L)	60-150 seconds	60-150 seconds
Peak Temperature(T _p)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

TO-251AB Dimension



Marking:

Product Name → D1858
 HFE rank → □ □ □ ← Date Code:
 Year+Month
 Year : 1 → 2011, 2 → 2012, ..., etc.
 Month : 1~9, A, B, C

Style: Pin 1. Base 2. Collector 3. Emitter

3-Lead TO-251 Plastic Package
 CYStek Package Code: I3

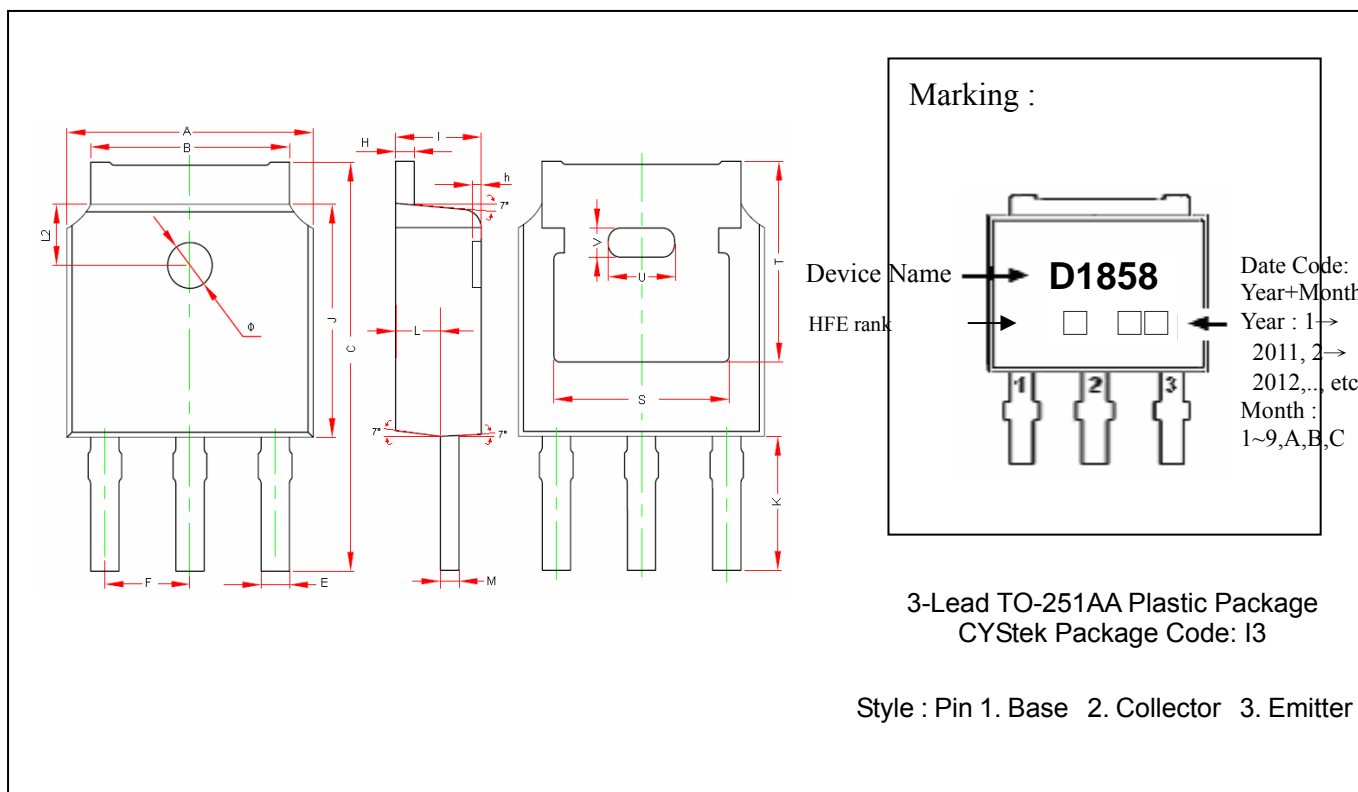
DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.250	0.262	6.350	6.650	I	0.087	0.094	2.200	2.400
B	0.205	0.213	5.200	5.400	J	0.213	0.224	5.400	5.700
C	0.571	0.587	14.500	14.900	K	0.295	0.311	7.500	7.900
D	0.028	0.035	0.700	0.900	L	0.042	0.054	1.050	1.350
E	0.020	0.028	0.500	0.700	M	0.017	0.023	0.430	0.580
F	0.091 TYP		2.300 TYP		N	0.118 REF		3.000 REF	
G	0.091 TYP		2.300 TYP		S	0.197 REF		5.000 REF	
H	0.017	0.023	0.430	0.580	T	0.150 REF		3.800 REF	

Notes: 1. Controlling dimension: millimeters.
 2. Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
 3. If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.

TO-251S Dimension



*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.256	0.264	6.500	6.700	K	0.138	REF	3.500	REF
B	0.201	0.215	5.100	5.460	L	0.036	0.046	0.910	1.110
C	0.409	0.433	10.400	11.000	L2	0.063	REF	1.600	REF
E	0.026	0.034	0.660	0.860	M	0.018	0.023	0.460	0.580
F	0.086	0.094	2.186	2.386	S	0.190	REF	4.830	REF
H	0.018	0.023	0.460	0.580	T	0.211	REF	5.350	REF
h	0.000	0.012	0.000	0.300	U	0.070	REF	1.780	REF
I	0.087	0.094	2.200	2.400	V	0.030	REF	0.760	REF
J	0.236	0.244	6.000	6.200	Φ	0.043	0.051	1.100	1.300

Notes: 1. Controlling dimension: inch.
 2. Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
 3. If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.

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