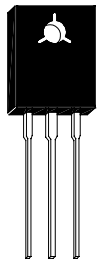
HBD438T

COMPLEMENTARY SILICON POWER TRANSISTORS



TO-126

Description

The HBD438T is silison epitaxial-base PNP power transistor in TO-126 plastic package, intented for use in medium power linear and switching applications. The complementary NPN type is HBD437T.

Absolute Maximum Ratings (T_A=25°C)

Symbol	Parametor	Value	Unit
V_{CBO}	Collector-Base Voltage (I_E=0)	-45	V
V_{CES}	Collector-Emitter Voltage (V_{BE}=0)	-45	V
V_{CEO}	Collector-Emitter Voltage (I_B=0)	-45	V
V_{EBO}	Emitter-Base Voltage (I_C=0)	-5	V
I_C	Collector Current	-4	A
I_{CM}	Collector Peak Current (t≤10ms)	-7	A
I_B	Base Current	-1	A
P_D	Total Dissipation at T_C=25°C	25	W
	Total Dissipation at T_A=25°C	1.3	W
T_{stg}	Storage Temperature	-55 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

Thermal Data

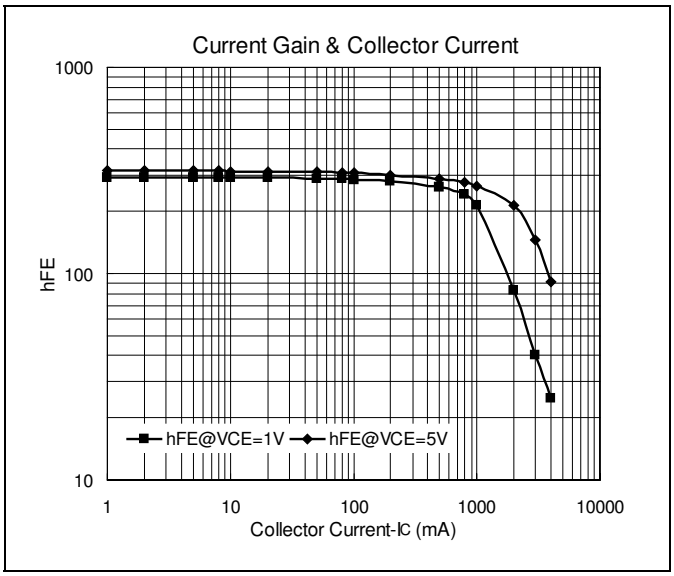
$R_{thj\text{-}case}$	Thermal Resistance Junction-case (Max.)	6	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient (Max.)	96	°C/W

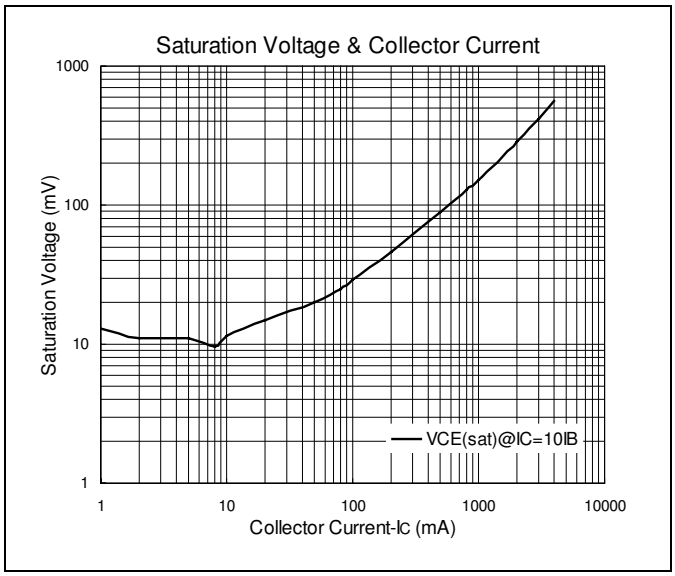
Electrical Characteristics (T_A=25°C, unless otherwise specified)

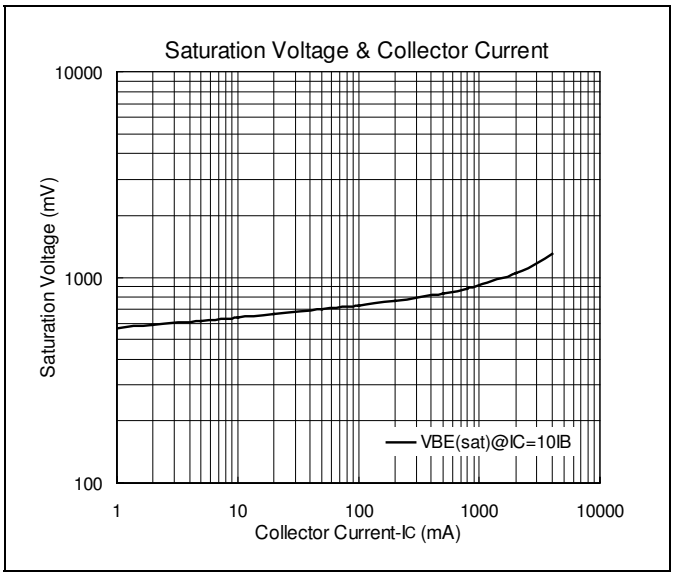
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-off Current (I_E=0)	V_{CB}=-45V	-	-	-100	uA
I_{CES}	Collector Cut-off Current (V_{BE}=0)	V_{CE}=-45V	-	-	-100	uA
I_{EBO}	Emitter Cut-off Current (I_C=0)	V_{EB}=-5V	-	-	-1	mA
*$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage (I_B=0)	I_C=-100mA	-45	-	-	V
*$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=-2A, I_B=-0.2A	-	-0.2	-0.6	V
*V_{BE}	Base-Emitter Voltage	I_C=-10mA,V_{CE}=-5V	-	-0.58	-	V
		I_C=-2A, V_{CE}=-1V	-	-	-1.2	V
*h_{FE}	DC Current Gain	I_C=-10mA, V_{CE}=-5V	30	130	-	
		I_C=-0.5A, V_{CE}=-1V	85	140	-	
		I_C=-2A, V_{CE}=-1V	40	-	-	
f_T	Transition Frequency	I_C=-0.25A, V_{CE}=-1V	3	-	-	MHz

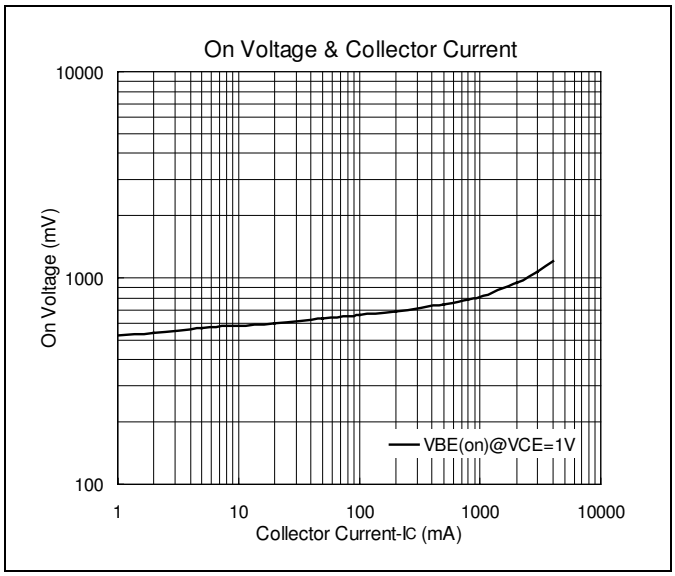
*Pulse Test: Pulse Width ≤380us, Duty Cycle≤2%

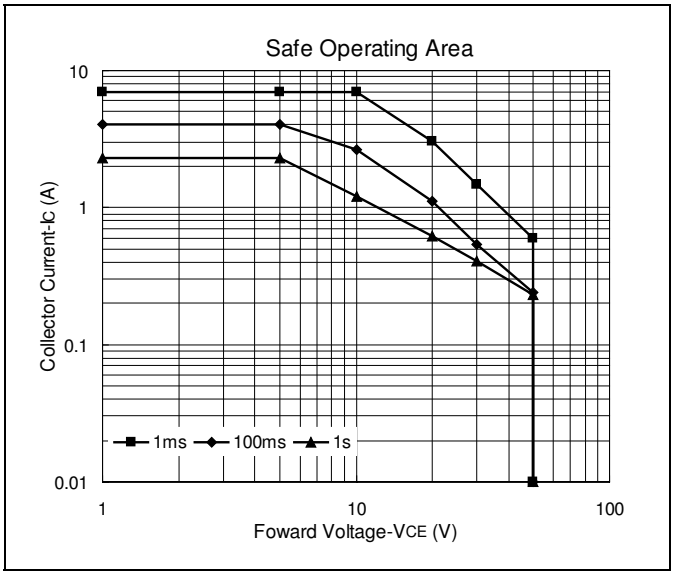
Characteristics Curve



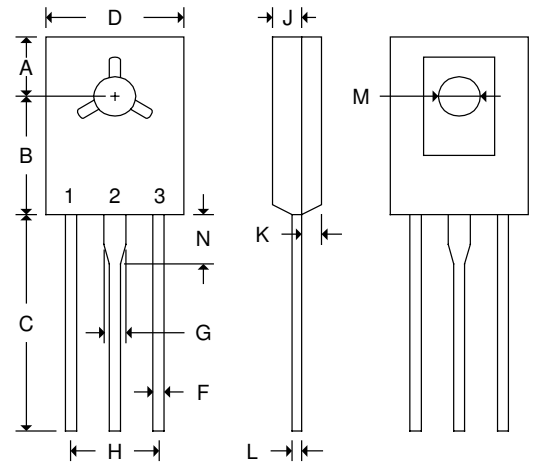






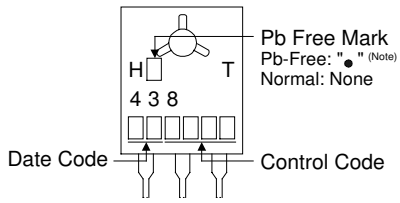


TO-126 Dimension



3-Lead TO-126
Plastic Package
HSMC Package Code: T

Marking:



Note: Green label is used for pb-free packing

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

Material:
- Lead solder plating: Sn60/Pb40 (Normal), Sn/3.0Ag/0.5Cu or Pure-Tin (Pb-free)
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

DIM	Min.	Max.
A	3.60	4.40
B	6.90	7.60
C	13.00	16.50
D	7.20	8.50
F	0.65	0.88
G	1.00	1.42
H	4.52	4.62
J	1.14	1.50
K	0.90	1.50
L	0.45	0.60
M	2.92	3.40
N	2.00	2.70

Unit: mm

Head Office And Factory:

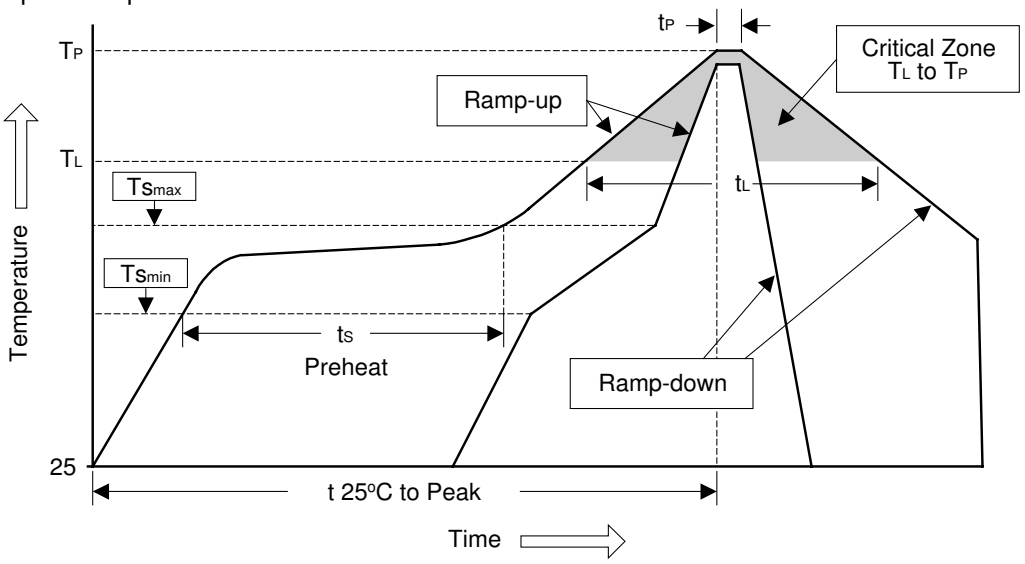
- **Head Office** (Hi-Sincerity Microelectronics Corp.): 10F.,No. 61, Sec. 2, Chung-Shan N. Rd. Taipei Taiwan R.O.C.
  Tel: 886-2-25212056 Fax: 886-2-25632712, 25368454
- **Factory 1:** No. 38, Kuang Fu S. Rd., Fu-Kou Hsin-Chu Industrial Park Hsin-Chu Taiwan. R.O.C
  Tel: 886-3-5983621~5 Fax: 886-3-5982931

Soldering Methods for HSMC's Products

1. Storage environment: Temperature=10°C~35°C Humidity=65%±15%

2. Reflow soldering of surface-mount devices

Figure 1: Temperature profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	<3°C/sec	<3°C/sec
Preheat - Temperature Min (Ts_{min}) - Temperature Max (Ts_{max}) - Time (min to max) (ts)	 100°C 150°C 60~120 sec	 150°C 200°C 60~180 sec
Tsmax to T_L - Ramp-up Rate	 <3°C/sec	 <3°C/sec
Time maintained above: - Temperature (T_L) - Time (t_L)	 183°C 60~150 sec	 217°C 60~150 sec
Peak Temperature (T_P)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t_P)	10~30 sec	20~40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

3. Flow (wave) soldering (solder dipping)

Products	Peak temperature	Dipping time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec