

### SURFACE MOUNT SMALL SIGNAL TRANSISTORS

- \* Epitaxial Die Construction
- \* Ideally Suited Automatic Insertion
- \* 310mW Power Dissipation
- \* Complementary PNP types Available(BC856-BC858)
- \* For Switching and AF Amplifier Applications

### ABSOLUTE MAXIMUM RATINGS at Ta=25°C

| Characteristic                  | Symbol           | Rating  | Unit |
|---------------------------------|------------------|---------|------|
| Collector-Base Voltage          | BC846            | 80      | V    |
|                                 | BC847            | 50      |      |
|                                 | BC848            | 30      |      |
| Collector-Emitter Voltage       | BC846            | 65      | V    |
|                                 | BC847            | 45      |      |
|                                 | BC848            | 30      |      |
| Emitter-Base Voltage            | BC846            | 6.0     | V    |
|                                 | BC847            | 6.0     |      |
|                                 | BC848            | 5.0     |      |
| Collector Current               | Ic               | 100     | mA   |
| Collector Dissipation Ta=25°C * | P <sub>D</sub>   | 310     | mW   |
| Junction Temperature Range      | T <sub>j</sub>   | -55-150 | °C   |
| Storage Temperature Range       | T <sub>stg</sub> | -55-150 | °C   |

Package:SOT-23



|       |   |   |   |
|-------|---|---|---|
| PIN:  | 1 | 2 | 3 |
| STYLE |   |   |   |
| NO.1  | B | E | C |

### ELECTRICAL CHARACTERISTICS at Ta=25°C

| Characteristic                       | Symbol   | Min | Typ | Max | Unit | Test Conditions   |
|--------------------------------------|----------|-----|-----|-----|------|-------------------|
| Collector-Base Breakdown Voltage     | BC846    | 80  |     |     | V    | Ic=10uA Ie=0      |
|                                      | BC847    | 50  |     |     |      |                   |
|                                      | BC848    | 30  |     |     |      |                   |
| Collector-Emitter Breakdown Voltage  | BC846    | 65  |     |     | V    | Ic= 10mA Ib=0     |
|                                      | BC847    | 45  |     |     |      |                   |
|                                      | BC848    | 30  |     |     |      |                   |
| Collector-Emitter Saturation Voltage | Vce(sat) |     | 90  | 250 | mV   | Ic=10mA Ib=0.5mA  |
|                                      |          |     | 200 | 600 |      | Ic=100mA Ib=5.0mA |
| Base-Emitter Saturation Voltage      | Vbe(sat) |     | 700 |     | mV   | Ic=10mA Ib=0.5mA  |
|                                      |          |     | 900 |     |      | Ic=100mA Ib=5.0mA |
| Base-Emitter Voltage                 | Vbe      | 580 | 660 | 700 | mV   | Vce=5.0V Ic=2.0mA |
|                                      |          |     |     | 770 |      | Vce=5.0V Ic=10mA  |



SEMICONDUCTOR  
TECHNICAL DATA

## BC846A-BC848C

NPN EPITAXIAL SILICON TRANSISTOR

### SURFACE MOUNT SMALL SIGNAL TRANSISTORS

#### ELECTRICAL CHARACTERISTICS at Ta=25°C (CONTINUED)

| Characteristic                   | Symbol           | Min | Typ | Max | Unit | Test Conditions                                         |
|----------------------------------|------------------|-----|-----|-----|------|---------------------------------------------------------|
| DC Current Gain                  |                  | 110 |     | 220 |      | Vce=5.0V Ic=2.0mA                                       |
| A                                | H <sub>FE</sub>  |     |     |     |      |                                                         |
| B                                |                  | 200 |     | 450 |      |                                                         |
| C                                |                  | 420 |     | 800 |      |                                                         |
| Collector-Emitter Cutoff Current | I <sub>CES</sub> |     |     | 0.1 | μA   | Vce=60V<br>Vce=45V<br>Vce=30V                           |
| BC846                            |                  |     |     |     |      |                                                         |
| BC847                            |                  |     |     |     |      |                                                         |
| BC848                            |                  |     |     |     |      |                                                         |
|                                  | I <sub>CBO</sub> |     |     | 0.1 | μA   | Vcb=70V<br>Vcb=50V<br>Vcb=30V                           |
| BC846                            |                  |     |     |     |      |                                                         |
| BC847                            |                  |     |     |     |      |                                                         |
| BC848                            |                  |     |     |     |      |                                                         |
| Collector-Base Capacitance       | C <sub>cbo</sub> |     | 3.5 | 6.0 | PF   | Vcb=10V f=1MHz                                          |
| Emitter-Base Capacitance         | C <sub>ebo</sub> |     | 9.0 |     | PF   | Veb=0.5V f=1MHz                                         |
| Gain Bandwidth Product           | f <sub>T</sub>   |     | 300 |     | MHz  | Vce=5V Ic=10mA f=100MHz                                 |
| Noise Figure                     | NF               |     | 2.0 | 10  | dB   | Vce=5V Ic=200uA R <sub>G</sub> =2K Ω<br>f=1MHz Δf=200Hz |

\* Total Device Dissipation : FR=1x0.75x0.062in Board, Derate 25°C.

# Pulse Test : Pulse Width ≤300uS, Duty cycle ≤2%

DEVICE MARKING:

BC846A=1A

BC846B=1B

BC847A=1E

BC847B=1F

BC847C=1G

BC848A=1J

BC848B=1K

BC848C=1L



Fig.1 Grounded emitter propagation characteristics

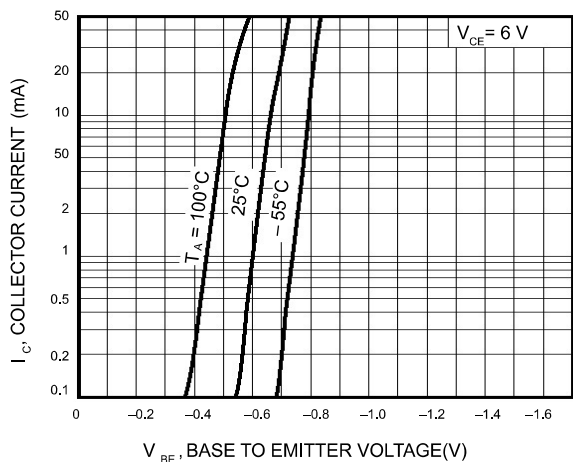


Fig.2 Grounded emitter output characteristics(I)

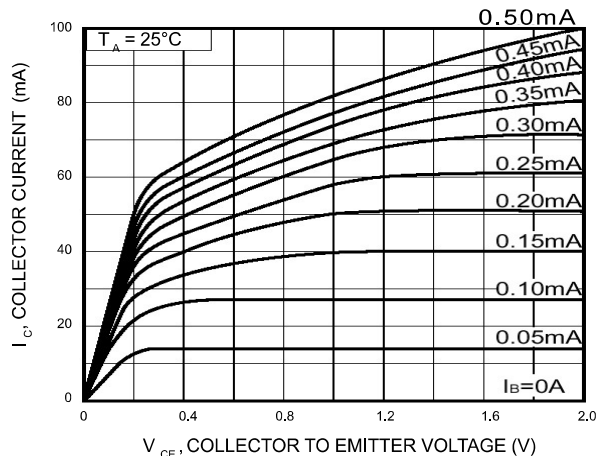


Fig.3 Grounded emitter output characteristics(II)

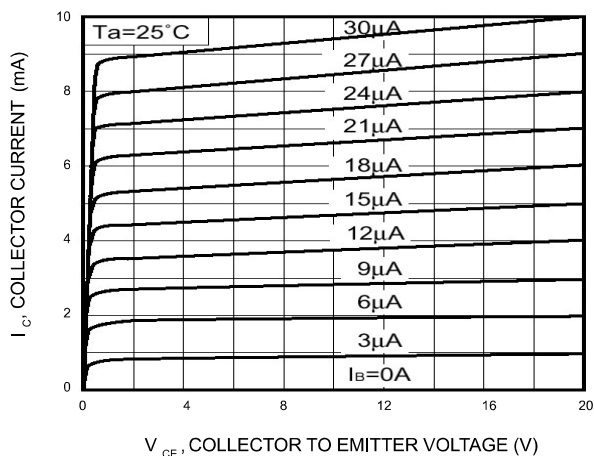


Fig.4 DC current gain vs. collector current (I)

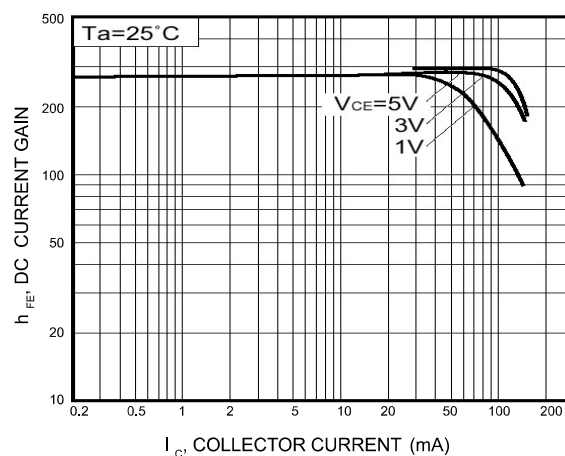


Fig.5 DC current gain vs. collector current (II)

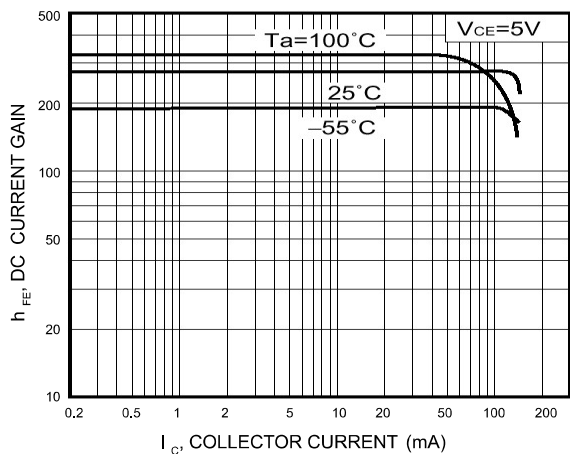


Fig.6 Collector-emitter saturation voltage vs. collector current

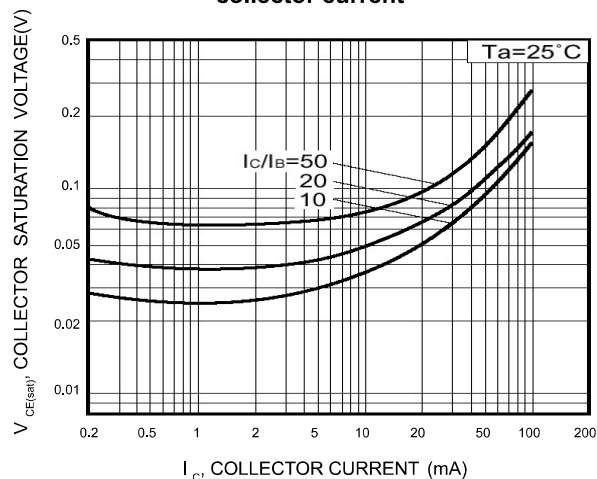




Fig.7 Collector-emitter saturation voltage vs. collector current (I)

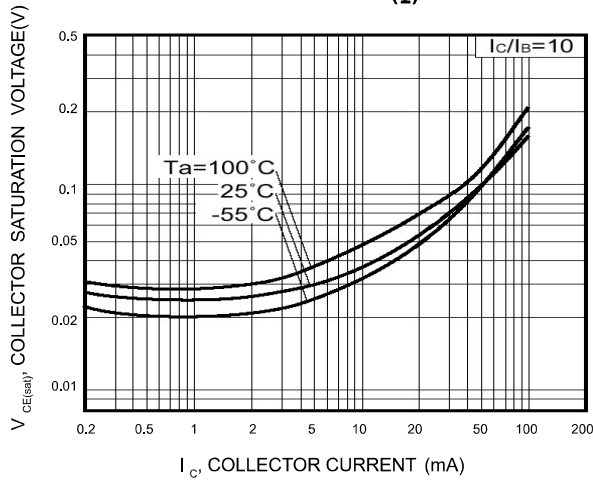


Fig.8 Collector-emitter saturation voltage vs. collector current (I)

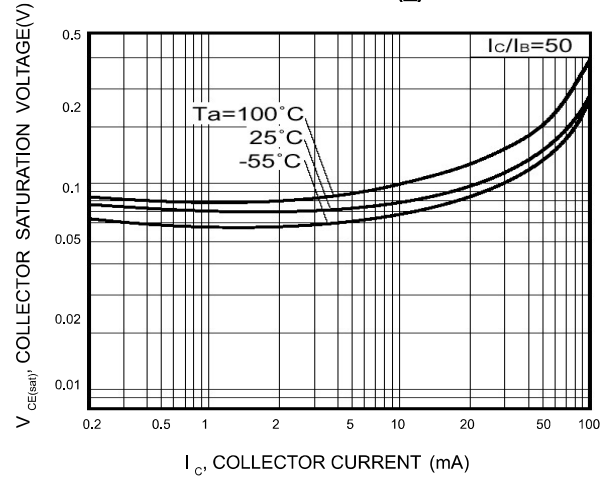


Fig.9 Gain bandwidth product vs. emitter current

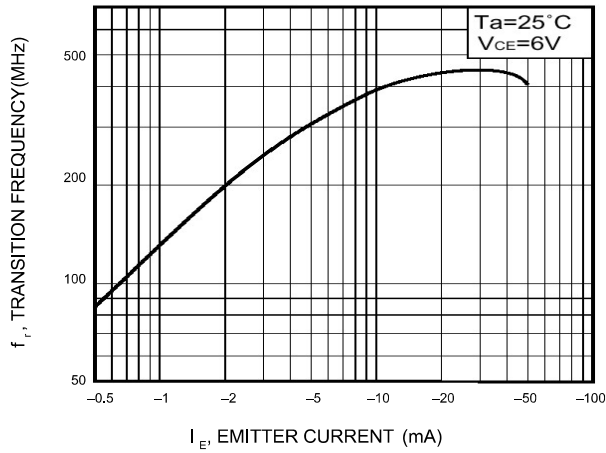


Fig.10 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

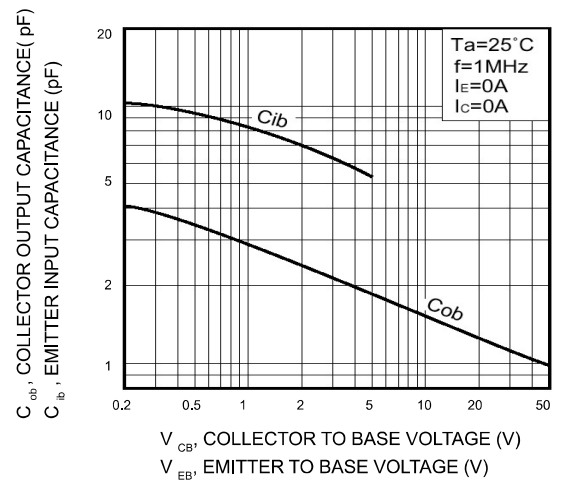
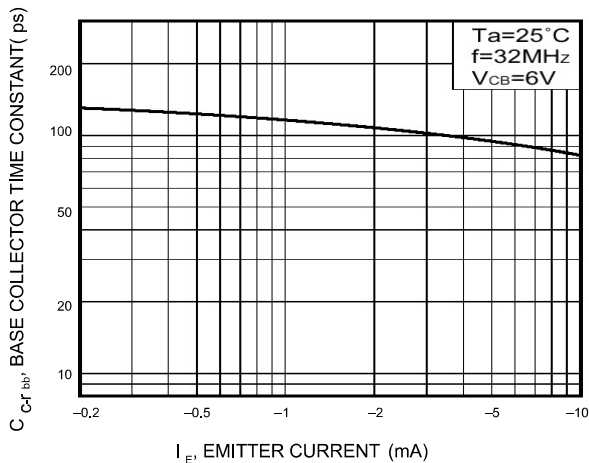
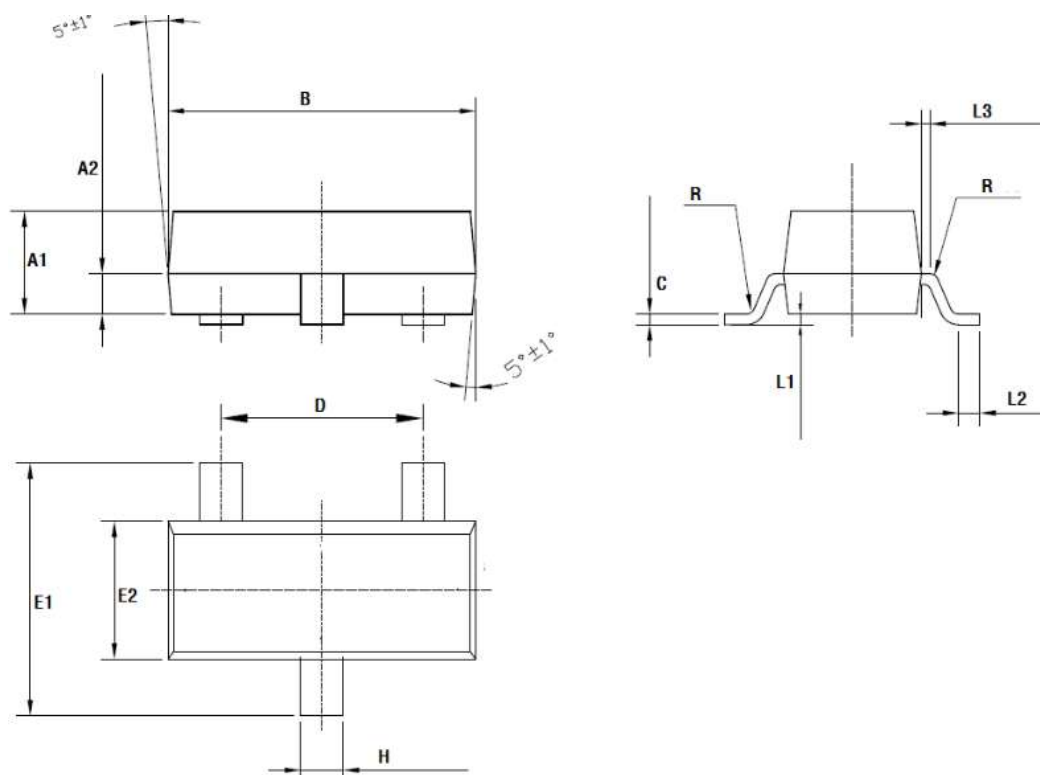
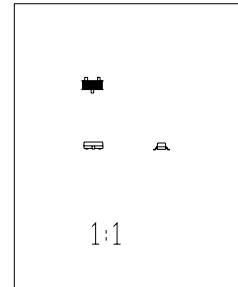


Fig.11 Base-collector time constant vs. emitter current



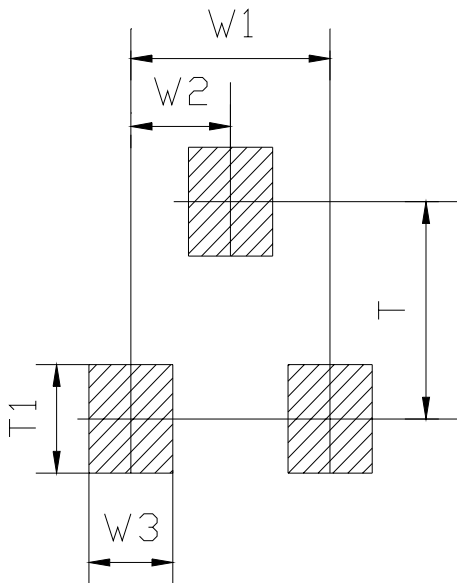


| Symbol | Dimensions in Millimeters |         |       | 内部结构<br>STYLS | 管脚 PIN                |                       |                        |
|--------|---------------------------|---------|-------|---------------|-----------------------|-----------------------|------------------------|
|        | Min                       | Nominal | Max   |               | 1 脚                   | 2 脚                   | 3 脚                    |
| A1     | 0.900                     | 0.950   | 1.000 | 6             | 基极<br>BASE            | 发射极<br>EMITTER        | 集电极<br>COLLCTOR        |
| A2     | 0.350                     | 0.380   | 0.410 |               |                       |                       |                        |
| B      | 2.800                     | 2.900   | 3.000 | 8             | 阳极<br>ANODE           | 不连接 NO-<br>CONNECTION | 阴极<br>CATHODE          |
| C      | 0.080                     | 0.100   | 0.150 |               |                       |                       |                        |
| D      | 1.800                     | 1.900   | 2.000 | 9             | 阳极<br>ANODE           | 阳极<br>ANODE           | 阴极<br>CATHODE          |
| E1     | 2.200                     | 2.400   | 2.600 |               |                       |                       |                        |
| E2     | 1.200                     | 1.300   | 1.400 | 11            | 阳极<br>ANODE           | 阴极<br>CATHODE         | 阳极-阴极<br>ANODE-CATHODE |
| H      | 0.300                     | 0.400   | 0.500 |               |                       |                       |                        |
| L1     | 0.000                     |         | 0.100 | 12            | 阴极<br>CATHODE         | 阴极<br>CATHODE         | 阳极<br>ANODE            |
| L2     | 0.200                     |         |       |               |                       |                       |                        |
| L3     | 0.030                     | 0.080   | 0.130 | 18            | 不连接 NO-<br>CONNECTION | 阴极<br>CATHODE         | 阳极<br>ANODE            |
| R      | 0.080TYP                  |         |       |               |                       |                       |                        |
|        |                           |         |       | 19            | 阴极<br>CATHODE         | 阳极<br>ANODE           | 阴极-阳极<br>CATHODE-ANODE |



OUTSIDE

Scale 1:1 on letter size paper



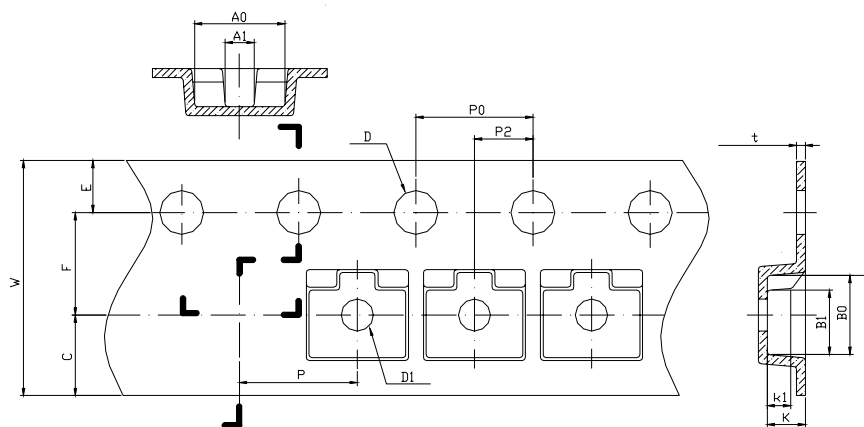
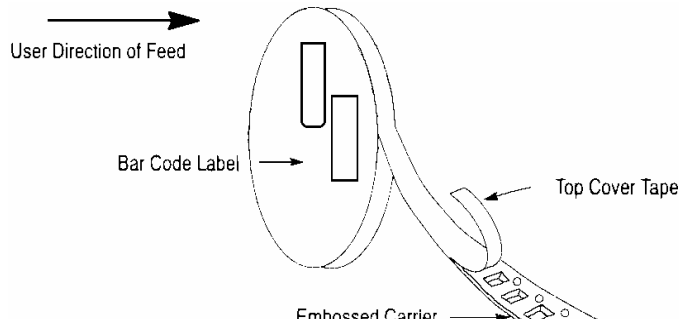
FOOTPRINTS FOR SOLDERING

| Symbol | Dimensions in Millimeters | Dimensions in Inches |
|--------|---------------------------|----------------------|
|        | Nominal                   | Nominal              |
| W1     | 1.900                     | 0.0748               |
| W2     | 0.950                     | 0.0374               |
| W3     | 0.800                     | 0.0315               |
| T      | 2.000                     | 0.0787               |
| T1     | 1.000                     | 0.0394               |



## SOT-23 TAPE AND REEL DATA

### SOT-23 PACKAGING:



| Symbol | Dimensions in Millimeters |         |         | Dimensions in Inches |         |         |
|--------|---------------------------|---------|---------|----------------------|---------|---------|
|        | Minimum                   | Nominal | Maximum | Minimum              | Nominal | Maximum |
| A0     | 3.000                     | 3.150   | 3.300   | 0.1181               | 0.1240  | 0.1299  |
| A1     | 0.950                     | 1.100   | 1.250   | 0.0374               | 0.0433  | 0.0492  |
| B0     | 2.670                     | 2.770   | 2.870   | 0.1051               | 0.1090  | 0.1130  |
| B1     | 2.000                     | 2.150   | 2.300   | 0.0787               | 0.0846  | 0.0906  |
| C      | 2.750TYP                  |         |         | 0.1083TYP            |         |         |
| D      | 1.350                     | 1.500   | 1.650   | 0.0531               | 0.0591  | 0.0650  |
| D1     | 0.900                     | 1.050   | 1.150   | 0.0354               | 0.0394  | 0.0453  |
| E      | 1.650                     | 1.750   | 1.850   | 0.0650               | 0.0689  | 0.0728  |
| F      | 3.400                     | 3.500   | 3.600   | 0.1339               | 0.1378  | 0.1417  |
| K      | 1.020                     | 1.220   | 1.420   | 0.0402               | 0.0480  | 0.0559  |
| K1     | 0.850TYP                  |         |         | 0.03346TYP           |         |         |
| P      | 3.900                     | 4.000   | 4.100   | 0.1535               | 0.1575  | 0.1614  |
| P0     | 3.900                     | 4.000   | 4.100   | 0.1535               | 0.1575  | 0.1614  |
| P010   | 39.800                    | 40.000  | 40.200  | 1.5669               | 1.5748  | 1.5827  |
| P2     | 1.950                     | 2.000   | 2.050   | 0.0768               | 0.0787  | 0.0807  |
| t      | 0.190                     | 0.210   | 0.230   | 0.0075               | 0.0083  | 0.0098  |
| W      | 7.900                     | 8.000   | 8.300   | 0.3110               | 0.3150  | 0.3268  |