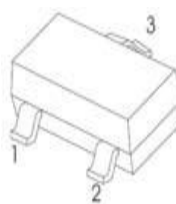
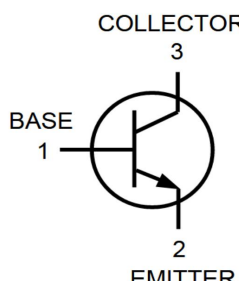
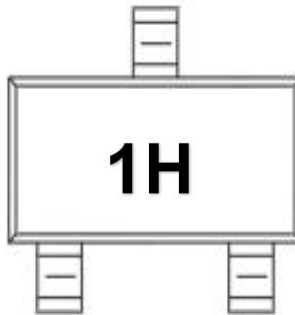
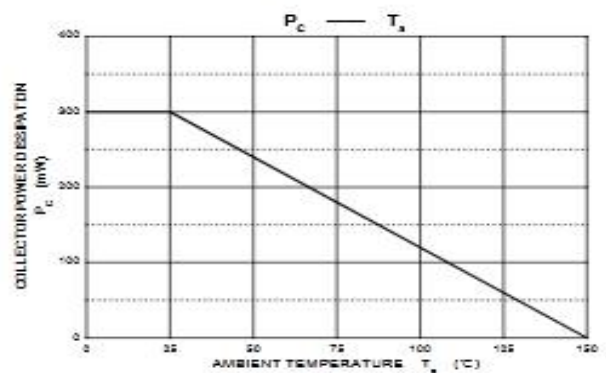
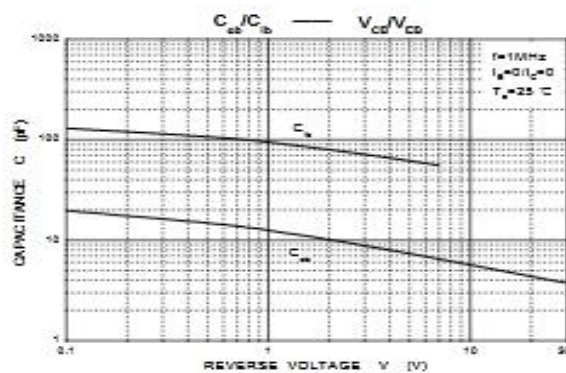
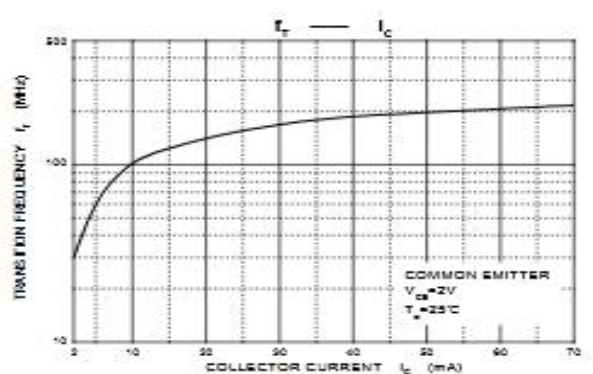
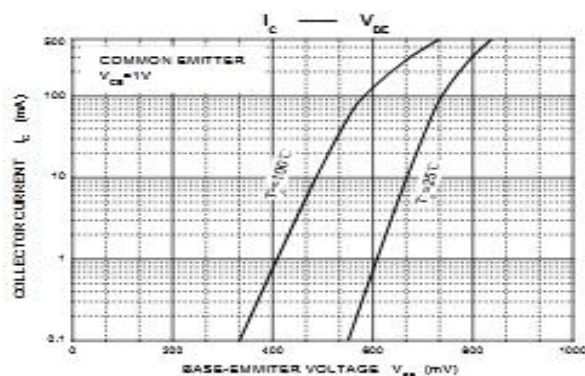
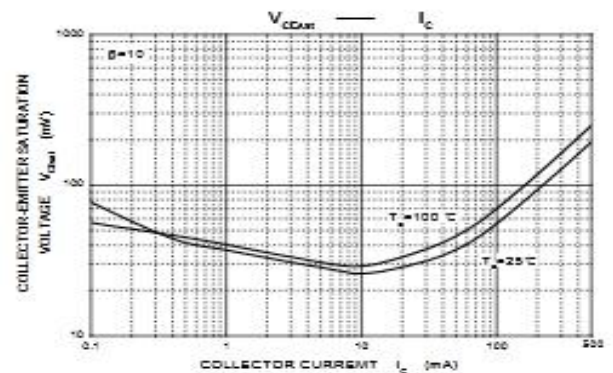
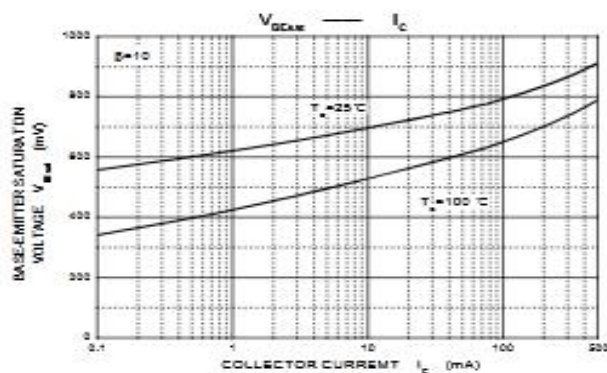
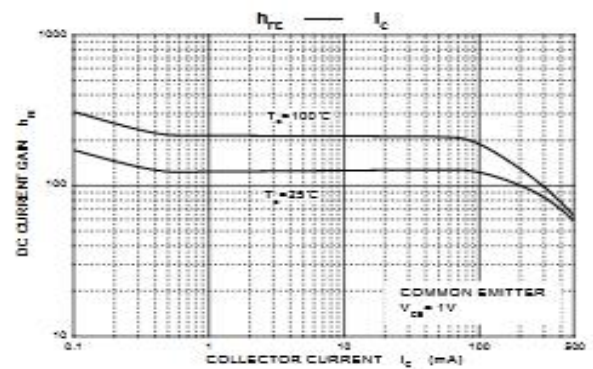
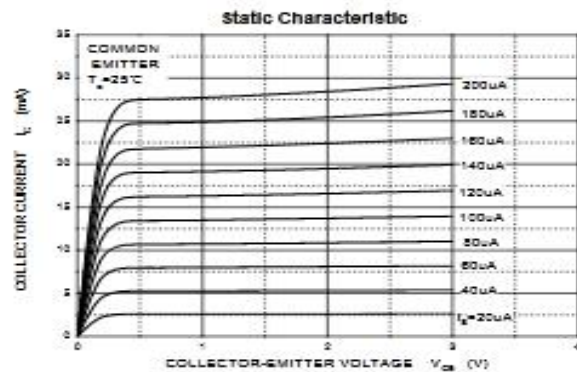


| TRANSISTOR (NPN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        | SOT-23 Plastic-Encapsulate Transistors                                                                                                                        |      |           |        |       |      |                        |      |    |   |                           |      |    |   |                      |      |   |   |                   |    |     |    |                             |    |     |    |                                             |      |     |     |                      |    |     |   |                     |      |          |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|--------|-------|------|------------------------|------|----|---|---------------------------|------|----|---|----------------------|------|---|---|-------------------|----|-----|----|-----------------------------|----|-----|----|---------------------------------------------|------|-----|-----|----------------------|----|-----|---|---------------------|------|----------|---|
| <div><p><u>SOT-23</u></p><p><b>1.BASE</b><br/><b>2.EMITTER</b><br/><b>3.COLLECTOR</b></p><p><b>Equivalent Circuit:</b></p></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        | <div><p>Features</p><p>※ Driver transistor</p><p><b>MARKING:</b></p></div> |      |           |        |       |      |                        |      |    |   |                           |      |    |   |                      |      |   |   |                   |    |     |    |                             |    |     |    |                                             |      |     |     |                      |    |     |   |                     |      |          |   |
| <p><b>MAXIMUM RATINGS (Ta=25℃ unless otherwise noted)</b></p> <table><tr><th>Parameter</th><th>Symbol</th><th>Value</th><th>Unit</th></tr><tr><td>Collector-Base Voltage</td><td>VCBO</td><td>60</td><td>V</td></tr><tr><td>Collector-Emitter Voltage</td><td>VCEO</td><td>60</td><td>V</td></tr><tr><td>Emitter-Base Voltage</td><td>VEBO</td><td>4</td><td>V</td></tr><tr><td>Collector Current</td><td>IC</td><td>500</td><td>mA</td></tr><tr><td>Collector Power Dissipation</td><td>PC</td><td>300</td><td>mW</td></tr><tr><td>Thermal Resistance From Junction To Ambient</td><td>ROJA</td><td>417</td><td>℃/W</td></tr><tr><td>Junction Temperature</td><td>Tj</td><td>150</td><td>℃</td></tr><tr><td>Storage Temperature</td><td>Tstg</td><td>-55~+150</td><td>℃</td></tr></table> |        |                                                                                                                                                               |      | Parameter | Symbol | Value | Unit | Collector-Base Voltage | VCBO | 60 | V | Collector-Emitter Voltage | VCEO | 60 | V | Emitter-Base Voltage | VEBO | 4 | V | Collector Current | IC | 500 | mA | Collector Power Dissipation | PC | 300 | mW | Thermal Resistance From Junction To Ambient | ROJA | 417 | ℃/W | Junction Temperature | Tj | 150 | ℃ | Storage Temperature | Tstg | -55~+150 | ℃ |
| Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Symbol | Value                                                                                                                                                         | Unit |           |        |       |      |                        |      |    |   |                           |      |    |   |                      |      |   |   |                   |    |     |    |                             |    |     |    |                                             |      |     |     |                      |    |     |   |                     |      |          |   |
| Collector-Base Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | VCBO   | 60                                                                                                                                                            | V    |           |        |       |      |                        |      |    |   |                           |      |    |   |                      |      |   |   |                   |    |     |    |                             |    |     |    |                                             |      |     |     |                      |    |     |   |                     |      |          |   |
| Collector-Emitter Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | VCEO   | 60                                                                                                                                                            | V    |           |        |       |      |                        |      |    |   |                           |      |    |   |                      |      |   |   |                   |    |     |    |                             |    |     |    |                                             |      |     |     |                      |    |     |   |                     |      |          |   |
| Emitter-Base Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | VEBO   | 4                                                                                                                                                             | V    |           |        |       |      |                        |      |    |   |                           |      |    |   |                      |      |   |   |                   |    |     |    |                             |    |     |    |                                             |      |     |     |                      |    |     |   |                     |      |          |   |
| Collector Current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | IC     | 500                                                                                                                                                           | mA   |           |        |       |      |                        |      |    |   |                           |      |    |   |                      |      |   |   |                   |    |     |    |                             |    |     |    |                                             |      |     |     |                      |    |     |   |                     |      |          |   |
| Collector Power Dissipation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PC     | 300                                                                                                                                                           | mW   |           |        |       |      |                        |      |    |   |                           |      |    |   |                      |      |   |   |                   |    |     |    |                             |    |     |    |                                             |      |     |     |                      |    |     |   |                     |      |          |   |
| Thermal Resistance From Junction To Ambient                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ROJA   | 417                                                                                                                                                           | ℃/W  |           |        |       |      |                        |      |    |   |                           |      |    |   |                      |      |   |   |                   |    |     |    |                             |    |     |    |                                             |      |     |     |                      |    |     |   |                     |      |          |   |
| Junction Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Tj     | 150                                                                                                                                                           | ℃    |           |        |       |      |                        |      |    |   |                           |      |    |   |                      |      |   |   |                   |    |     |    |                             |    |     |    |                                             |      |     |     |                      |    |     |   |                     |      |          |   |
| Storage Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Tstg   | -55~+150                                                                                                                                                      | ℃    |           |        |       |      |                        |      |    |   |                           |      |    |   |                      |      |   |   |                   |    |     |    |                             |    |     |    |                                             |      |     |     |                      |    |     |   |                     |      |          |   |

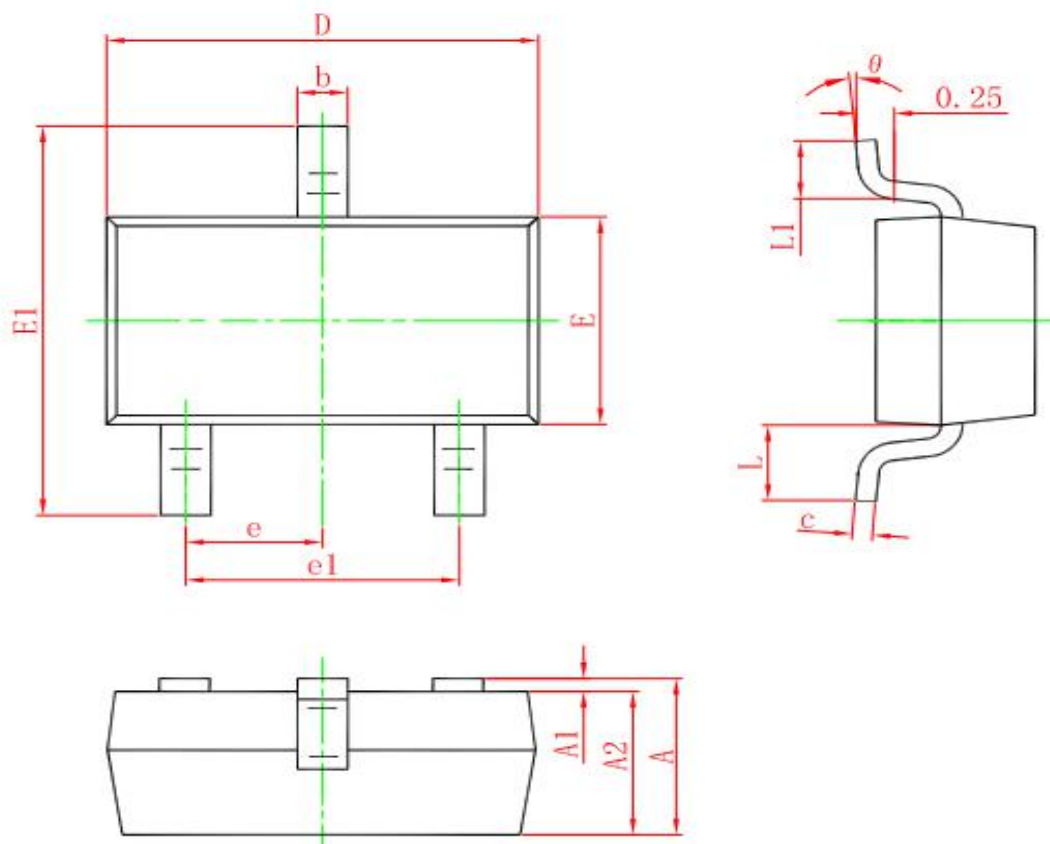
**ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)**

| Parameter                            | Symbol          | Test Condition               | Min | Typ | Max  | Unit |
|--------------------------------------|-----------------|------------------------------|-----|-----|------|------|
| Collector-base breakdown voltage     | <b>V(BR)CBO</b> | IC= 100μA, IE=0              | 60  |     |      | V    |
| Collector-emitter breakdown voltage  | <b>V(BR)CEO</b> | IC= 1mA, IB=0                | 60  |     |      | V    |
| Emitter-base breakdown voltage       | <b>V(BR)EBO</b> | IE=100μA, IC=0               | 4   |     |      | V    |
| Collector cut-off current            | <b>ICBO</b>     | VCB=60 V , IE=0              |     |     | 0.1  | μA   |
| Collector cut-off current            | <b>ICEO</b>     | VCE=60V , IB=0               |     |     | 0.1  | μA   |
| Emitter cut-off current              | <b>IEBO</b>     | VEB= 3V , IC=0               |     |     | 0.1  | μA   |
| DC current gain                      | <b>hFE</b>      | VCE=1V, IC= 10mA             | 100 |     | 400  |      |
|                                      | <b>hFE</b>      | VCE=1V, IC= 100mA            | 100 |     |      |      |
| Collector-emitter saturation voltage | <b>VCE(sat)</b> | IC=100 mA, IB= 10mA          |     |     | 0.25 | V    |
| Base-emitter saturation voltage      | <b>VBE(sat)</b> | IC=100 mA, IB= 10mA          |     |     | 1.2  | V    |
| Transition frequency                 | <b>fT</b>       | VCE=2V, IC= 10mA<br>f=100MHz | 100 |     |      | MHz  |

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



**SOT-23 PACKAGE OUTLINE DIMENSIONS**



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950 TYP.                |       | 0.037 TYP.           |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF.                |       | 0.022 REF.           |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |