

DATA SHEET

NEC

SILICON TRANSISTOR FN4xxx

RESISTOR BUILT-IN TYPE PNP TRANSISTOR

FEATURES

- Compact package
- Resistors built-in type
- Complementary to FA4xxx

ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|-------------|---------|
| FN4xxx | SC-59 |

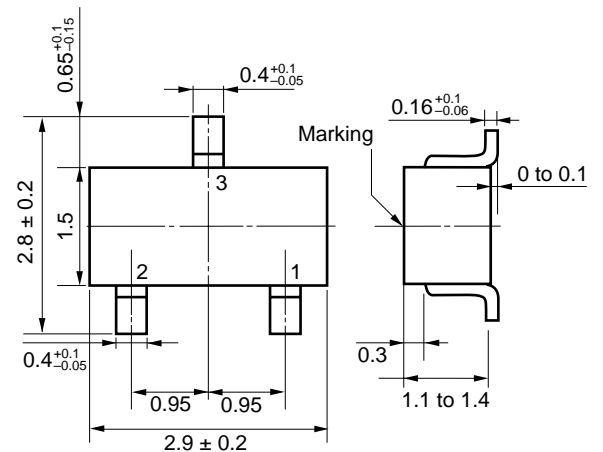
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

| | | | |
|---|-----------------------|-------------|----|
| Collector to Base Voltage | V _{CBO} | -60 | V |
| Collector to Emitter Voltage | V _{CEO} | -50 | V |
| Emitter to Base Voltage | V _{EBO} | -5 | V |
| Collector Current (DC) | I _C | -0.1 | A |
| Collector Current (pulse) ^{Note} | I _{C(pulse)} | -0.2 | A |
| Total Power Dissipation | P _T | 0.2 | W |
| Junction Temperature | T _j | 150 | °C |
| Storage Temperature | T _{stg} | -55 to +150 | °C |

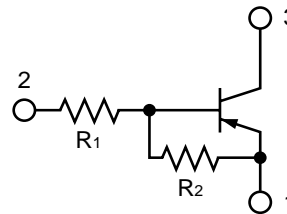
Note PW ≤ 10 ms, Duty Cycle ≤ 50%

| PART NUMBER | MARK | R ₁ | R ₂ | UNIT |
|-------------|------|----------------|----------------|------|
| FN4A4M | NA1 | 10.0 | 10.0 | kΩ |
| FN4F4M | NB1 | 22.0 | 22.0 | kΩ |
| FN4L4M | NC1 | 47.0 | 47.0 | kΩ |
| FN4L3M | ND1 | 4.7 | 4.7 | kΩ |
| FN4L3N | NE1 | 4.7 | 10.0 | kΩ |
| FN4L3Z | NF1 | 4.7 | | kΩ |
| FN4A3Q | NG1 | 1.0 | 10.0 | kΩ |
| FN4A4P | NH1 | 10.0 | 47.0 | kΩ |
| FN4F4N | NJ1 | 22.0 | 47.0 | kΩ |

★ PACKAGE DRAWING (Unit: mm)



★ EQUIVALENT CIRCUIT



★ PIN CONNECTION

- 1: Emitter
- 2: Base
- 3: Collector

| PART NUMBER | MARK | R ₁ | R ₂ | UNIT |
|-------------|------|----------------|----------------|------|
| FN4L4L | NK1 | 47.0 | 22.0 | kΩ |
| FN4A4Z | NL1 | 10.0 | | kΩ |
| FN4F4Z | NM1 | 22.0 | | kΩ |
| FN4L4Z | NN1 | 47.0 | | kΩ |
| FN4F3M | NP1 | 2.2 | 2.2 | kΩ |
| FN4F3P | NQ1 | 2.2 | 10.0 | kΩ |
| FN4F3R | NR1 | 2.2 | 47.0 | kΩ |
| FN4A4L | NS1 | 10.0 | 4.7 | kΩ |
| FN4L4K | NT1 | 47.0 | 10.0 | kΩ |

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Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|------------------------------|----------------------|---|--------------|------|------|------|
| Collector Cut-off Current | I _{CBO} | V _{CB} = -5.0 V, I _E = 0 | | | -100 | nA |
| DC Current Gain | h _{FE1} | V _{CE} = -5.0 V, I _C = -5.0 mA | Note1 | | | - |
| | h _{FE2} | V _{CE} = -5.0 V, I _C = -50 mA | | | | - |
| Collector Saturation Voltage | V _{CE(sat)} | I _C = -5.0 mA, I _B = -0.25 mA | | | -0.2 | V |
| Low-level Input Voltage | V _{IL} | V _{CE} = -5.0 V, I _C = -100 μA | Note2 | | | V |
| High-level Input Voltage | V _{IH} | V _{CE} = -0.2 V, I _C = -5.0 mA | | | | V |
| Input Resistor | R ₁ | | Note3 | | | kΩ |
| Emitter to Base Resistor | R ₂ | | | | | kΩ |

Note 1.

| PART NUMBER | h _{FE1} | | | h _{FE2} | | | UNIT |
|-------------|------------------|------|------|------------------|------|------|------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. | |
| FN4A4M | 35 | | 100 | 80 | | | - |
| FN4F4M | 60 | | 195 | 90 | | | - |
| FN4L4M | 85 | | 340 | 95 | | | - |
| FN4L3M | 20 | | 80 | 80 | | | - |
| FN4L3N | 35 | | 100 | 80 | | | - |
| FN4L3Z | 135 | | 600 | 100 | | | - |
| FN4A3Q | 35 | | 100 | 80 | | | - |
| FN4A4P | 85 | | 340 | 95 | | | - |
| FN4F4N | 85 | | 340 | 95 | | | - |
| FN4L4L | 60 | | 195 | 90 | | | - |
| FN4A4Z | 135 | | 600 | 100 | | | - |
| FN4F4Z | 135 | | 600 | 100 | | | - |
| FN4L4Z | 135 | | 600 | 100 | | | - |
| ★ FN4F3M | 8 | | 50 | 50 | | | - |
| FN4F3P | 35 | | 100 | 80 | | | - |
| FN4F3R | 85 | | 340 | 95 | | | - |
| FN4A4L | 20 | | 80 | 80 | | | - |
| FN4L4K | 35 | | 100 | 80 | | | - |

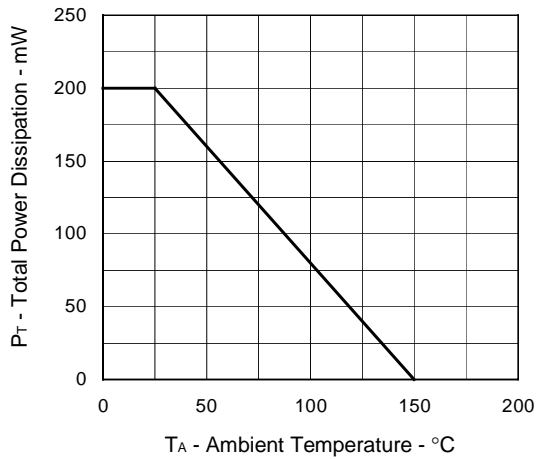
Note 2.

| PART NUMBER | V _{IL} | | | V _{IH} | | | UNIT |
|-------------|-----------------|------|------|-----------------|------|------|------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. | |
| FN4A4M | | | -0.8 | -3.0 | | | V |
| FN4F4M | | | -0.8 | -4.0 | | | V |
| FN4L4M | | | -0.8 | -5.0 | | | V |
| FN4L3M | | | -0.8 | -3.0 | | | V |
| FN4L3N | | | -0.6 | -3.0 | | | V |
| FN4L3Z | | | -0.5 | -1.2 | | | V |
| FN4A3Q | | | -0.5 | -2.0 | | | V |
| FN4A4P | | | -0.5 | -3.0 | | | V |
| FN4F4N | | | -0.6 | -3.0 | | | V |
| FN4L4L | | | -0.9 | -6.0 | | | V |
| FN4A4Z | | | -0.5 | -2.0 | | | V |
| FN4F4Z | | | -0.5 | -3.0 | | | V |
| FN4L4Z | | | -0.5 | -4.0 | | | V |
| FN4F3M | | | -0.8 | -3.0 | | | V |
| FN4F3P | | | -0.5 | -2.0 | | | V |
| FN4F3R | | | -0.5 | -2.0 | | | V |
| FN4A4L | | | -0.9 | -6.0 | | | V |
| FN4L4K | | | -2.0 | -8.0 | | | V |

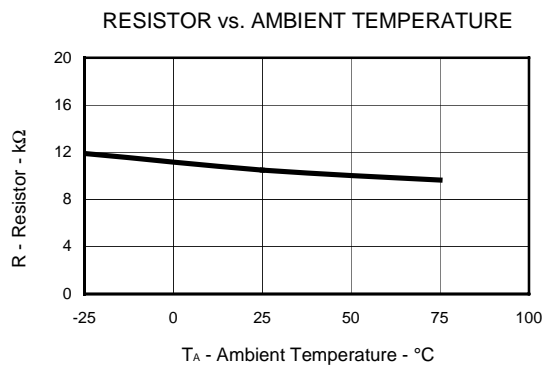
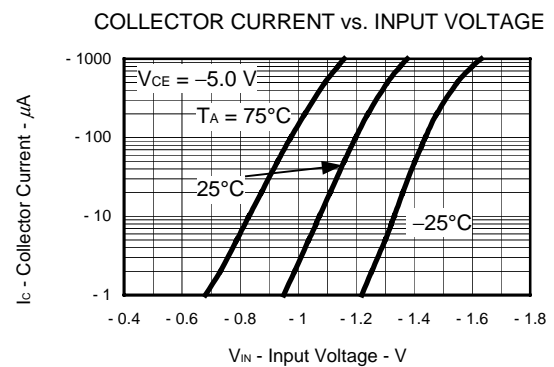
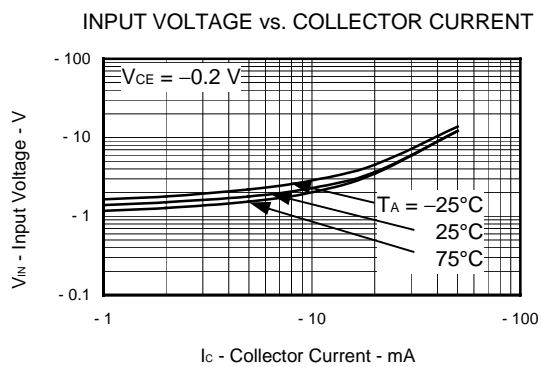
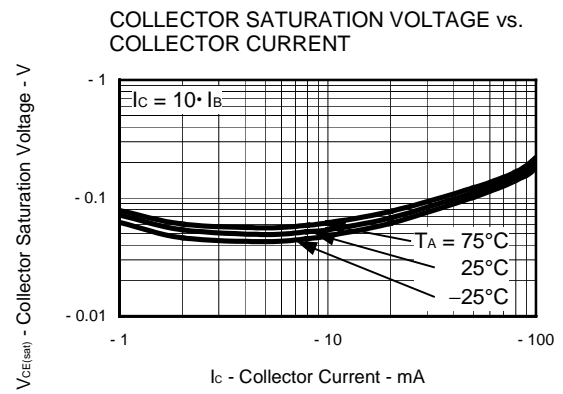
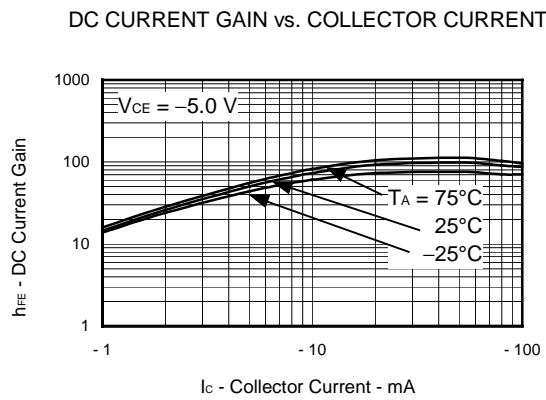
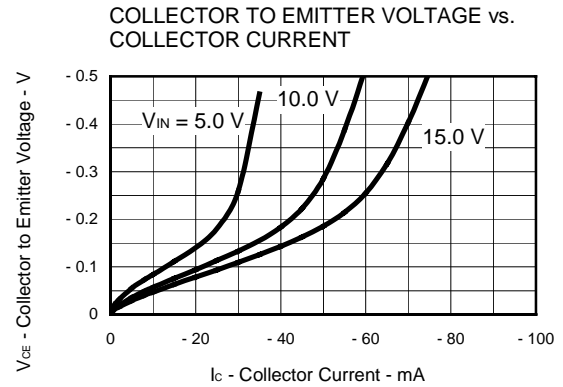
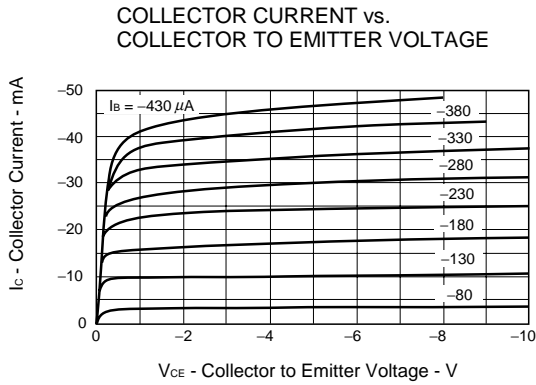
Note 3.

| PART NUMBER | R ₁ | | | R ₂ | | | UNIT |
|-------------|----------------|-------|-------|----------------|-------|-------|------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. | |
| FN4A4M | 7.00 | 10.00 | 13.00 | 7.00 | 10.00 | 13.00 | kΩ |
| FN4F4M | 15.40 | 22.00 | 28.60 | 15.40 | 22.00 | 28.60 | kΩ |
| FN4L4M | 32.90 | 47.00 | 61.10 | 32.90 | 47.00 | 61.10 | kΩ |
| FN4L3M | 3.29 | 4.70 | 6.11 | 3.29 | 4.70 | 6.11 | kΩ |
| FN4L3N | 3.29 | 4.70 | 6.11 | 7.00 | 10.00 | 13.00 | kΩ |
| FN4L3Z | 3.29 | 4.70 | 6.11 | | | | kΩ |
| FN4A3Q | 0.70 | 1.00 | 1.30 | 7.00 | 10.00 | 13.00 | kΩ |
| FN4A4P | 7.00 | 10.00 | 13.00 | 32.90 | 47.00 | 61.10 | kΩ |
| FN4F4N | 15.40 | 22.00 | 28.60 | 32.90 | 47.00 | 61.10 | kΩ |
| FN4L4L | 32.90 | 47.00 | 61.10 | 15.40 | 22.00 | 28.60 | kΩ |
| FN4A4Z | 7.00 | 10.00 | 13.00 | | | | kΩ |
| FN4F4Z | 15.40 | 22.00 | 28.60 | | | | kΩ |
| FN4L4Z | 32.90 | 47.00 | 61.10 | | | | kΩ |
| FN4F3M | 1.54 | 2.20 | 2.86 | 1.54 | 2.20 | 2.86 | kΩ |
| FN4F3P | 1.54 | 2.20 | 2.86 | 7.00 | 10.00 | 13.00 | kΩ |
| FN4F3R | 1.54 | 2.20 | 2.86 | 32.90 | 47.00 | 61.10 | kΩ |
| FN4A4L | 7.00 | 10.00 | 13.00 | 3.29 | 4.70 | 6.11 | kΩ |
| FN4L4K | 32.90 | 47.00 | 61.10 | 7.00 | 10.00 | 13.00 | kΩ |

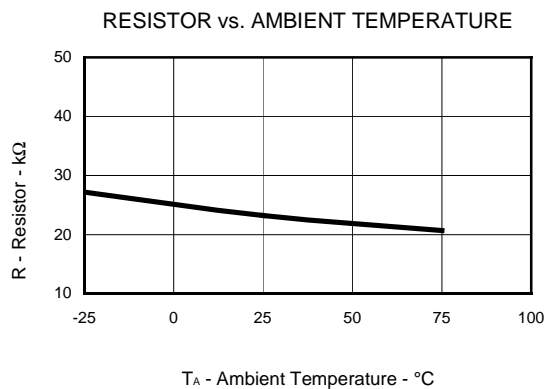
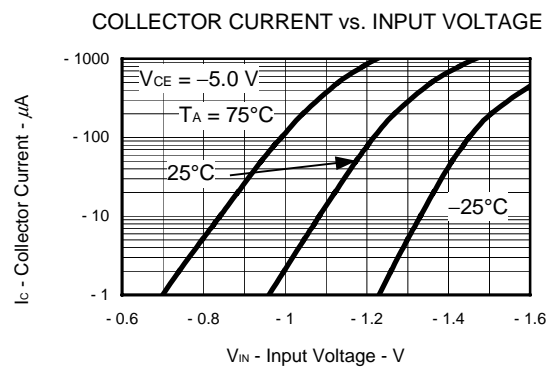
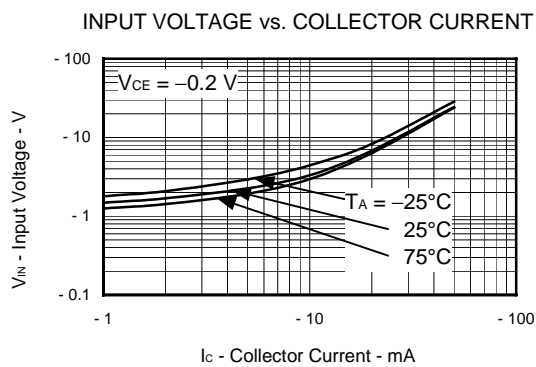
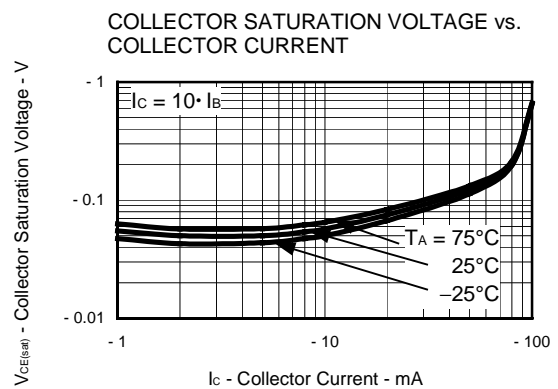
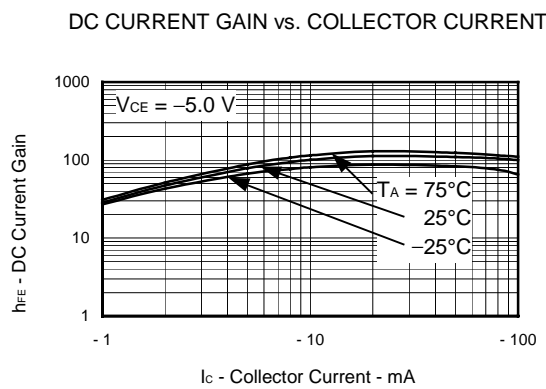
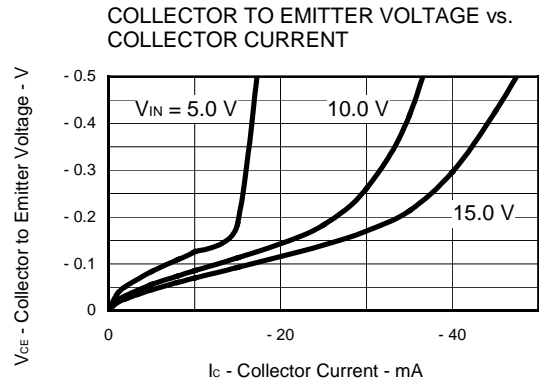
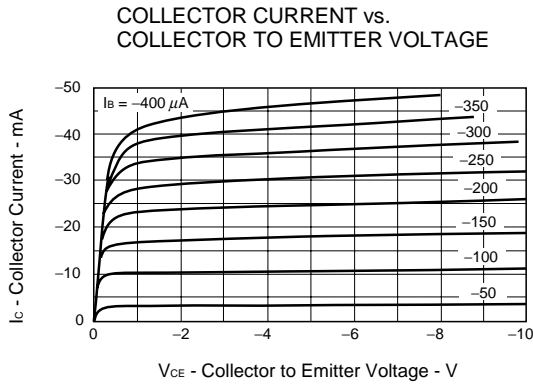
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



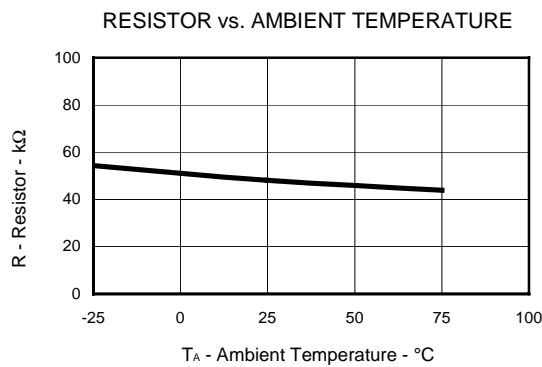
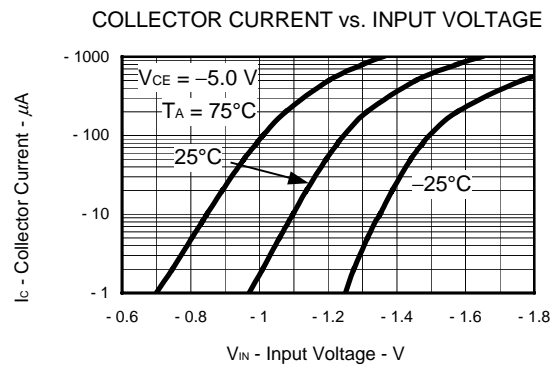
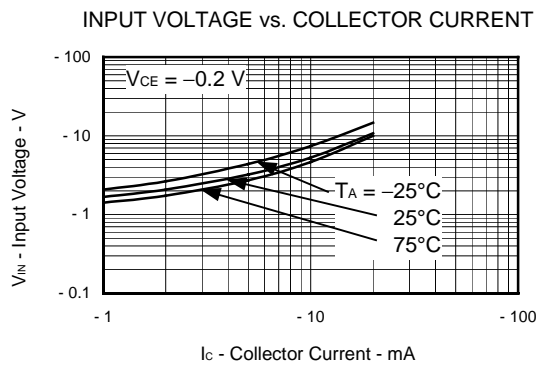
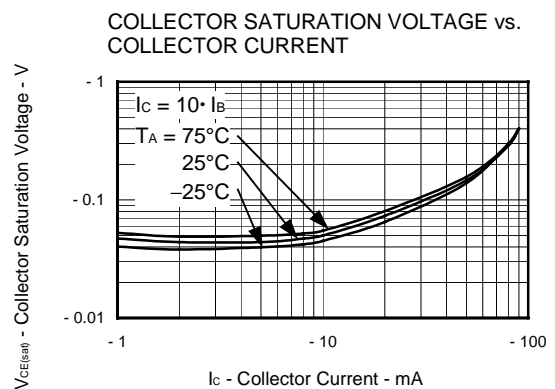
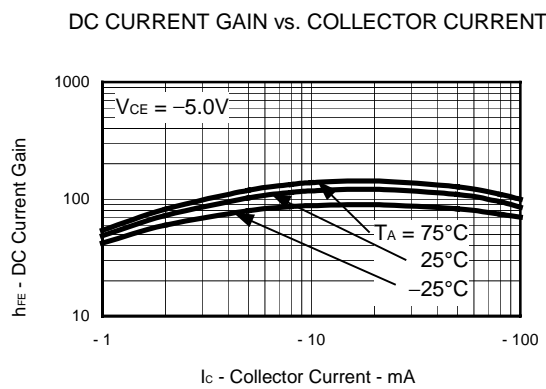
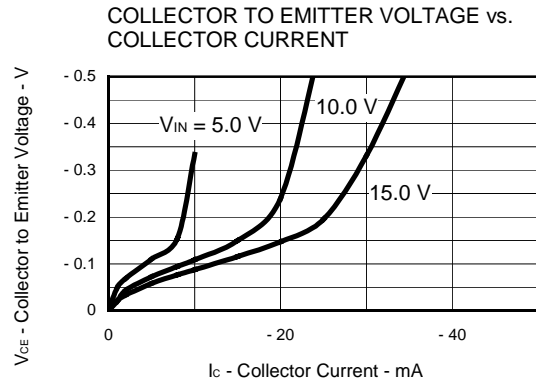
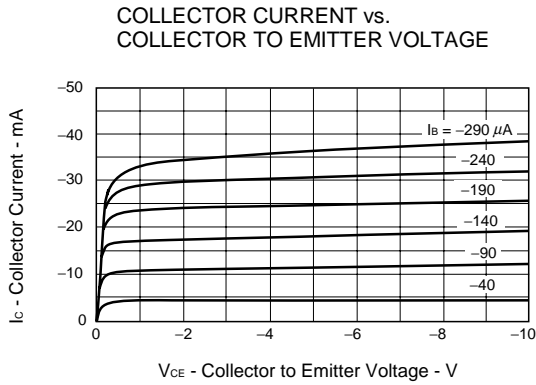
[FN4A4M]
TYPICAL CHARACTERISTICS (T_A = 25°C)



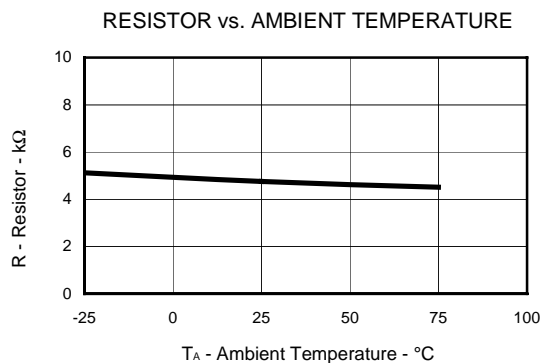
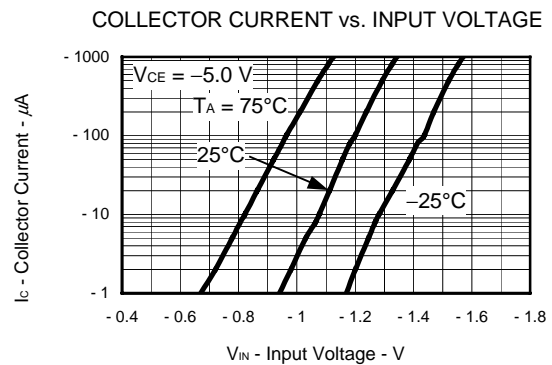
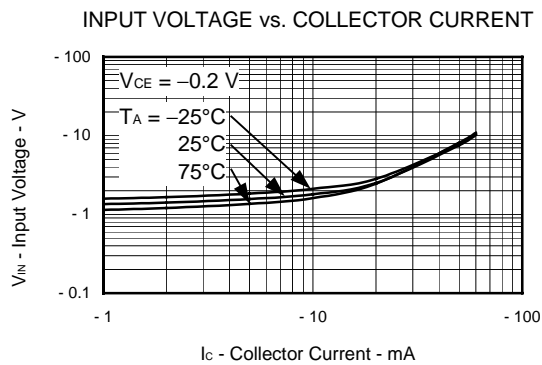
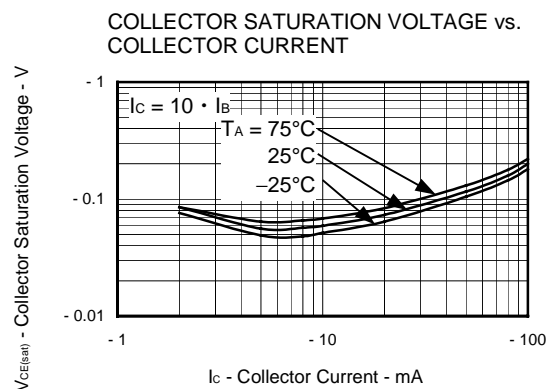
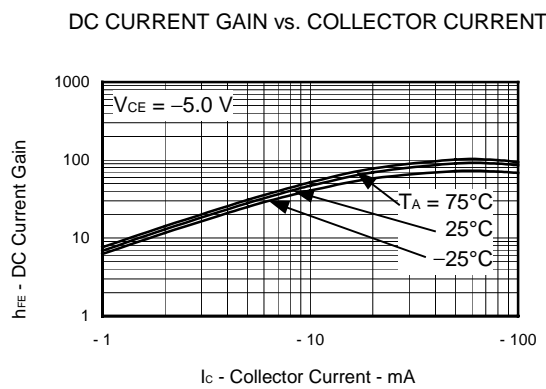
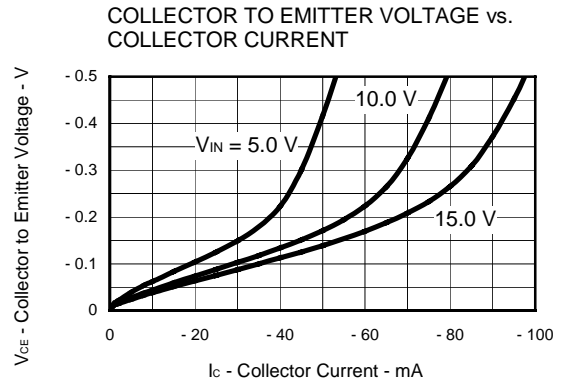
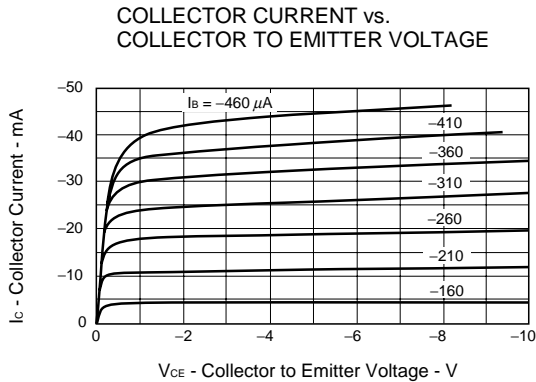
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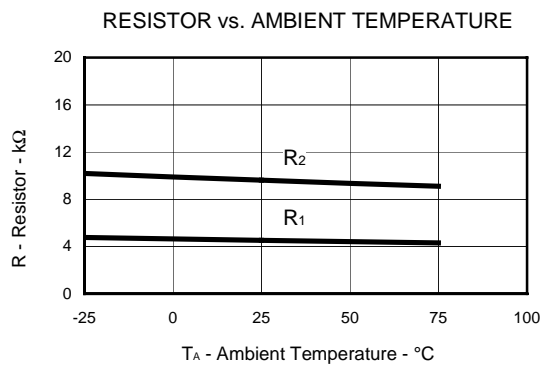
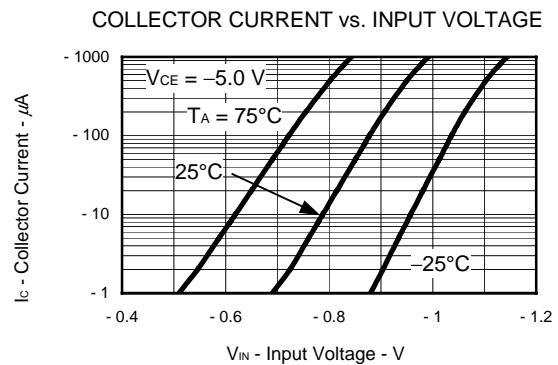
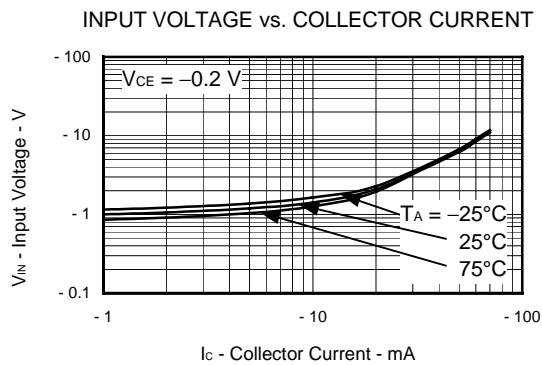
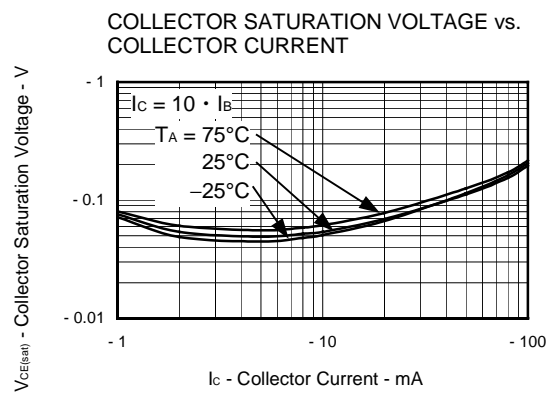
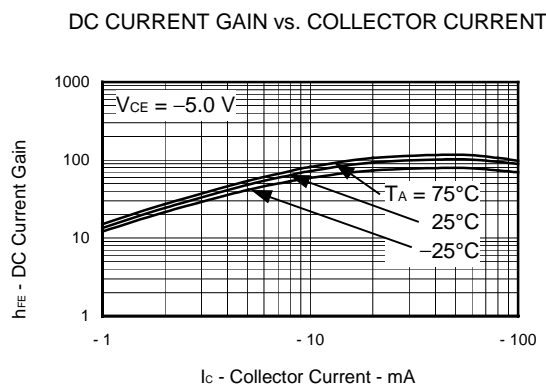
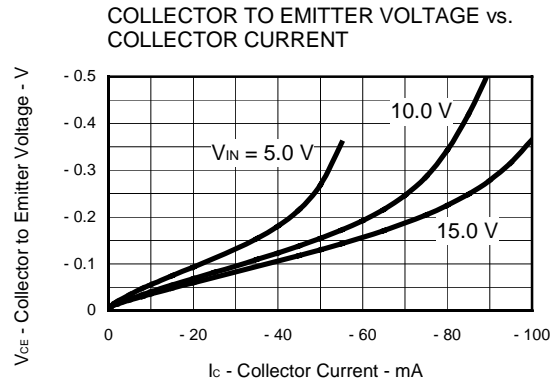
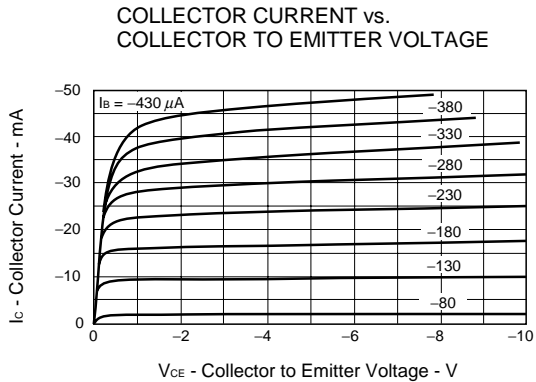
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TYPICAL CHARACTERISTICS (T_A = 25°C)



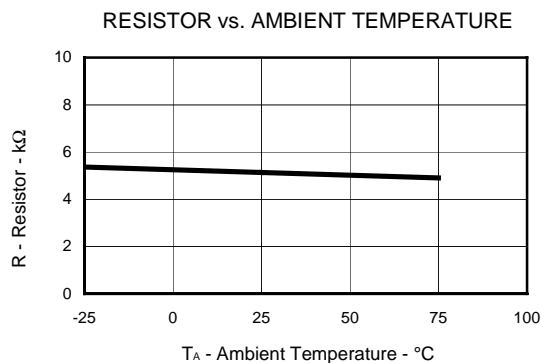
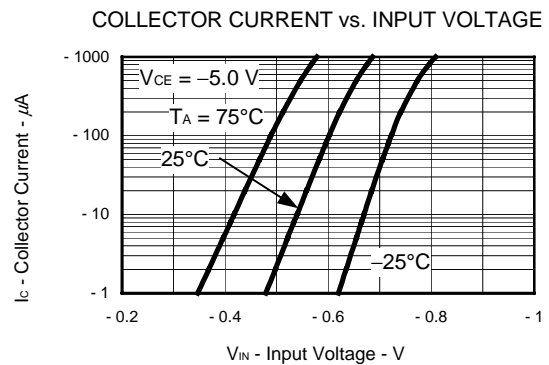
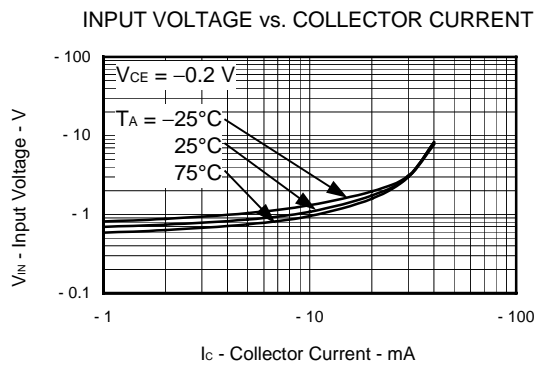
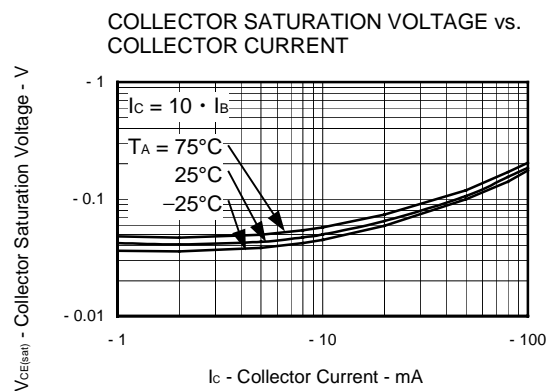
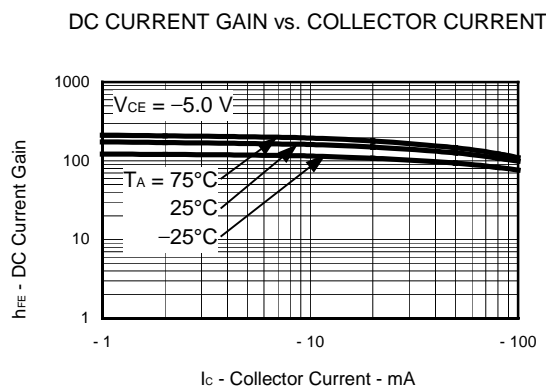
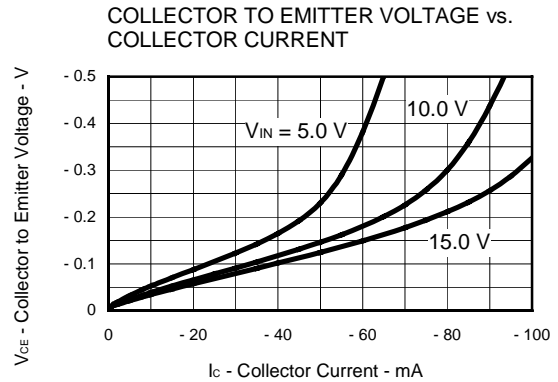
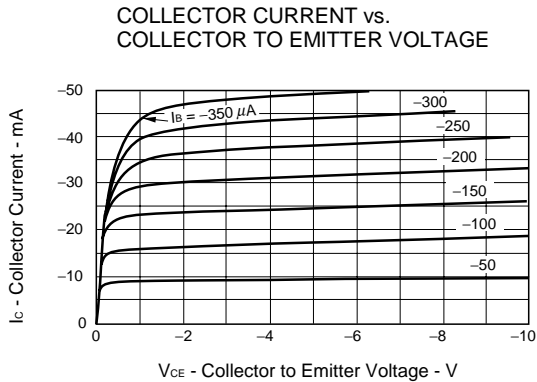
[FN4L3M]
TYPICAL CHARACTERISTICS (T_A = 25°C)



[FN4L3N]
TYPICAL CHARACTERISTICS (T_A = 25°C)

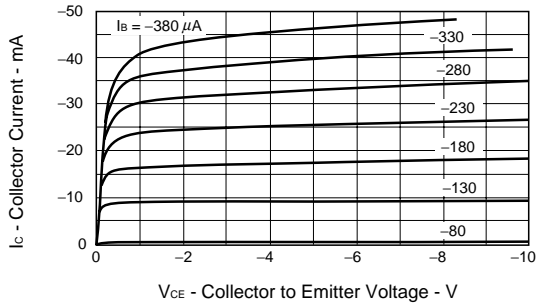


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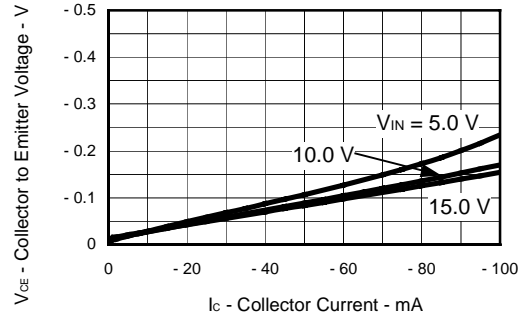


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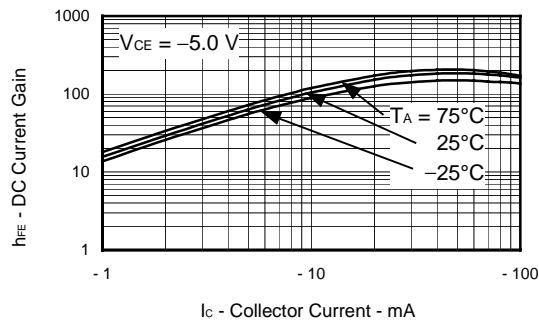
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



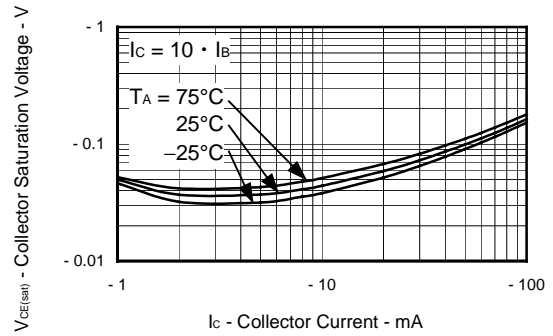
COLLECTOR TO EMITTER VOLTAGE vs. COLLECTOR CURRENT



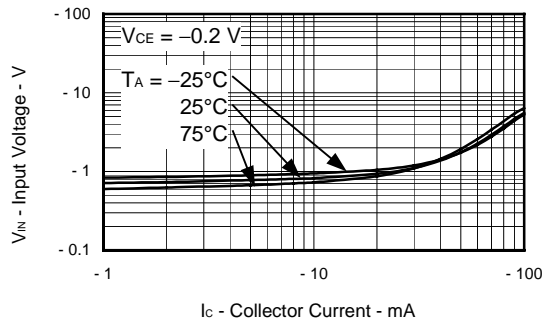
DC CURRENT GAIN vs. COLLECTOR CURRENT



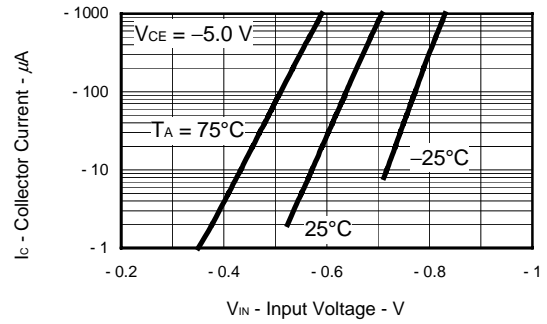
COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



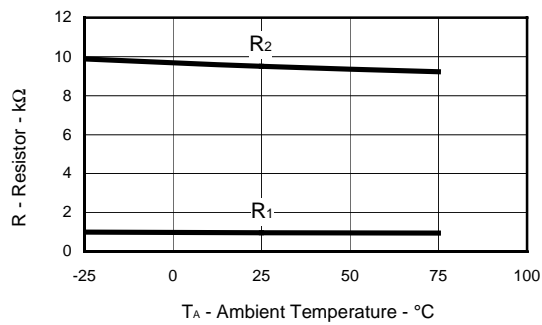
INPUT VOLTAGE vs. COLLECTOR CURRENT



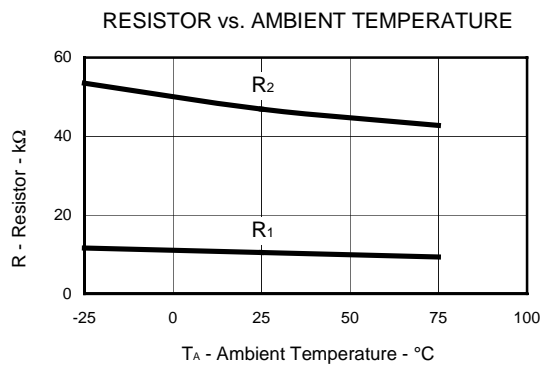
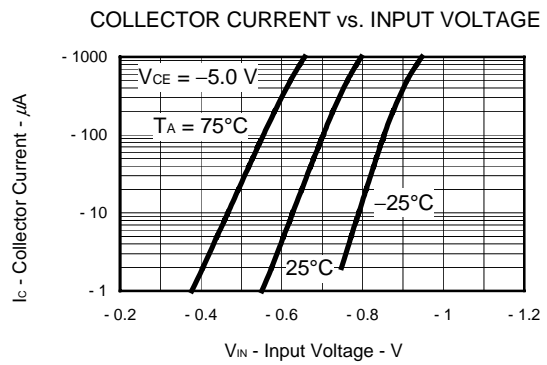
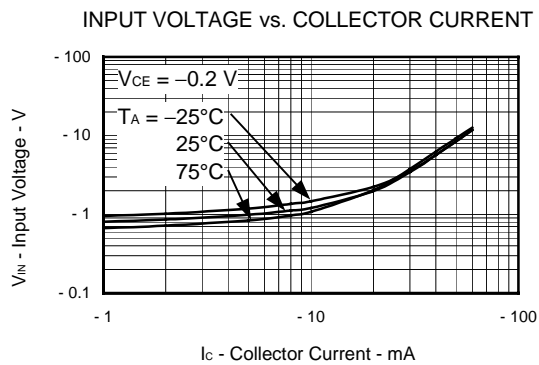
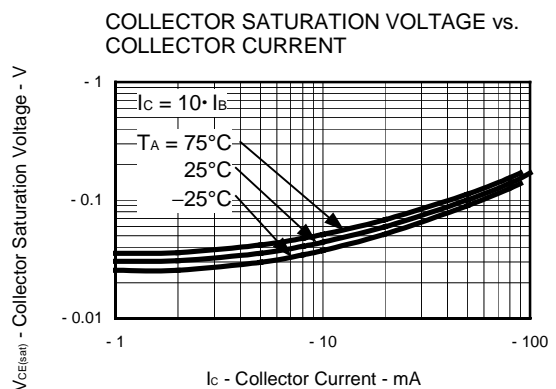
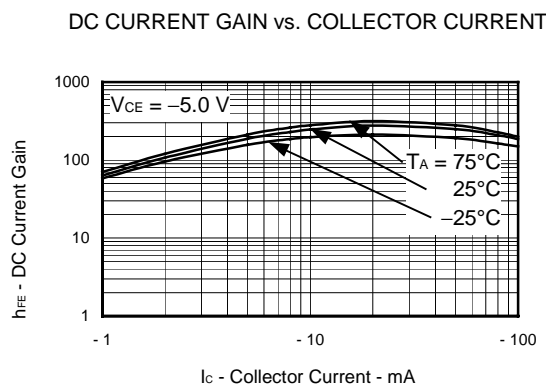
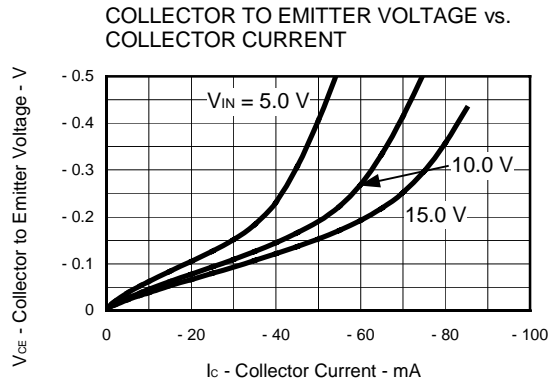
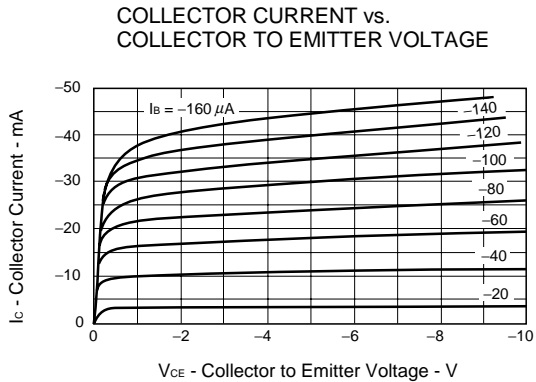
COLLECTOR CURRENT vs. INPUT VOLTAGE



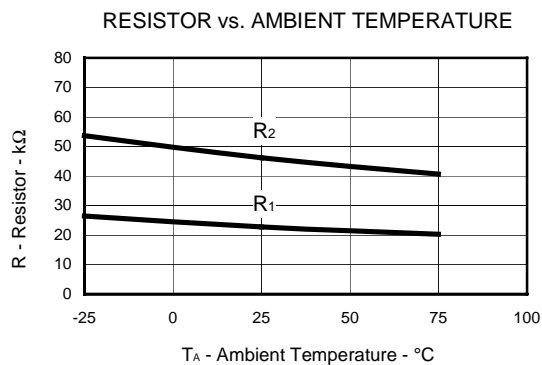
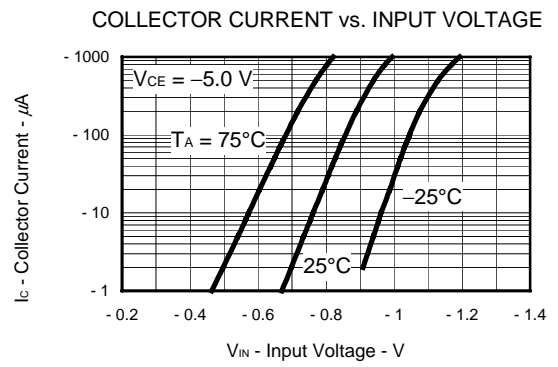
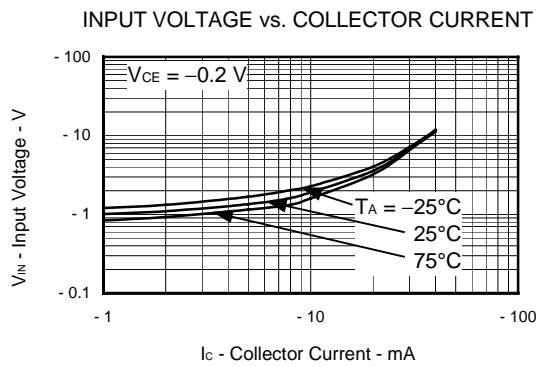
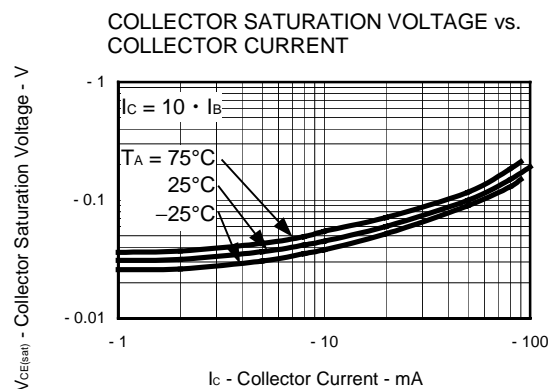
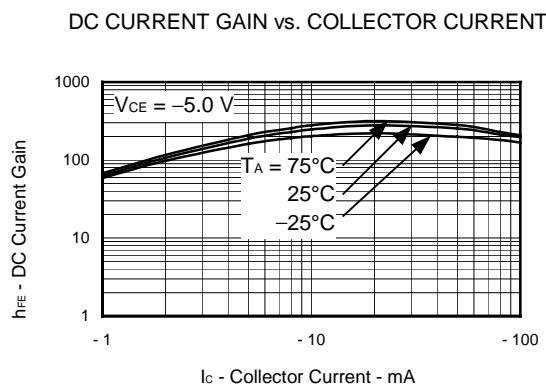
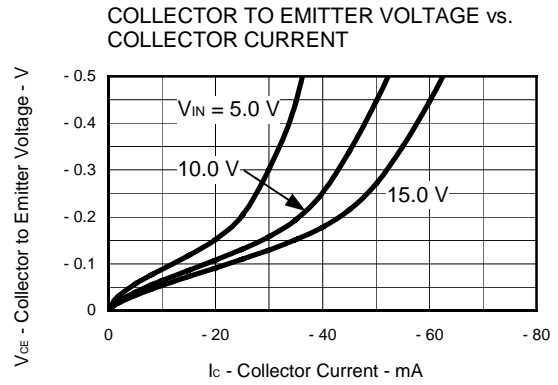
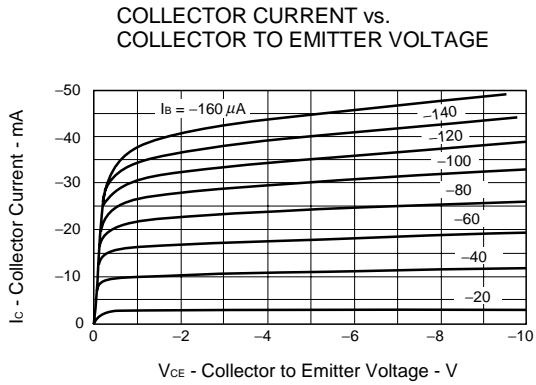
RESISTOR vs. AMBIENT TEMPERATURE



[FN4A4P]
TYPICAL CHARACTERISTICS (T_A = 25°C)

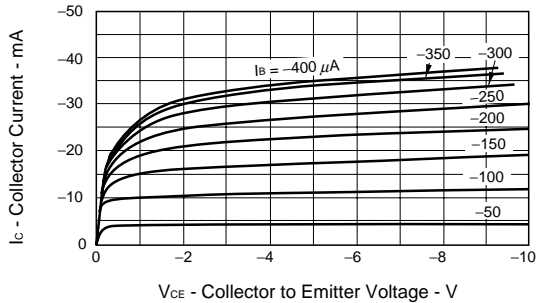


[FN4F4N]
TYPICAL CHARACTERISTICS (T_A = 25°C)

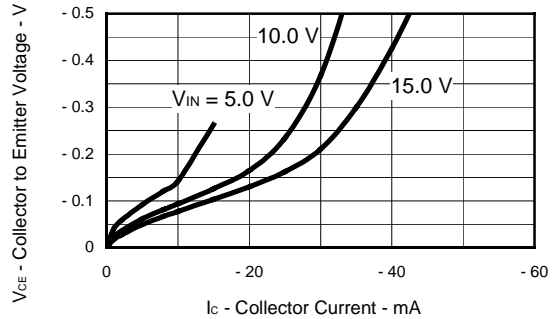


[FN4L4L]
TYPICAL CHARACTERISTICS (T_A = 25°C)

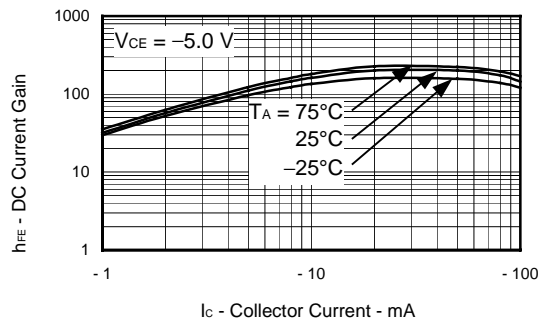
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



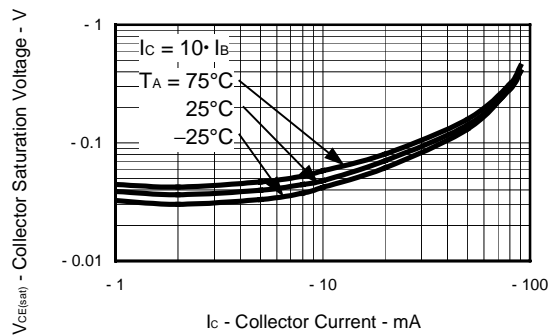
COLLECTOR TO EMITTER VOLTAGE vs. COLLECTOR CURRENT



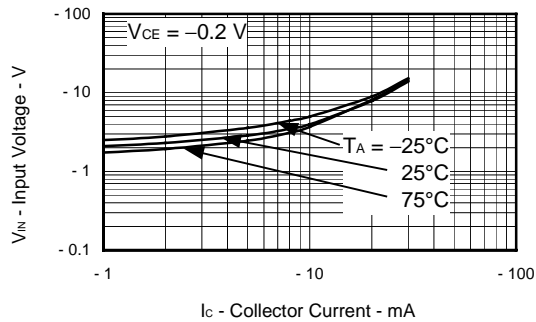
DC CURRENT GAIN vs. COLLECTOR CURRENT



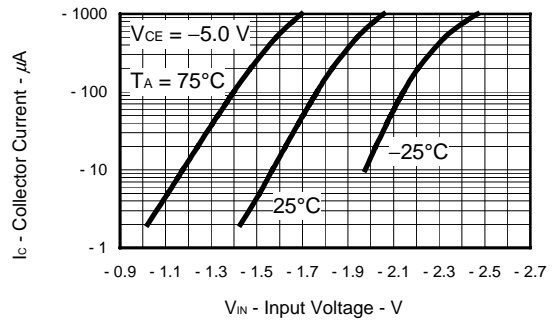
COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



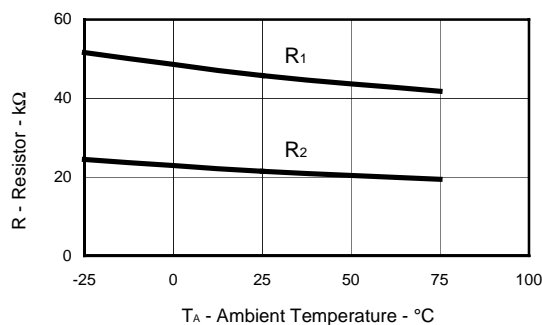
INPUT VOLTAGE vs. COLLECTOR CURRENT



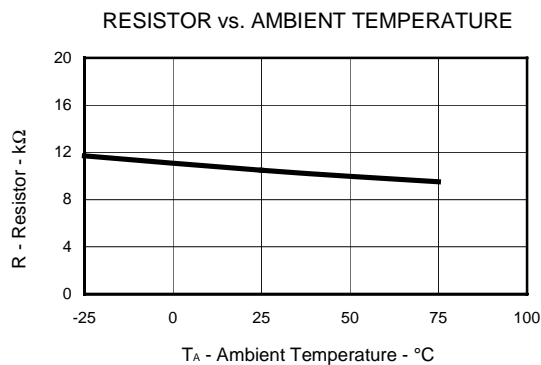
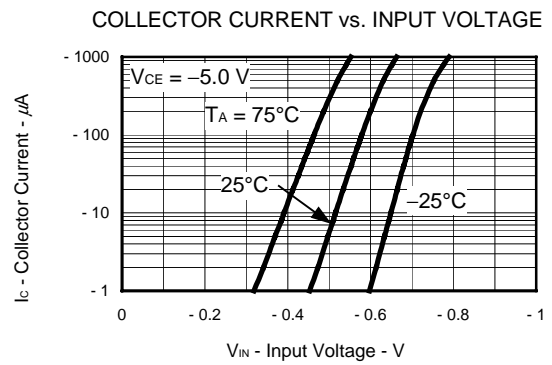
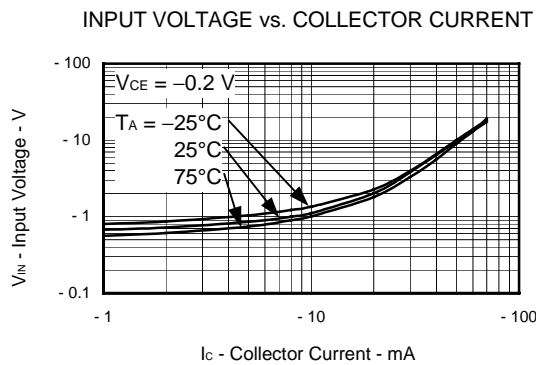
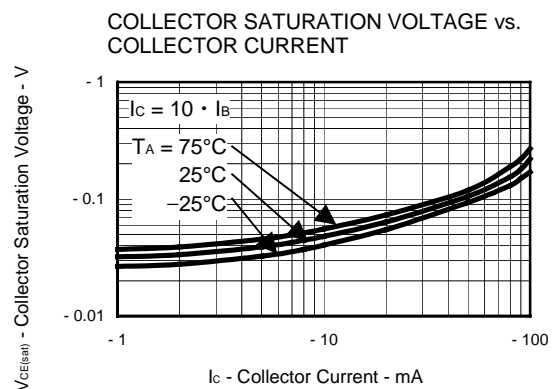
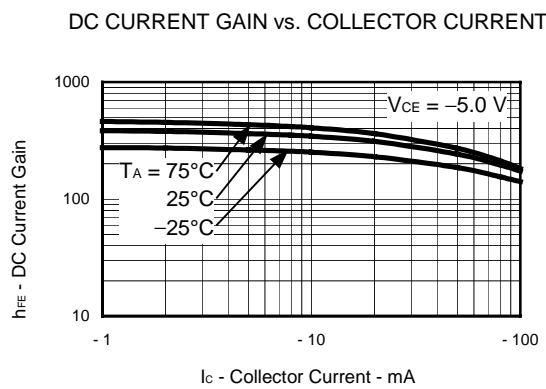
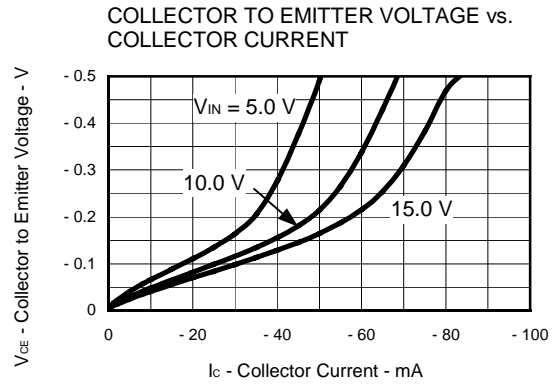
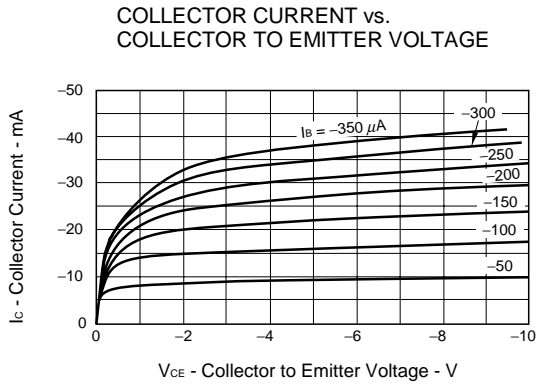
COLLECTOR CURRENT vs. INPUT VOLTAGE



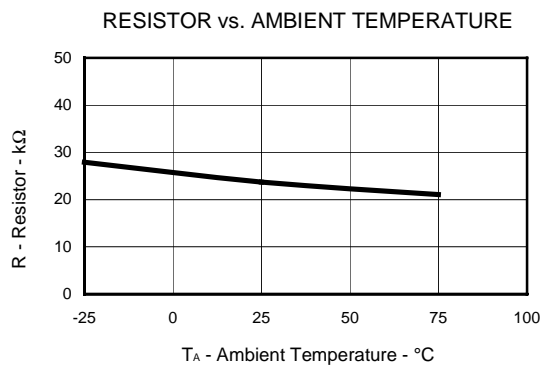
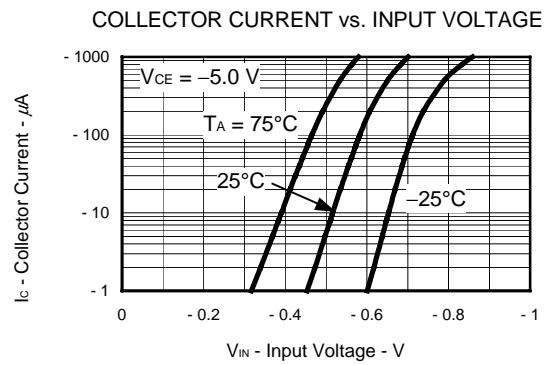
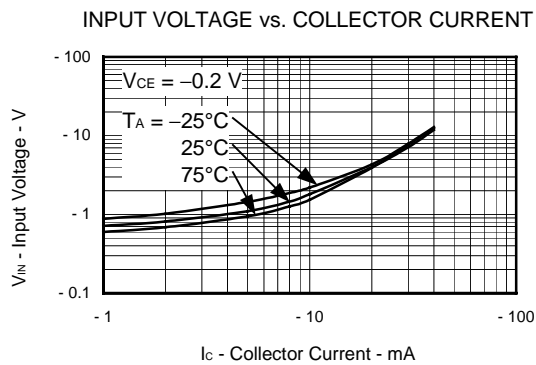
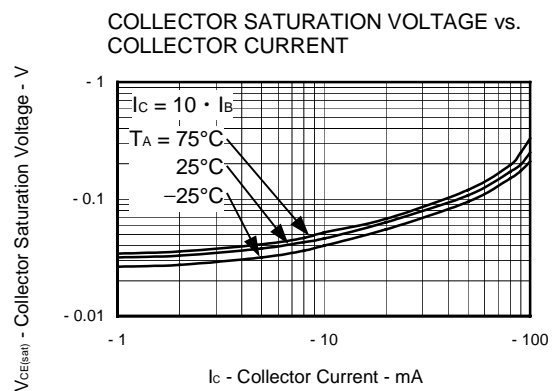
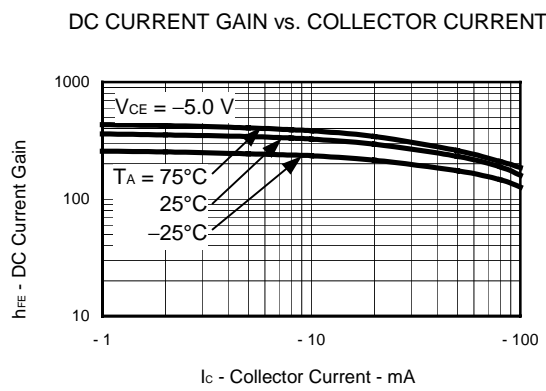
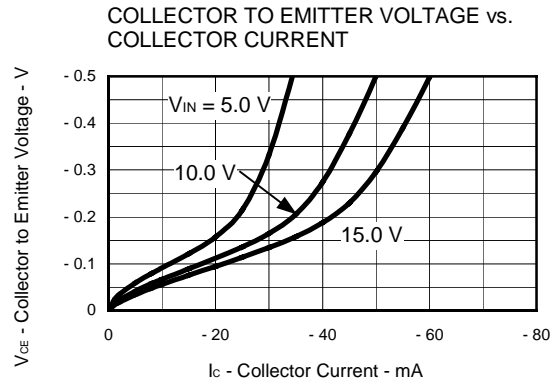
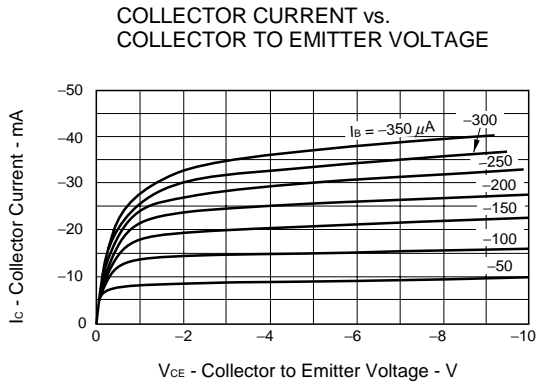
RESISTOR vs. AMBIENT TEMPERATURE



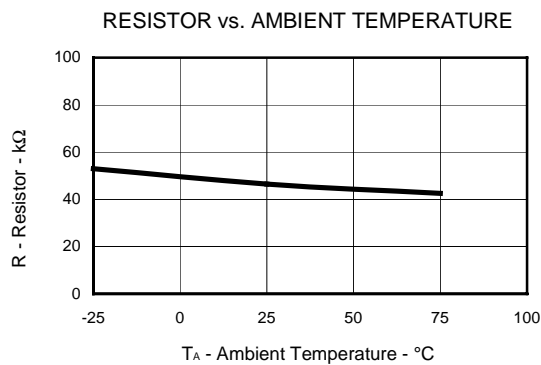
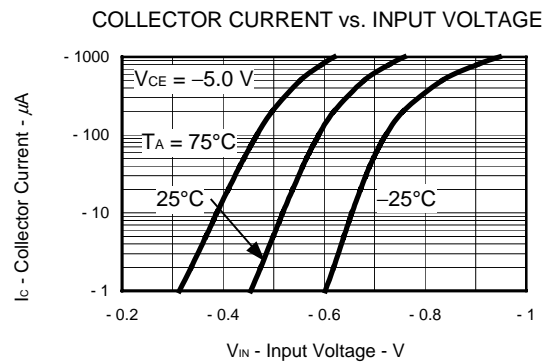
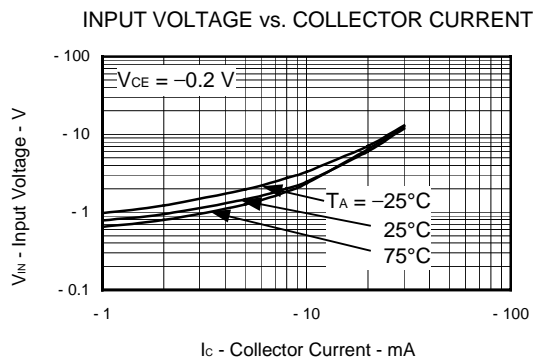
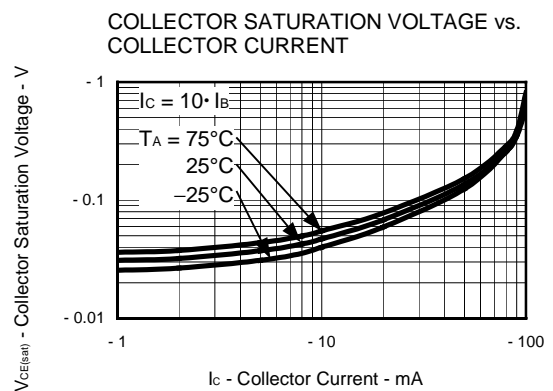
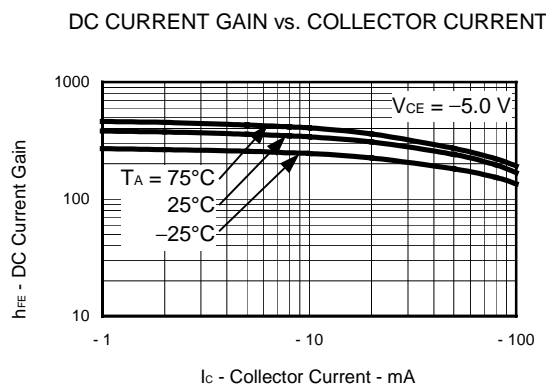
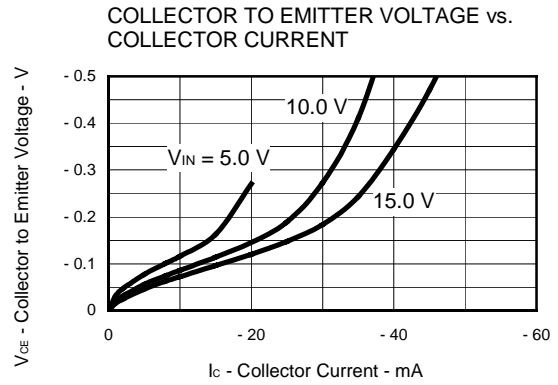
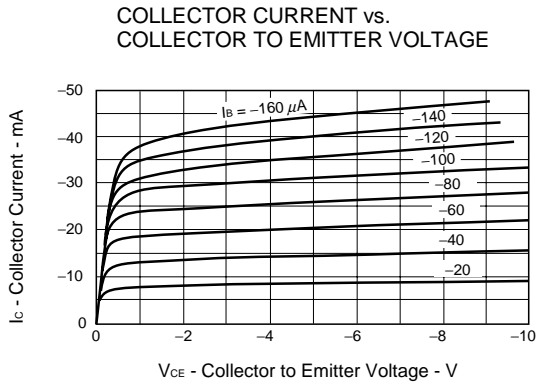
[FN4A4Z]
TYPICAL CHARACTERISTICS (T_A = 25°C)



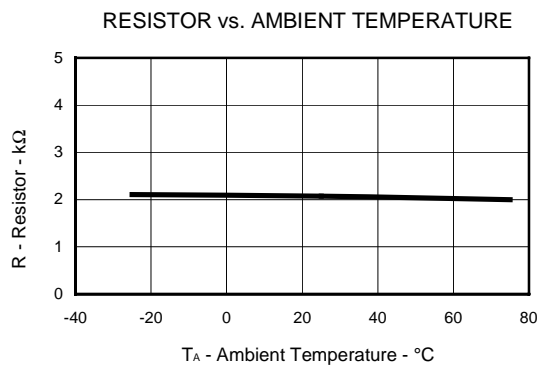
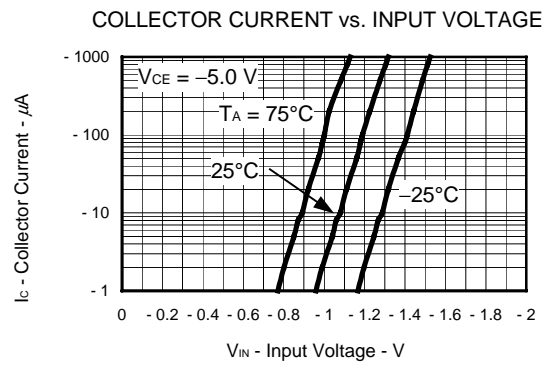
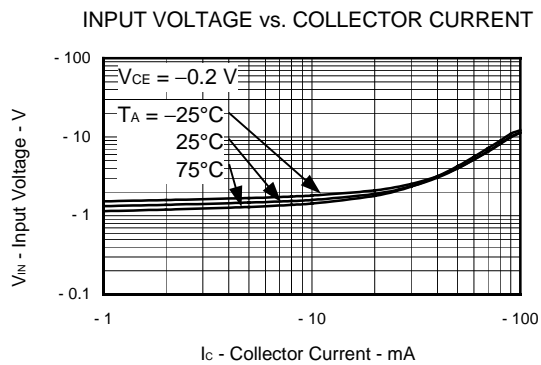
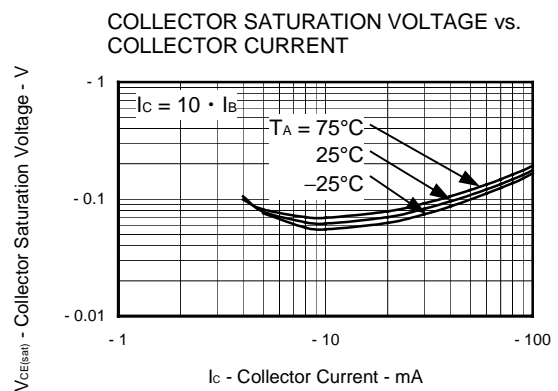
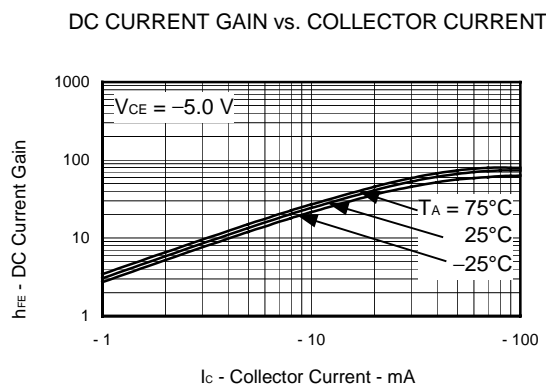
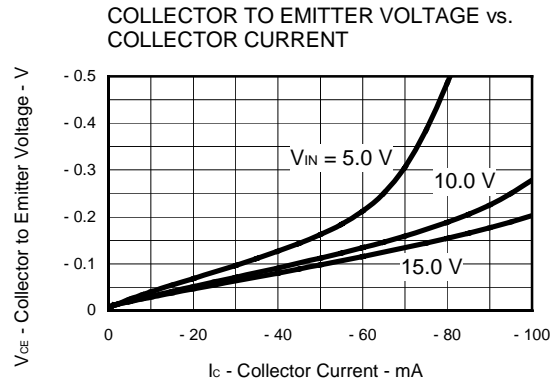
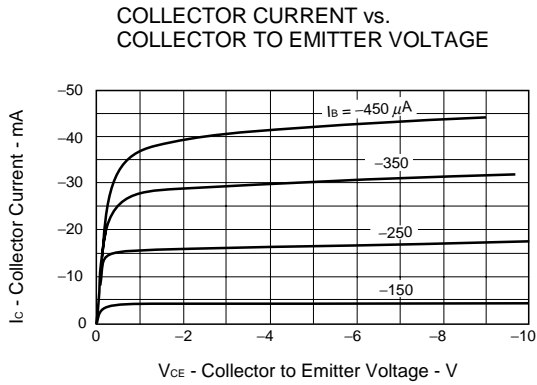
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TYPICAL CHARACTERISTICS (T_A = 25°C)



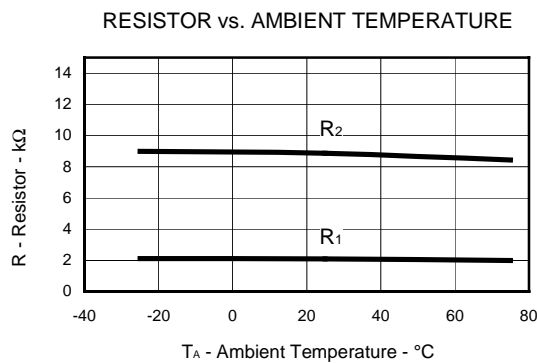
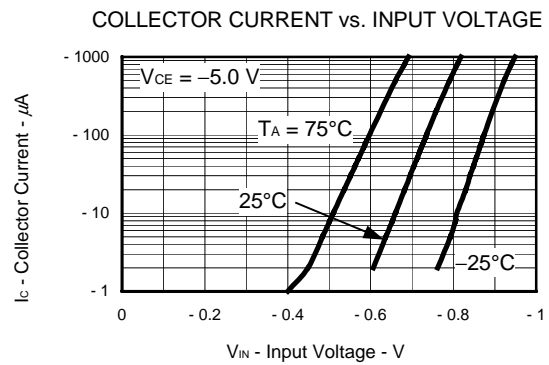
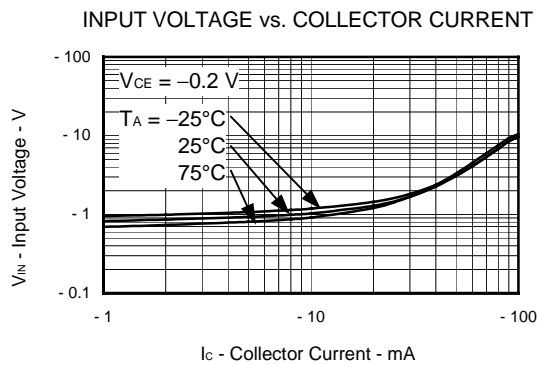
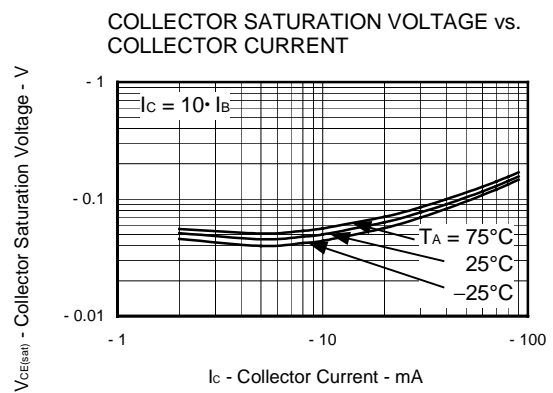
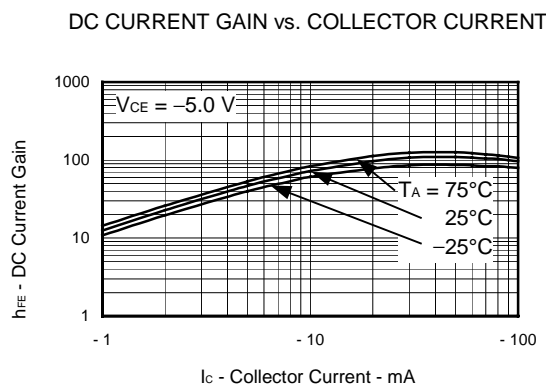
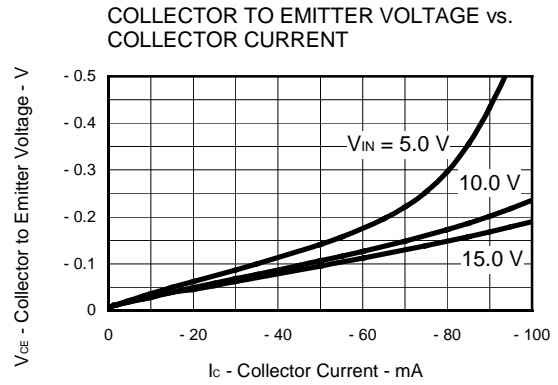
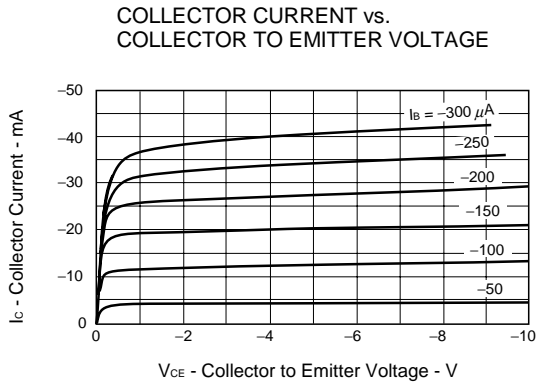
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TYPICAL CHARACTERISTICS (T_A = 25°C)



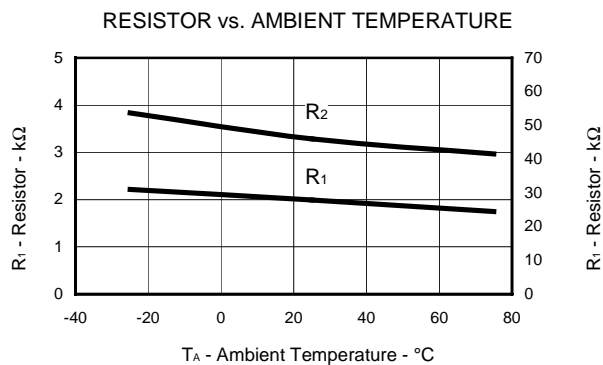
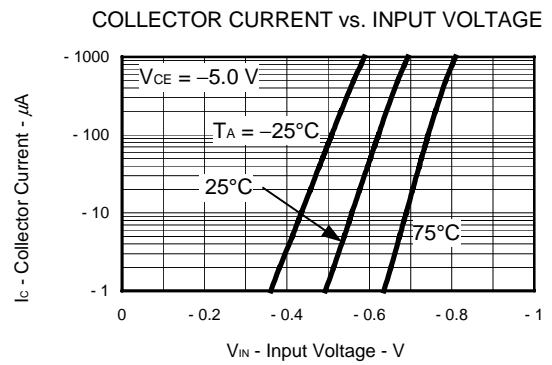
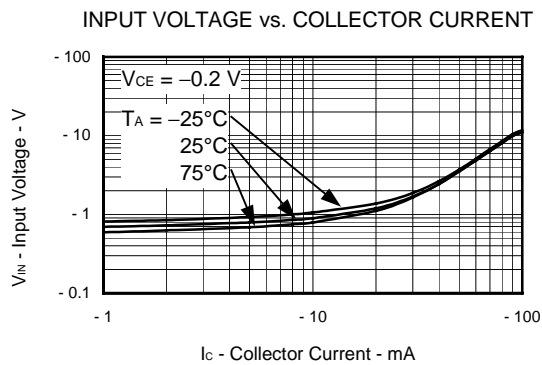
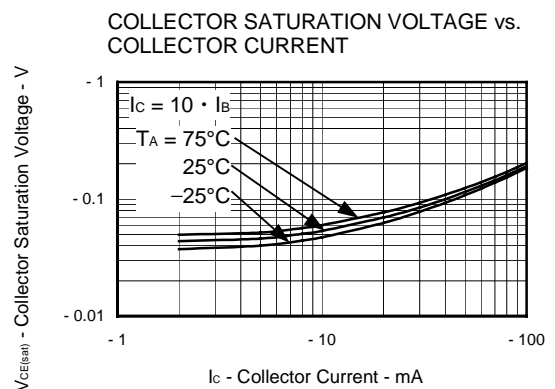
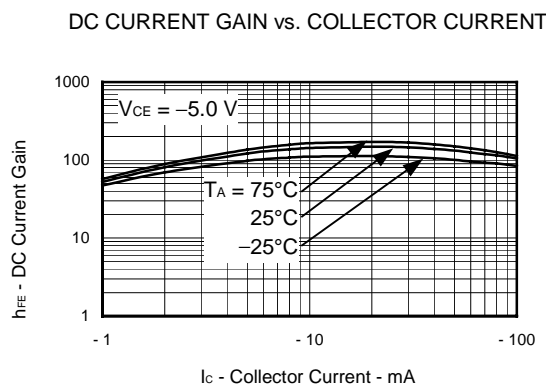
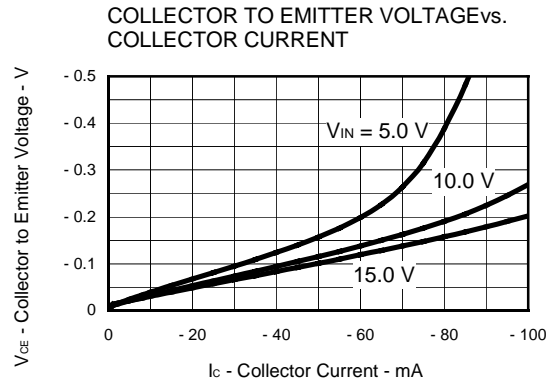
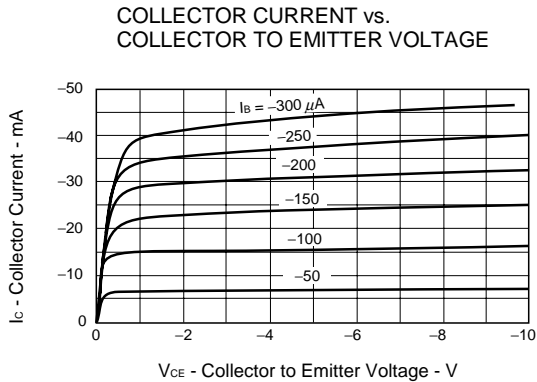
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TYPICAL CHARACTERISTICS (T_A = 25°C)



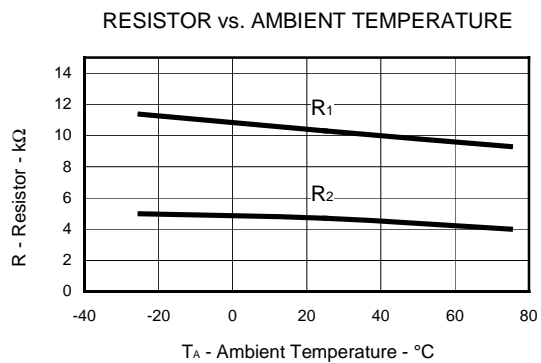
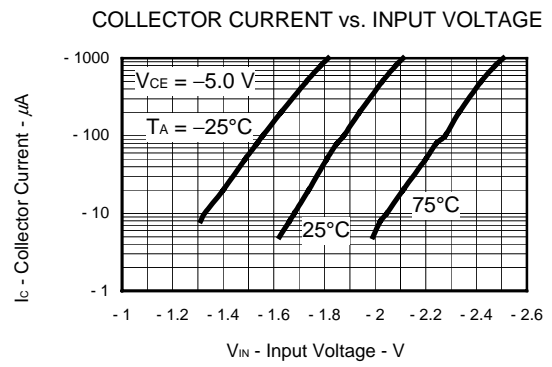
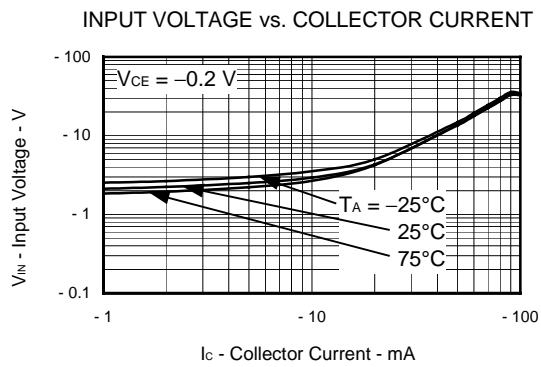
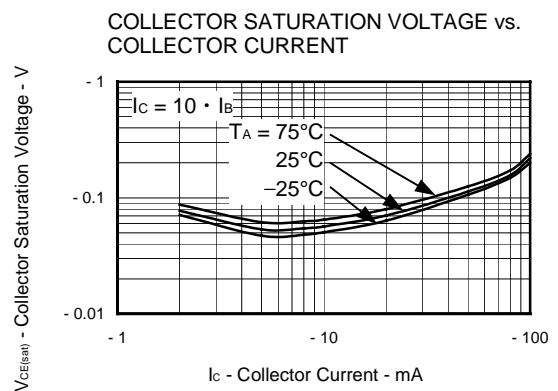
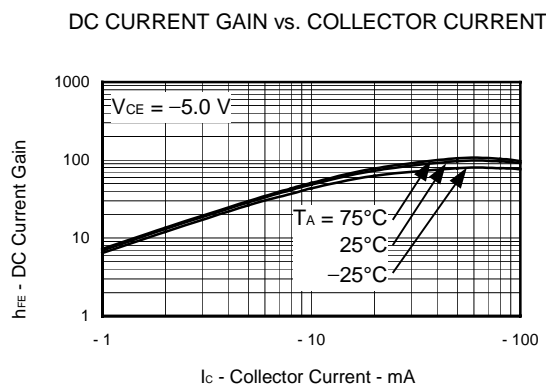
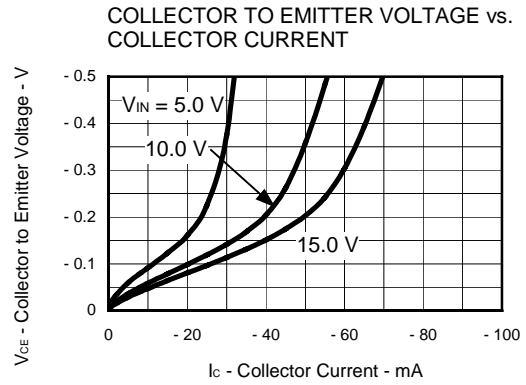
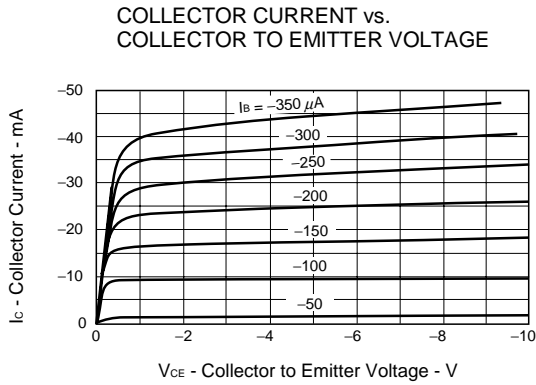
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TYPICAL CHARACTERISTICS (T_A = 25°C)



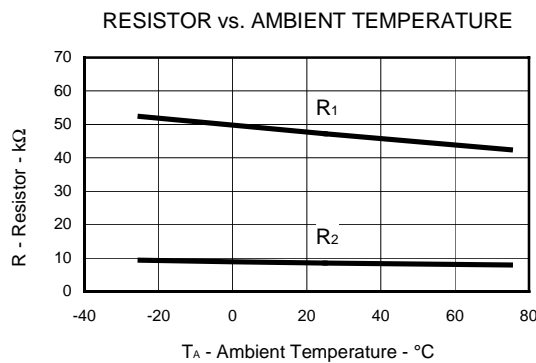
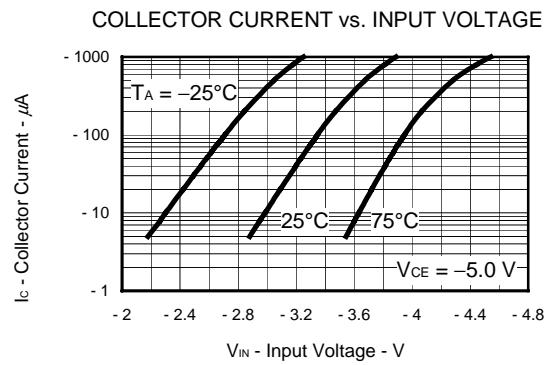
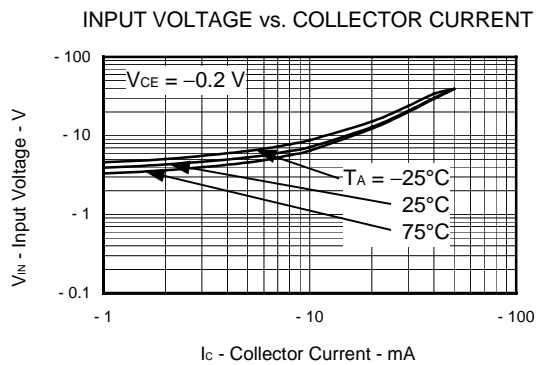
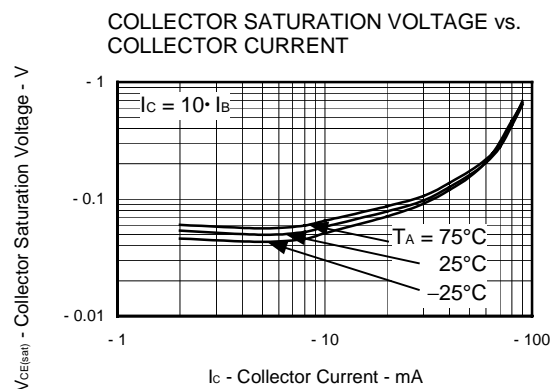
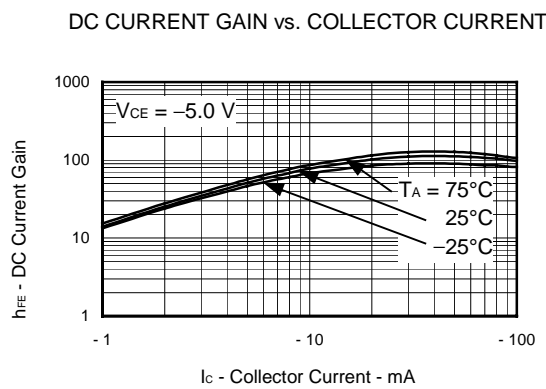
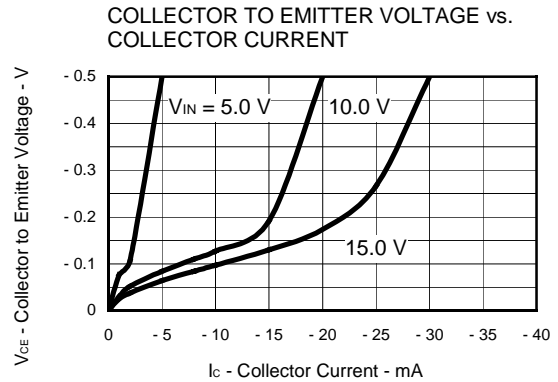
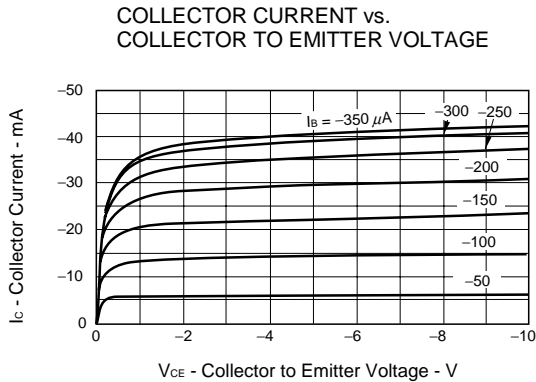
[FN4F3R]
TYPICAL CHARACTERISTICS (T_A = 25°C)



[FN4A4L]
TYPICAL CHARACTERISTICS (T_A = 25°C)



[FN4L4K]
TYPICAL CHARACTERISTICS (T_A = 25°C)



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