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MUN5111DW1T1 Series

Preferred Devices

Dual Bias Resistor Transistors

PNP Silicon Surface Mount Transistors with Monolithic Bias Resistor Network

The BRT (Bias Resistor Transistor) contains a single transistor with a monolithic bias network consisting of two resistors; a series base resistor and a base-emitter resistor. These digital transistors are designed to replace a single device and its external resistor bias network. The BRT eliminates these individual components by integrating them into a single device. In the MUN5111DW1T1 series, two BRT devices are housed in the SOT-363 package which is ideal for low-power surface mount applications where board space is at a premium.

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- Available in 8 mm, 7 inch/3000 Unit Tape and Reel

MAXIMUM RATINGS

($T_A = 25^\circ\text{C}$ unless otherwise noted, common for Q_1 and Q_2)

| Rating | Symbol | Value | Unit |
|---------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | -50 | Vdc |
| Collector-Emitter Voltage | V_{CEO} | -50 | Vdc |
| Collector Current | I_C | -100 | mAdc |

THERMAL CHARACTERISTICS

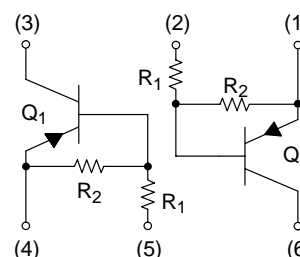
| Characteristic (One Junction Heated) | Symbol | Max | Unit |
|---|-----------------|--|----------------------------|
| Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 187 (Note 1.) 256 (Note 2.) 1.5 (Note 1.) 2.0 (Note 2.) | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance – Junction-to-Ambient | $R_{\theta JA}$ | 670 (Note 1.) 490 (Note 2.) | $^\circ\text{C}/\text{W}$ |
| Characteristic (Both Junctions Heated) | Symbol | Max | Unit |
| Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 250 (Note 1.) 385 (Note 2.) 2.0 (Note 1.) 3.0 (Note 2.) | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance – Junction-to-Ambient | $R_{\theta JA}$ | 493 (Note 1.) 325 (Note 2.) | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance – Junction-to-Lead | $R_{\theta JL}$ | 188 (Note 1.) 208 (Note 2.) | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

1. FR-4 @ Minimum Pad
2. FR-4 @ 1.0 x 1.0 inch Pad



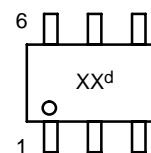
ON Semiconductor®

<http://onsemi.com>



SOT-363
CASE 419B
STYLE 1

MARKING DIAGRAM



XX = Specific Device Code
^d = Date Code
(See Page 2)

DEVICE MARKING INFORMATION

See specific marking information in the device marking table on page 2 of this data sheet.

Preferred devices are recommended choices for future use and best overall value.

MUN5111DW1T1 Series

DEVICE MARKING AND RESISTOR VALUES

| Device | Package | Marking | R1 (K) | R2 (K) | Shipping |
|--------------|---------|---------|--------|--------|------------------|
| MUN5111DW1T1 | SOT-363 | 0A | 10 | 10 | 3000/Tape & Reel |
| MUN5112DW1T1 | SOT-363 | 0B | 22 | 22 | 3000/Tape & Reel |
| MUN5113DW1T1 | SOT-363 | 0C | 47 | 47 | 3000/Tape & Reel |
| MUN5114DW1T1 | SOT-363 | 0D | 10 | 47 | 3000/Tape & Reel |
| MUN5115DW1T1 | SOT-363 | 0E | 10 | ∞ | 3000/Tape & Reel |
| MUN5116DW1T1 | SOT-363 | 0F | 4.7 | ∞ | 3000/Tape & Reel |
| MUN5130DW1T1 | SOT-363 | 0G | 1.0 | 1.0 | 3000/Tape & Reel |
| MUN5131DW1T1 | SOT-363 | 0H | 2.2 | 2.2 | 3000/Tape & Reel |
| MUN5132DW1T1 | SOT-363 | 0J | 4.7 | 4.7 | 3000/Tape & Reel |
| MUN5133DW1T1 | SOT-363 | 0K | 4.7 | 47 | 3000/Tape & Reel |
| MUN5134DW1T1 | SOT-363 | 0L | 22 | 47 | 3000/Tape & Reel |
| MUN5135DW1T1 | SOT-363 | 0M | 2.2 | 47 | 3000/Tape & Reel |
| MUN5136DW1T1 | SOT-363 | 0N | 100 | 100 | 3000/Tape & Reel |
| MUN5137DW1T1 | SOT-363 | 0P | 47 | 22 | 3000/Tape & Reel |

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, common for Q₁ and Q₂)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|--|----------------------|-----|-------|-------|------|
| Collector-Base Cutoff Current (V _{CB} = -50 V, I _E = 0) | I _{CBO} | - | - | -100 | nAdc |
| Collector-Emitter Cutoff Current (V _{CE} = -50 V, I _B = 0) | I _{CEO} | - | - | -500 | nAdc |
| Emitter-Base Cutoff Current (V _{EB} = -6.0 V, I _C = 0) | MUN5111DW1T1 | - | - | -0.5 | mAdc |
| | MUN5112DW1T1 | - | - | -0.2 | |
| | MUN5113DW1T1 | - | - | -0.1 | |
| | MUN5114DW1T1 | - | - | -0.2 | |
| | MUN5115DW1T1 | - | - | -0.9 | |
| | MUN5116DW1T1 | - | - | -1.9 | |
| | MUN5130DW1T1 | - | - | -4.3 | |
| | MUN5131DW1T1 | - | - | -2.3 | |
| | MUN5132DW1T1 | - | - | -1.5 | |
| | MUN5133DW1T1 | - | - | -0.18 | |
| | MUN5134DW1T1 | - | - | -0.13 | |
| | MUN5135DW1T1 | - | - | -0.2 | |
| | MUN5136DW1T1 | - | - | -0.05 | |
| MUN5137DW1T1 | - | - | -0.13 | | |
| Collector-Base Breakdown Voltage (I _C = -10 μA, I _E = 0) | V _{(BR)CBO} | -50 | - | - | Vdc |
| Collector-Emitter Breakdown Voltage (Note 3.) (I _C = -2.0 mA, I _B = 0) | V _{(BR)CEO} | -50 | - | - | Vdc |

ON CHARACTERISTICS (Note 3.)

| | | | | | |
|--|----------------------|---|---|-------|-----|
| Collector-Emitter Saturation Voltage (I _C = -10 mA, I _E = -0.3 mA) (I _C = -10 mA, I _B = -5 mA) MUN5130DW1T1/MUN5131DW1T1 (I _C = -10 mA, I _B = -1 mA) MUN5115DW1T1/MUN5116DW1T1 MUN5132DW1T1/MUN5133DW1T1/MUN5134DW1T1 | V _{CE(sat)} | - | - | -0.25 | Vdc |
|--|----------------------|---|---|-------|-----|

3. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%

MUN5111DW1T1 Series

ALL MUN5111DW1T1 SERIES DEVICES

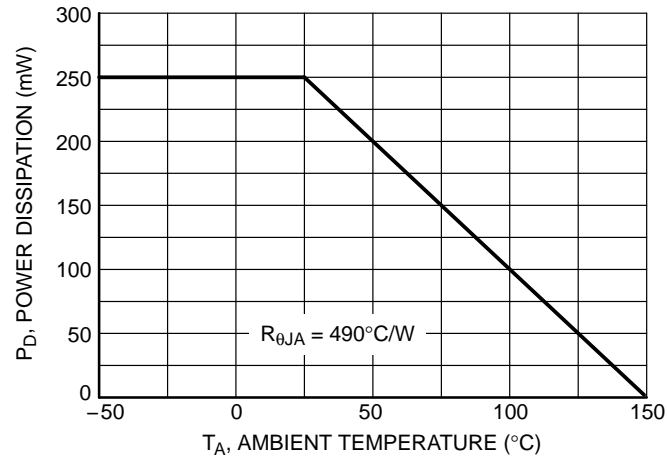


Figure 1. Derating Curve – ALL DEVICES

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5111DW1T1

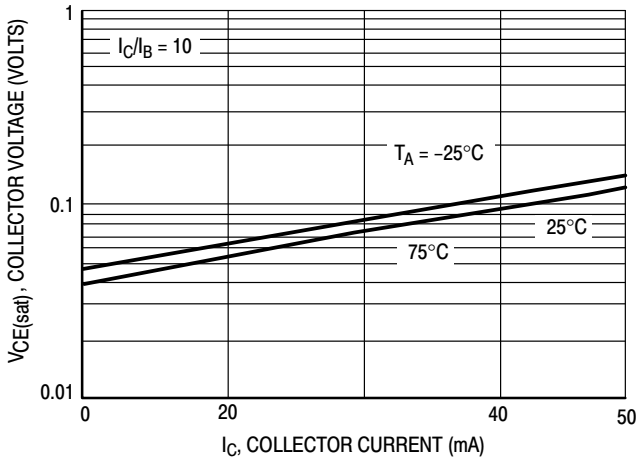


Figure 2. $V_{CE(sat)}$ versus I_C

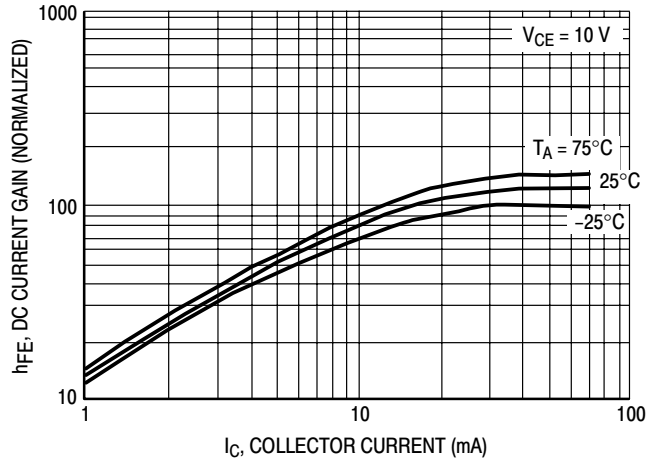


Figure 3. DC Current Gain

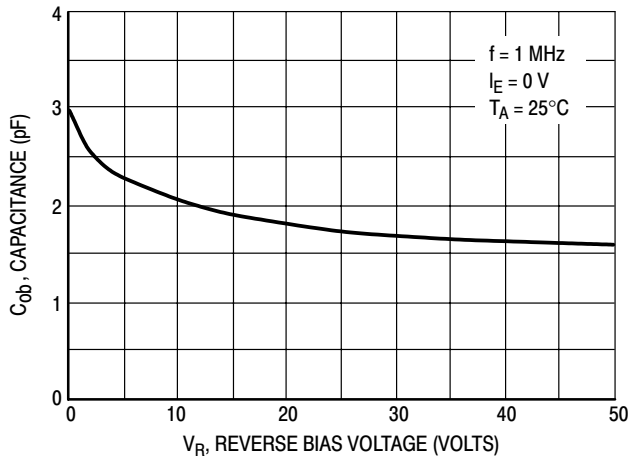


Figure 4. Output Capacitance

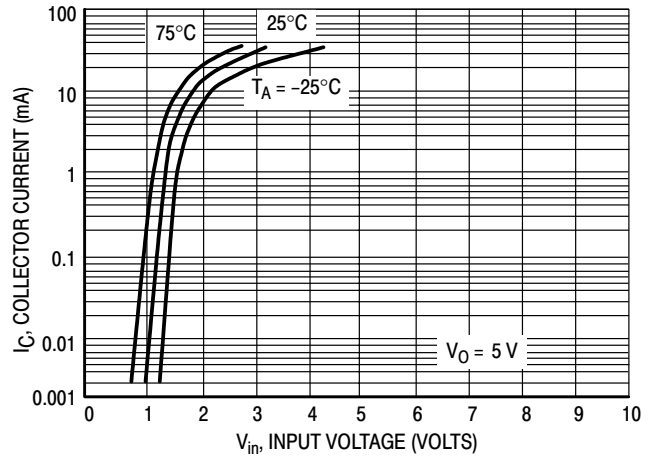


Figure 5. Output Current versus Input Voltage

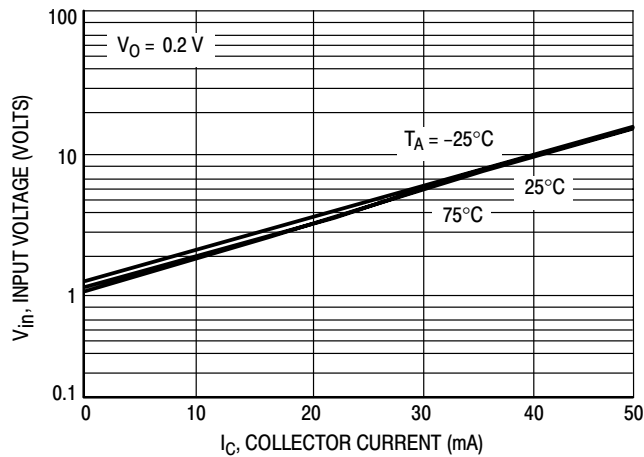


Figure 6. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5112DW1T1

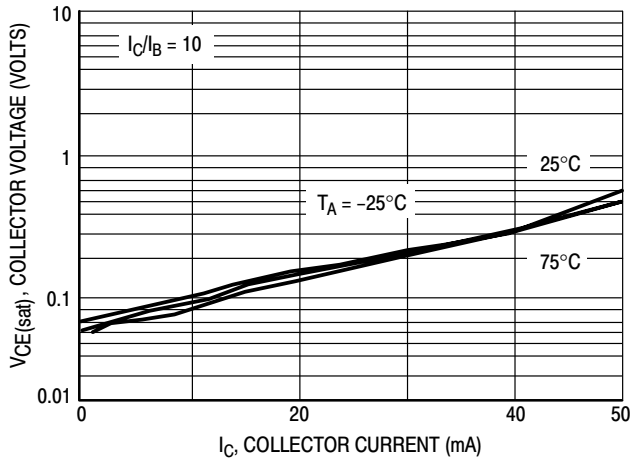


Figure 7. $V_{CE(sat)}$ versus I_C

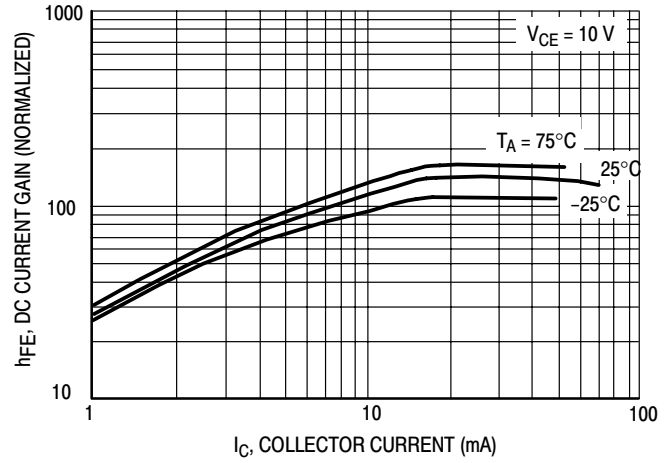


Figure 8. DC Current Gain

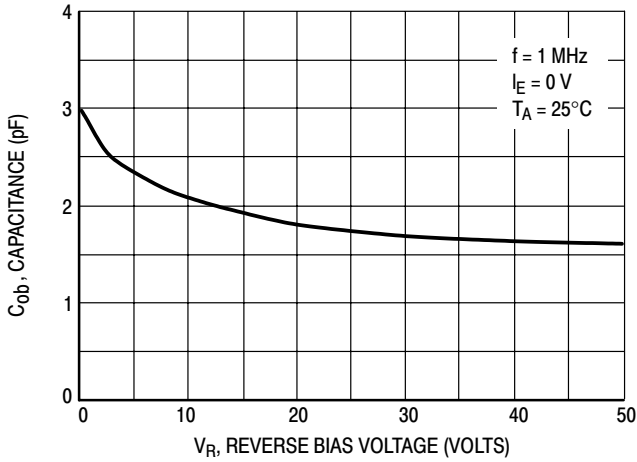


Figure 9. Output Capacitance

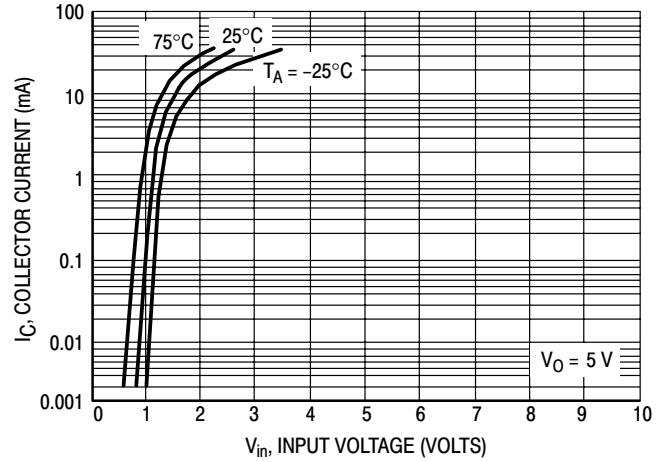


Figure 10. Output Current versus Input Voltage

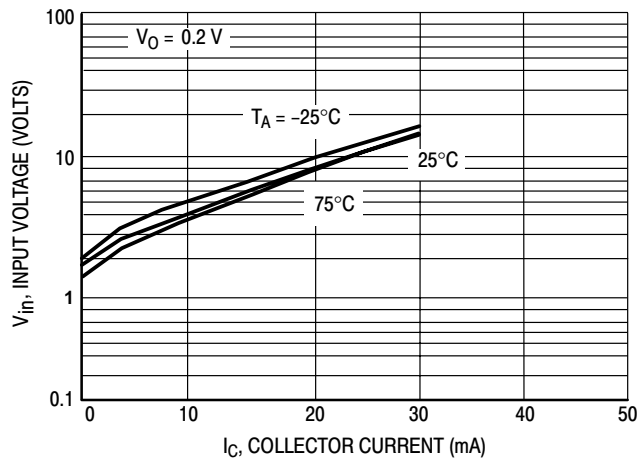


Figure 11. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5113DW1T1

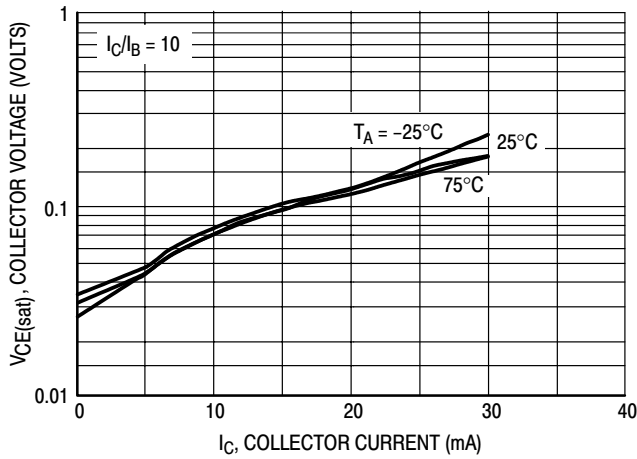


Figure 12. $V_{CE(sat)}$ versus I_C

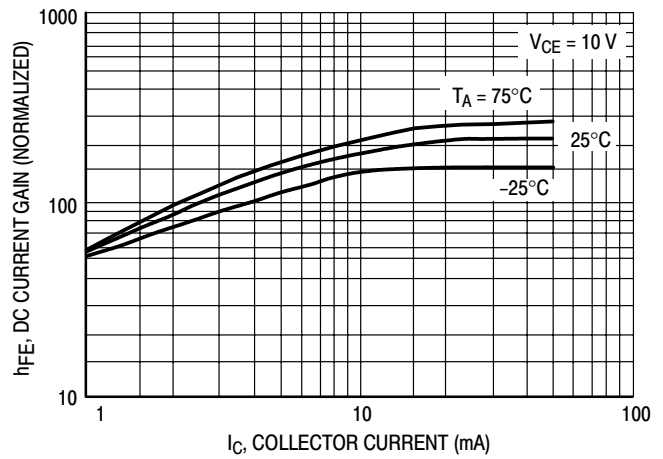


Figure 13. DC Current Gain

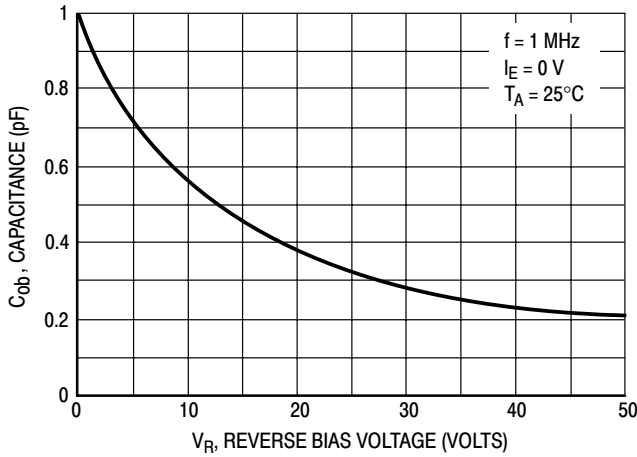


Figure 14. Output Capacitance

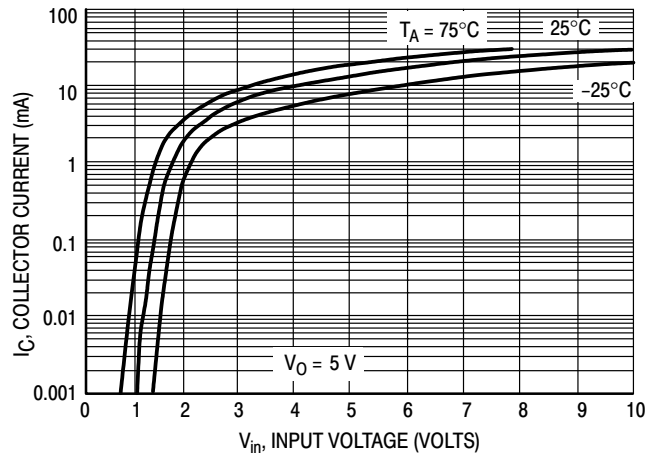


Figure 15. Output Current versus Input Voltage

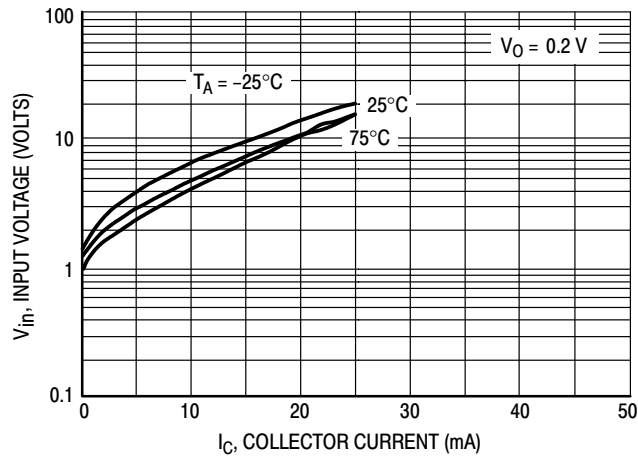


Figure 16. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5114DW1T1

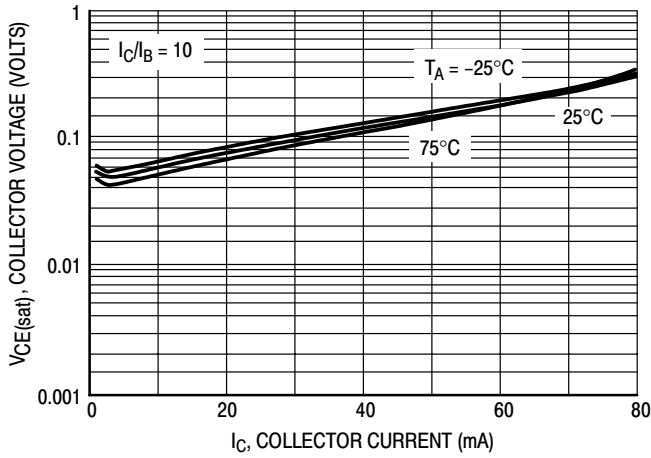


Figure 17. $V_{CE(sat)}$ versus I_C

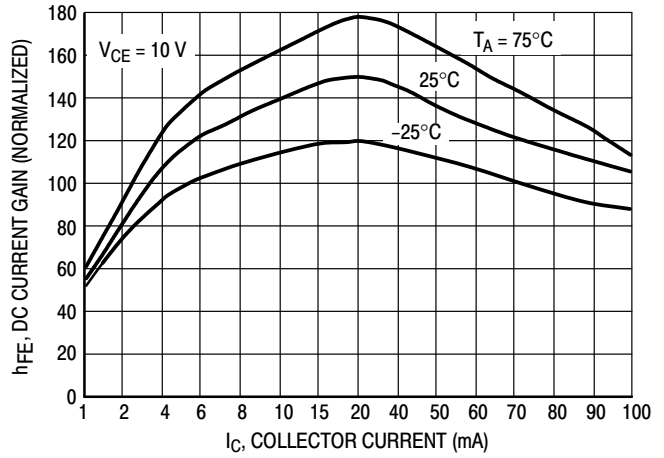


Figure 18. DC Current Gain

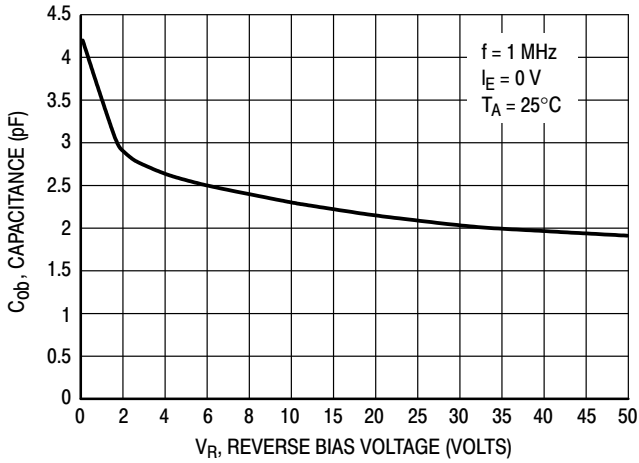


Figure 19. Output Capacitance

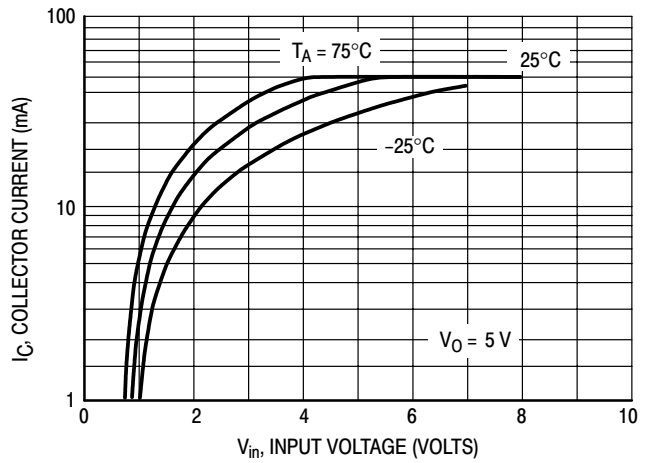


Figure 20. Output Current versus Input Voltage

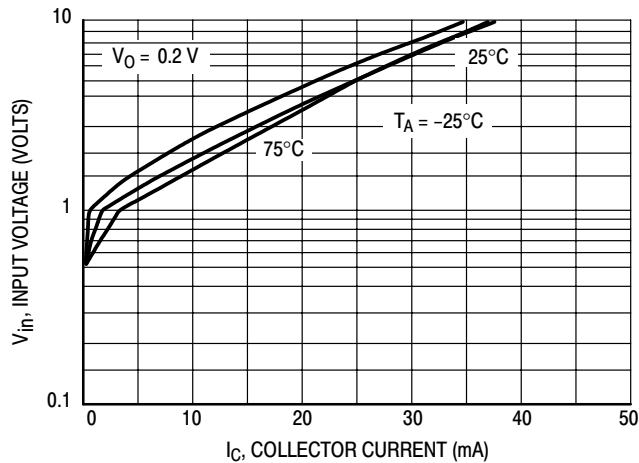


Figure 21. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5115DW1T1

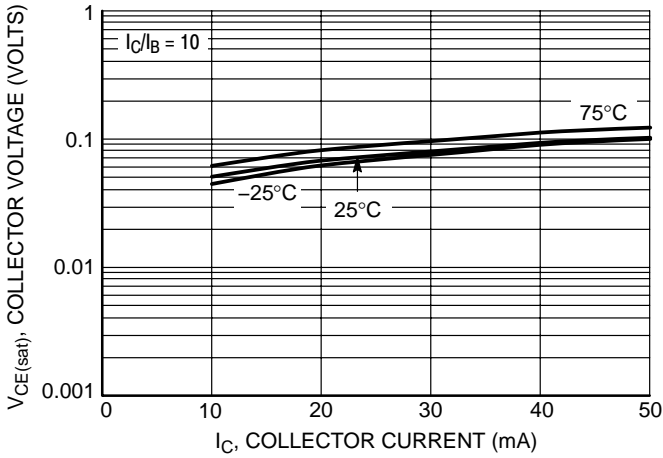


Figure 22. $V_{CE(sat)}$ versus I_C

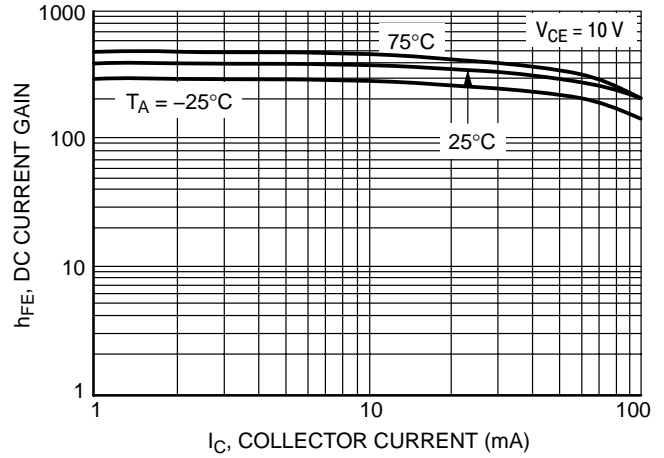


Figure 23. DC Current Gain

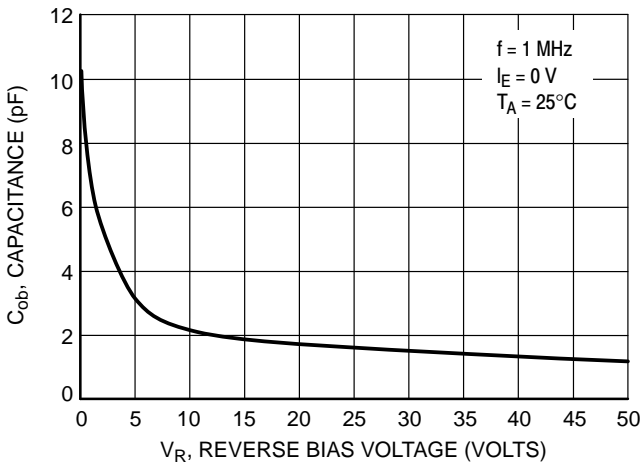


Figure 24. Output Capacitance

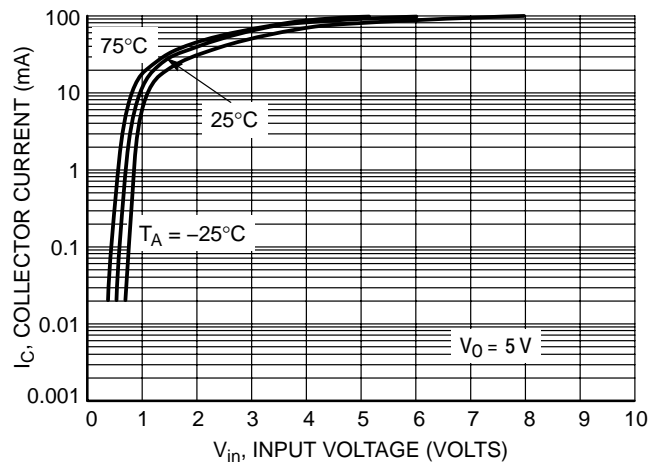


Figure 25. Output Current versus Input Voltage

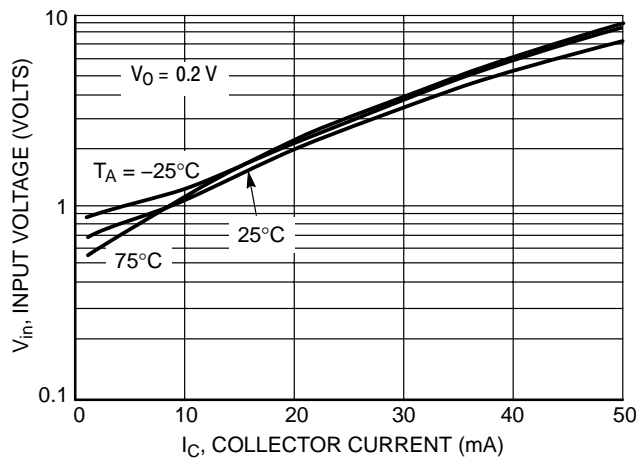


Figure 26. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5116DW1T1

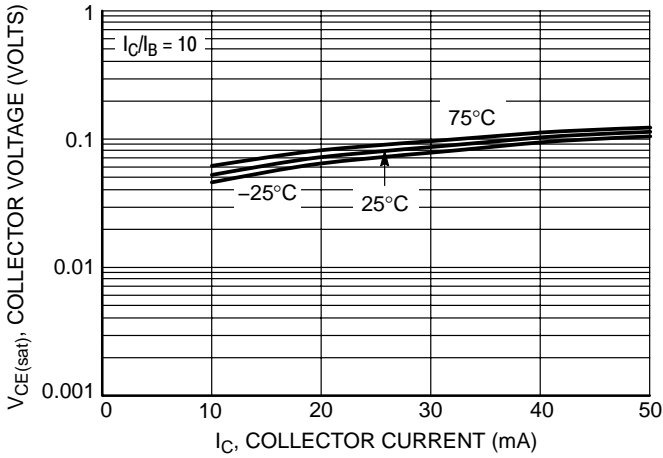


Figure 27. $V_{CE(sat)}$ versus I_C

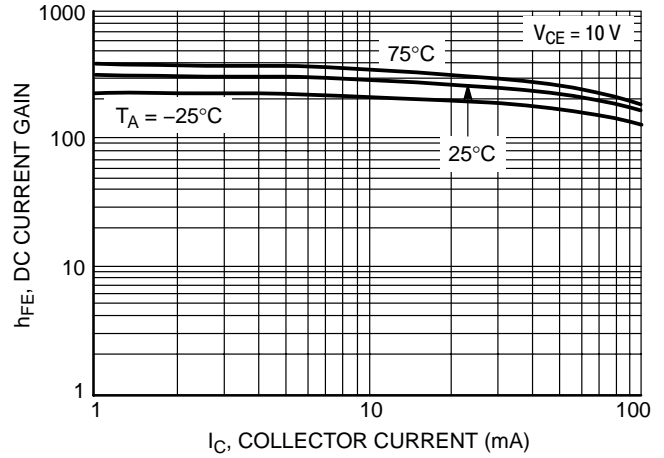


Figure 28. DC Current Gain

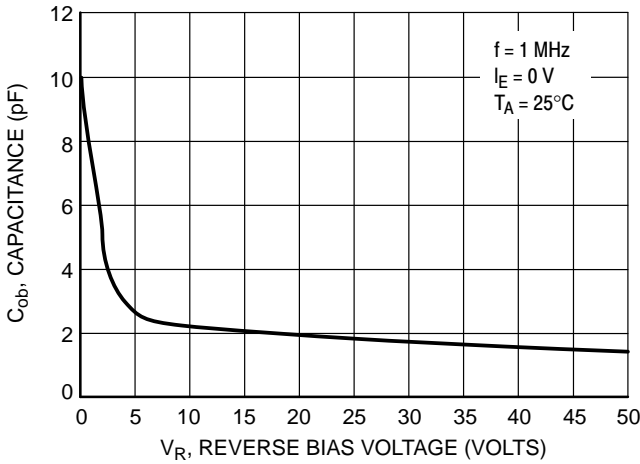


Figure 29. Output Capacitance

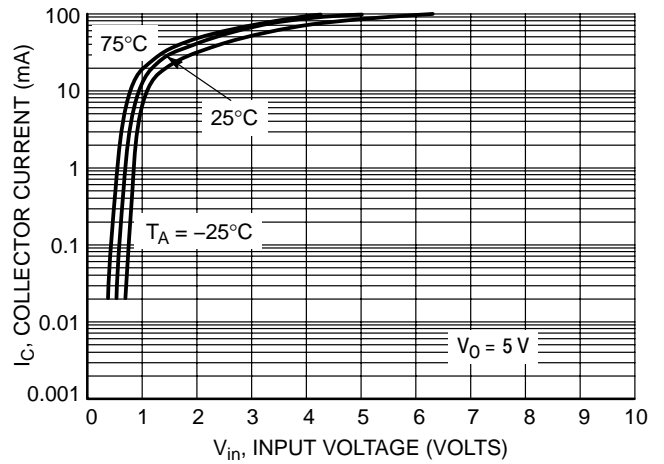


Figure 30. Output Current versus Input Voltage

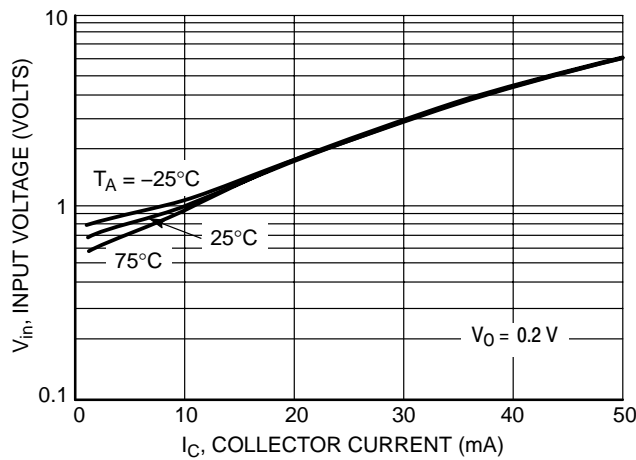


Figure 31. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5130DW1T1

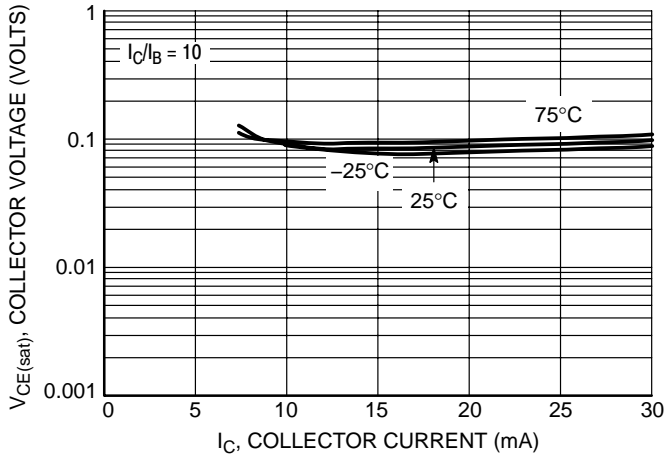


Figure 32. $V_{CE(sat)}$ versus I_C

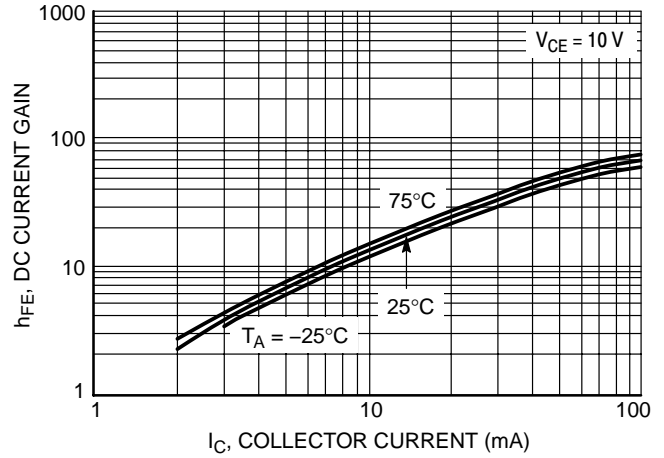


Figure 33. DC Current Gain

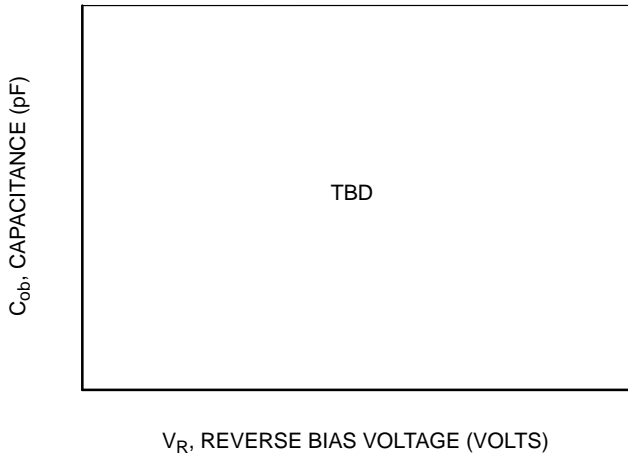


Figure 34. Output Capacitance

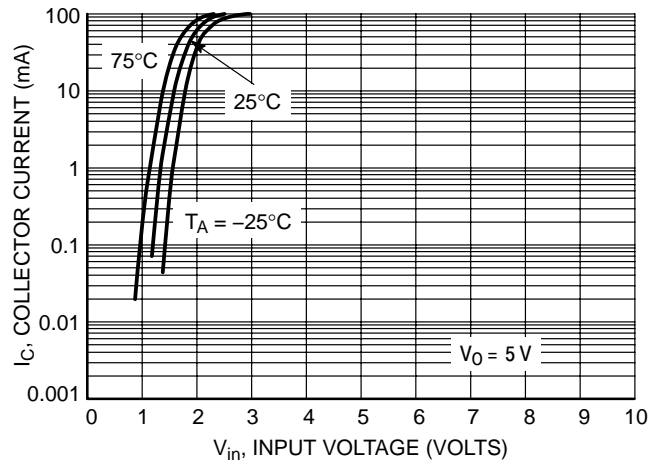


Figure 35. Output Current versus Input Voltage

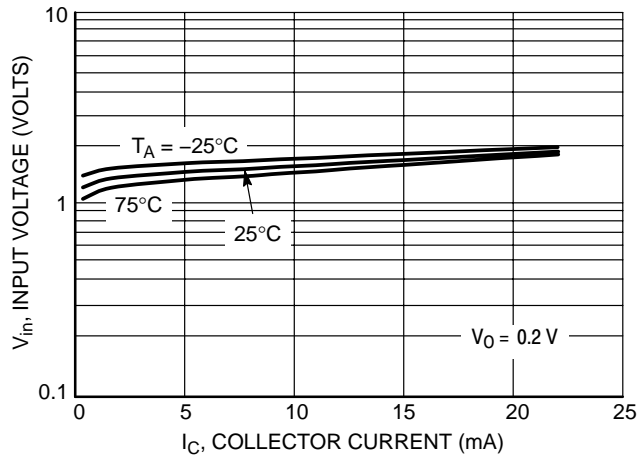


Figure 36. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5131DW1T1

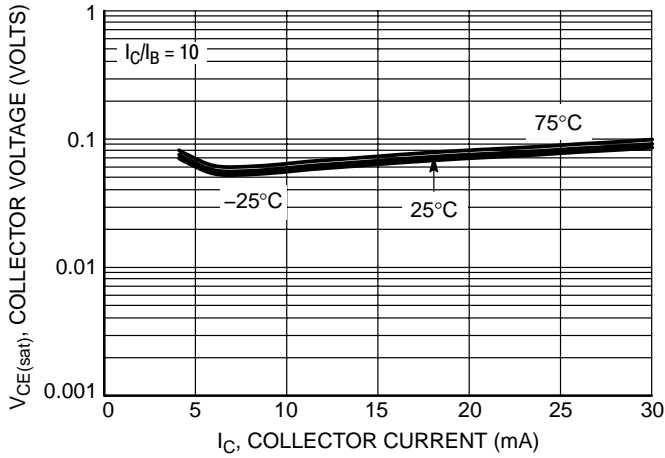


Figure 37. $V_{CE(sat)}$ versus I_C

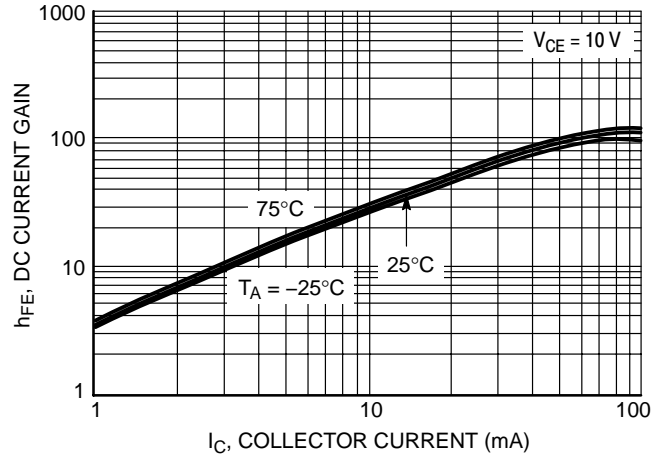


Figure 38. DC Current Gain

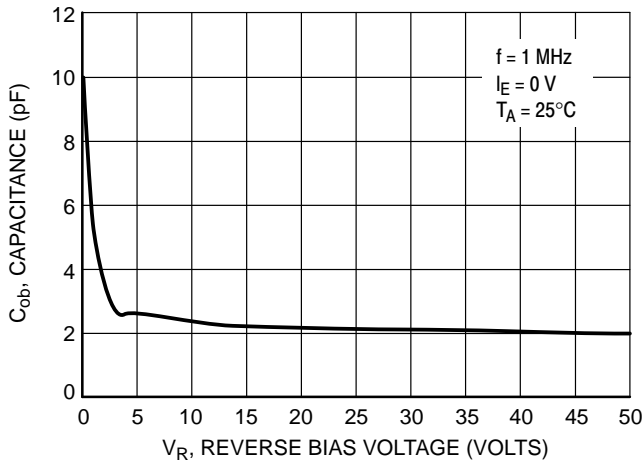


Figure 39. Output Capacitance

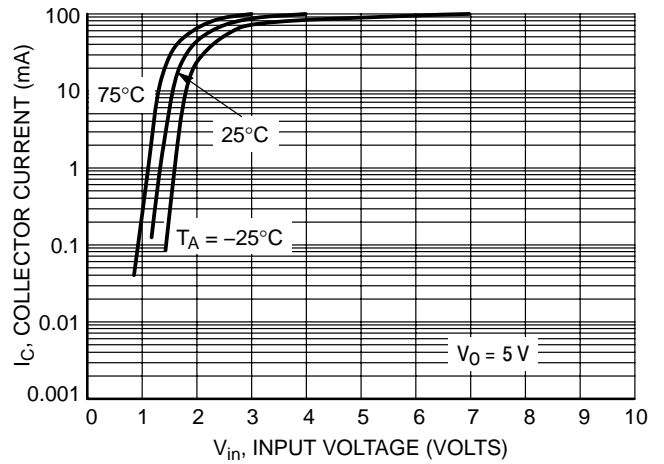


Figure 40. Output Current versus Input Voltage

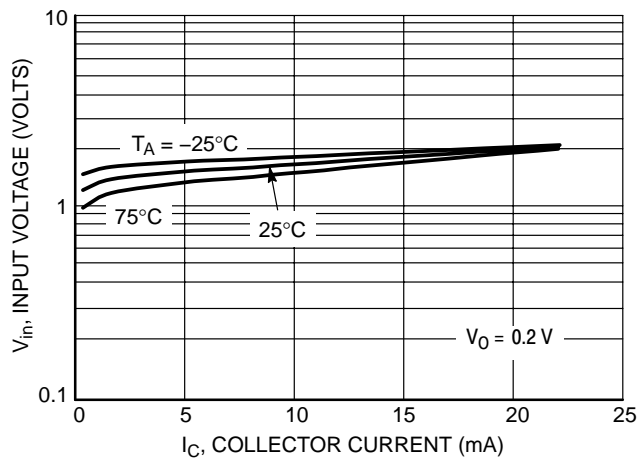


Figure 41. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5132DW1T1

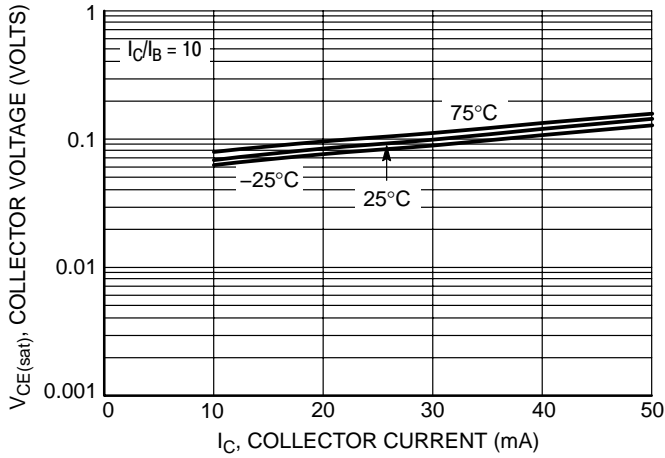


Figure 42. $V_{CE(sat)}$ versus I_C

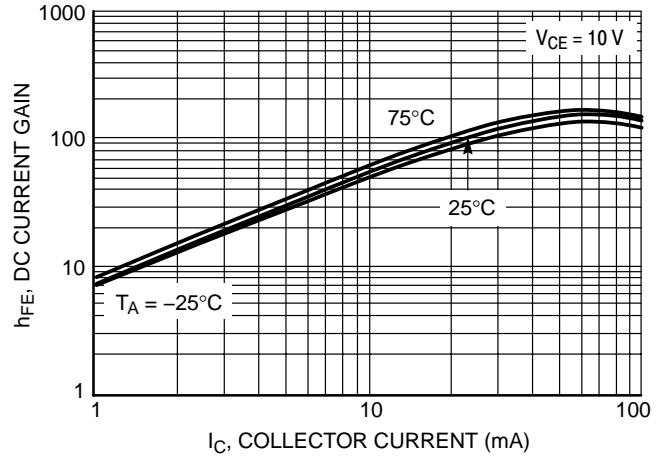


Figure 43. DC Current Gain

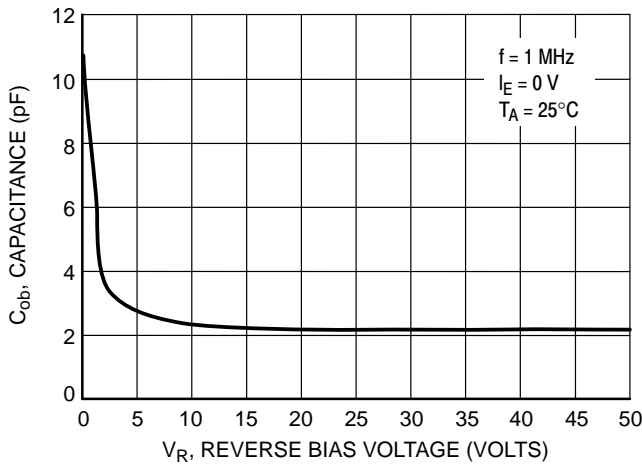


Figure 44. Output Capacitance

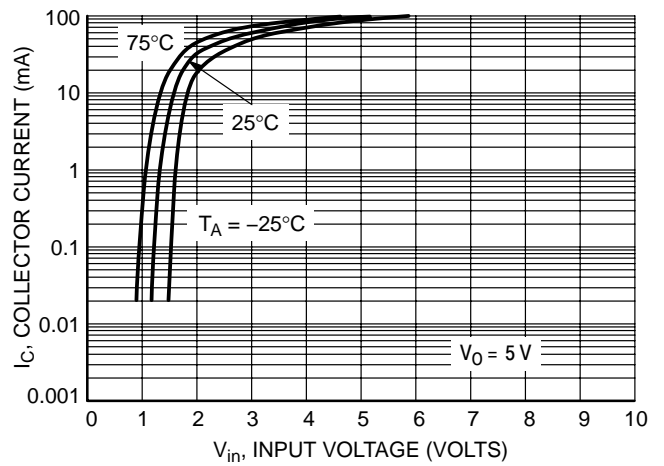


Figure 45. Output Current versus Input Voltage

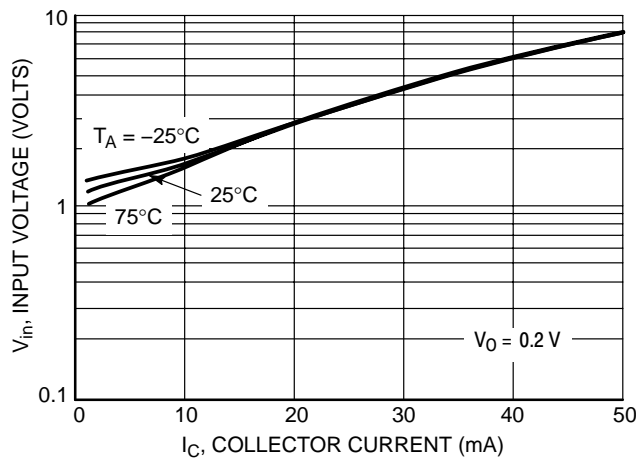


Figure 46. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5133DW1T1

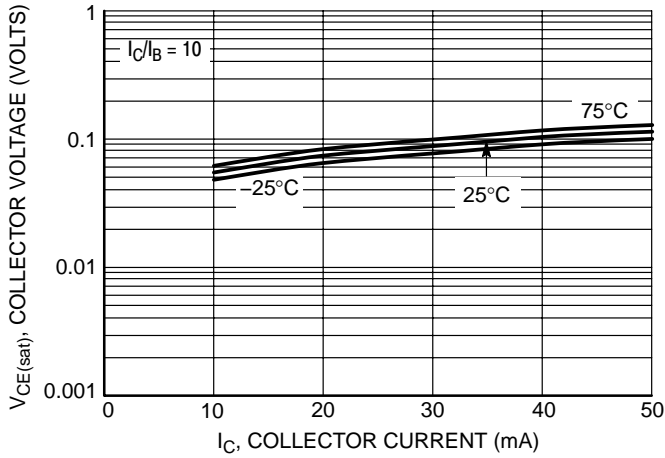


Figure 47. $V_{CE(sat)}$ versus I_C

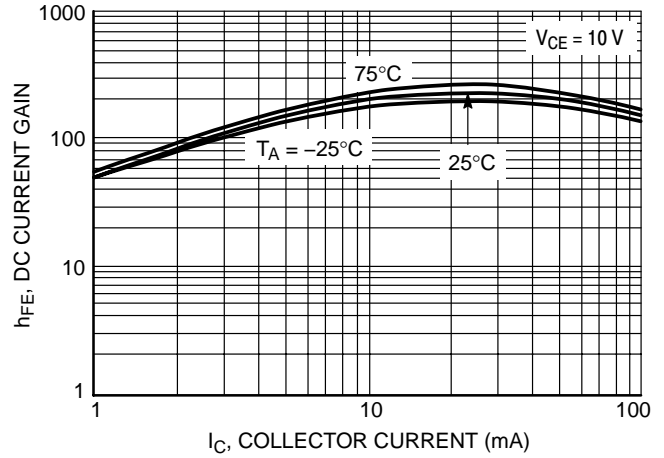


Figure 48. DC Current Gain

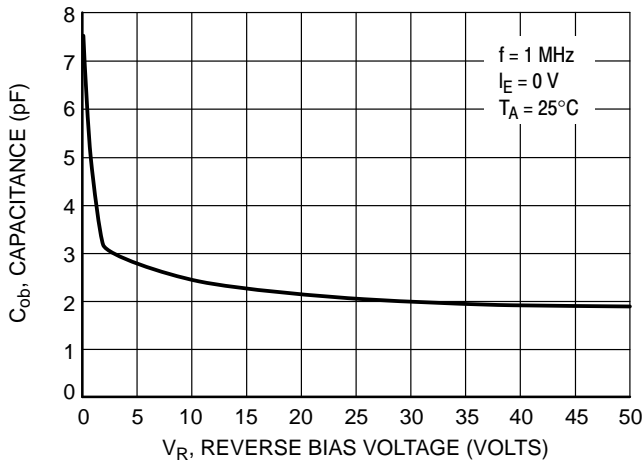


Figure 49. Output Capacitance

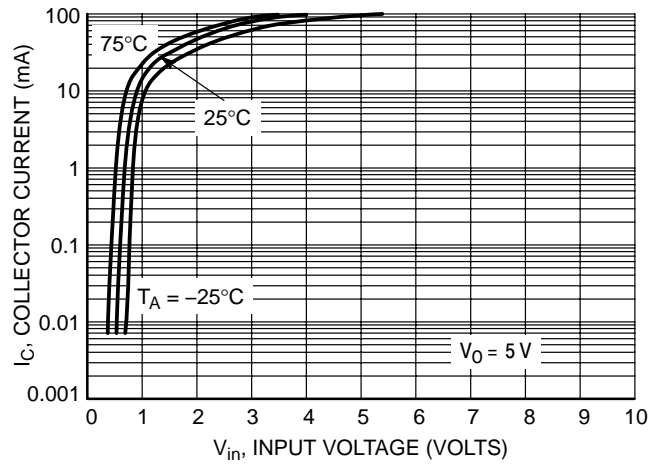


Figure 50. Output Current versus Input Voltage

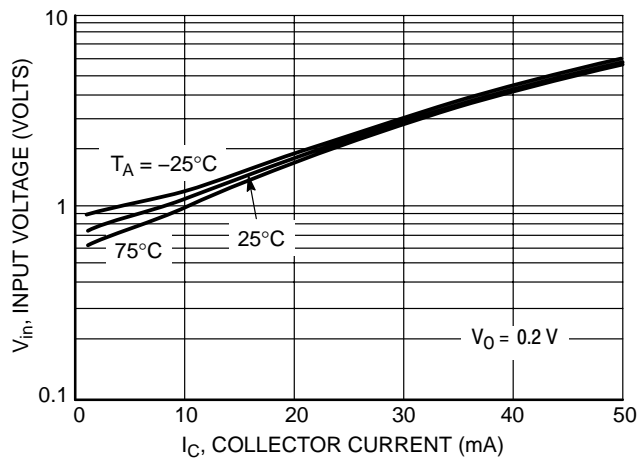


Figure 51. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5134DW1T1

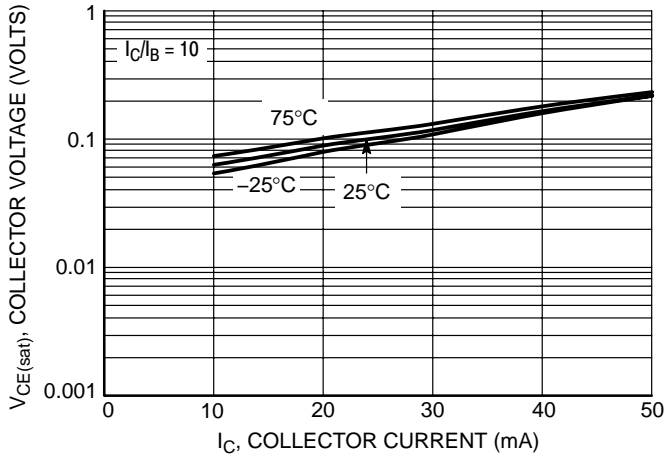


Figure 52. $V_{CE(sat)}$ versus I_C

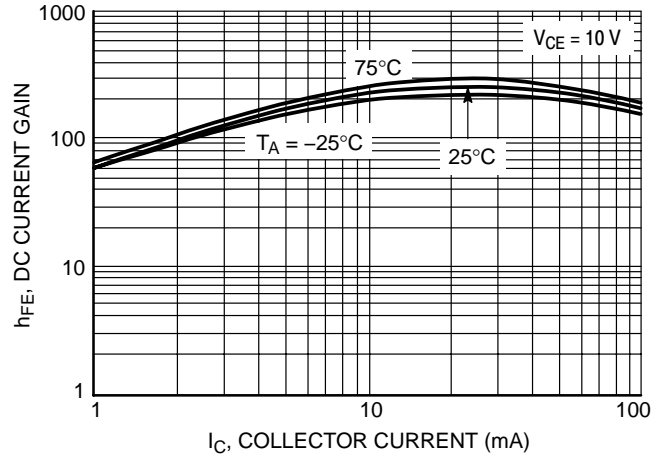


Figure 53. DC Current Gain

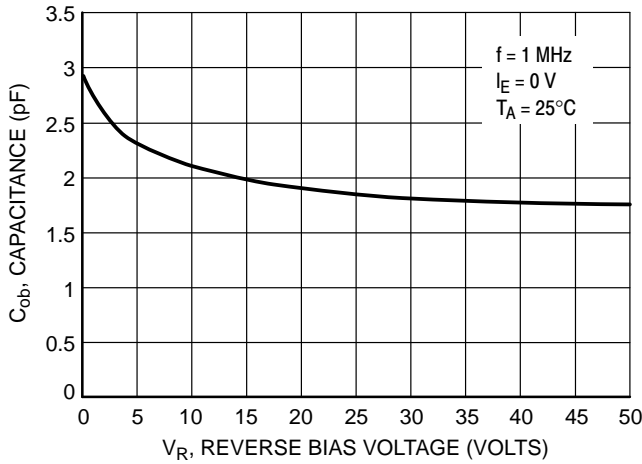


Figure 54. Output Capacitance

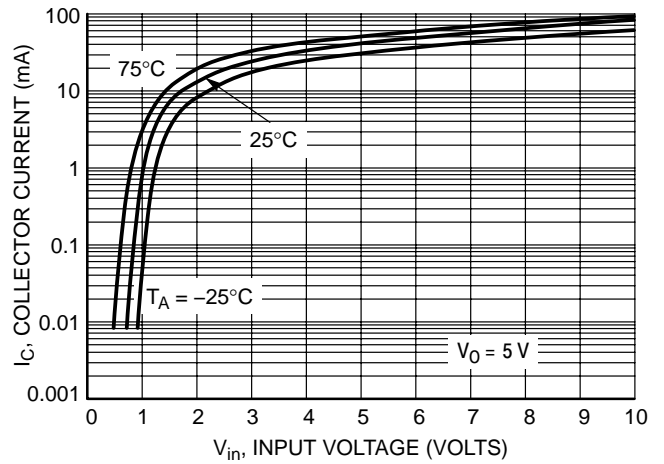


Figure 55. Output Current versus Input Voltage

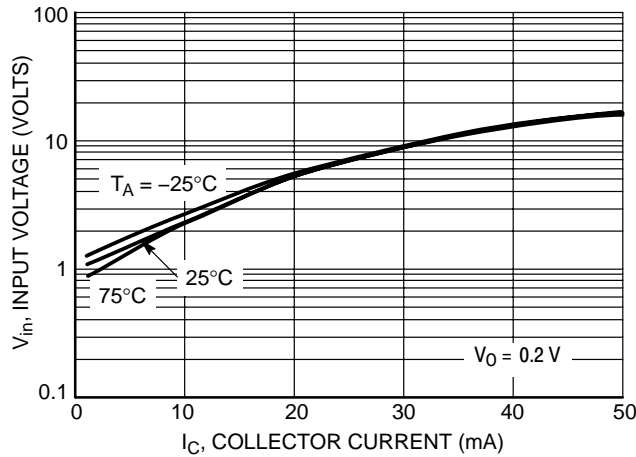


Figure 56. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5135DW1T1

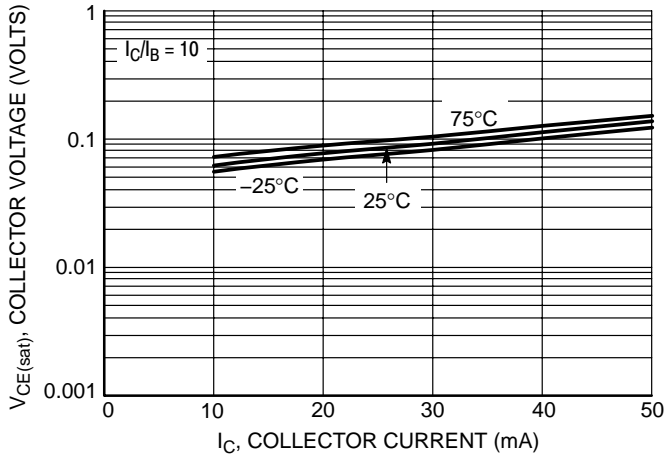


Figure 57. $V_{CE(sat)}$ versus I_C

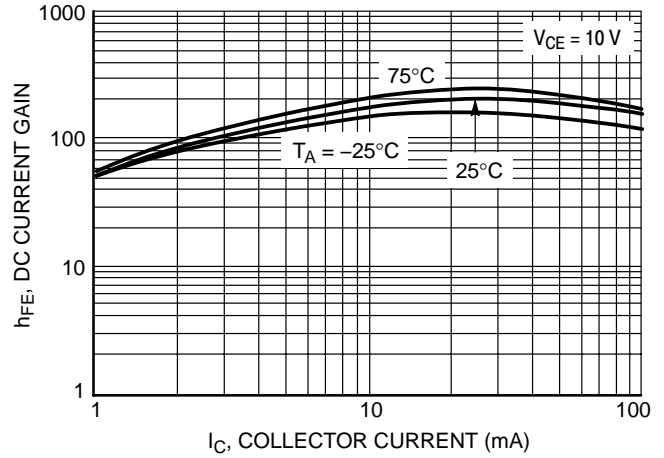


Figure 58. DC Current Gain

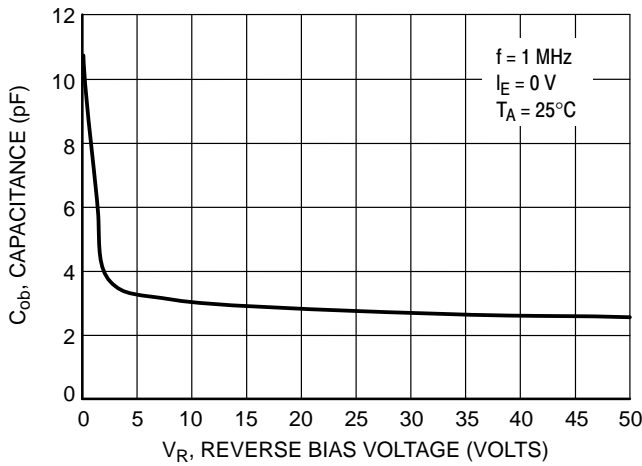


Figure 59. Output Capacitance

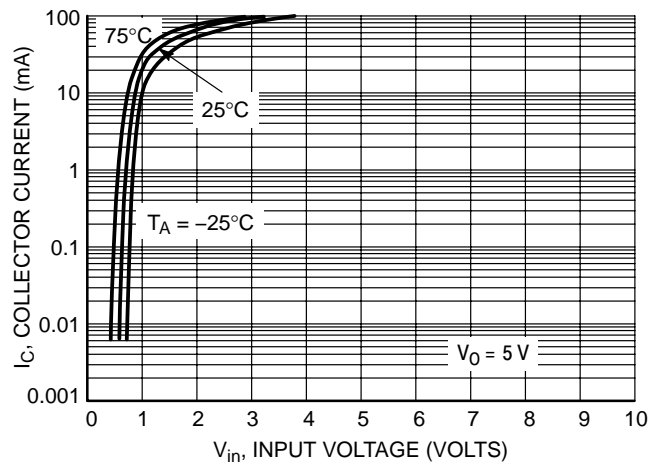


Figure 60. Output Current versus Input Voltage

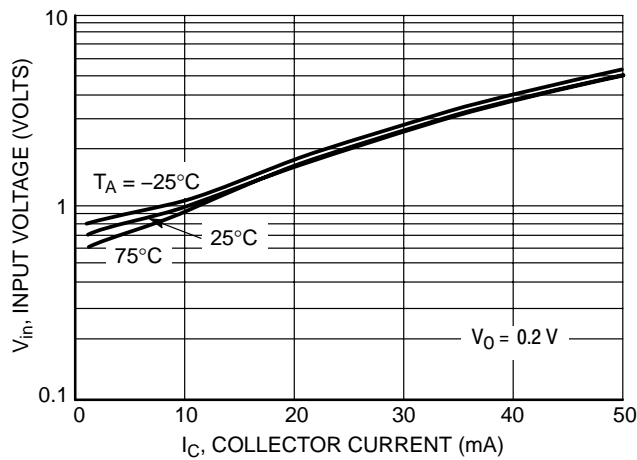


Figure 61. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5136DW1T1

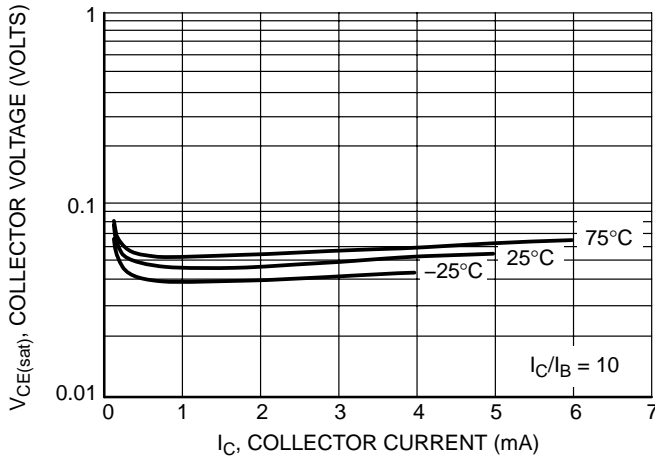


Figure 62. $V_{CE(sat)}$ versus I_C

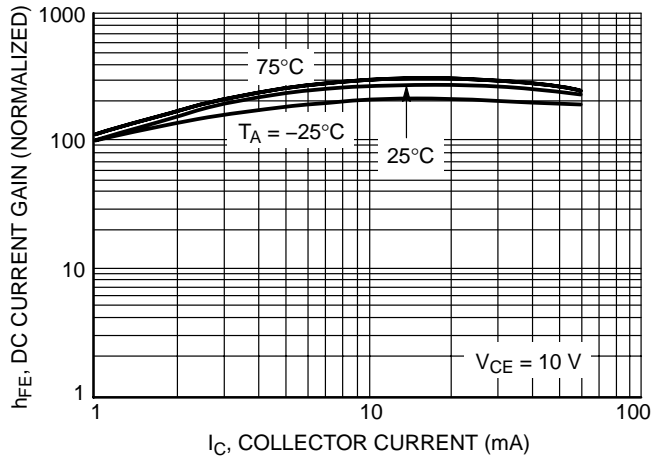


Figure 63. DC Current Gain

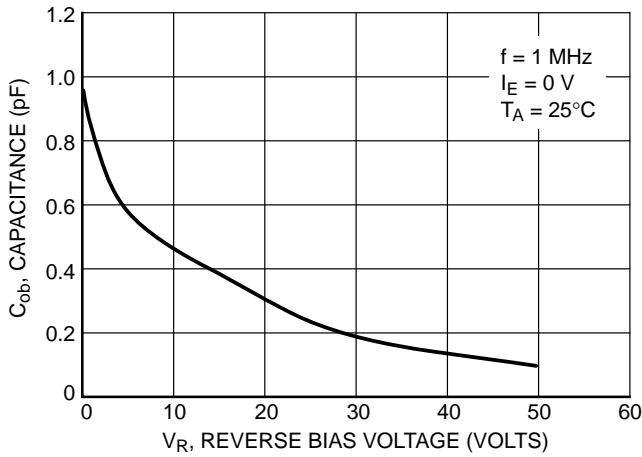


Figure 64. Output Capacitance

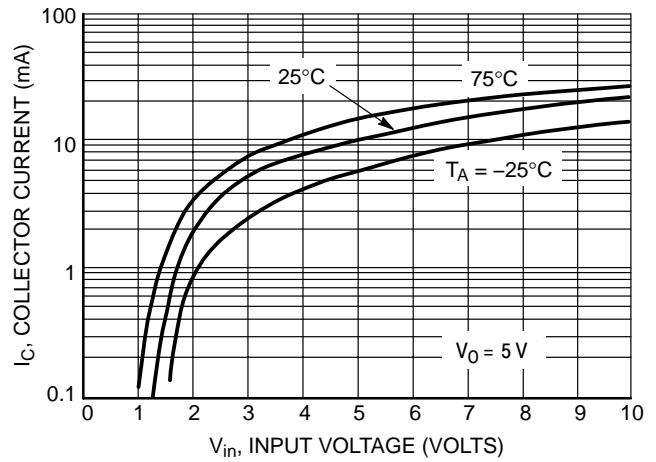


Figure 65. Output Current versus Input Voltage

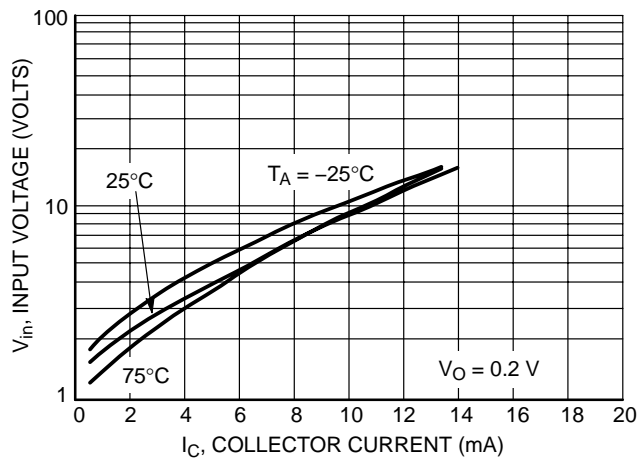


Figure 66. Input Voltage versus Output Current

MUN5111DW1T1 Series

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5137DW1T1

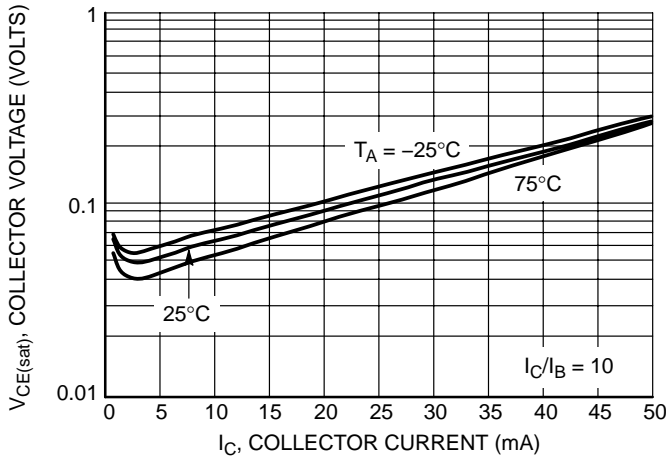


Figure 67. $V_{CE(sat)}$ versus I_C

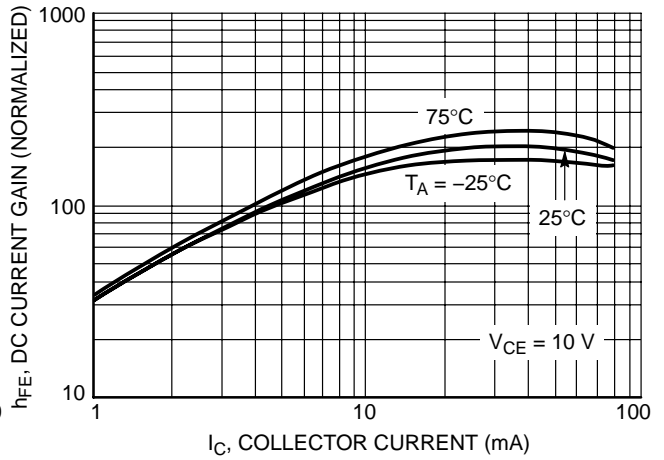


Figure 68. DC Current Gain

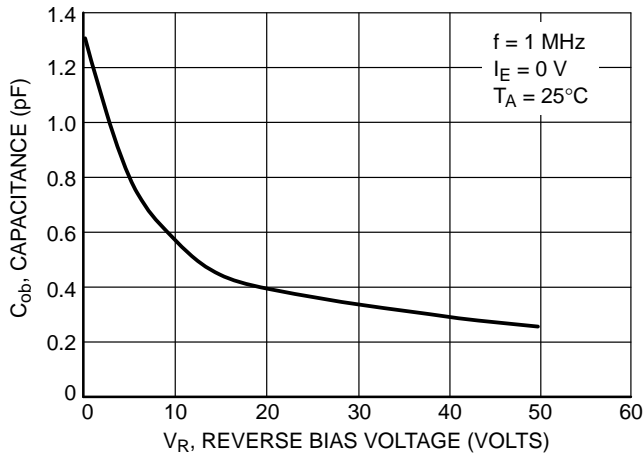


Figure 69. Output Capacitance

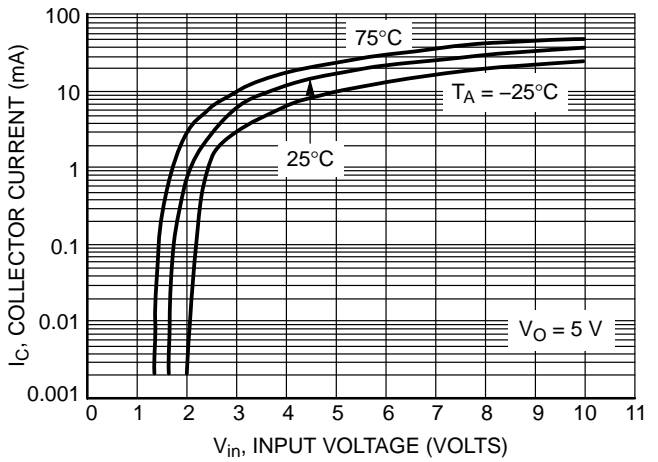


Figure 70. Output Current versus Input Voltage

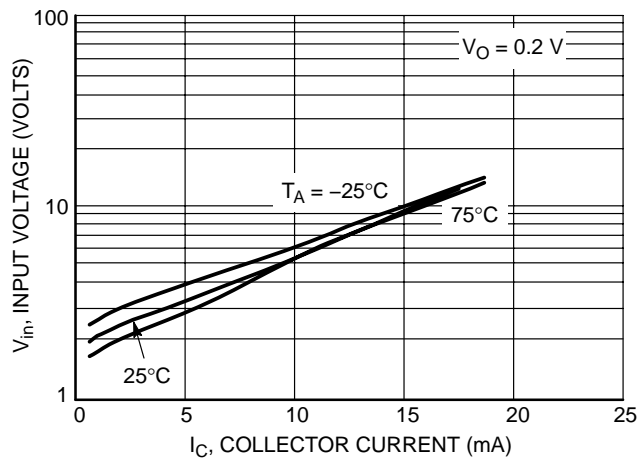
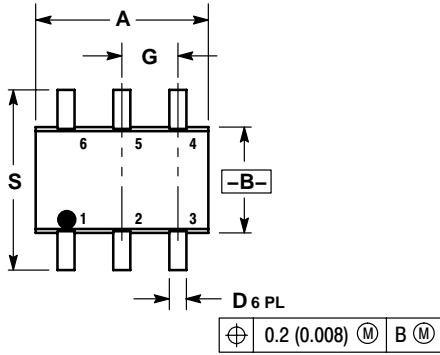


Figure 71. Input Voltage versus Output Current

MUN5111DW1T1 Series

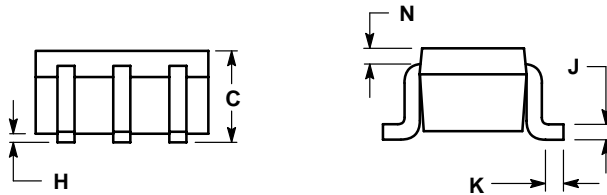
PACKAGE DIMENSIONS

SC-88 (SOT-363)
CASE 419B-02
ISSUE T



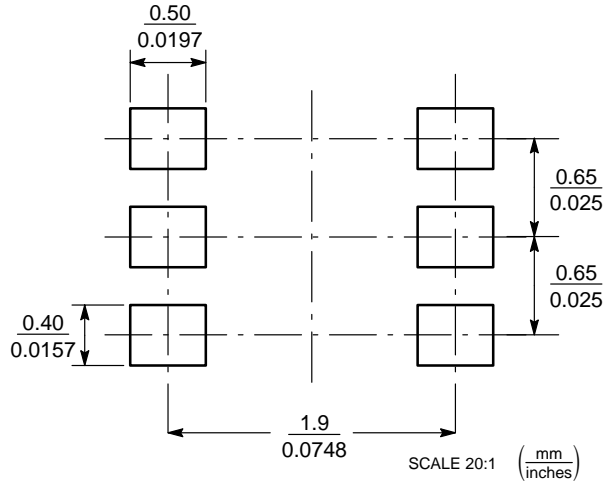
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.071 | 0.087 | 1.80 | 2.20 |
| B | 0.045 | 0.053 | 1.15 | 1.35 |
| C | 0.031 | 0.043 | 0.80 | 1.10 |
| D | 0.004 | 0.012 | 0.10 | 0.30 |
| G | 0.026 BSC | | 0.65 BSC | |
| H | --- | 0.004 | --- | 0.10 |
| J | 0.004 | 0.010 | 0.10 | 0.25 |
| K | 0.004 | 0.012 | 0.10 | 0.30 |
| N | 0.008 REF | | 0.20 REF | |
| S | 0.079 | 0.087 | 2.00 | 2.20 |




- STYLE 1:
1. EMITTER 2
 2. BASE 2
 3. COLLECTOR 1
 4. EMITTER 1
 5. BASE 1
 6. COLLECTOR 2

SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MUN5111DW1T1 Series

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