

To our customers,

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## Old Company Name in Catalogs and Other Documents

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On April 1<sup>st</sup>, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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# SILICON TRANSISTOR FA4xxx

### RESISTOR BUILT-IN TYPE NPN TRANSISTOR

#### FEATURES

- Compact package
- Resistors built-in type
- Complementary to FN4xxx

#### ORDERING INFORMATION

PART NUMBER	PACKAGE
FA4xxx	SC-59

#### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

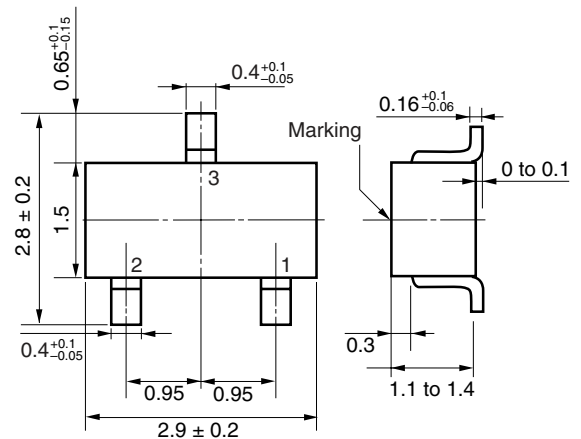
Collector to Base Voltage	V <sub>CBO</sub>	60	V
Collector to Emitter Voltage	V <sub>CEO</sub>	50	V
<R> Emitter to Base Voltage	V <sub>EBO</sub>	Note1	V
Collector Current (DC)	I <sub>C</sub>	0.1	A
Collector Current (pulse) <sup>Note2</sup>	I <sub>C(pulse)</sub>	0.2	A
Total Power Dissipation	P <sub>T</sub>	0.2	W
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C

#### <R> Note 1.

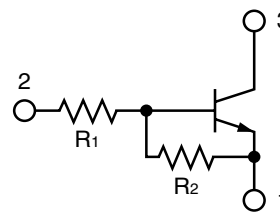
PART NUMBER	V <sub>EBO</sub> (V)	MARK	R <sub>1</sub> (kΩ)	R <sub>2</sub> (kΩ)
FA4A4M	10	AA1	10.0	10.0
FA4F4M	10	AB1	22.0	22.0
FA4L4M	10	AC1	47.0	47.0
FA4L3M	10	AD1	4.7	4.7
FA4L3N	5	AE1	4.7	10.0
FA4L3Z	5	AF1	4.7	
FA4A3Q	5	AG1	1.0	10.0
FA4A4P	5	AH1	10.0	47.0
FA4F4N	5	AJ1	22.0	47.0

Note 2. PW ≤ 10 ms, Duty Cycle ≤ 50%

#### PACKAGE DRAWING (Unit: mm)



#### EQUIVALENT CIRCUIT



#### PIN CONNECTION

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

PART NUMBER	V <sub>EBO</sub> (V)	MARK	R <sub>1</sub> (kΩ)	R <sub>2</sub> (kΩ)
FA4L4L	15	AK1	47.0	22.0
FA4A4Z	5	AL1	10.0	
FA4F4Z	5	AM1	22.0	
FA4L4Z	5	AN1	47.0	
FA4F3M	10	AP1	2.2	2.2
FA4F3P	5	AQ1	2.2	10.0
FA4F3R	5	AR1	2.2	47.0
FA4A4L	15	AS1	10.0	4.7
FA4L4K	25	AT1	47.0	10.0

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**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I <sub>CBO</sub>	V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0			100	nA
DC Current Gain	h <sub>FE1</sub>	V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 5.0 mA	<b>Note1</b>			-
	h <sub>FE2</sub>	V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 50 mA				-
Collector Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 5.0 mA, I <sub>B</sub> = 0.25 mA			0.2	V
Low-level Input Voltage	V <sub>IL</sub>	V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 100 μA	<b>Note2</b>			V
High-level Input Voltage	V <sub>IH</sub>	V <sub>CE</sub> = 0.2 V, I <sub>C</sub> = 5.0 mA				V
Input Resistor	R <sub>1</sub>		<b>Note3</b>			kΩ
Emitter to Base Resistor	R <sub>2</sub>					kΩ

**Note 1.**

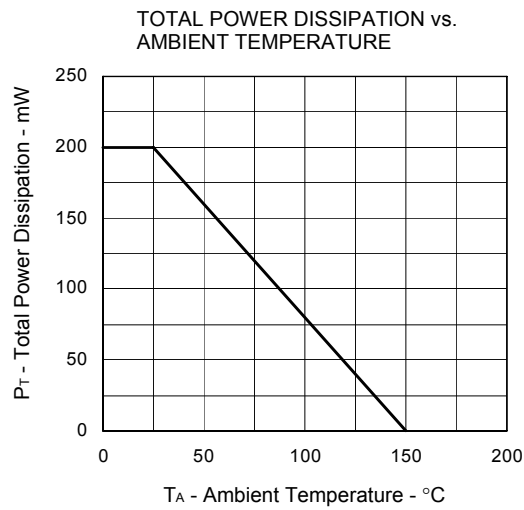
PART NUMBER	h <sub>FE1</sub>			h <sub>FE2</sub>			UNIT
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
FA4A4M	35		100	80			-
FA4F4M	60		195	90			-
FA4L4M	85		340	95			-
FA4L3M	20		80	80			-
FA4L3N	35		100	80			-
FA4L3Z	135		600	100			-
FA4A3Q	35		100	80			-
FA4A4P	85		340	95			-
FA4F4N	85		340	95			-
FA4L4L	60		195	90			-
FA4A4Z	135		600	100			-
FA4F4Z	135		600	100			-
FA4L4Z	135		600	100			-
FA4F3M	8		50	50			-
FA4F3P	35		100	80			-
FA4F3R	85		340	95			-
FA4A4L	20		80	80			-
FA4L4K	35		100	80			-

**Note 2.**

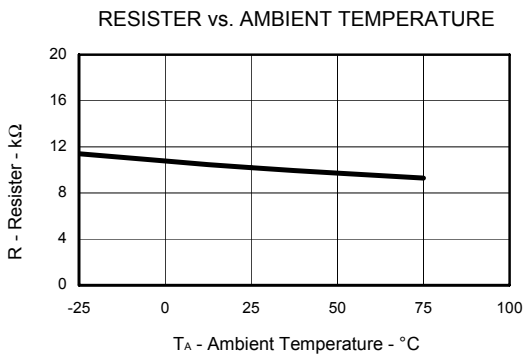
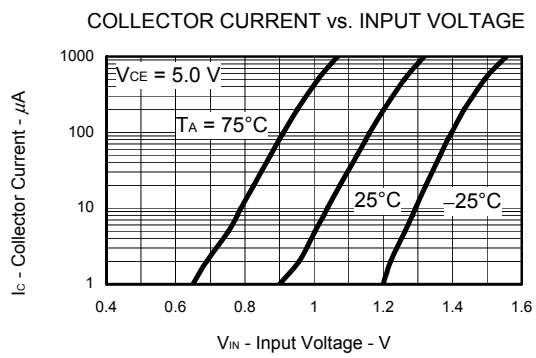
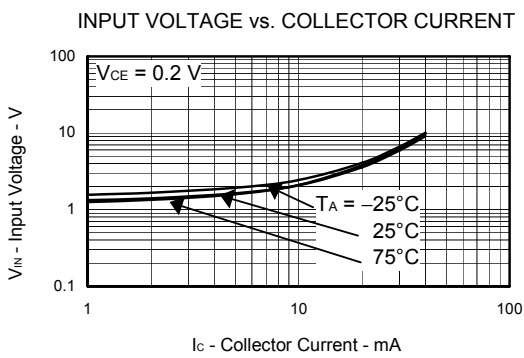
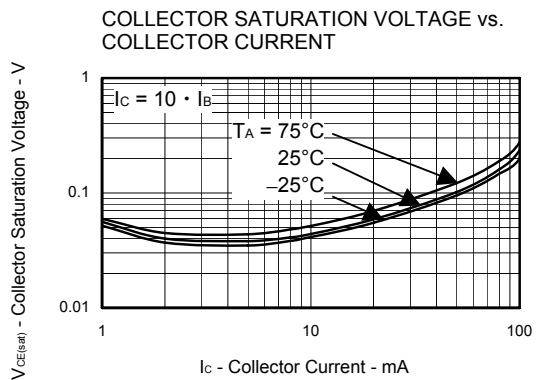
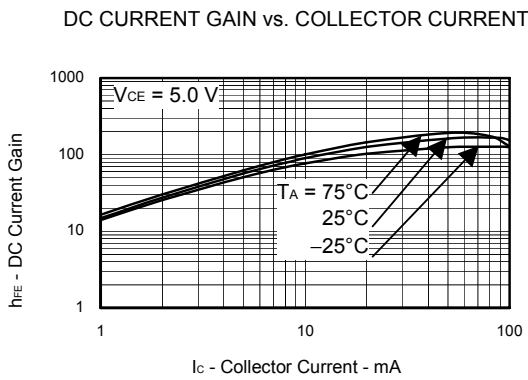
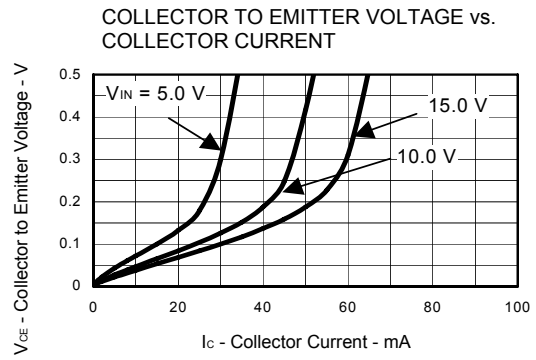
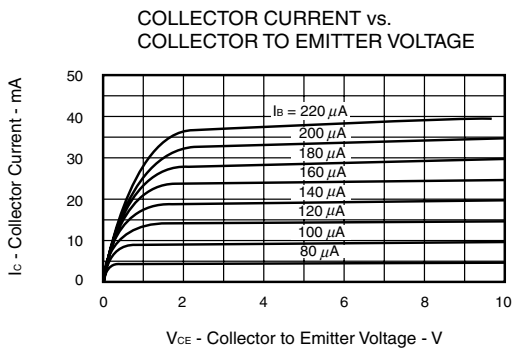
PART NUMBER	V <sub>IL</sub>			V <sub>IH</sub>			UNIT
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
FA4A4M			0.8	3.0			V
FA4F4M			0.8	4.0			V
FA4L4M			0.8	5.0			V
FA4L3M			0.8	3.0			V
FA4L3N			0.6	3.0			V
FA4L3Z			0.5	1.2			V
FA4A3Q			0.5	2.0			V
FA4A4P			0.5	3.0			V
FA4F4N			0.6	3.0			V
FA4L4L			0.9	6.0			V
FA4A4Z			0.5	2.0			V
FA4F4Z			0.5	3.0			V
FA4L4Z			0.5	4.0			V
FA4F3M			0.8	3.0			V
FA4F3P			0.5	2.0			V
FA4F3R			0.5	2.0			V
FA4A4L			0.9	6.0			V
FA4L4K			2.0	8.0			V

Note 3.

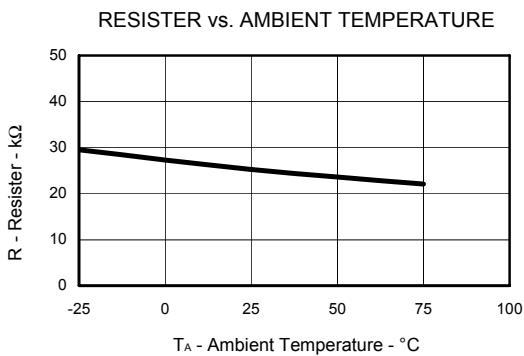
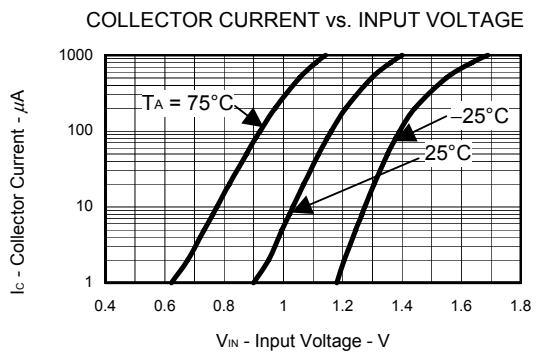
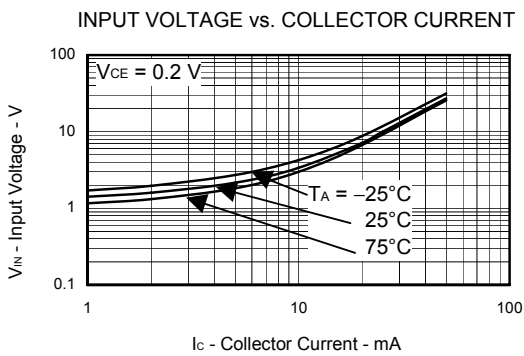
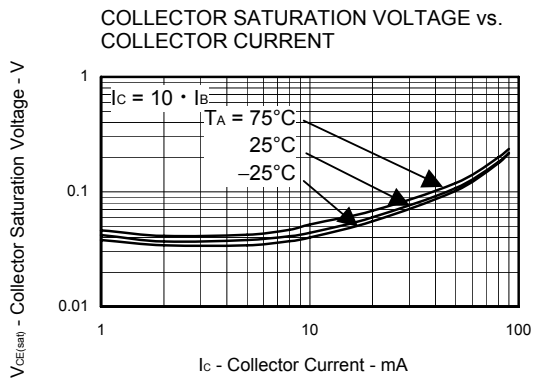
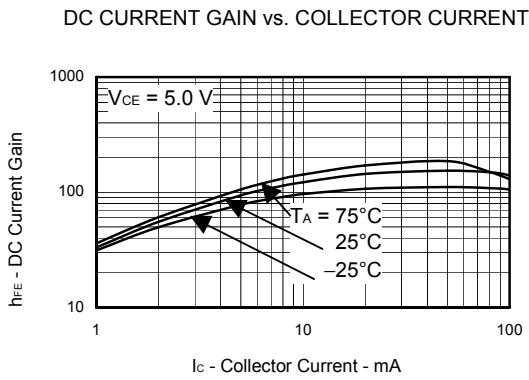
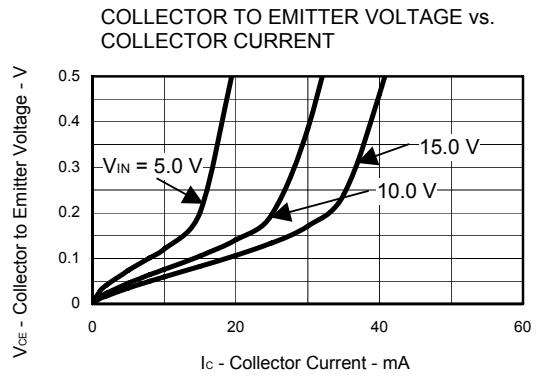
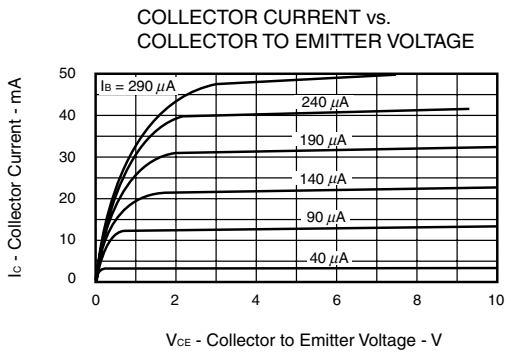
PART NUMBER	R <sub>1</sub>			R <sub>2</sub>			UNIT
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
FA4A4M	7.00	10.00	13.00	7.00	10.00	13.00	kΩ
FA4F4M	15.40	22.00	28.60	15.40	22.00	28.60	kΩ
FA4L4M	32.90	47.00	61.10	32.90	47.00	61.10	kΩ
FA4L3M	3.29	4.70	6.11	3.29	4.70	6.11	kΩ
FA4L3N	3.29	4.70	6.11	7.00	10.00	13.00	kΩ
FA4L3Z	3.29	4.70	6.11				kΩ
FA4A3Q	0.70	1.00	1.30	7.00	10.00	13.00	kΩ
FA4A4P	7.00	10.00	13.00	32.90	47.00	61.10	kΩ
FA4F4N	15.40	22.00	28.60	32.90	47.00	61.10	kΩ
FA4L4L	32.90	47.00	61.10	15.40	22.00	28.60	kΩ
FA4A4Z	7.00	10.00	13.00				kΩ
FA4F4Z	15.40	22.00	28.60				kΩ
FA4L4Z	32.90	47.00	61.10				kΩ
FA4F3M	1.54	2.20	2.86	1.54	2.20	2.86	kΩ
FA4F3P	1.54	2.20	2.86	7.00	10.00	13.00	kΩ
FA4F3R	1.54	2.20	2.86	32.90	47.00	61.10	kΩ
FA4A4L	7.00	10.00	13.00	3.29	4.70	6.11	kΩ
FA4L4K	32.90	47.00	61.10	7.00	10.00	13.00	kΩ



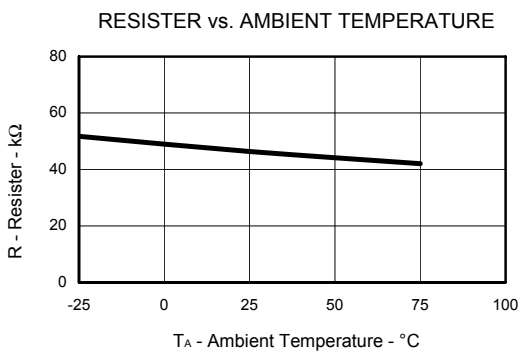
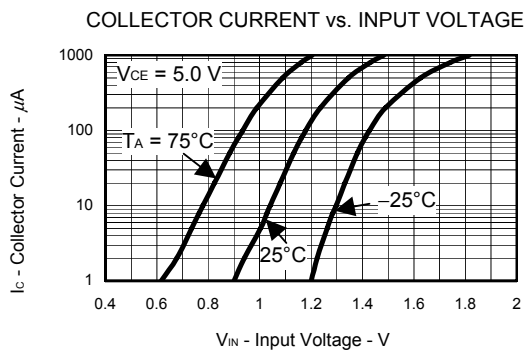
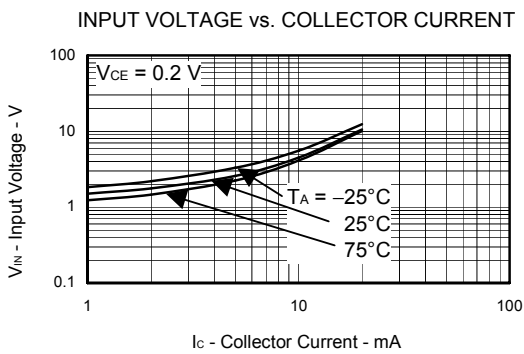
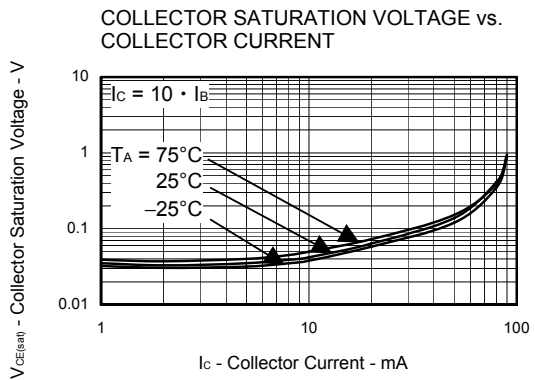
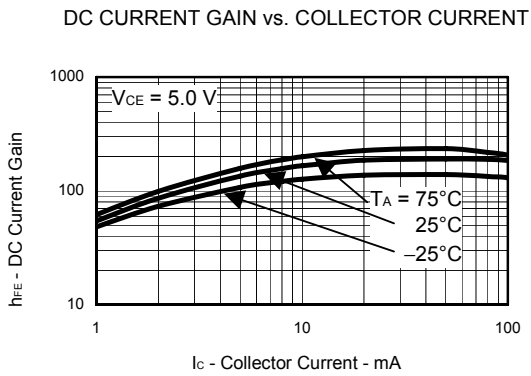
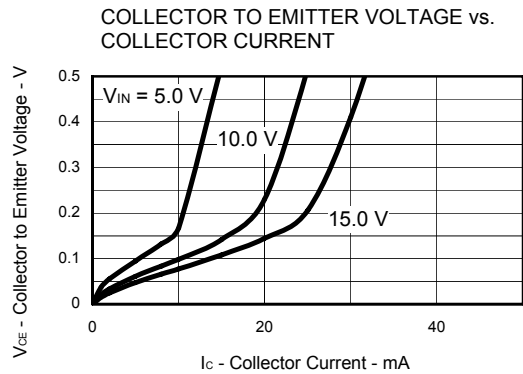
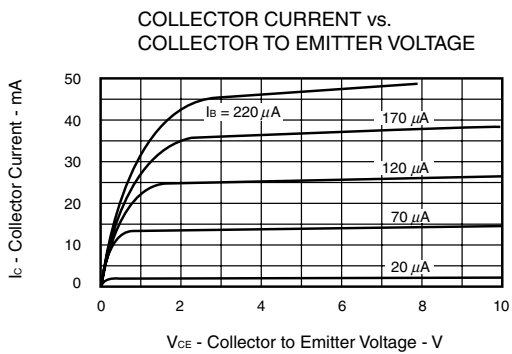
[FA4A4M]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



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TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

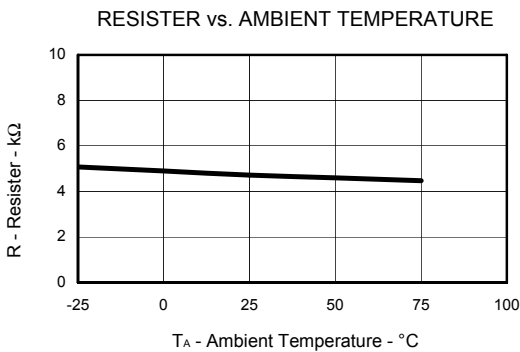
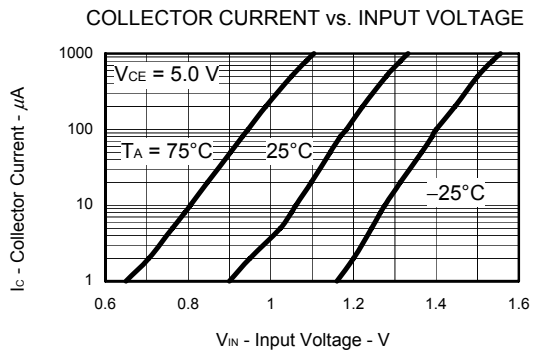
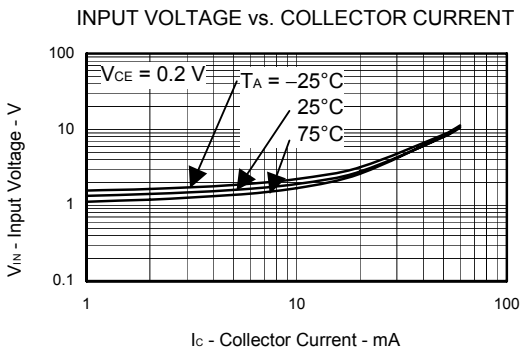
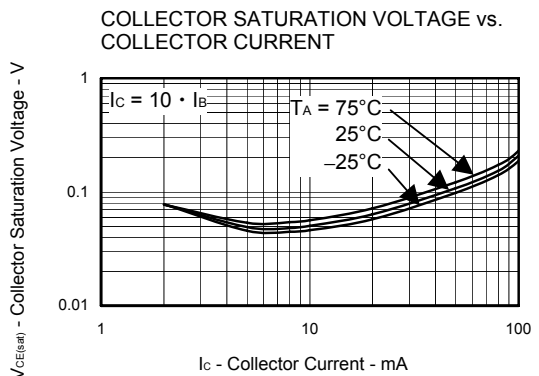
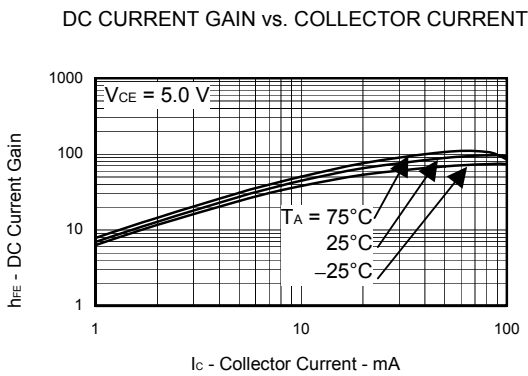
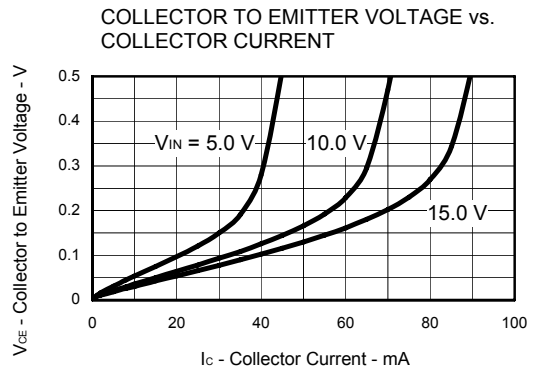
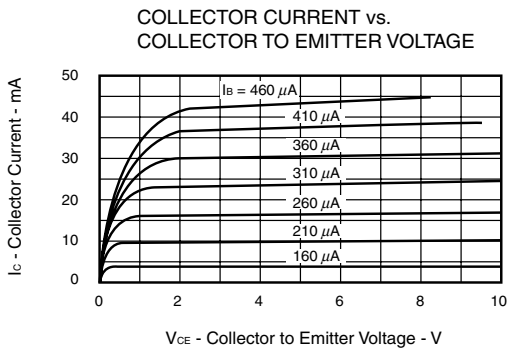


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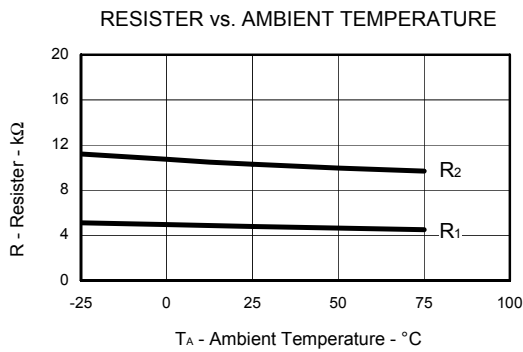
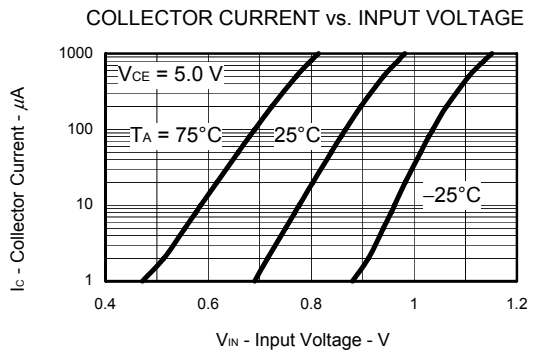
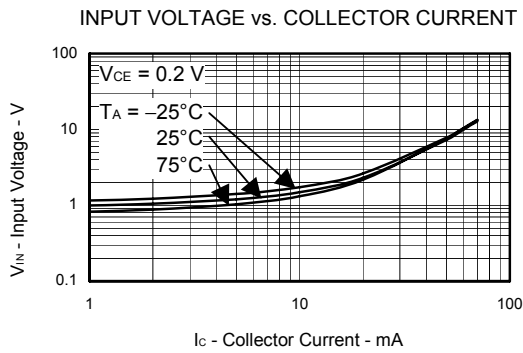
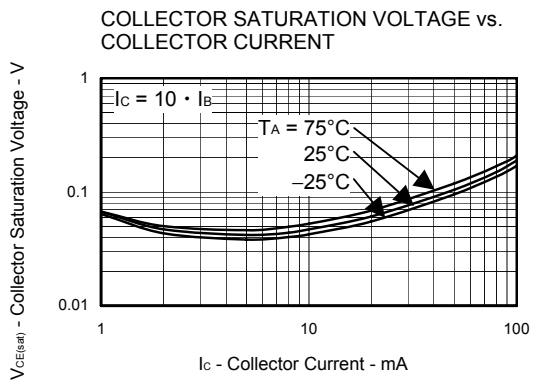
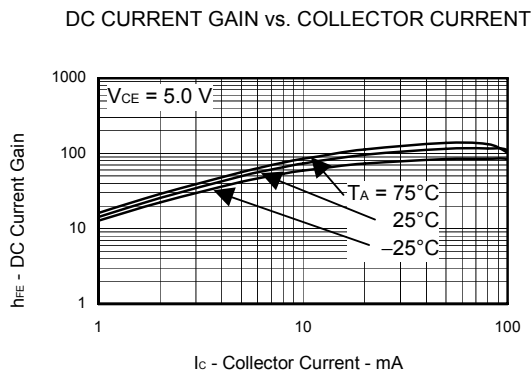
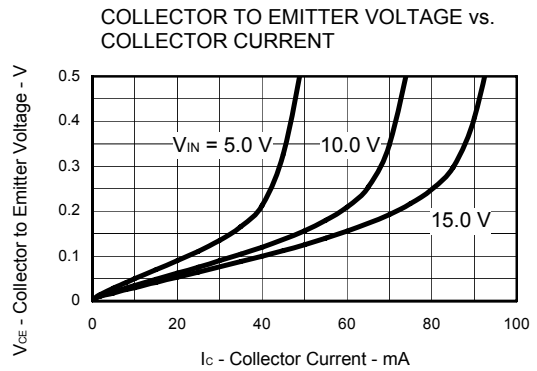
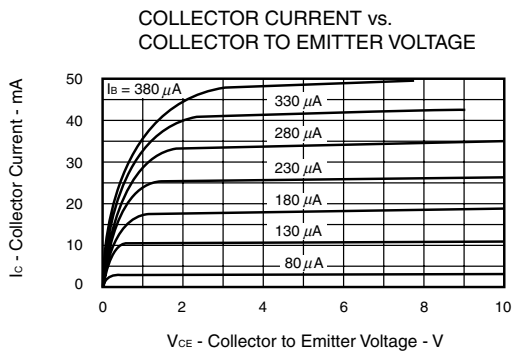




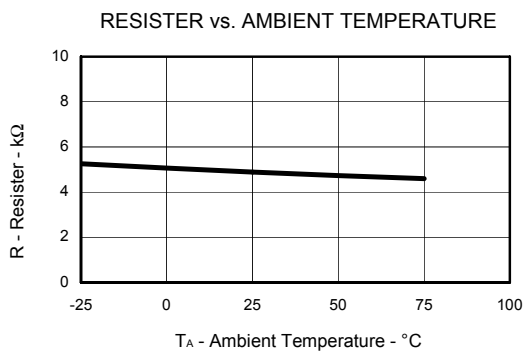
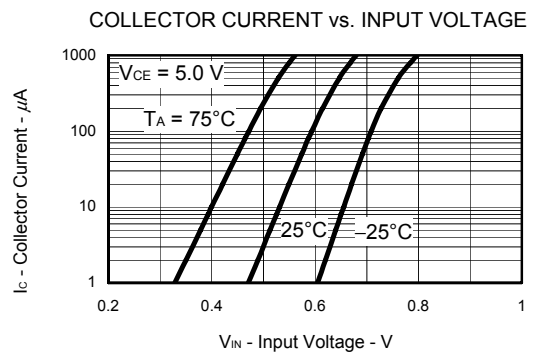
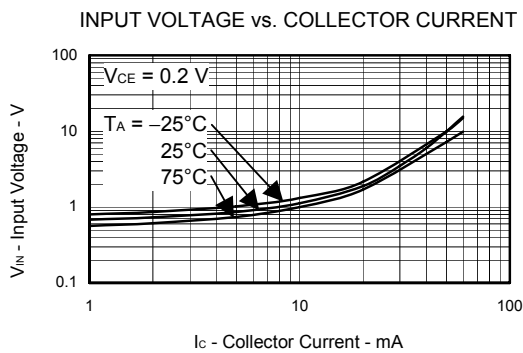
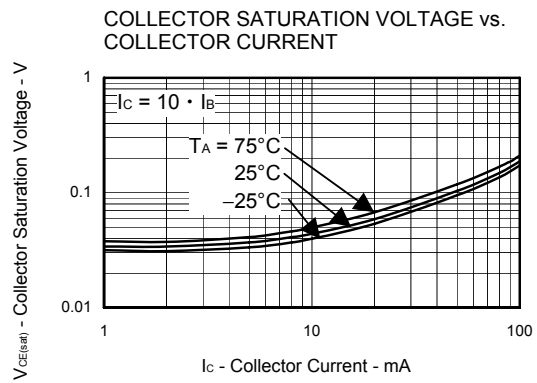
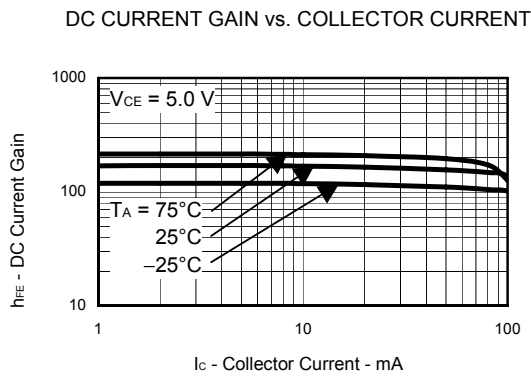
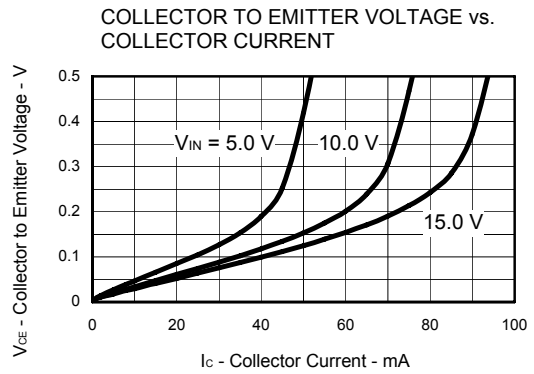
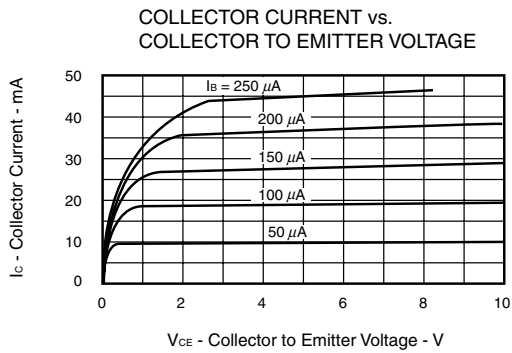
**[FA4L3M]**  
**TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**



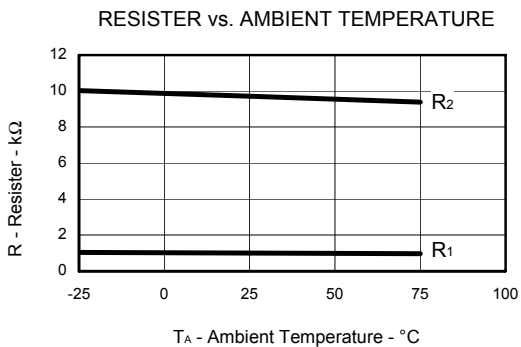
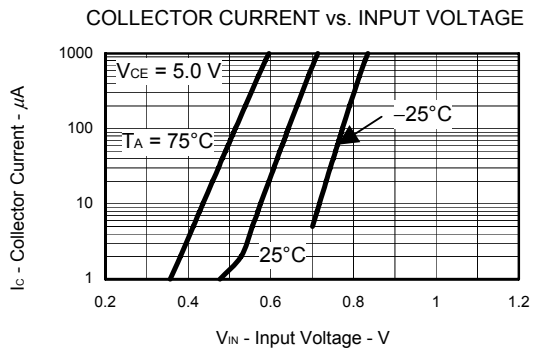
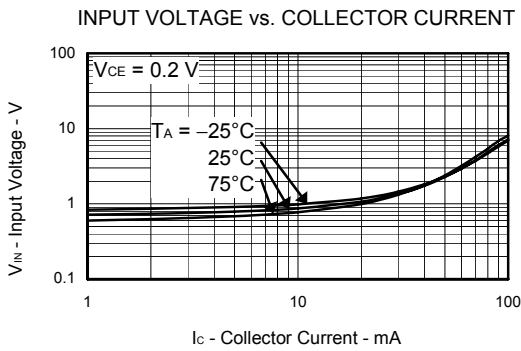
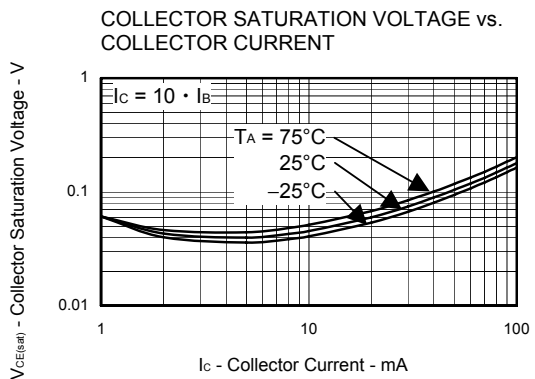
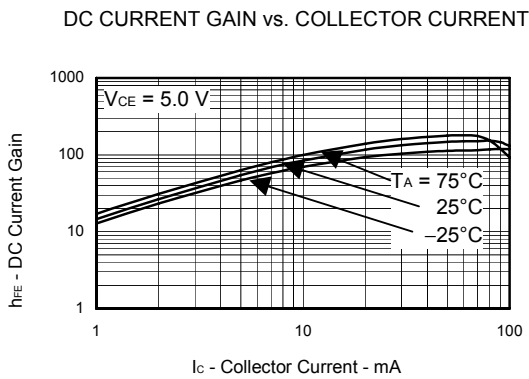
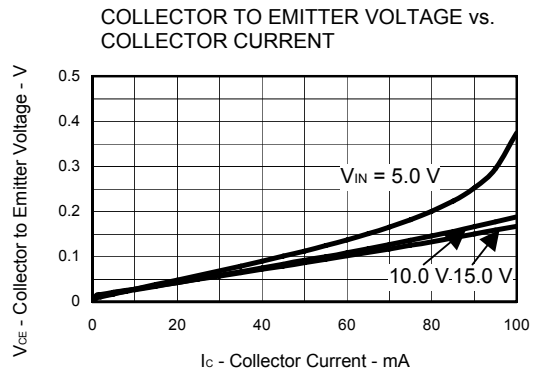
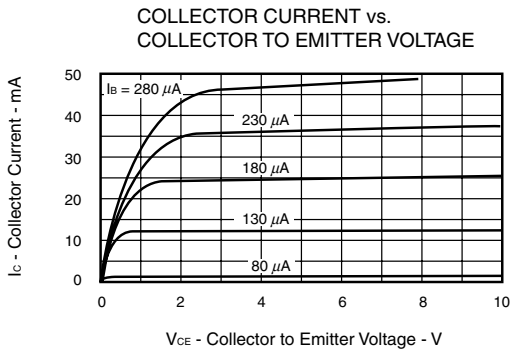
[FA4L3N]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



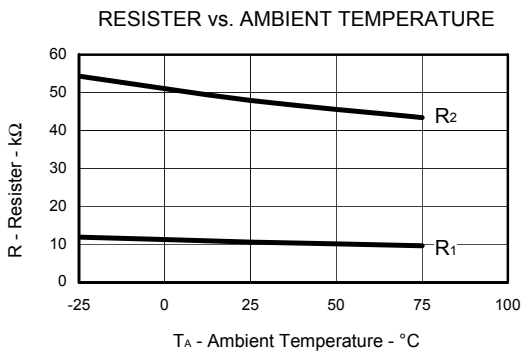
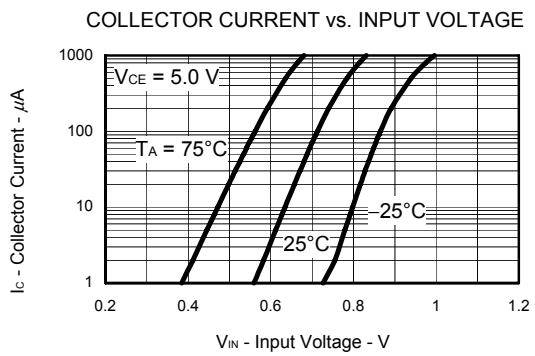
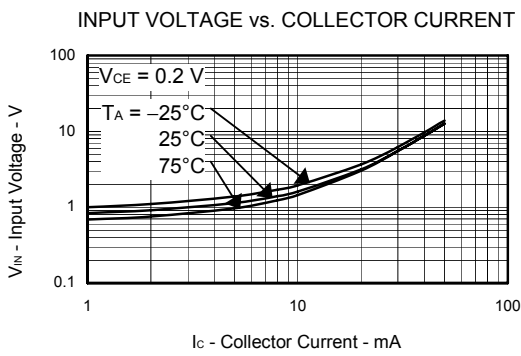
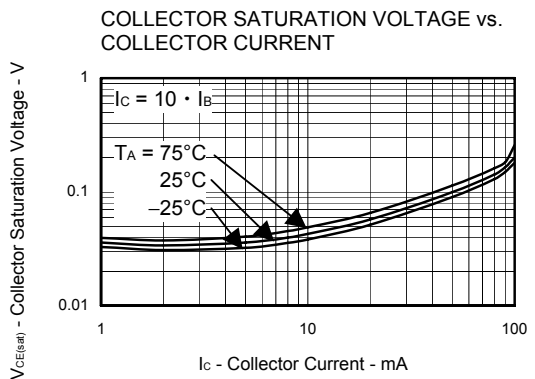
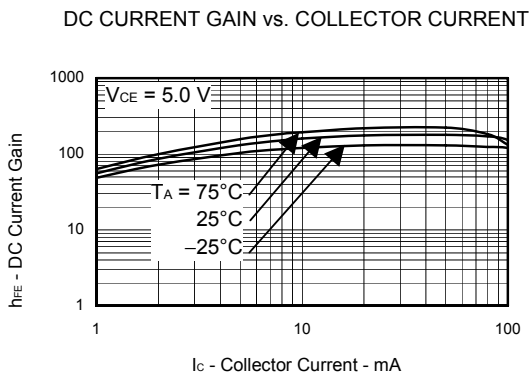
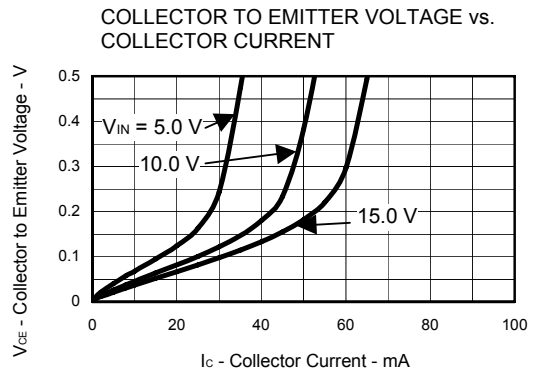
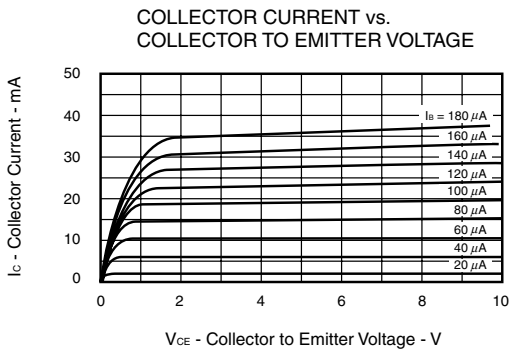
[FA4L3Z]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



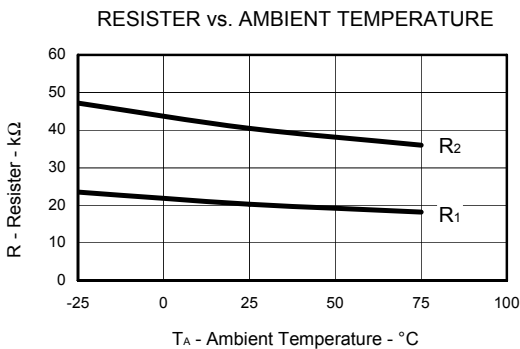
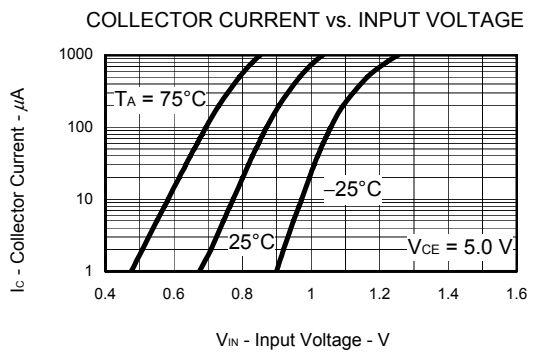
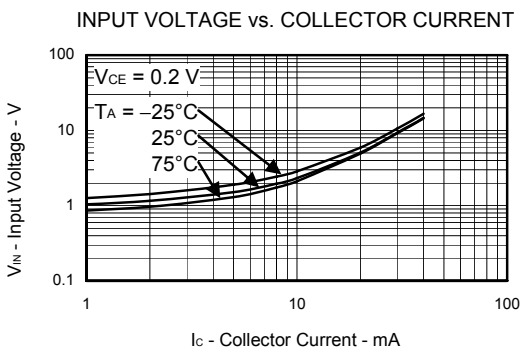
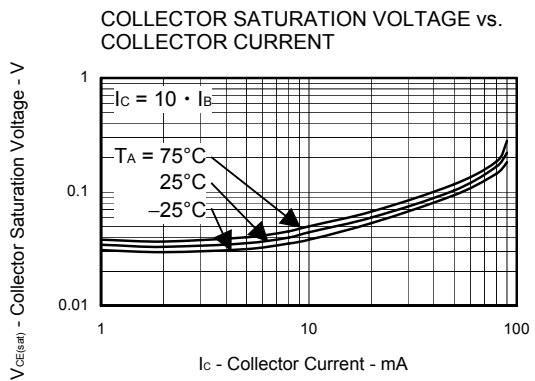
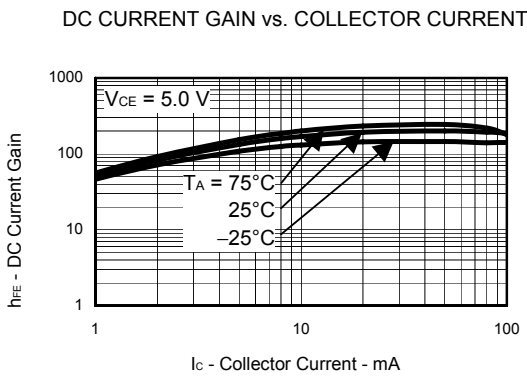
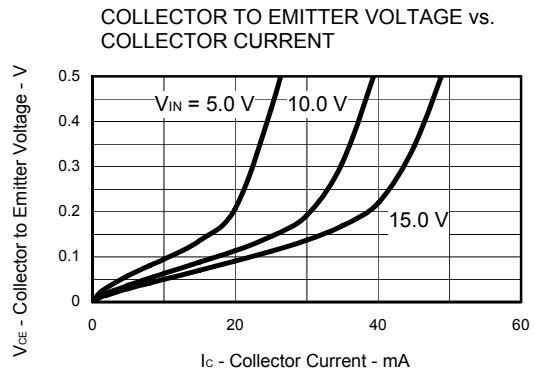
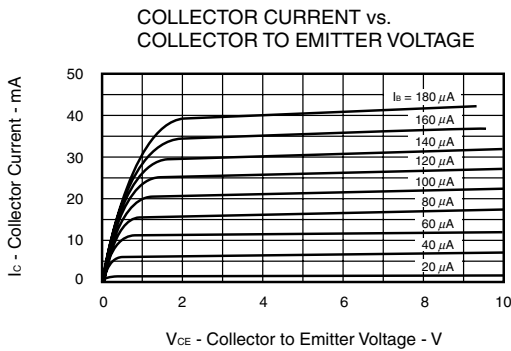
[FA4A3Q]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



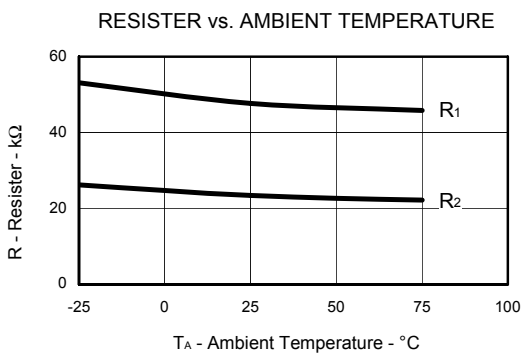
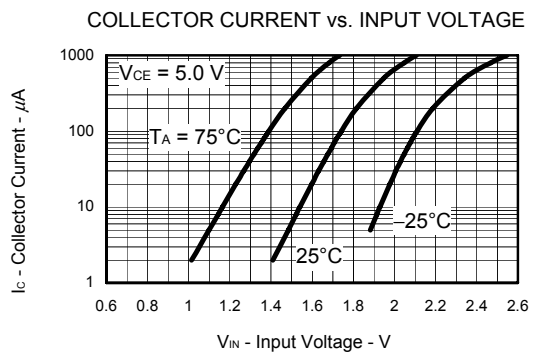
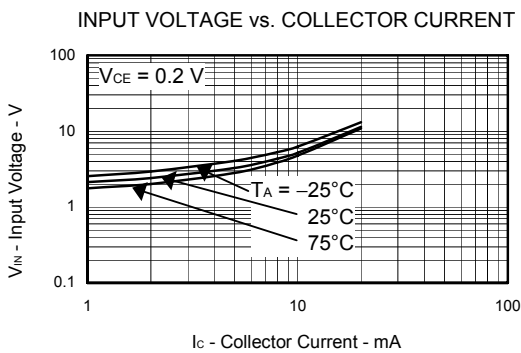
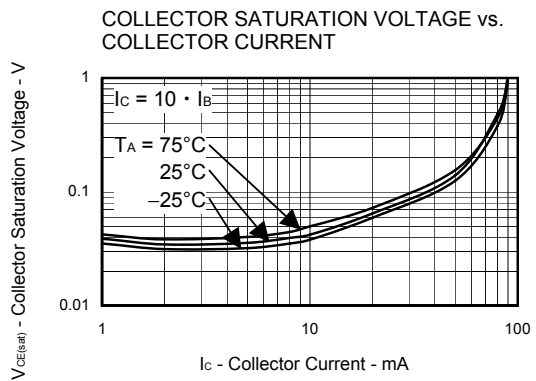
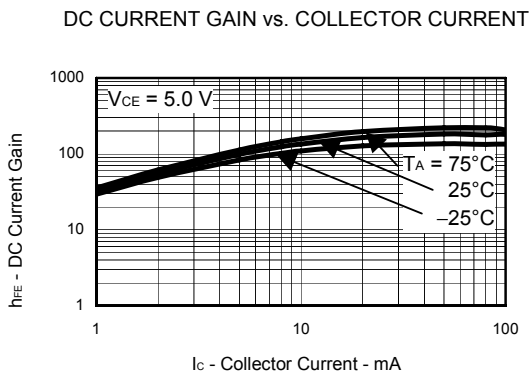
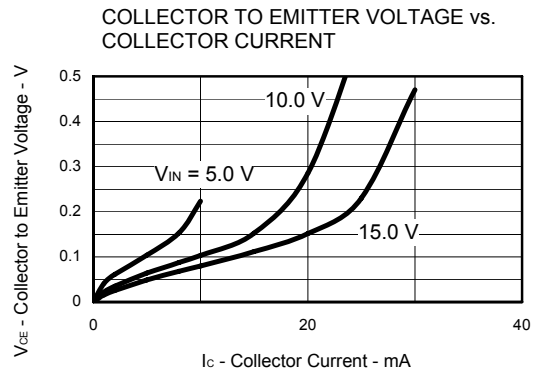
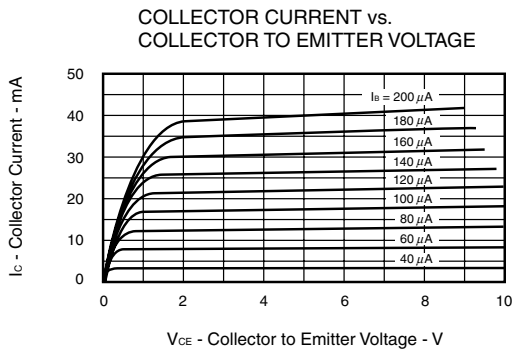
[FA4A4P]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



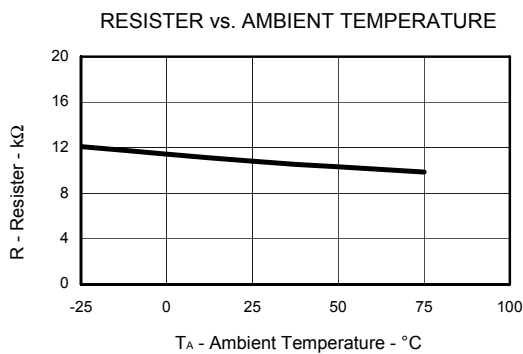
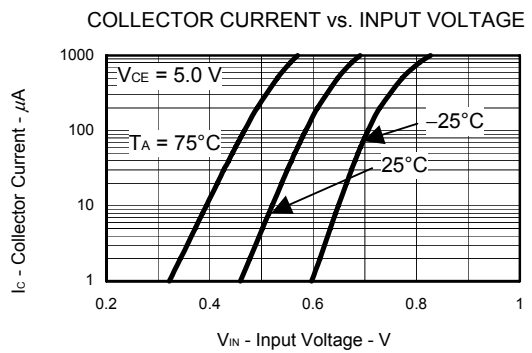
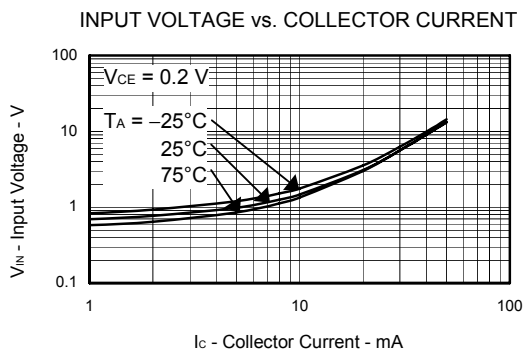
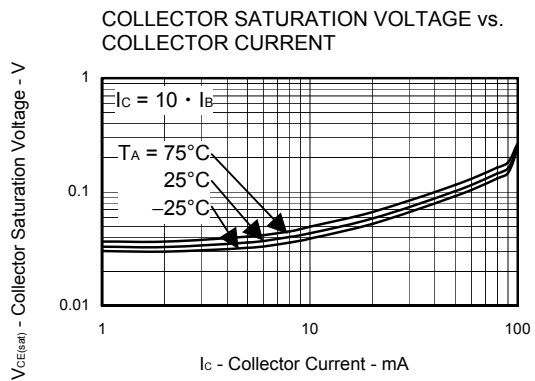
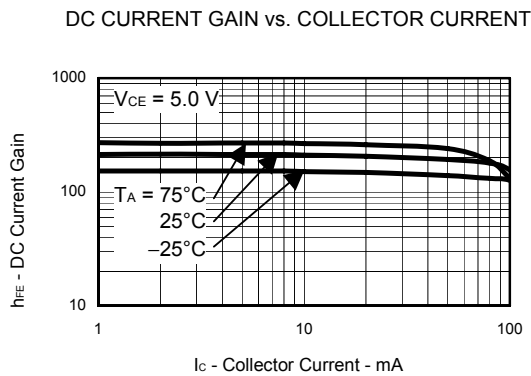
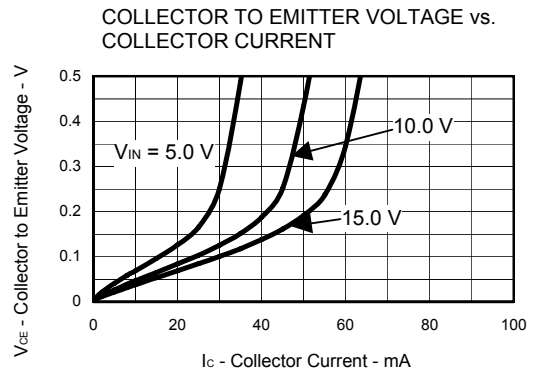
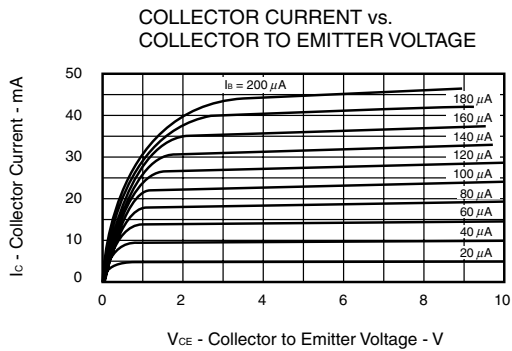
[FA4F4N]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



[FA4L4L]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

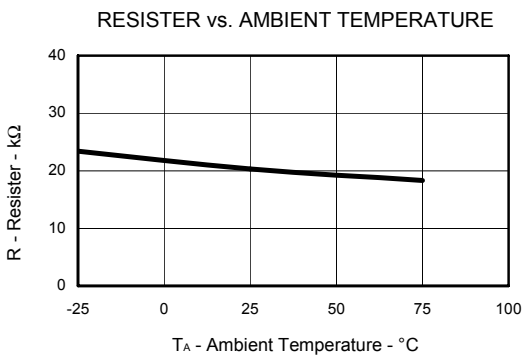
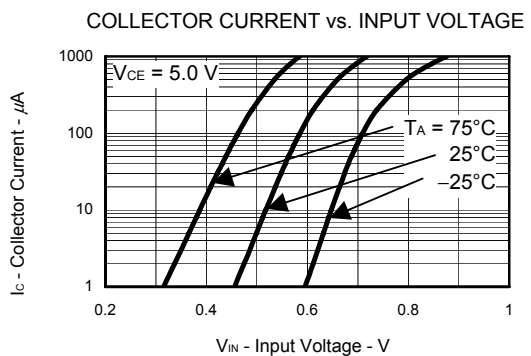
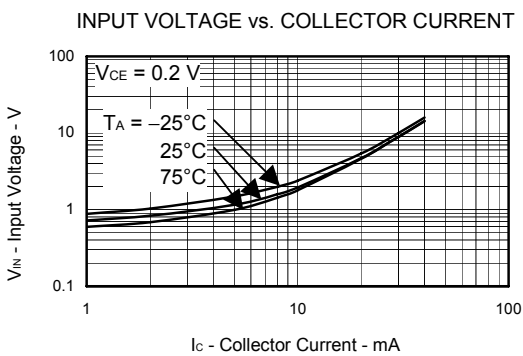
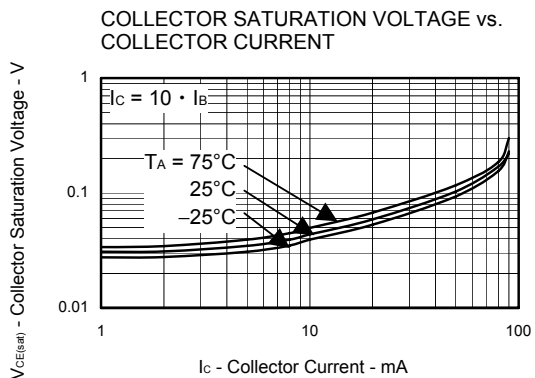
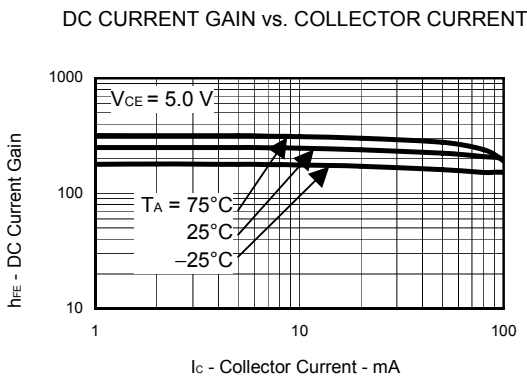
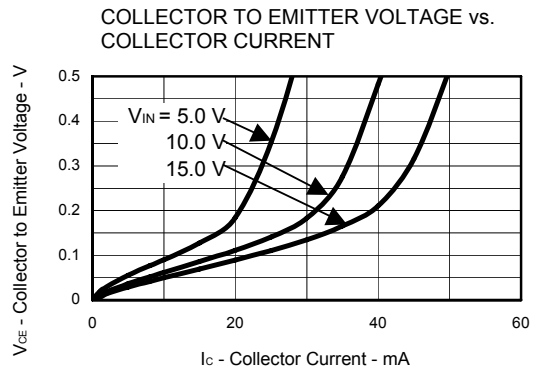
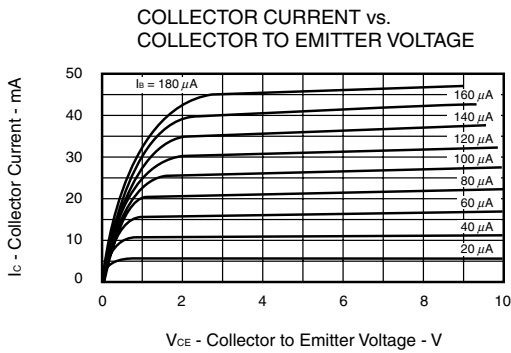


[FA4A4Z]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

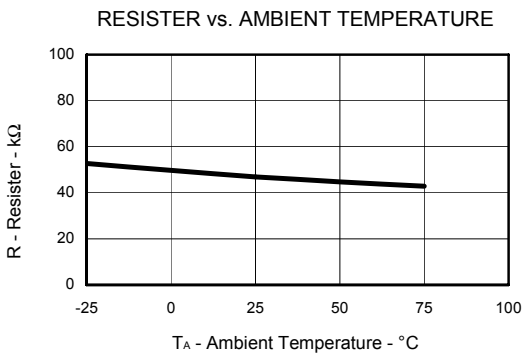
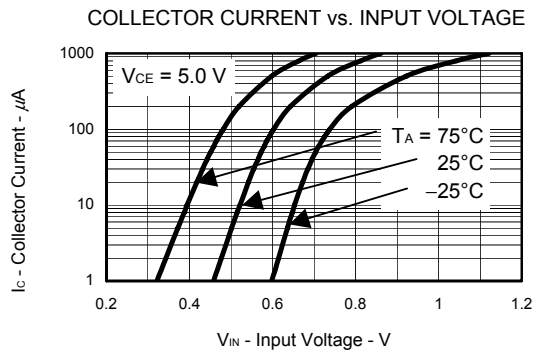
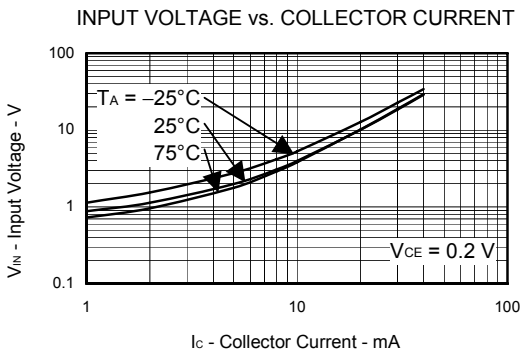
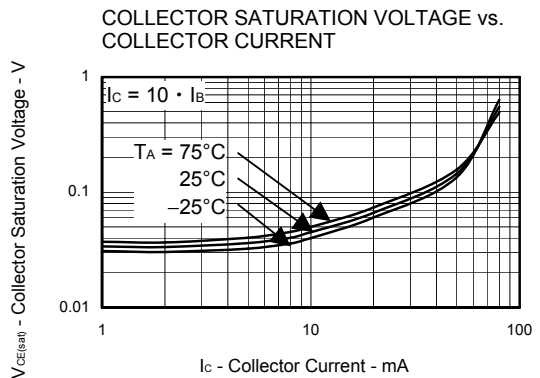
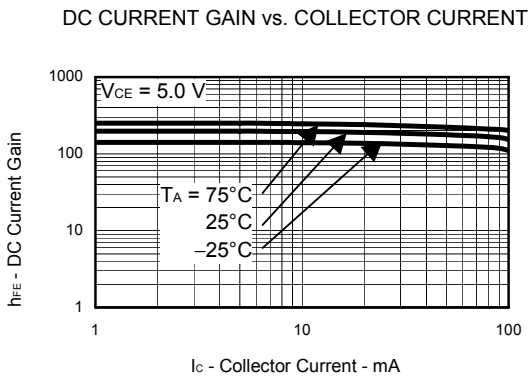
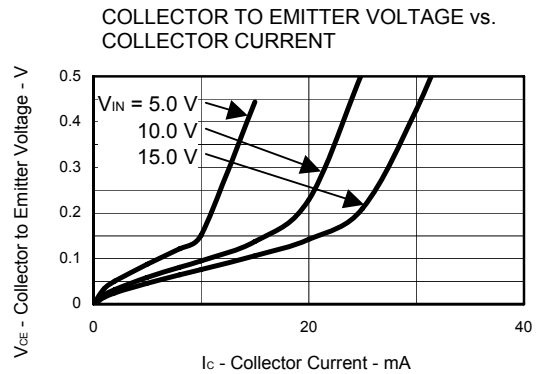
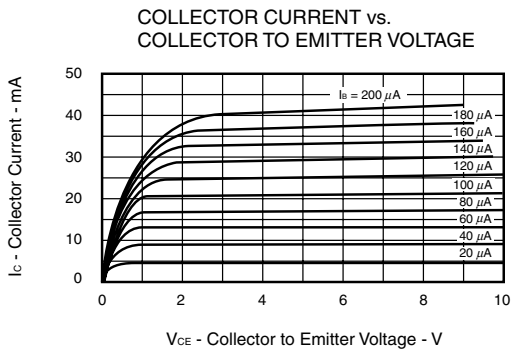




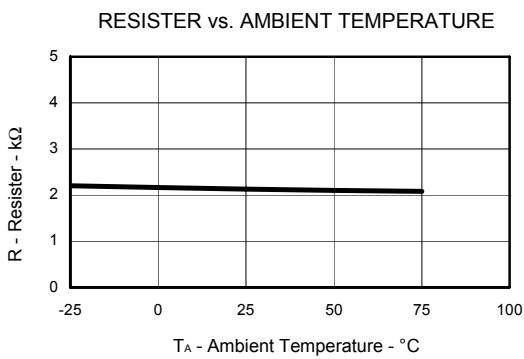
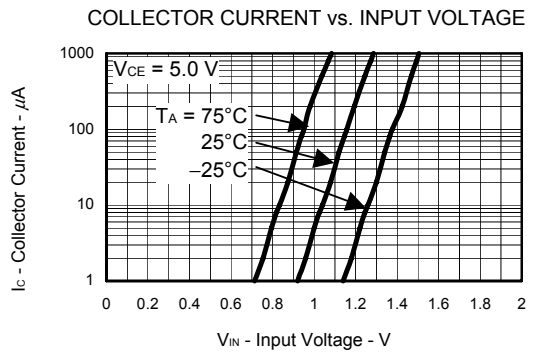
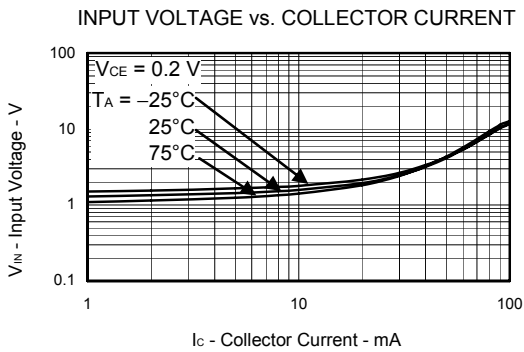
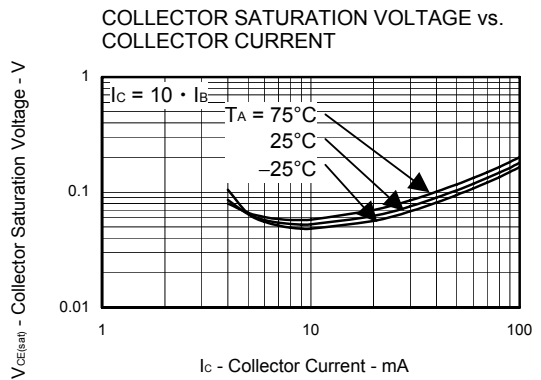
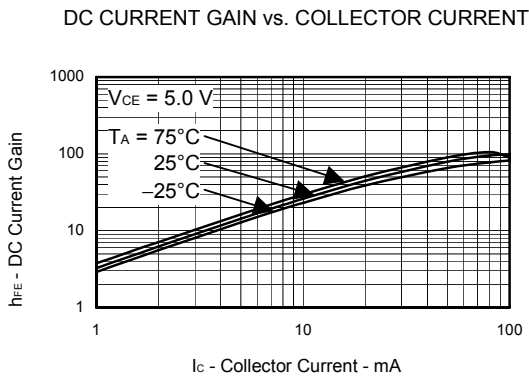
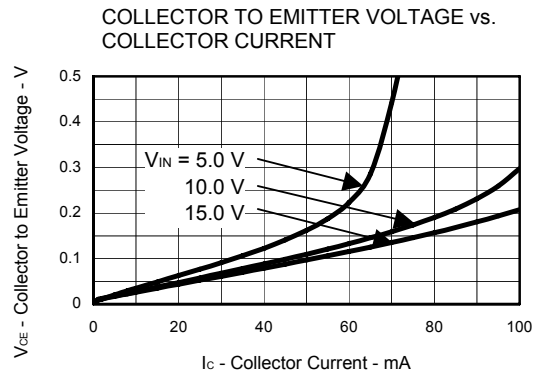
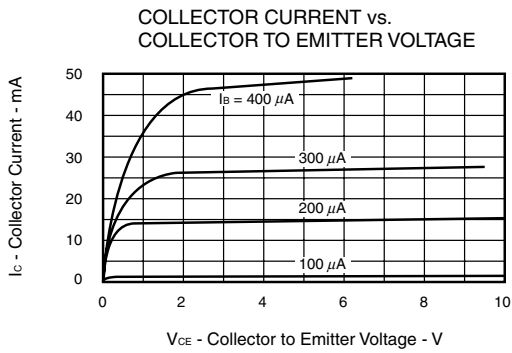
[FA4F4Z]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



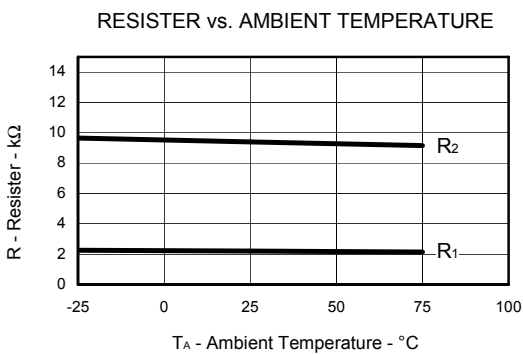
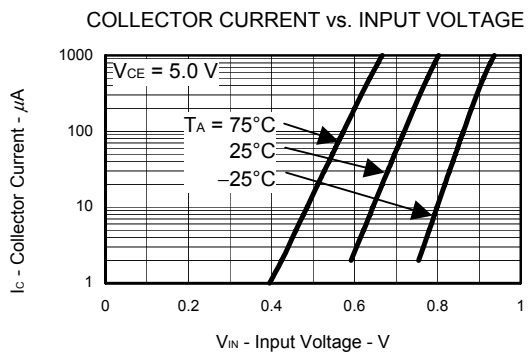
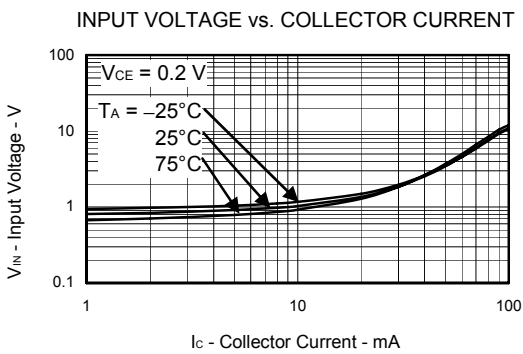
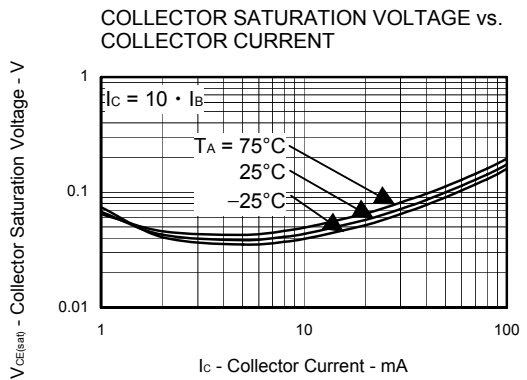
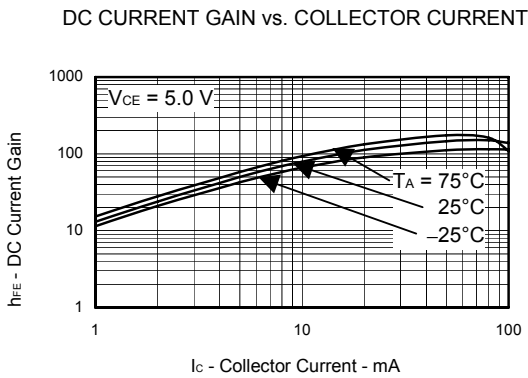
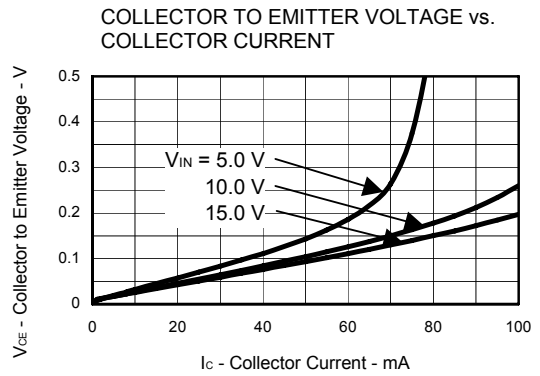
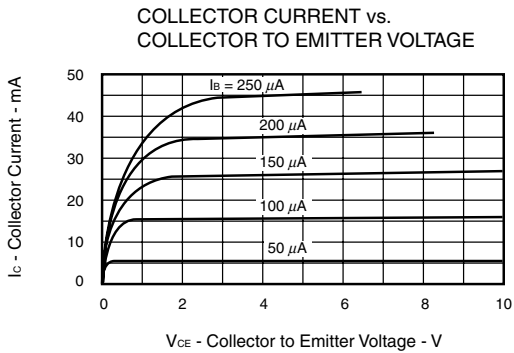
[FA4L4Z]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



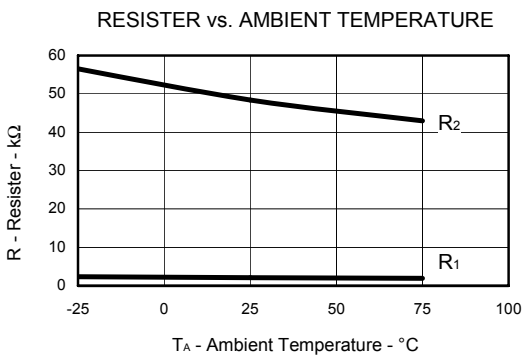
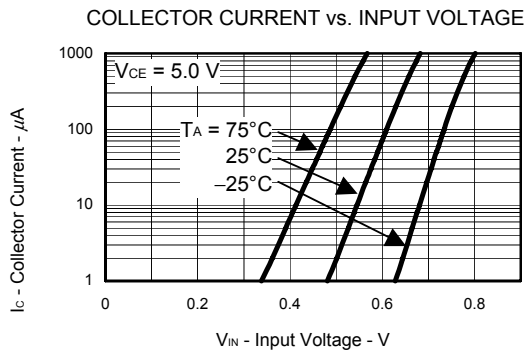
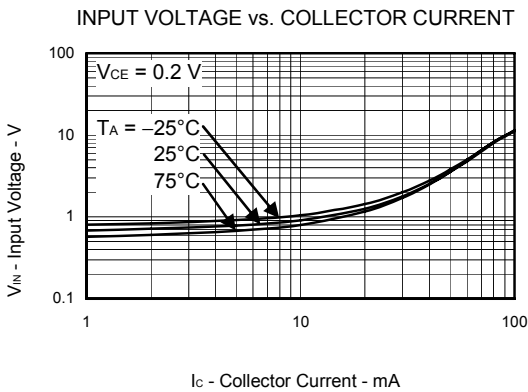
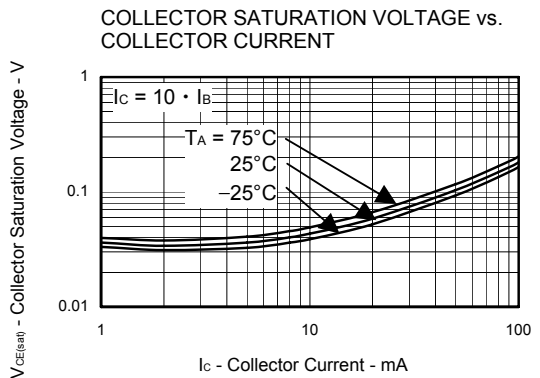
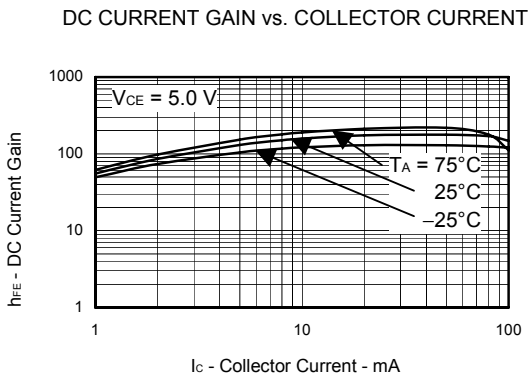
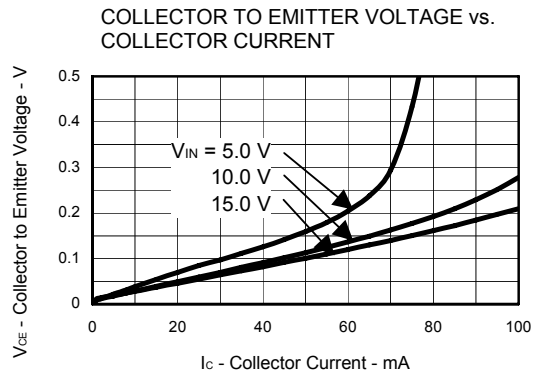
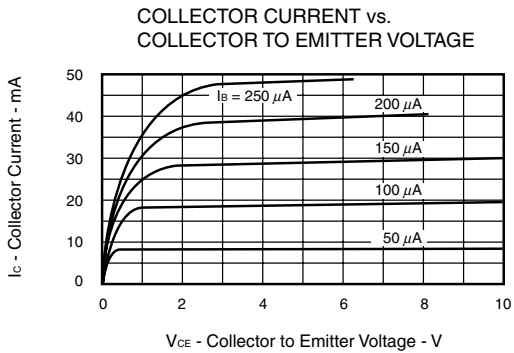
[FA4F3M]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



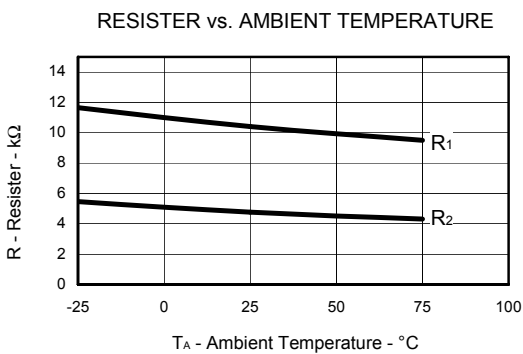
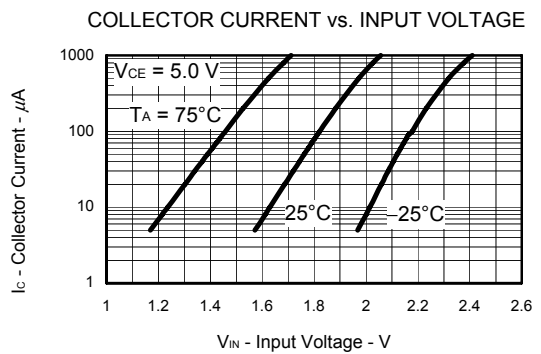
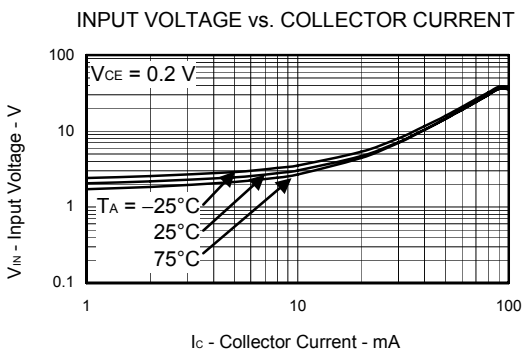
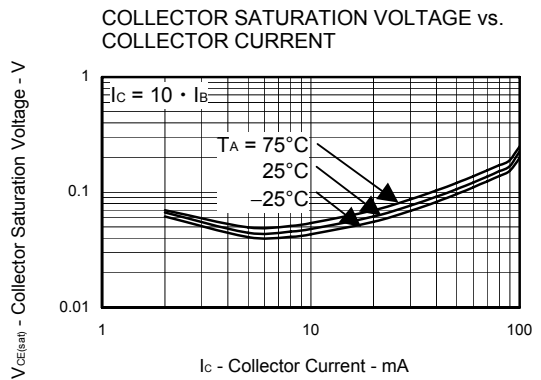
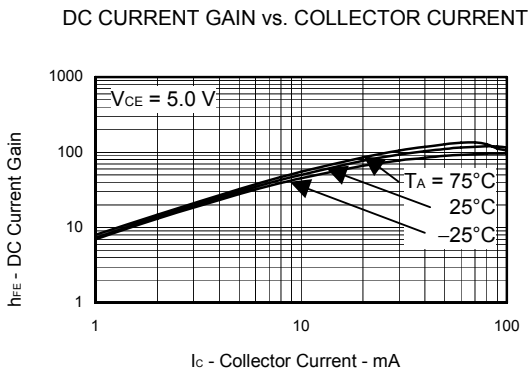
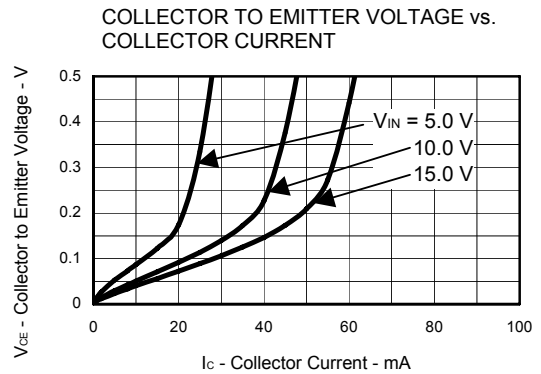
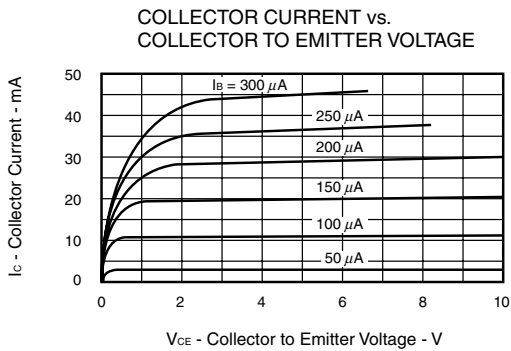
[FA4F3P]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



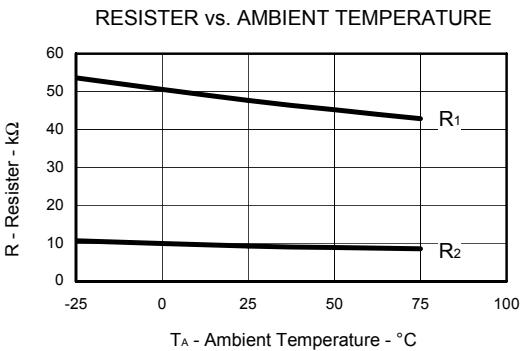
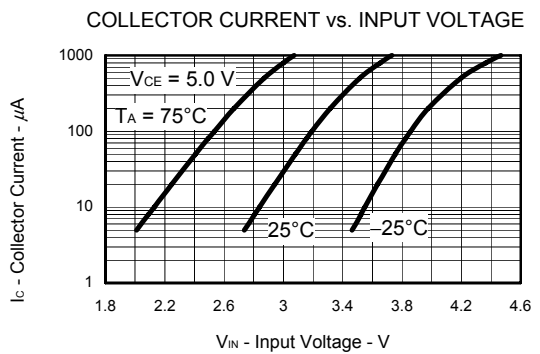
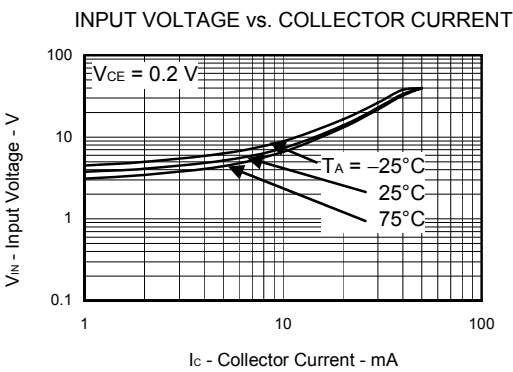
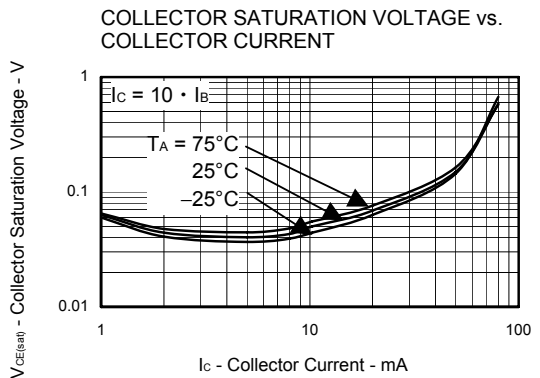
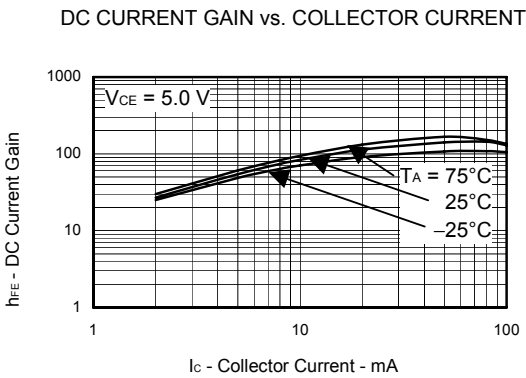
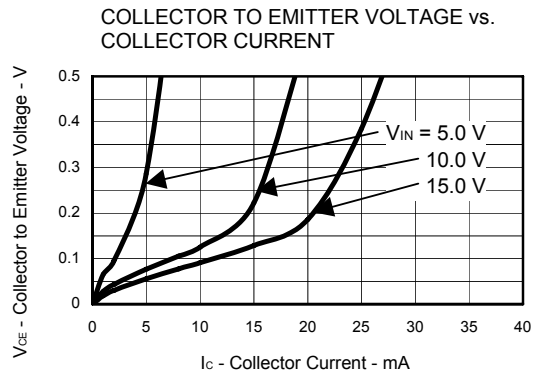
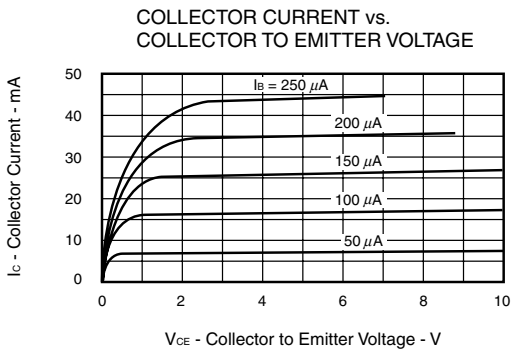
[FA4F3R]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



[FA4A4L]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



[FA4L4K]  
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



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"Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support).

"Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.

The quality grade of NEC Electronics products is "Standard" unless otherwise expressly specified in NEC Electronics data sheets or data books, etc. If customers wish to use NEC Electronics products in applications not intended by NEC Electronics, they must contact an NEC Electronics sales representative in advance to determine NEC Electronics' willingness to support a given application.

(Note)

- (1) "NEC Electronics" as used in this statement means NEC Electronics Corporation and also includes its majority-owned subsidiaries.
- (2) "NEC Electronics products" means any product developed or manufactured by or for NEC Electronics (as defined above).