

To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 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 1st, 2010
Renesas Electronics Corporation

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

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(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

SILICON TRANSISTOR GA4xxx

RESISTOR BUILT-IN TYPE NPN TRANSISTOR

FEATURES

- Compact package
- Resistors built-in type
- Complementary to GN4xxx

ORDERING INFORMATION

PART NUMBER	PACKAGE
GA4xxx	SC-70

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

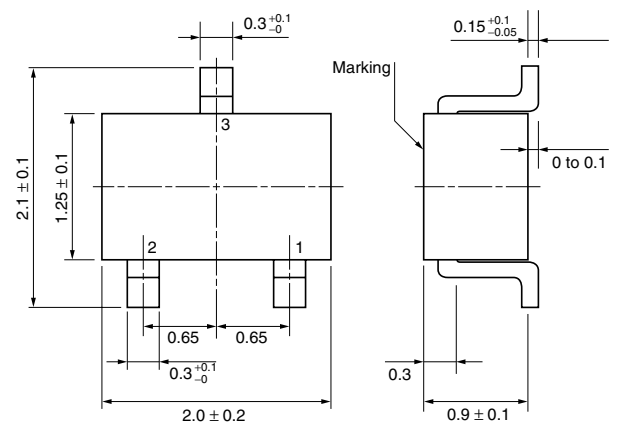
Collector to Base Voltage	V _{CBO}	60	V
Collector to Emitter Voltage	V _{CEO}	50	V
<R> Emitter to Base Voltage	V _{EBO}	Note1	V
Collector Current (DC)	I _C	0.1	A
Collector Current (pulse) ^{Note2}	I _{C(pulse)}	0.2	A
<R> Total Power Dissipation	P _T	0.15	W
Junction Temperature	T _j	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

<R> Note 1.

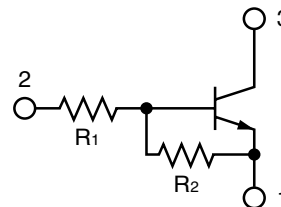
PART NUMBER	V _{EBO} (V)	MARK	R ₁ (kΩ)	R ₂ (kΩ)
GA4A4M	10	AA1	10.0	10.0
GA4F4M	10	AB1	22.0	22.0
GA4L4M	10	AC1	47.0	47.0
GA4L3M	10	AD1	4.7	4.7
GA4L3N	5	AE1	4.7	10.0
GA4L3Z	5	AF1	4.7	
GA4A3Q	5	AG1	1.0	10.0
GA4A4P	5	AH1	10.0	47.0
GA4F4N	5	AJ1	22.0	47.0

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 _{EBO} (V)	MARK	R ₁ (kΩ)	R ₂ (kΩ)
GA4L4L	15	AK1	47.0	22.0
GA4A4Z	5	AL1	10.0	
GA4F4Z	5	AM1	22.0	
GA4L4Z	5	AN1	47.0	
GA4F3M	10	AP1	2.2	2.2
GA4F3P	5	AQ1	2.2	10.0
GA4F3R	5	AR1	2.2	47.0
GA4A4L	15	AS1	10.0	4.7
GA4L4K	25	AT1	47.0	10.0

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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} = 50 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.

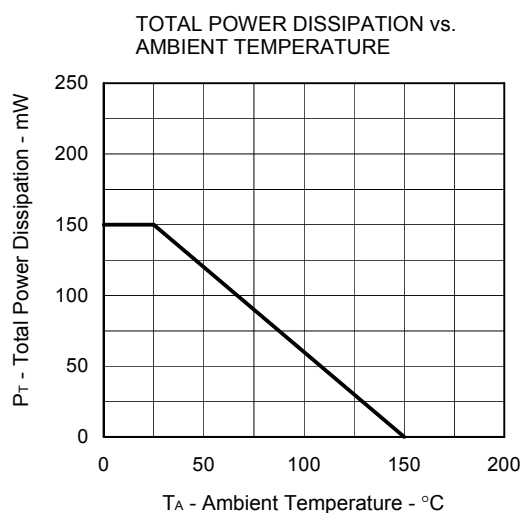
PART NUMBER	h _{FE1}			h _{FE2}			UNIT
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
GA4A4M	35		100	80			-
GA4F4M	60		195	90			-
GA4L4M	85		340	95			-
GA4L3M	20		80	80			-
GA4L3N	35		100	80			-
GA4L3Z	135		600	100			-
GA4A3Q	35		100	80			-
GA4A4P	85		340	95			-
GA4F4N	85		340	95			-
GA4L4L	60		195	90			-
GA4A4Z	135		600	100			-
GA4F4Z	135		600	100			-
GA4L4Z	135		600	100			-
GA4F3M	8		50	50			-
GA4F3P	35		100	80			-
GA4F3R	85		340	95			-
GA4A4L	20		80	80			-
GA4L4K	35		100	80			-

Note 2.

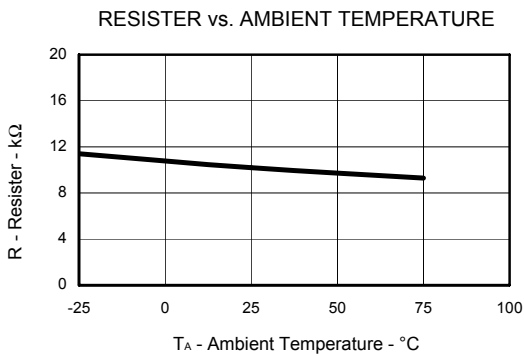
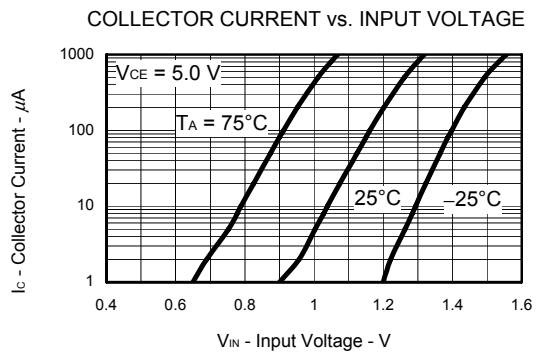
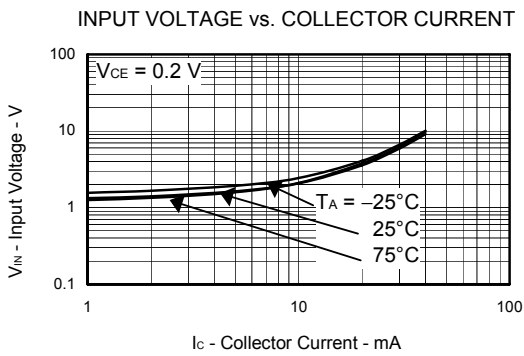
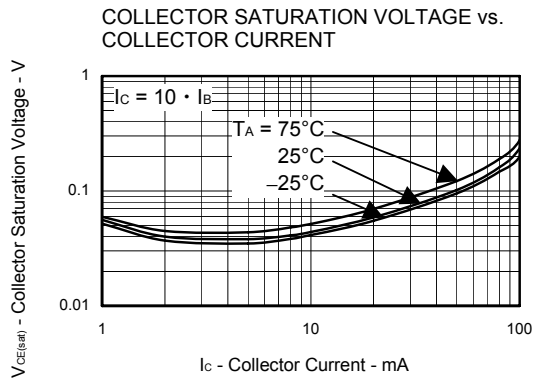
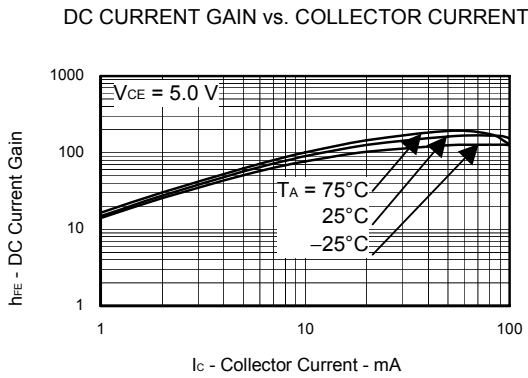
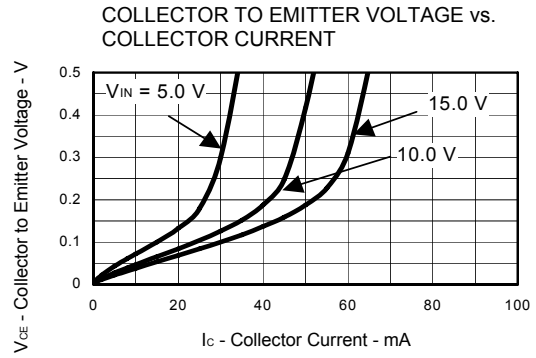
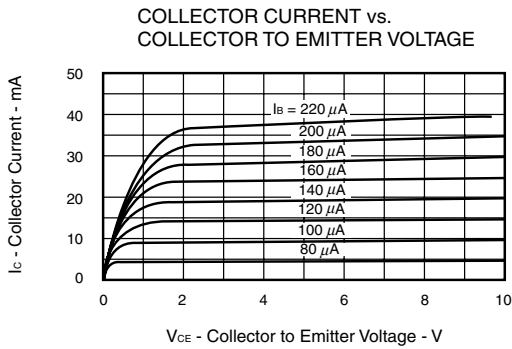
PART NUMBER	V _{IL}			V _{IH}			UNIT
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
GA4A4M			0.8	3.0			V
GA4F4M			0.8	4.0			V
GA4L4M			0.8	5.0			V
GA4L3M			0.8	3.0			V
GA4L3N			0.6	3.0			V
GA4L3Z			0.5	1.2			V
GA4A3Q			0.5	2.0			V
GA4A4P			0.5	3.0			V
GA4F4N			0.6	3.0			V
GA4L4L			0.9	6.0			V
GA4A4Z			0.5	2.0			V
GA4F4Z			0.5	3.0			V
GA4L4Z			0.5	4.0			V
GA4F3M			0.8	3.0			V
GA4F3P			0.5	2.0			V
GA4F3R			0.5	2.0			V
GA4A4L			0.9	6.0			V
GA4L4K			2.0	8.0			V

Note 3.

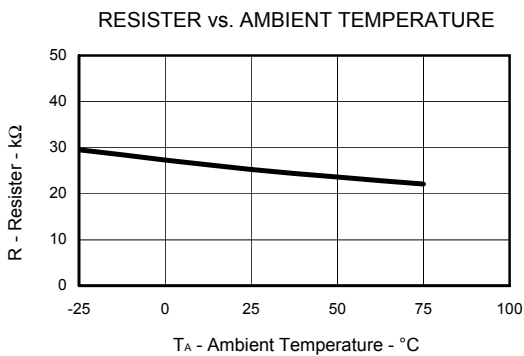
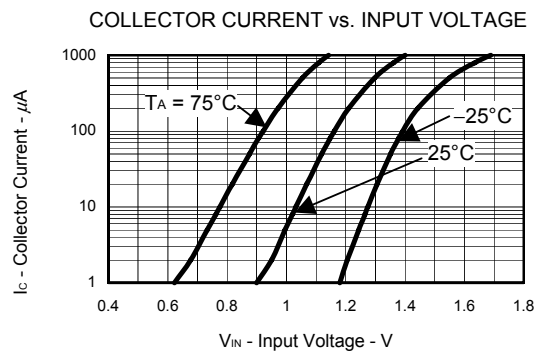
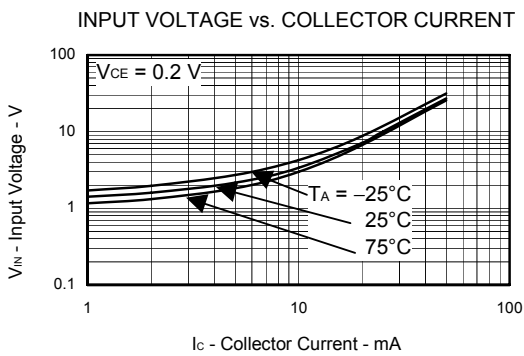
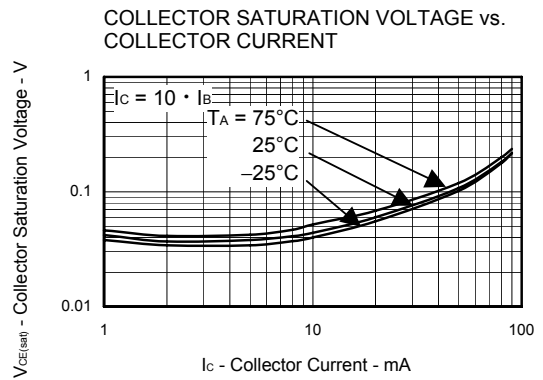
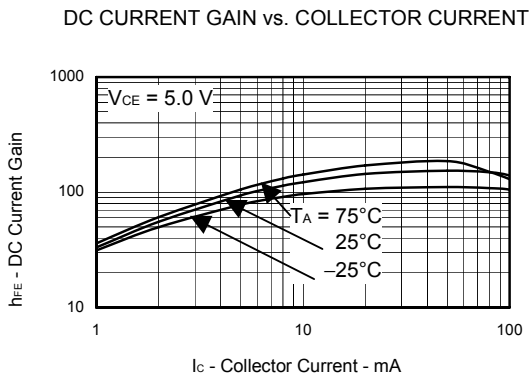
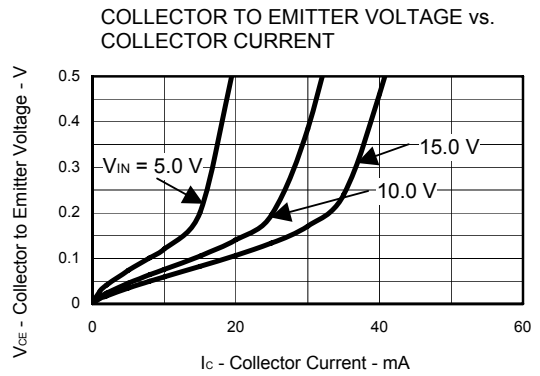
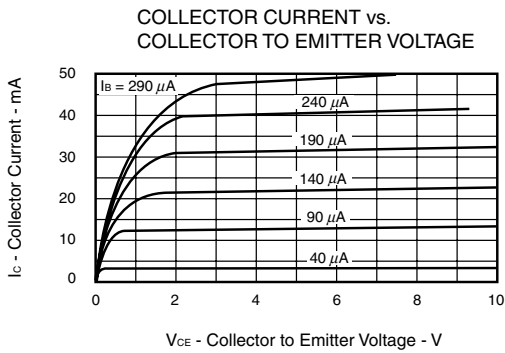
PART NUMBER	R ₁			R ₂			UNIT
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
GA4A4M	7.00	10.00	13.00	7.00	10.00	13.00	kΩ
GA4F4M	15.40	22.00	28.60	15.40	22.00	28.60	kΩ
GA4L4M	32.90	47.00	61.10	32.90	47.00	61.10	kΩ
GA4L3M	3.29	4.70	6.11	3.29	4.70	6.11	kΩ
GA4L3N	3.29	4.70	6.11	7.00	10.00	13.00	kΩ
GA4L3Z	3.29	4.70	6.11				kΩ
GA4A3Q	0.70	1.00	1.30	7.00	10.00	13.00	kΩ
GA4A4P	7.00	10.00	13.00	32.90	47.00	61.10	kΩ
GA4F4N	15.40	22.00	28.60	32.90	47.00	61.10	kΩ
GA4L4L	32.90	47.00	61.10	15.40	22.00	28.60	kΩ
GA4A4Z	7.00	10.00	13.00				kΩ
GA4F4Z	15.40	22.00	28.60				kΩ
GA4L4Z	32.90	47.00	61.10				kΩ
GA4F3M	1.54	2.20	2.86	1.54	2.20	2.86	kΩ
GA4F3P	1.54	2.20	2.86	7.00	10.00	13.00	kΩ
GA4F3R	1.54	2.20	2.86	32.90	47.00	61.10	kΩ
GA4A4L	7.00	10.00	13.00	3.29	4.70	6.11	kΩ
GA4L4K	32.90	47.00	61.10	7.00	10.00	13.00	kΩ



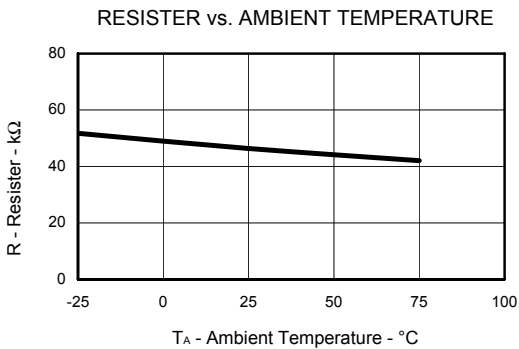
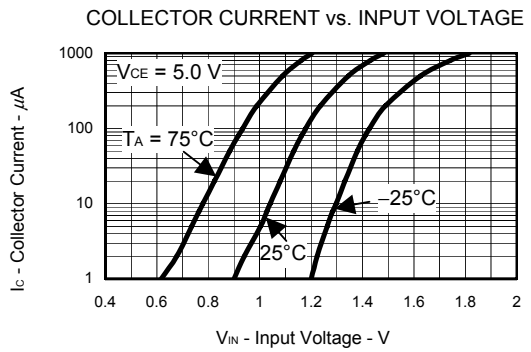
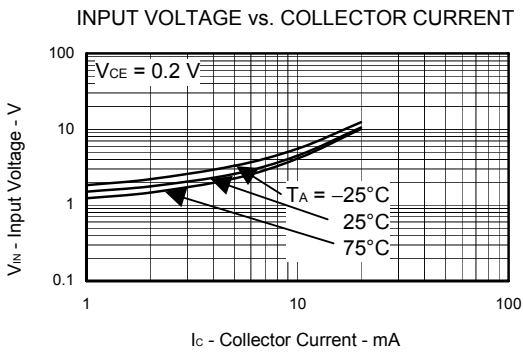
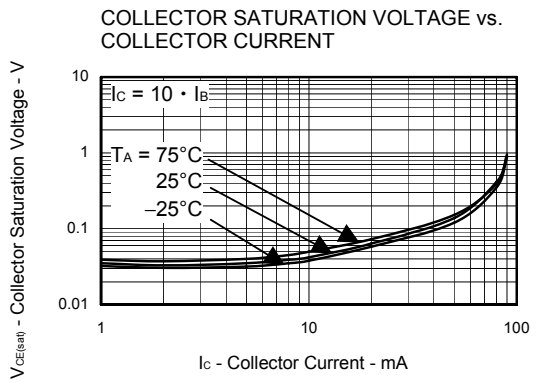
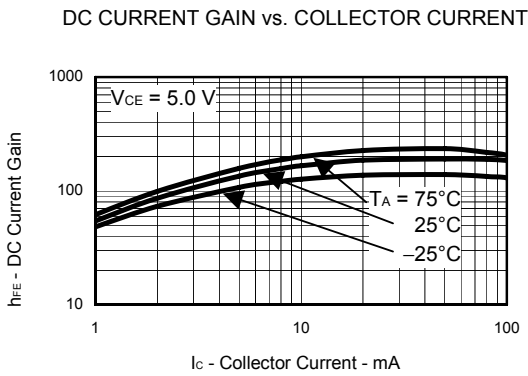
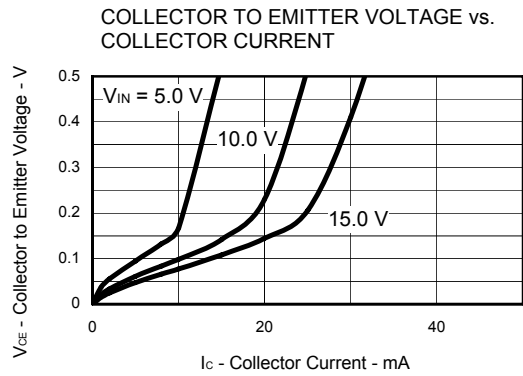
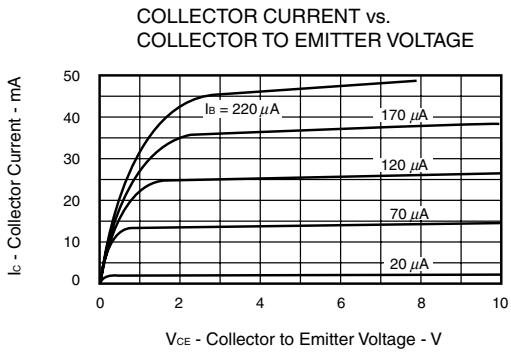
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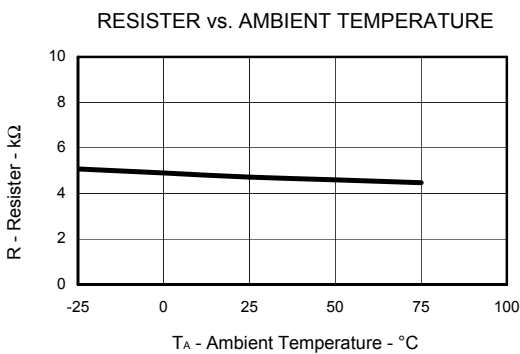
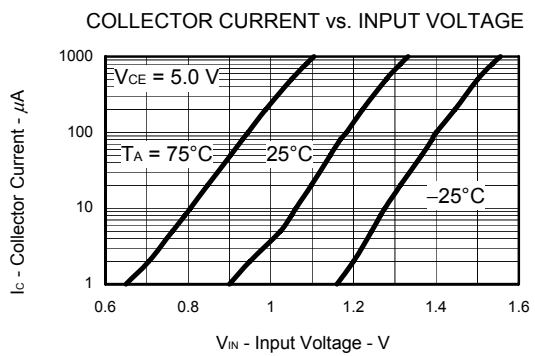
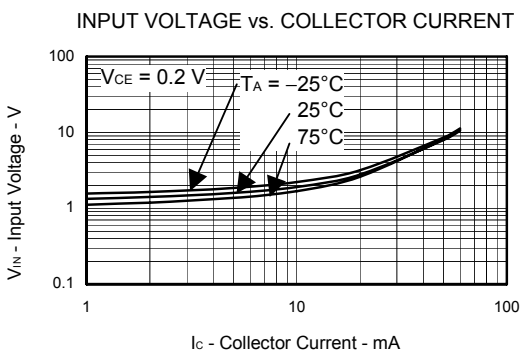
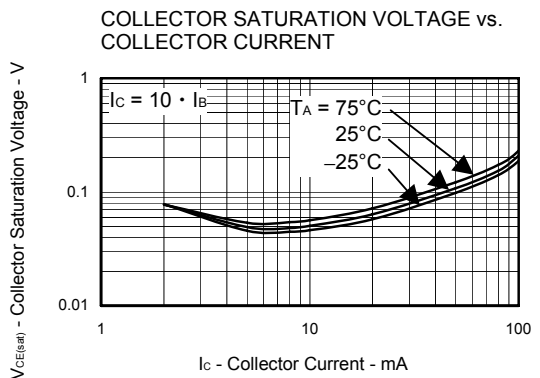
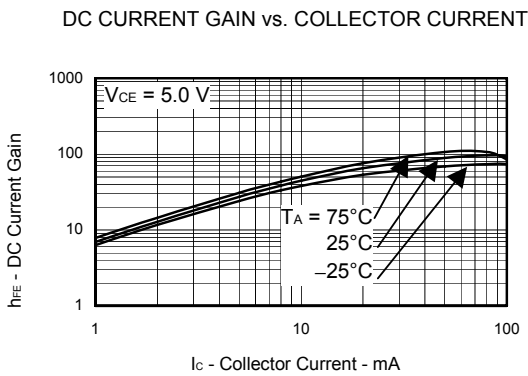
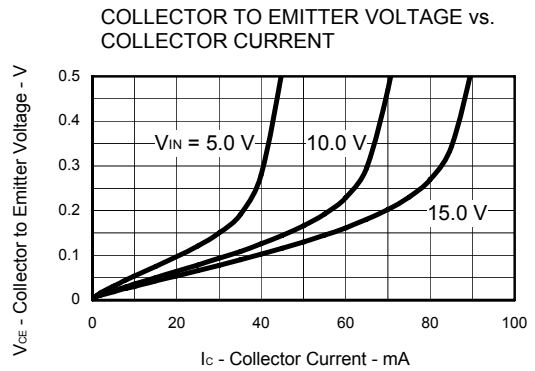
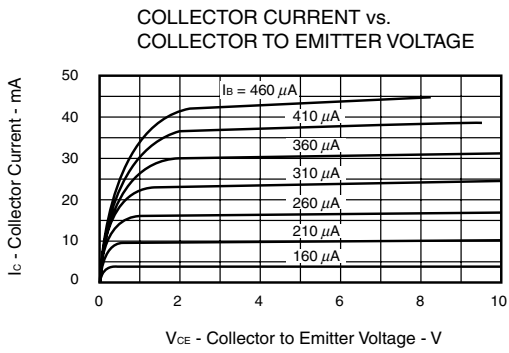
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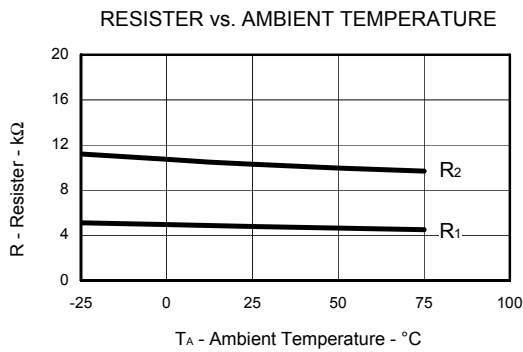
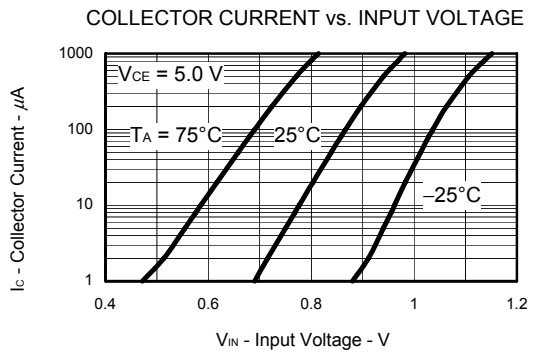
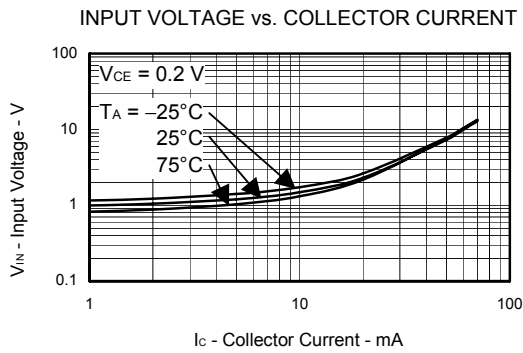
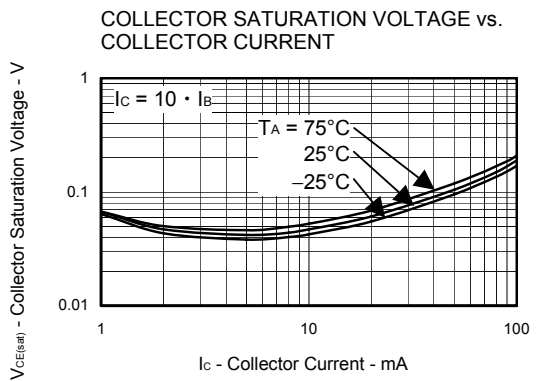
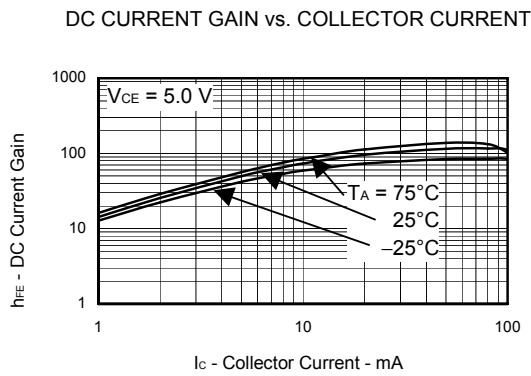
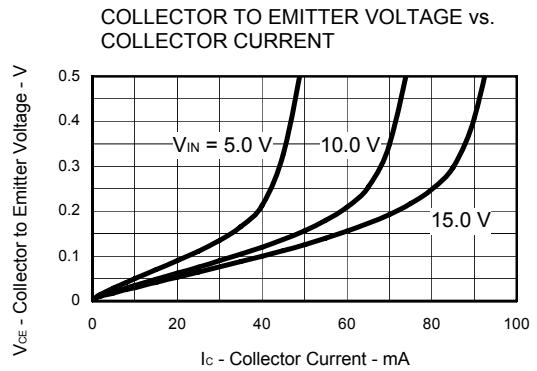
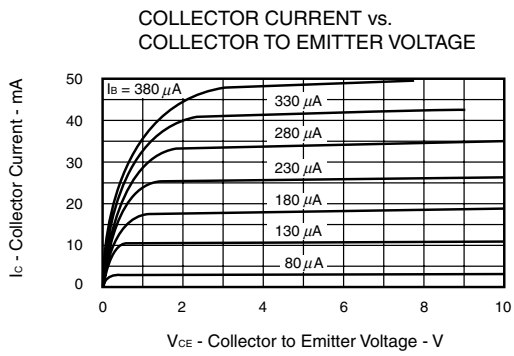
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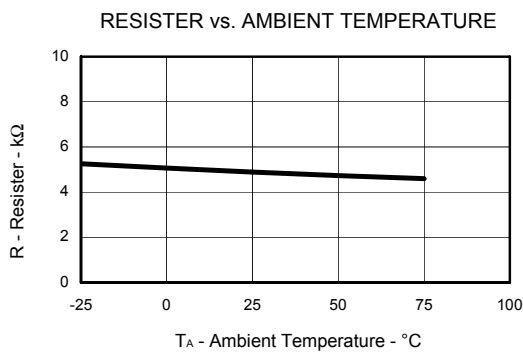
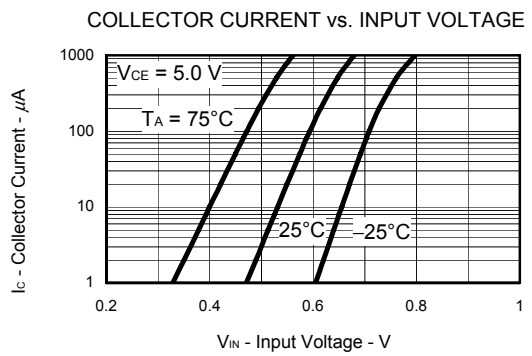
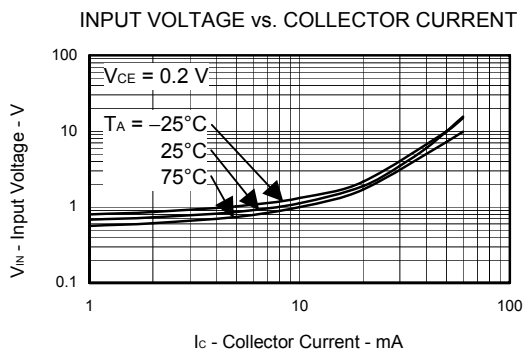
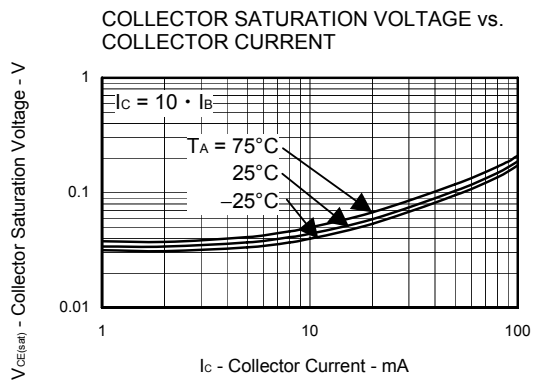
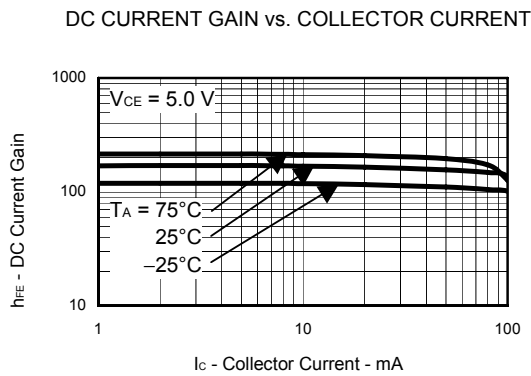
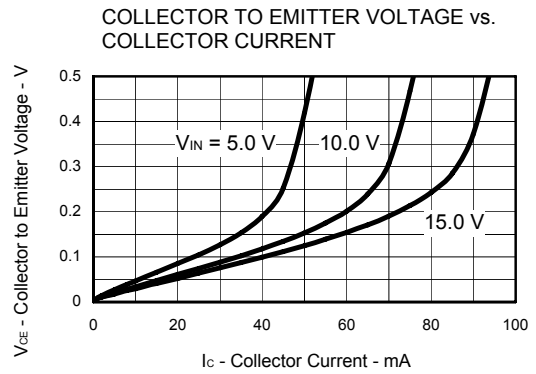
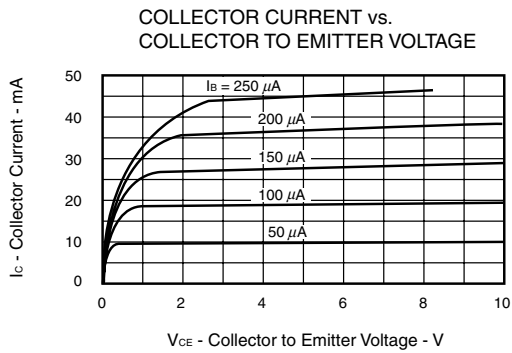
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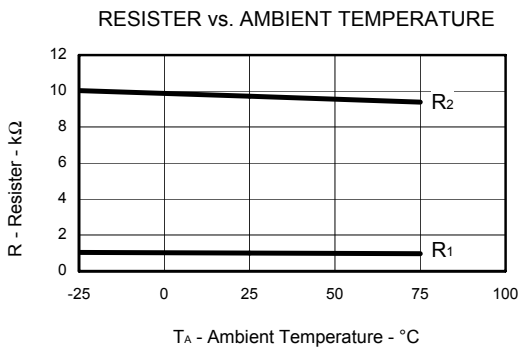
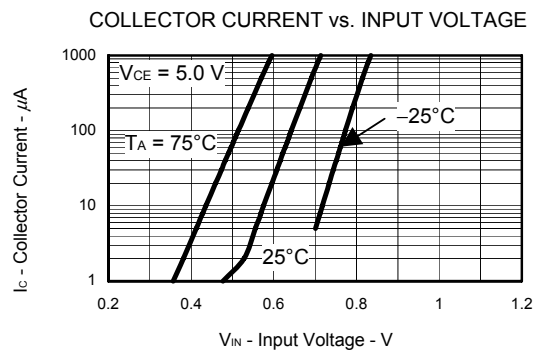
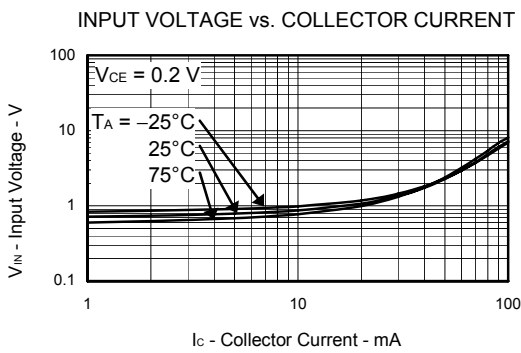
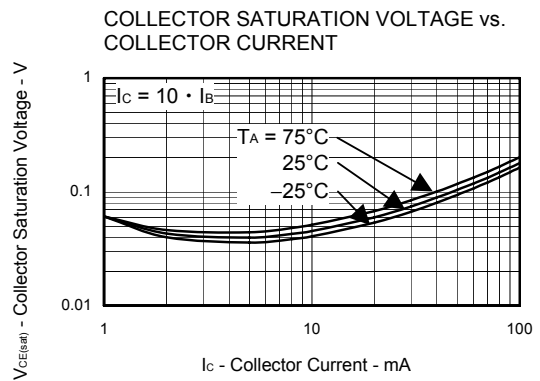
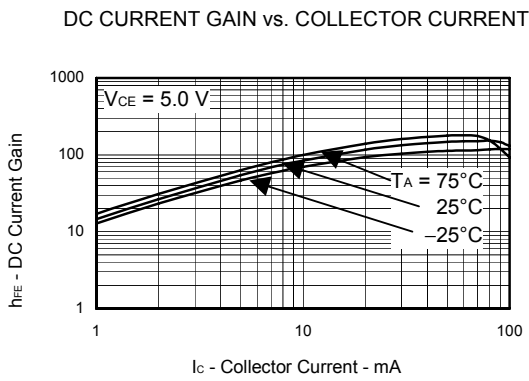
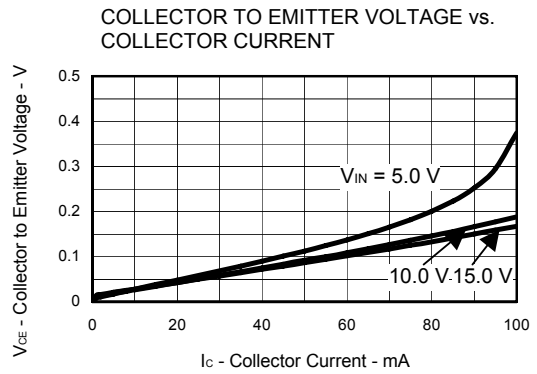
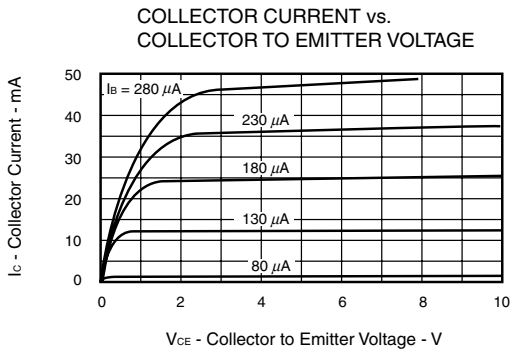
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TYPICAL CHARACTERISTICS (T_A = 25°C)



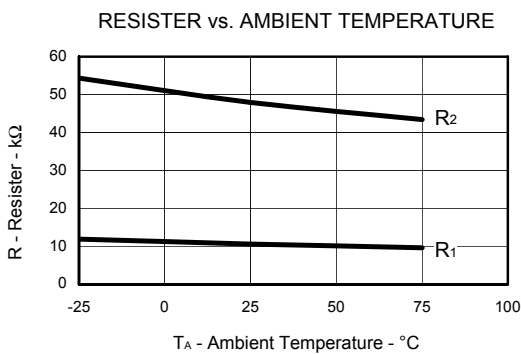
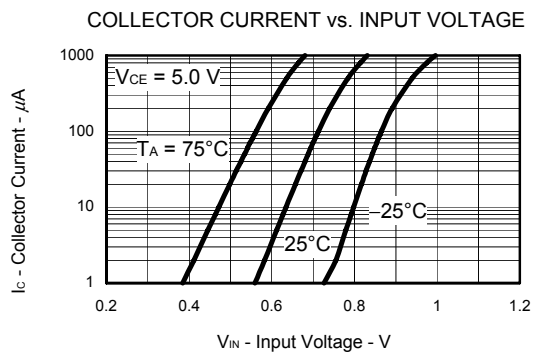
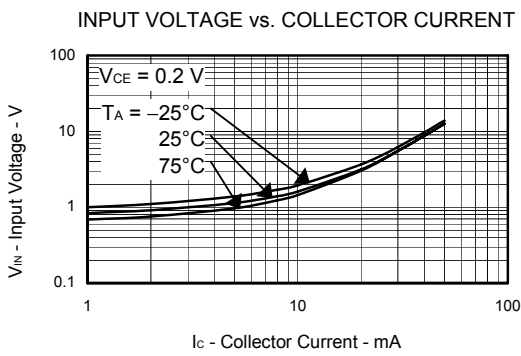
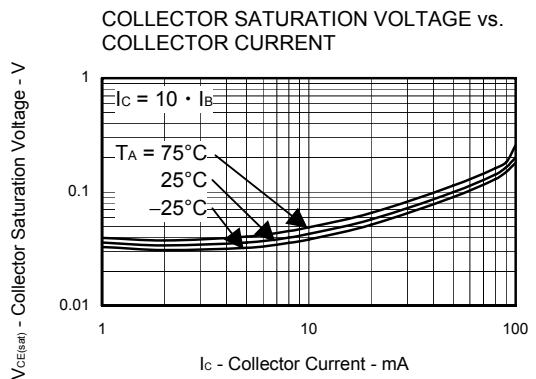
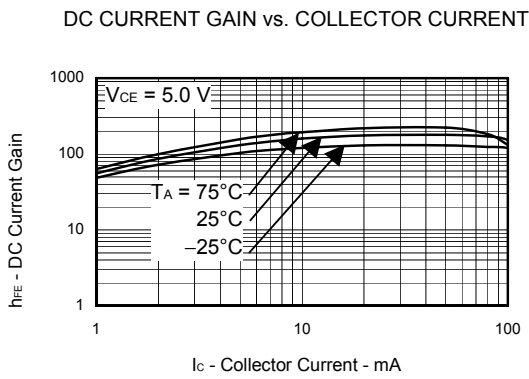
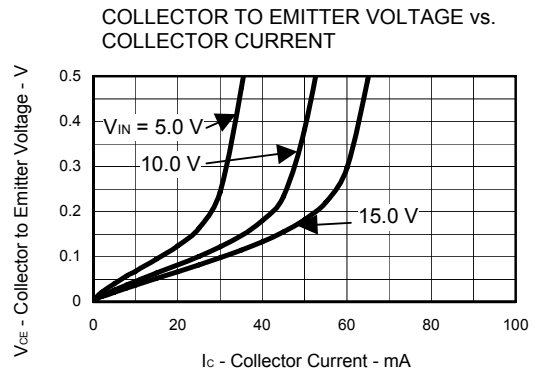
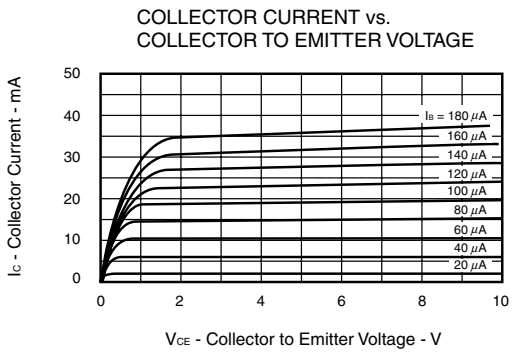
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TYPICAL CHARACTERISTICS (T_A = 25°C)



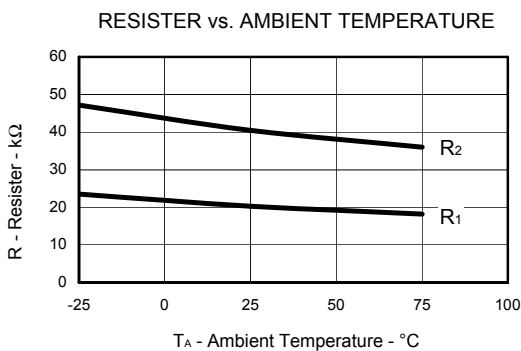
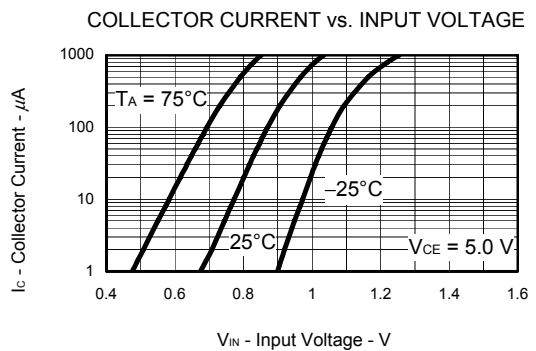
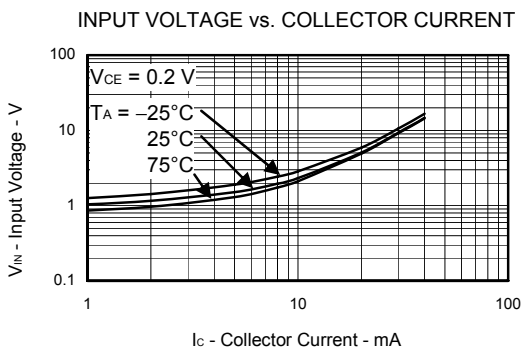
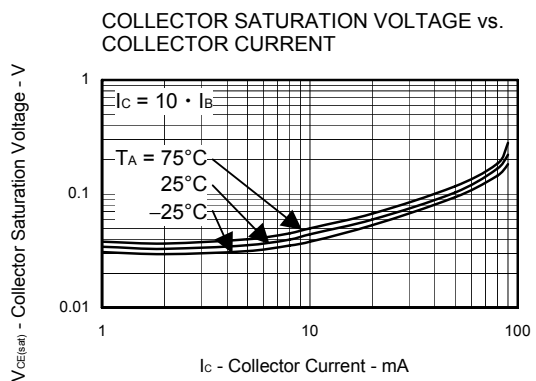
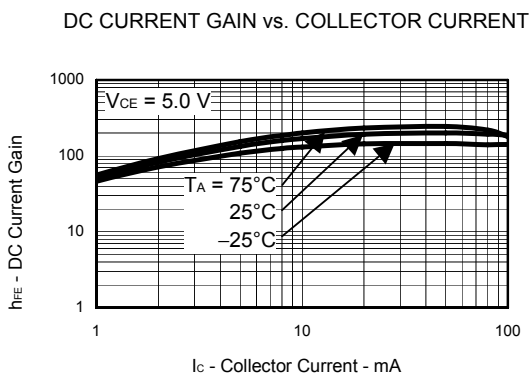
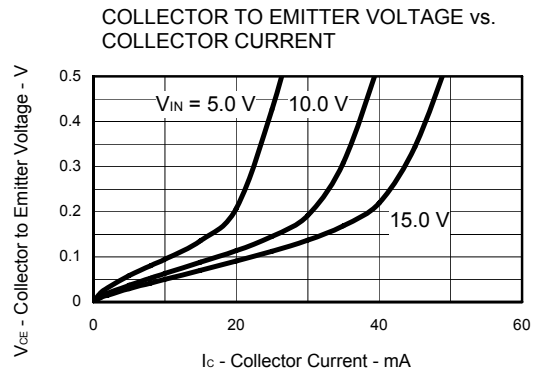
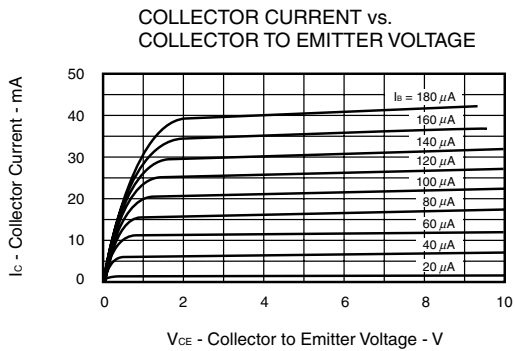
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TYPICAL CHARACTERISTICS (T_A = 25°C)



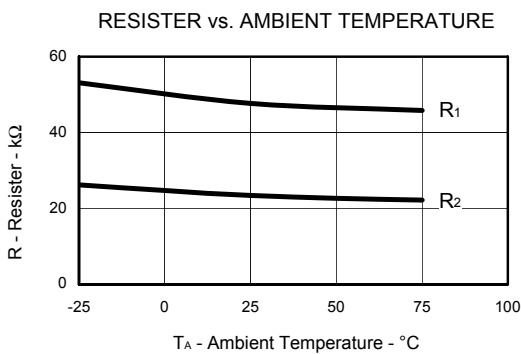
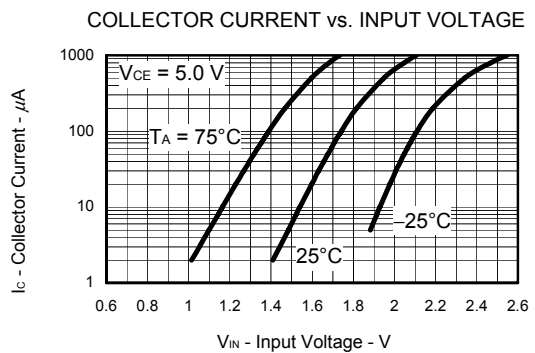
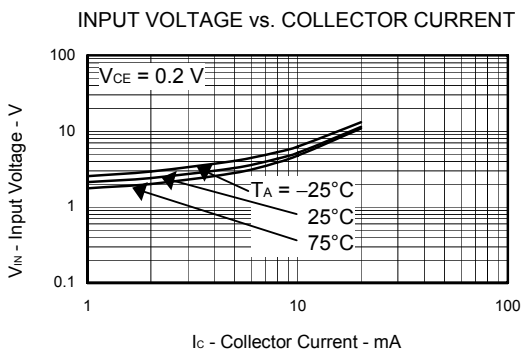
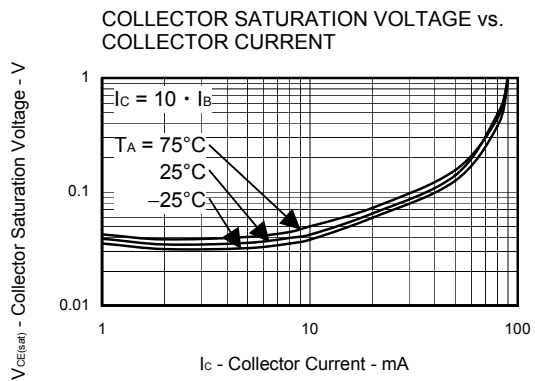
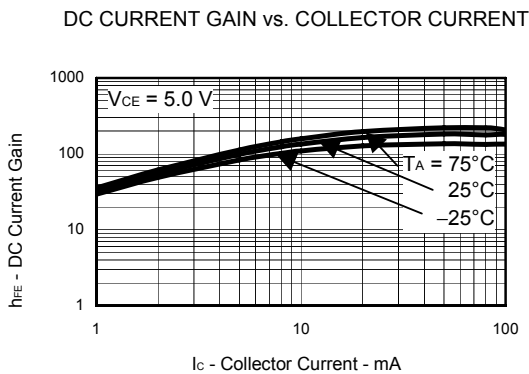
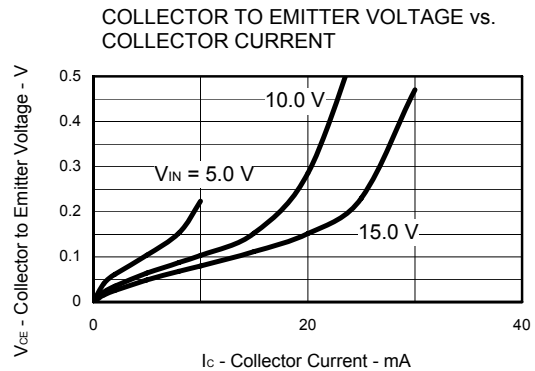
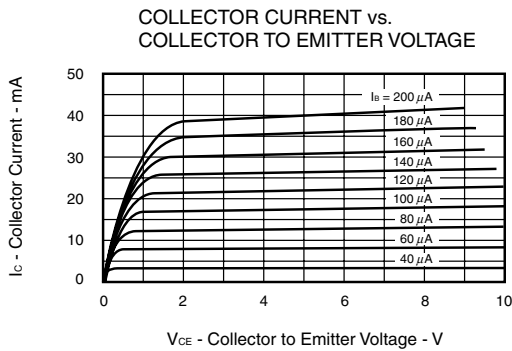
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TYPICAL CHARACTERISTICS (T_A = 25°C)



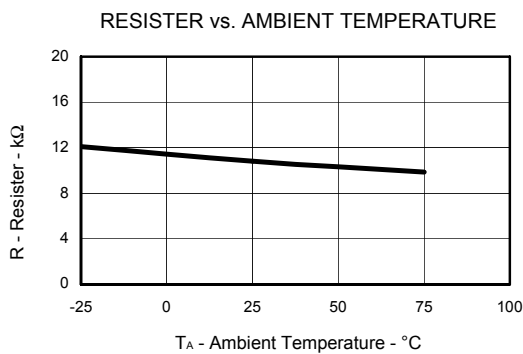
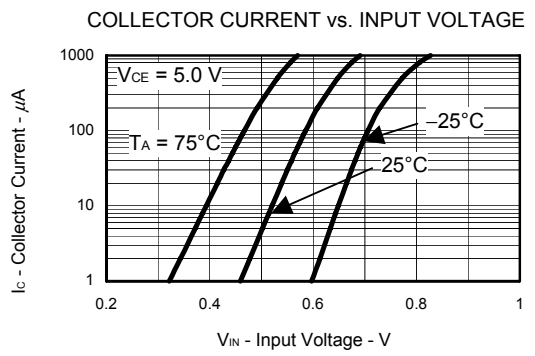
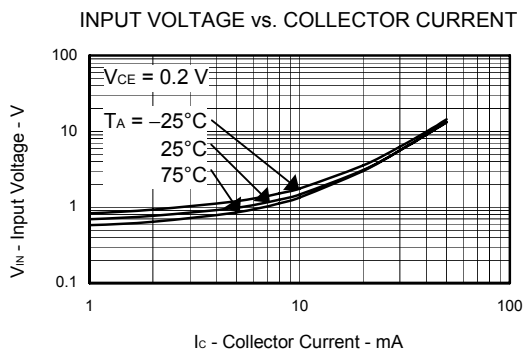
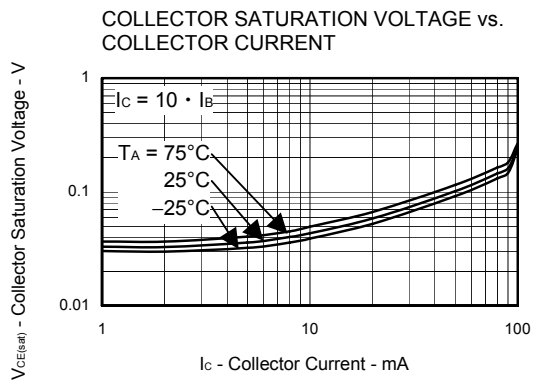
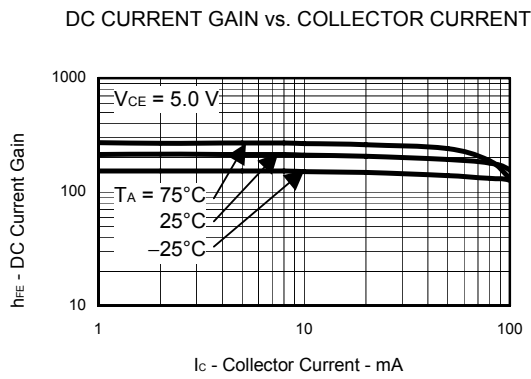
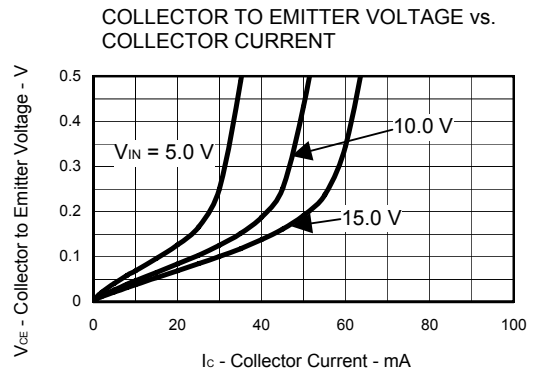
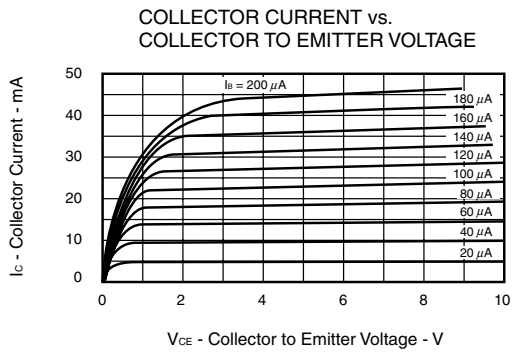
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TYPICAL CHARACTERISTICS (T_A = 25°C)



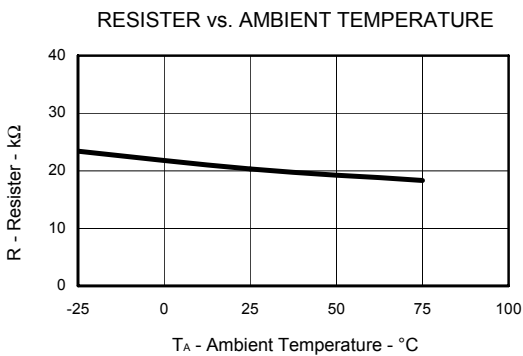
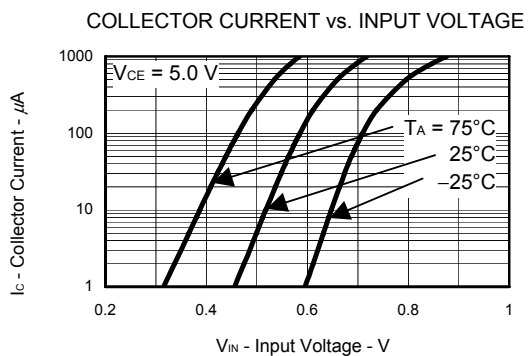
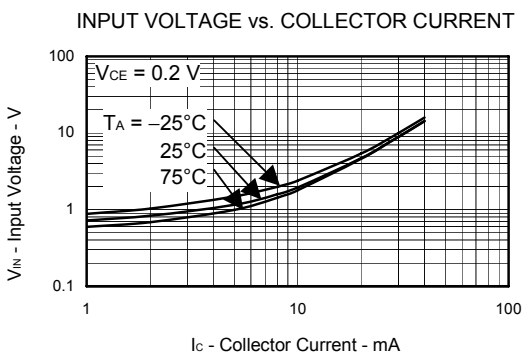
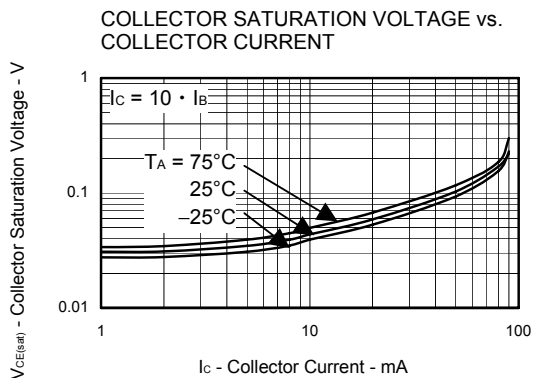
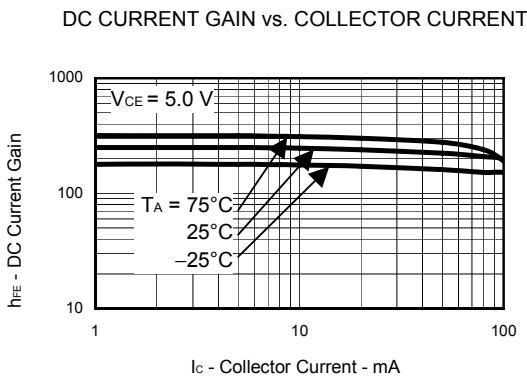
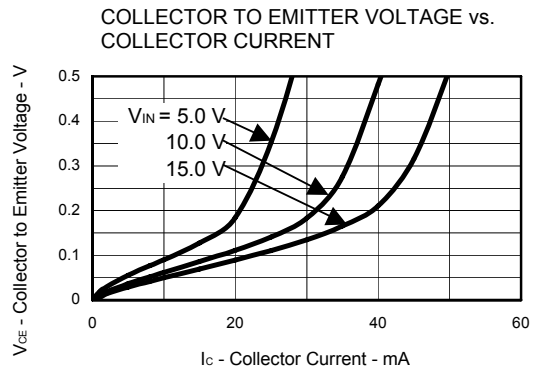
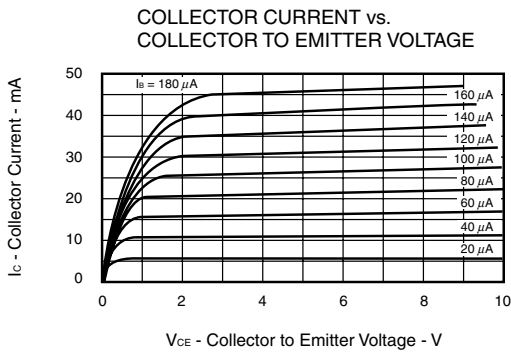
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TYPICAL CHARACTERISTICS (T_A = 25°C)



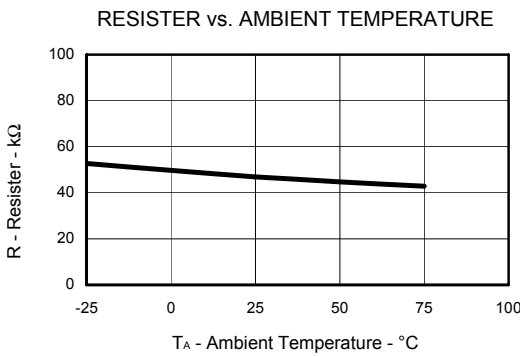
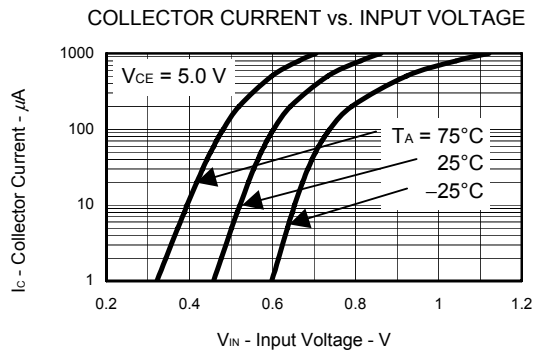
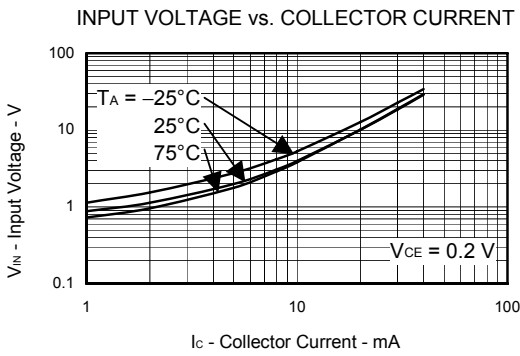
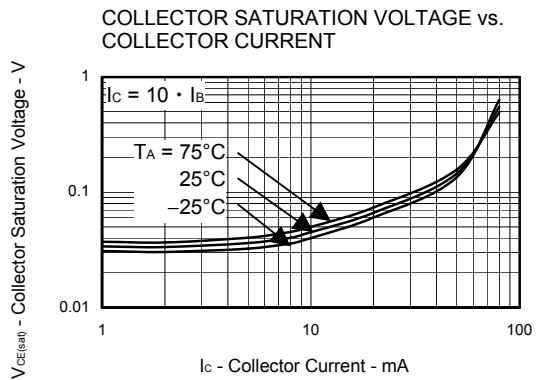
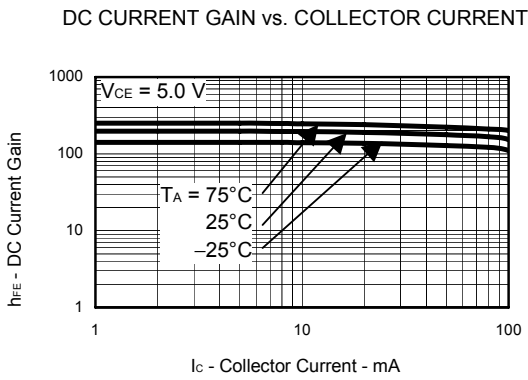
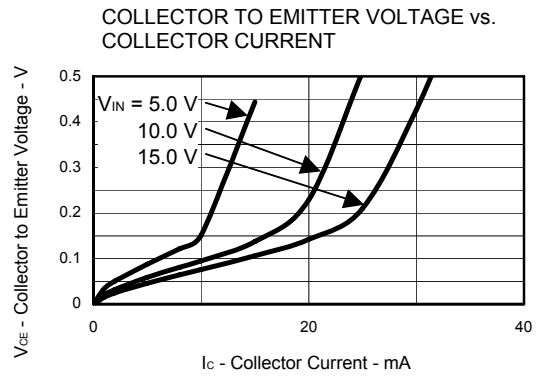
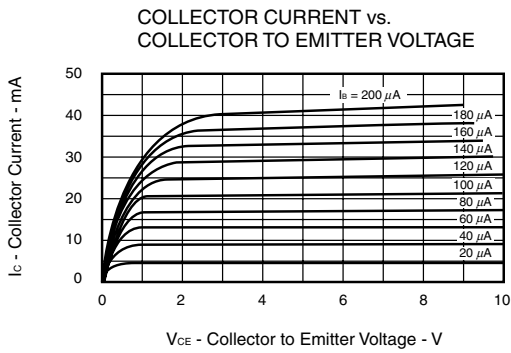
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TYPICAL CHARACTERISTICS (T_A = 25°C)



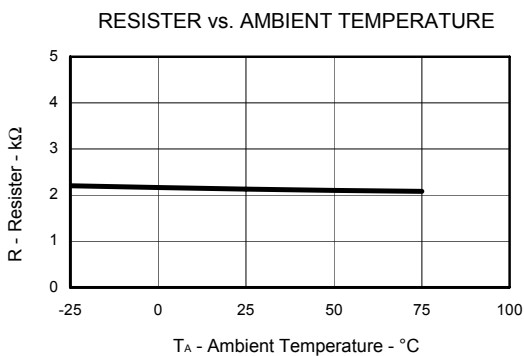
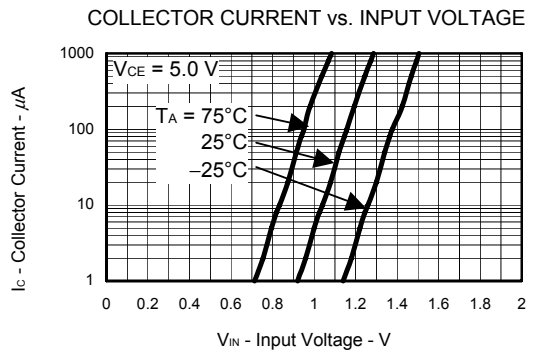
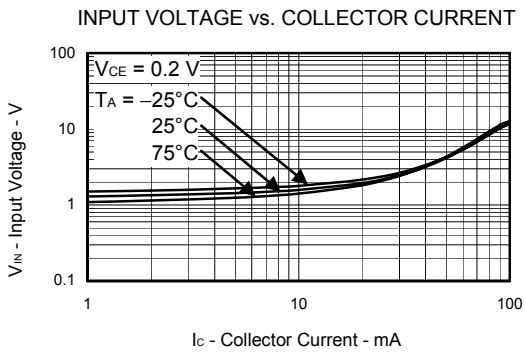
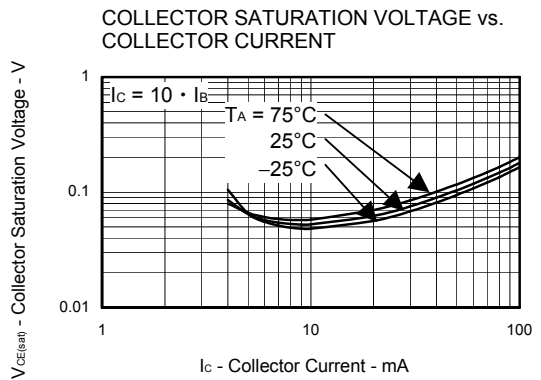
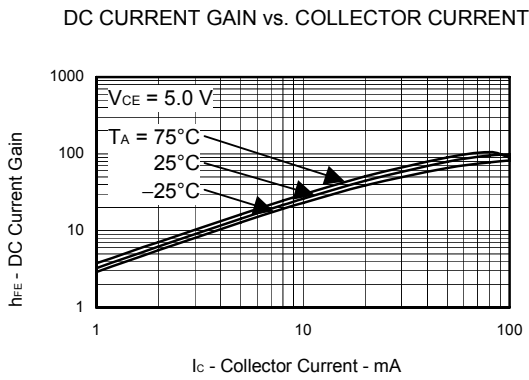
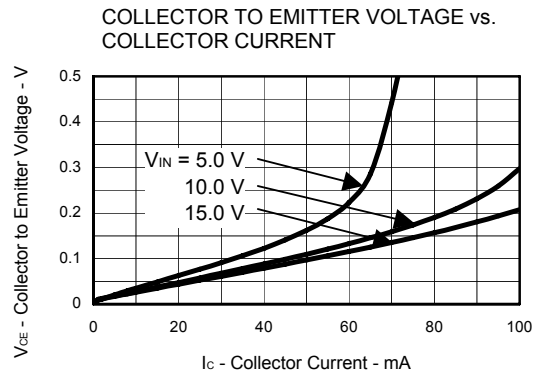
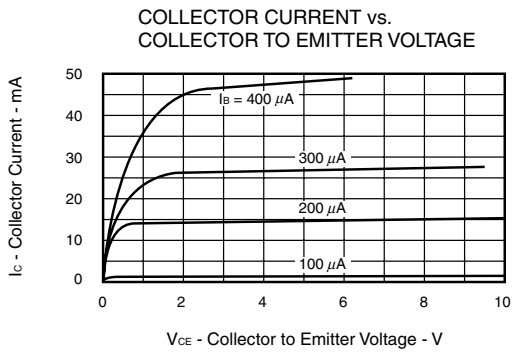
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TYPICAL CHARACTERISTICS (T_A = 25°C)



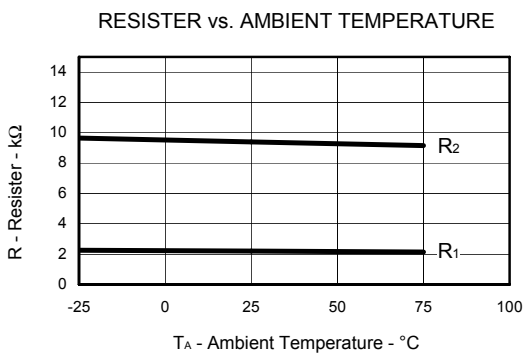
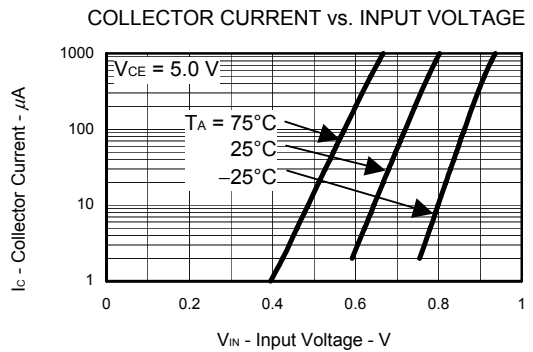
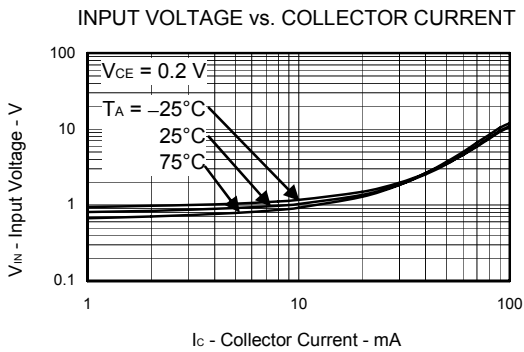
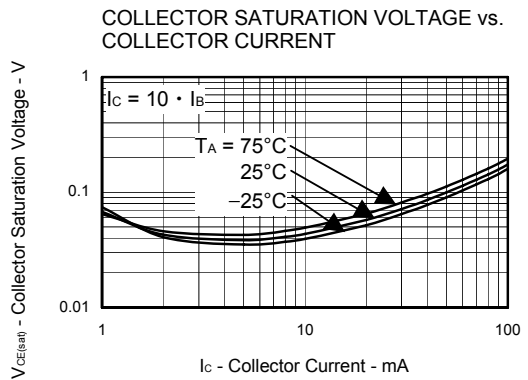
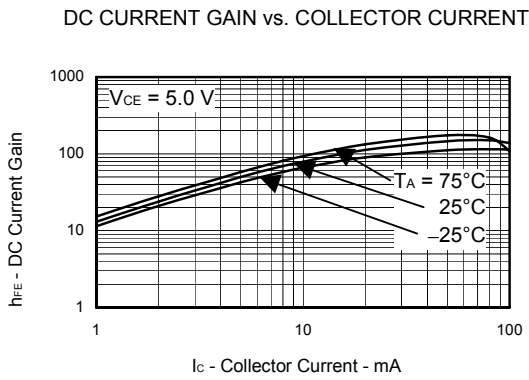
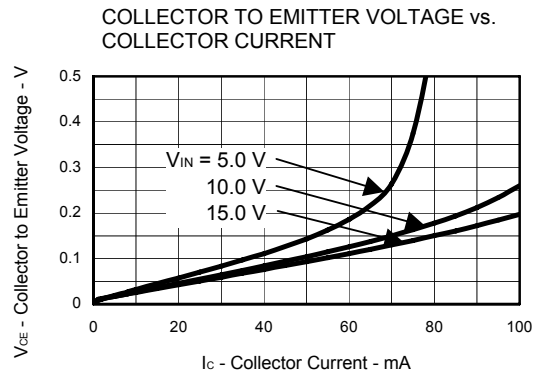
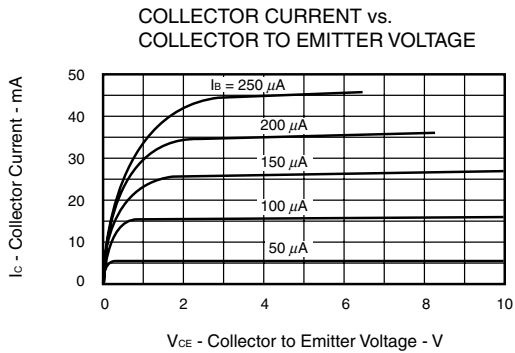
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TYPICAL CHARACTERISTICS (T_A = 25°C)



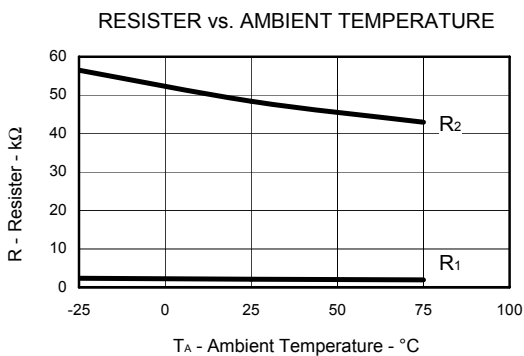
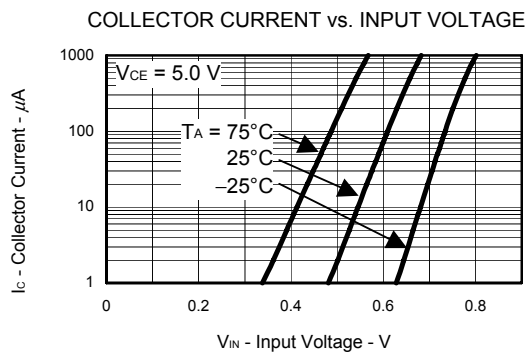
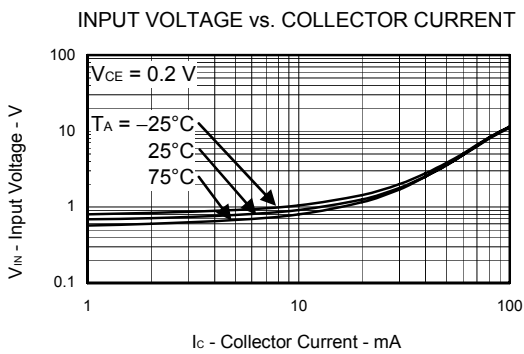
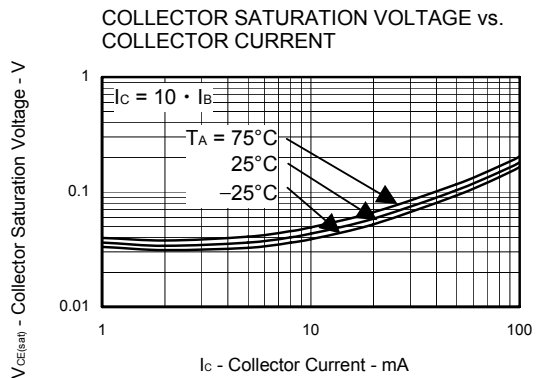
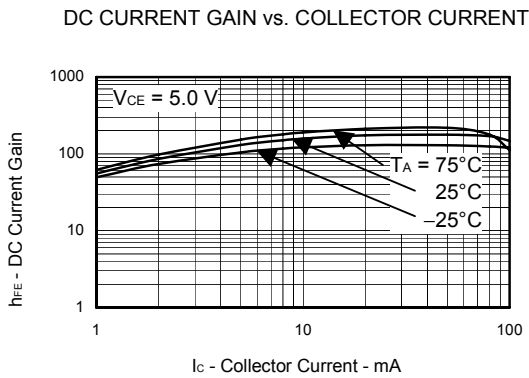
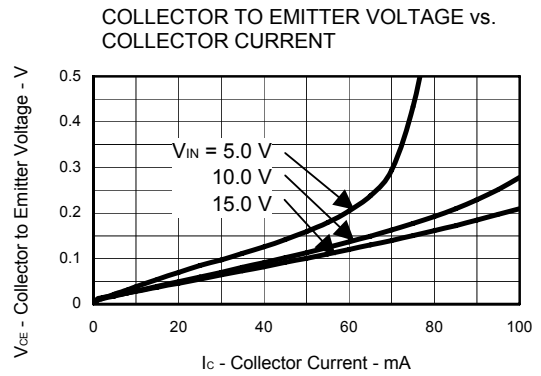
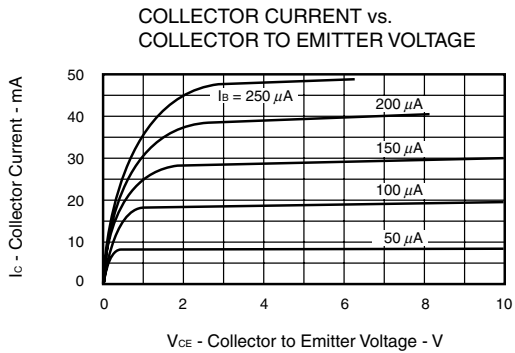
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TYPICAL CHARACTERISTICS (T_A = 25°C)



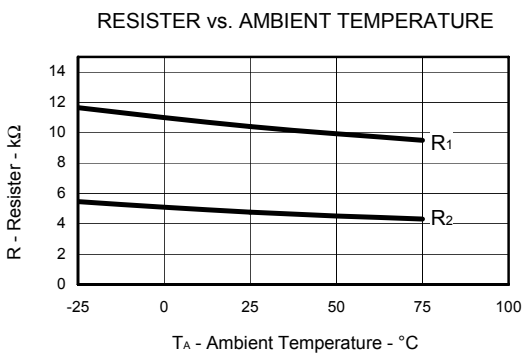
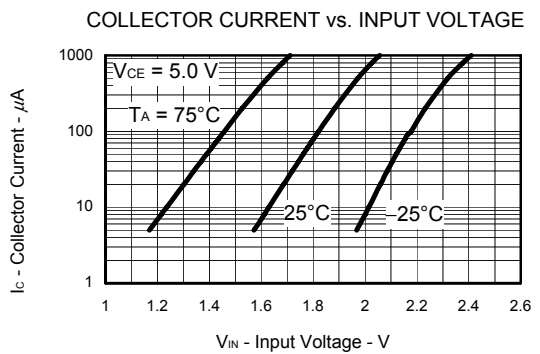
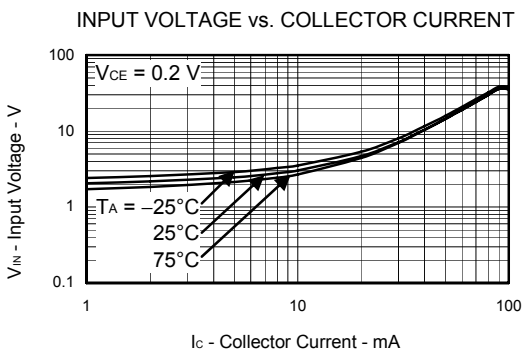
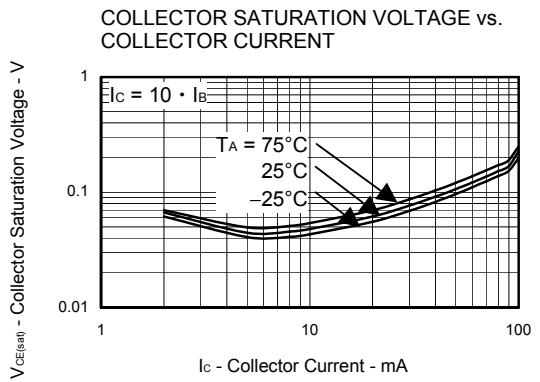
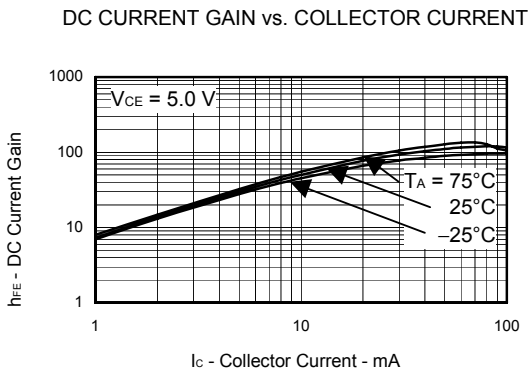
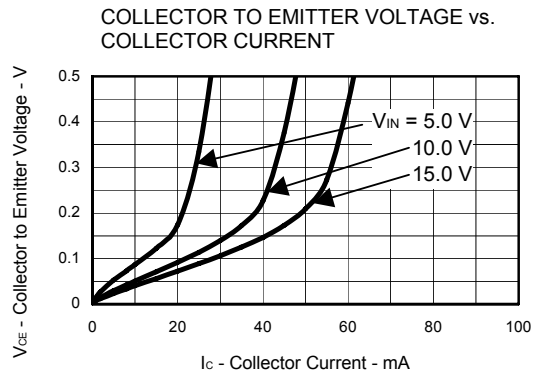
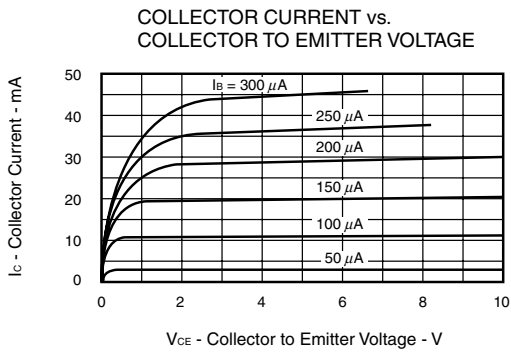
[GA4F3P]
TYPICAL CHARACTERISTICS (T_A = 25°C)



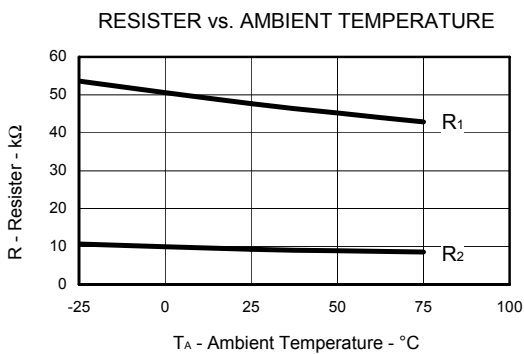
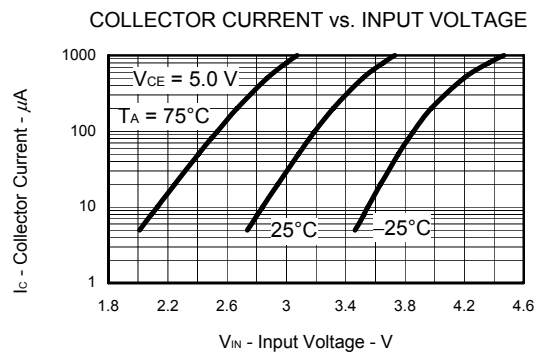
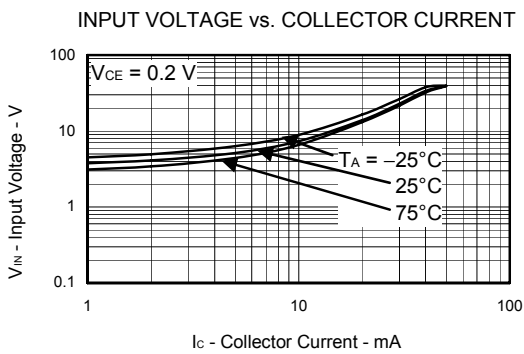
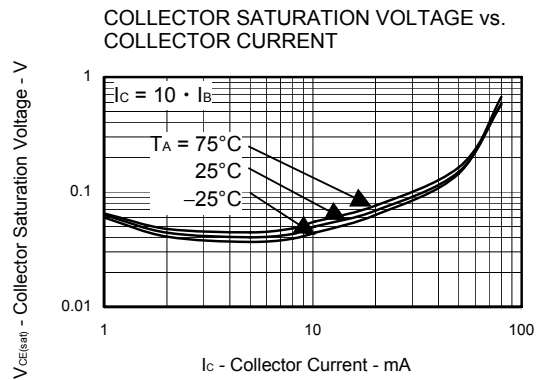
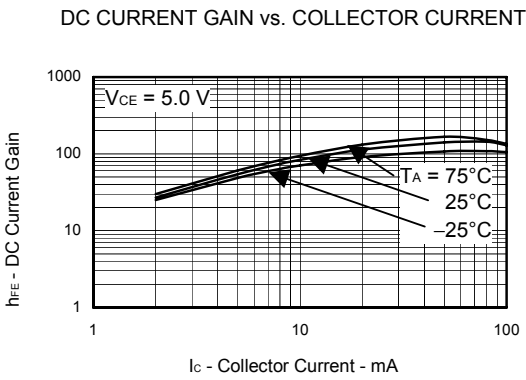
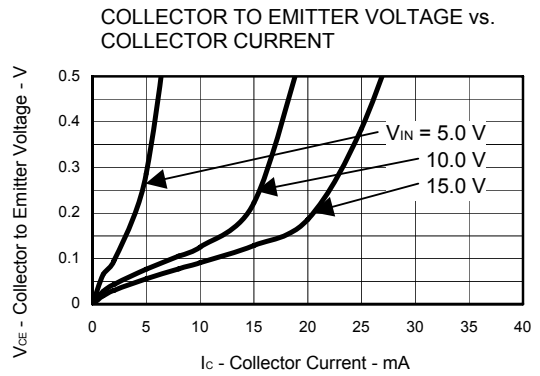
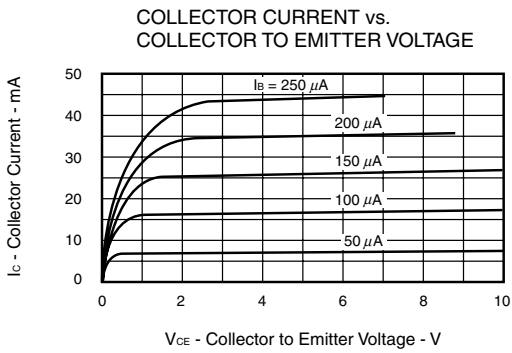
[GA4F3R]
TYPICAL CHARACTERISTICS (T_A = 25°C)



[GA4A4L]
TYPICAL CHARACTERISTICS (T_A = 25°C)



[GA4L4K]
TYPICAL CHARACTERISTICS (T_A = 25°C)



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(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).