To our customers,

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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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SILICON TRANSISTOR
KA4xxx

RESISTOR BUILT-IN TYPE NPN TRANSISTOR

FEATURES

- Compact package
- Resistors built-in type
- Complementary to KN4xxx

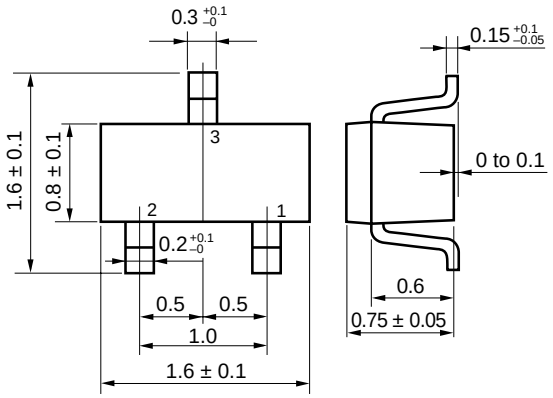
ORDERING INFORMATION

PART NUMBER	PACKAGE
KA4xxx	SC-75 (USM)

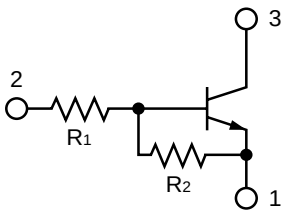
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Collector to Base Voltage	V_{CBO}	60	V
Collector to Emitter Voltage	V_{CEO}	50	V
Emitter to Base Voltage	V_{EBO}	**Note1**	V
Collector Current (DC)	I_C	0.1	A
Collector Current (pulse) **Note2**	$I_{C(pulse)}$	0.2	A
Total Power Dissipation **Note3**	P_T	0.2	W
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT



PIN CONNECTION

1: Emitter
2: Base
3: Collector

Note 1.

PART NUMBER	V_{EBO} (V)	MARK	R_1 (kΩ)	R_2 (kΩ)
KA4A4M	10	A4	10.0	10.0
KA4F4M	10	B4	22.0	22.0
KA4L4M	10	C4	47.0	47.0
KA4L3M	10	D4	4.7	4.7
KA4L3N	5	E4	4.7	10.0
KA4L3Z	5	F4	4.7	
KA4A3Q	5	G4	1.0	10.0
KA4A4P	5	H4	10.0	47.0
KA4F4N	5	X4	22.0	47.0

PART NUMBER	V_{EBO} (V)	MARK	R_1 (kΩ)	R_2 (kΩ)
KA4L4L	15	K4	47.0	22.0
KA4A4Z	5	Y4	10.0	
KA4F4Z	5	Z4	22.0	
KA4L4Z	5	N4	47.0	
KA4F3M	10	P4	2.2	2.2
KA4F3P	5	Q4	2.2	10.0
KA4F3R	5	R4	2.2	47.0
KA4A4L	15	S4	10.0	4.7
KA4L4K	25	T4	47.0	10.0

Note 2. PW ≤ 10 ms, Duty Cycle ≤ 50%

<R> **Note 3.** Mounted on ceramic substrate of 3.0 cm^2 x 0.64 mm

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The mark <R> shows major revised points.
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

ELECTRICAL CHARACTERISTICS (T_A = 25℃)

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.	
KA4A4M	35		100	80			-
KA4F4M	60		195	90			-
KA4L4M	85		340	95			-
KA4L3M	20		80	80			-
KA4L3N	35		100	80			-
KA4L3Z	135		600	100			-
KA4A3Q	35		100	80			-
KA4A4P	85		340	95			-
KA4F4N	85		340	95			-
KA4L4L	60		195	90			-
KA4A4Z	135		600	100			-
KA4F4Z	135		600	100			-
KA4L4Z	135		600	100			-
KA4F3M	8		50	50			-
KA4F3P	35		100	80			-
KA4F3R	85		340	95			-
KA4A4L	20		80	80			-
KA4L4K	35		100	80			-

Note 2.

PART NUMBER	V_{IL}			V_{IH}			UNIT
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
KA4A4M			0.8	3.0			V
KA4F4M			0.8	4.0			V
KA4L4M			0.8	5.0			V
KA4L3M			0.8	3.0			V
KA4L3N			0.6	3.0			V
KA4L3Z			0.5	1.2			V
KA4A3Q			0.5	2.0			V
KA4A4P			0.5	3.0			V
KA4F4N			0.6	3.0			V
KA4L4L			0.9	6.0			V
KA4A4Z			0.5	2.0			V
KA4F4Z			0.5	3.0			V
KA4L4Z			0.5	4.0			V
KA4F3M			0.8	3.0			V
KA4F3P			0.5	2.0			V
KA4F3R			0.5	2.0			V
KA4A4L			0.9	6.0			V
KA4L4K			2.0	8.0			V

Note 3.

PART NUMBER	R_1			R_2			UNIT
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
KA4A4M	7.00	10.00	13.00	7.00	10.00	13.00	kΩ
KA4F4M	15.40	22.00	28.60	15.40	22.00	28.60	kΩ
KA4L4M	32.90	47.00	61.10	32.90	47.00	61.10	kΩ
KA4L3M	3.29	4.70	6.11	3.29	4.70	6.11	kΩ
KA4L3N	3.29	4.70	6.11	7.00	10.00	13.00	kΩ
KA4L3Z	3.29	4.70	6.11				kΩ
KA4A3Q	0.70	1.00	1.30	7.00	10.00	13.00	kΩ
KA4A4P	7.00	10.00	13.00	32.90	47.00	61.10	kΩ
KA4F4N	15.40	22.00	28.60	32.90	47.00	61.10	kΩ
KA4L4L	32.90	47.00	61.10	15.40	22.00	28.60	kΩ
KA4A4Z	7.00	10.00	13.00				kΩ
KA4F4Z	15.40	22.00	28.60				kΩ
KA4L4Z	32.90	47.00	61.10				kΩ
KA4F3M	1.54	2.20	2.86	1.54	2.20	2.86	kΩ
KA4F3P	1.54	2.20	2.86	7.00	10.00	13.00	kΩ
KA4F3R	1.54	2.20	2.86	32.90	47.00	61.10	kΩ
KA4A4L	7.00	10.00	13.00	3.29	4.70	6.11	kΩ
KA4L4K	32.90	47.00	61.10	7.00	10.00	13.00	kΩ

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TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE