

# General purpose transistor (isolated transistor and diode)

## EML12 / UML12N

2SC4617 and RB521S-30 are housed independently in a EMT5 or UMT5 package.

### ●Applications

DC / DC converter  
Motor driver

### ●Features

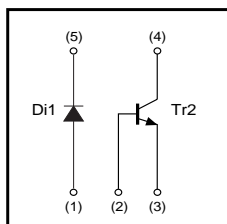
- 1) Tr : Low  $V_{CE(sat)}$   
Di : Low  $V_F$
- 2) Small package

### ●Structure

NPN Silicon epitaxial planar transistor  
Schottky barrier diode

The following characteristics apply to both Di1 and Tr2.

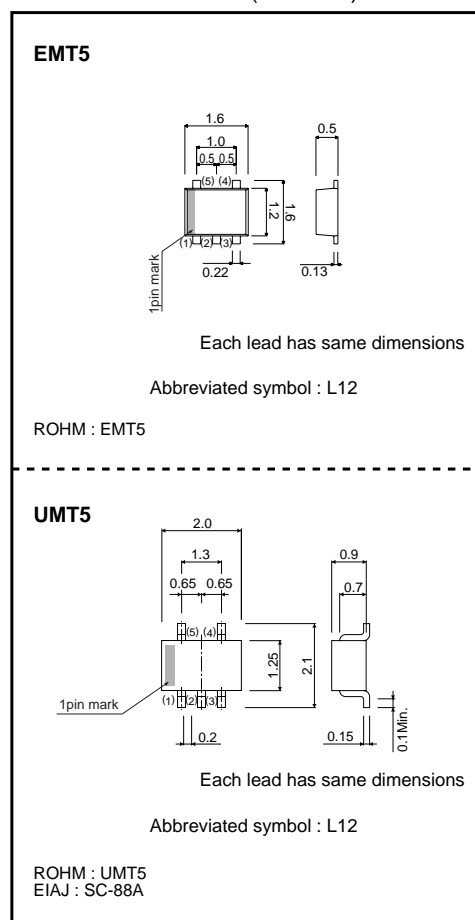
### ●Equivalent circuit (EML12 / UML12N)



### ●Packaging specifications

Type	EML12	UML12N
Package	EMT5	UMT5
Marking	L12	L12
Code	T2R	TR
Basic ordering unit (pieces)	8000	3000

### ●External dimensions (Unit : mm)



## Transistors

## ●Absolute maximum ratings (Ta=25°C)

Di1

Parameter	Symbol	Limits	Unit
Average rectified forward current	I <sub>o</sub>	200	mA
Forward current surge peak (60Hz, 1↔)	I <sub>FSM</sub>	1	A
Reverse voltage (DC)	V <sub>R</sub>	30	V
Junction temperature	T <sub>j</sub>	125	°C

Tr2

Parameter	Symbol	Limits	Unit
Collector-base voltage	V <sub>CB0</sub>	60	V
Collector-emitter voltage	V <sub>CEO</sub>	50	V
Emitter-base voltage	V <sub>EBO</sub>	7	V
Collector current	I <sub>c</sub>	150	mA
Power dissipation	P <sub>D</sub>	120	mW *
Junction temperature	T <sub>j</sub>	150	°C

\* Each terminal mount on a recommended.

Di1 / DTr2

Parameter	Symbol	Limits	Unit
Power dissipation	P <sub>d</sub>	150	mW *
Storage temperature	T <sub>stg</sub>	-55 to +125	°C

\* Each terminal mount on a recommended.

## ●Electrical characteristics (Ta=25°C)

Di1

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V <sub>F</sub>	-	0.40	0.50	V	I <sub>F</sub> =200mA
Reverse current	I <sub>R</sub>	-	4.0	30	μA	V <sub>R</sub> =10V

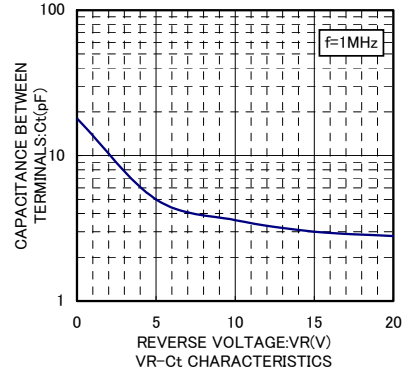
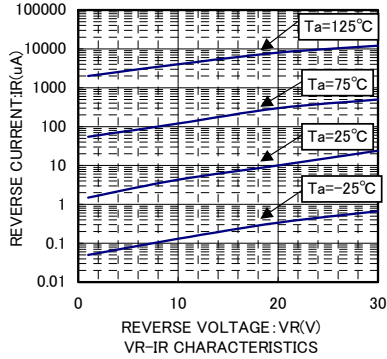
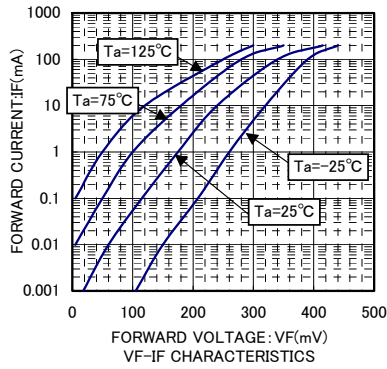
Tr2

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV <sub>CB0</sub>	60	-	-	V	I <sub>c</sub> =50μA
Collector-emitter breakdown voltage	BV <sub>CEO</sub>	50	-	-	V	I <sub>c</sub> =1mA
Emitter-base breakdown voltage	BV <sub>EBO</sub>	7	-	-	V	I <sub>E</sub> =50μA
Collector cutoff current	I <sub>CB0</sub>	-	-	0.1	μA	V <sub>CB</sub> =60V
Emitter cutoff current	I <sub>EBO</sub>	-	-	0.1	μA	V <sub>EB</sub> =7V
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	-	-	0.4	V	I <sub>c</sub> /I <sub>B</sub> =50mA/5mA
DC current transfer ratio	h <sub>FE</sub>	180	-	390	-	V <sub>CE</sub> =6V, I <sub>c</sub> =1mA
Transition frequency	f <sub>T</sub>	-	180	-	MHz	V <sub>CE</sub> =12V, I <sub>E</sub> =-2mA, f=100MHz
Output capacitance	C <sub>ob</sub>	-	2	3.5	PF	V <sub>CB</sub> =12V, I <sub>E</sub> =0A, f=1MHz

Transistors

●Electrical characteristic curves

Di1



Tr2

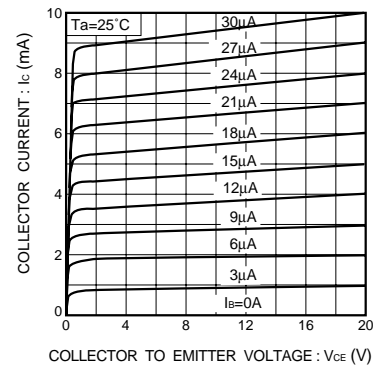
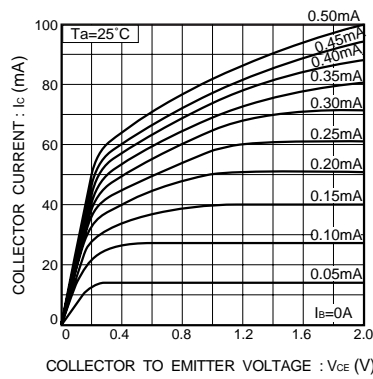
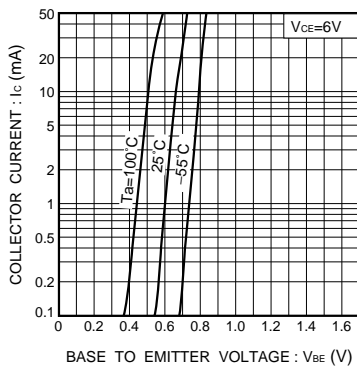


Fig.1 Grounded emitter propagation characteristics

Fig.2 Grounded emitter output characteristics ( I )

Fig.3 Grounded emitter output characteristics ( II )

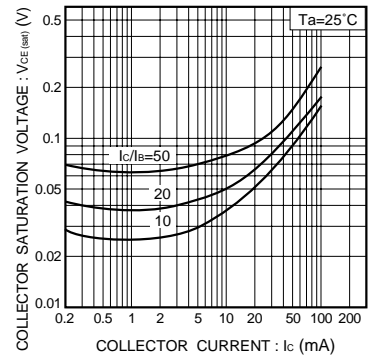
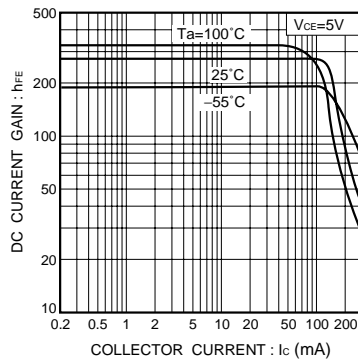
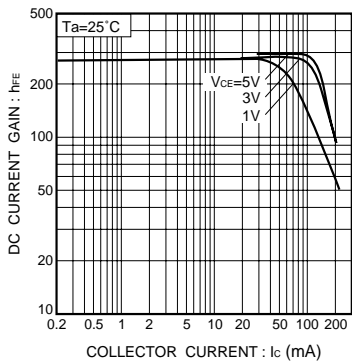


Fig.4 DC current gain vs. collector current ( I )

Fig.5 DC current gain vs. collector current ( II )

Fig.6 Collector-emitter saturation voltage vs. collector current

Transistors

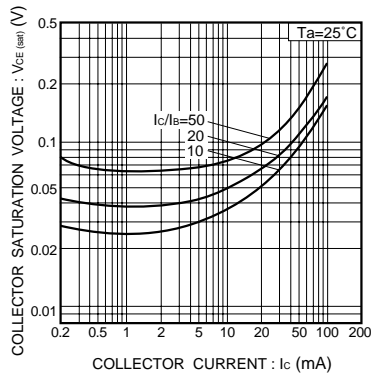


Fig.7 Collector-emitter saturation voltage vs. collector current ( I )

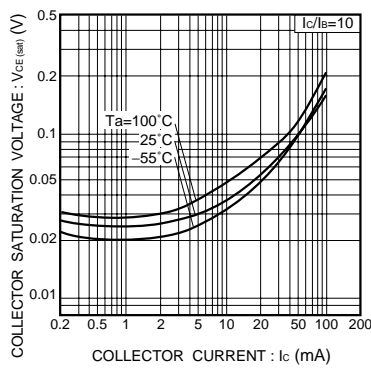


Fig.8 Collector-emitter saturation voltage vs. collector current ( II )

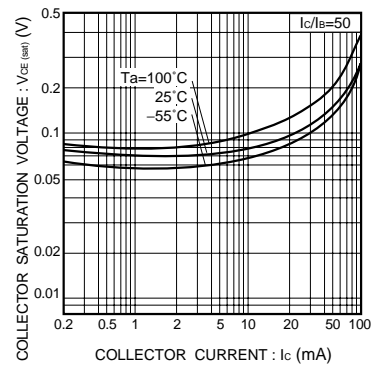


Fig.9 Collector-emitter saturation voltage vs. collector current ( III )

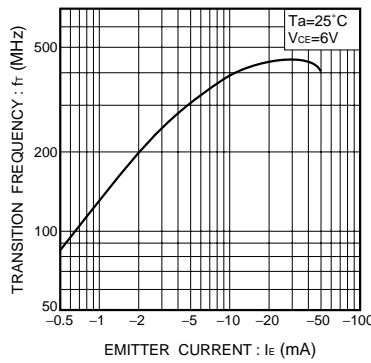


Fig.10 Gain bandwidth product vs. emitter current

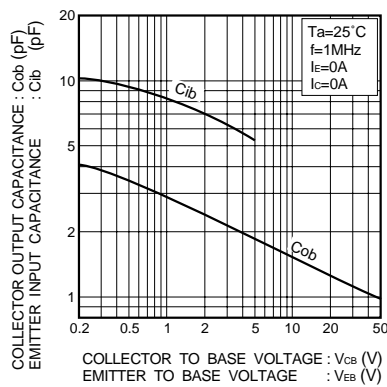


Fig.11 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

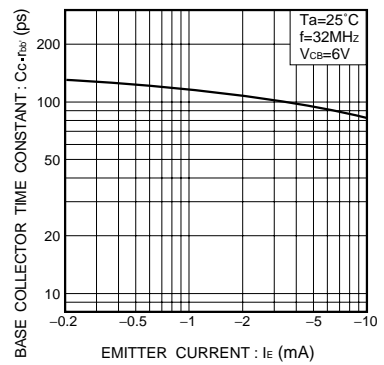


Fig.12 Base-collector time constant vs. emitter current

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