

# 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

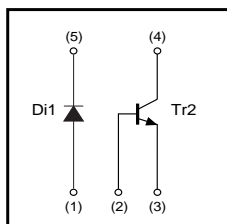
- 1) Tr : Low  $V_{CE(sat)}$   
Di : Low  $V_F$
- 2) Small package

### ●Structure

NPN Silicon epitaxial planar transistor  
Schottky barrier diode

The following characteristics apply to both Di1 and Tr2.

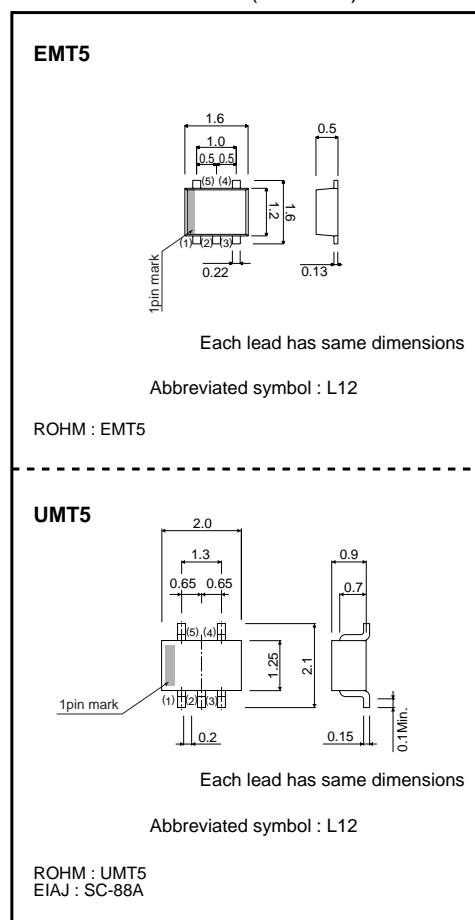
### ●Equivalent circuit (EML12 / UML12N)



### ●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

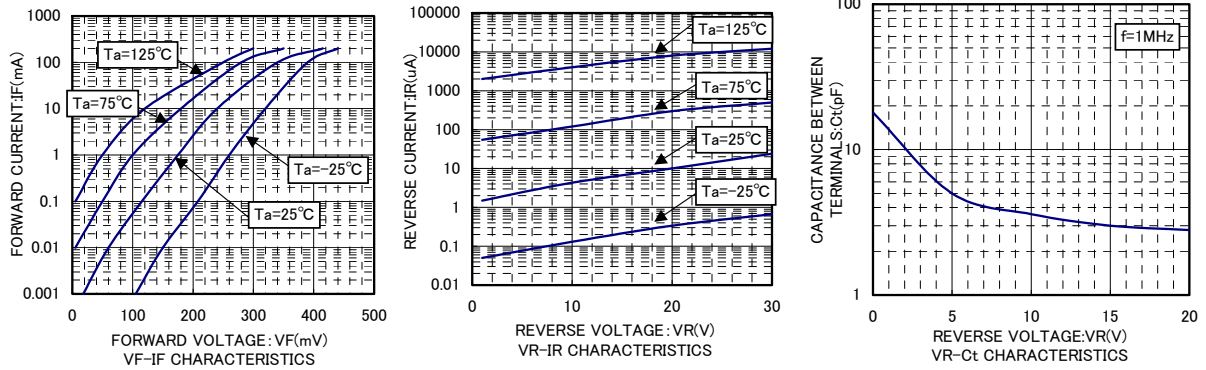
Tr2

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

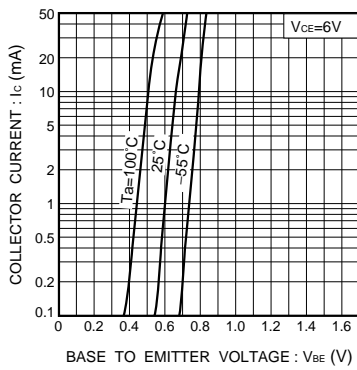


Fig.1 Grounded emitter propagation characteristics

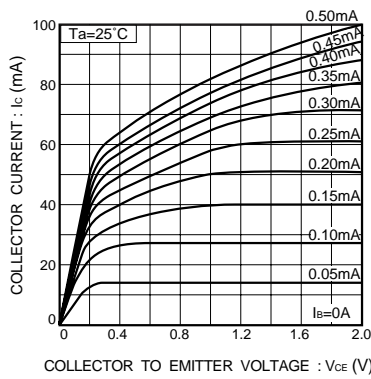


Fig.2 Grounded emitter output characteristics (I)

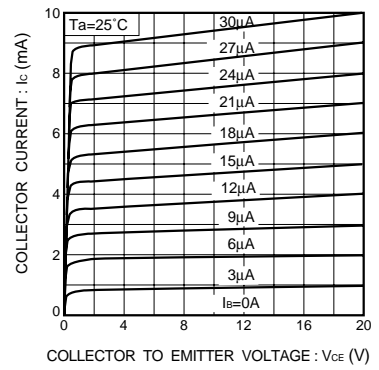


Fig.3 Grounded emitter output characteristics (II)

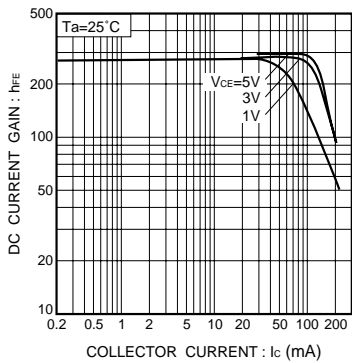


Fig.4 DC current gain vs. collector current (I)

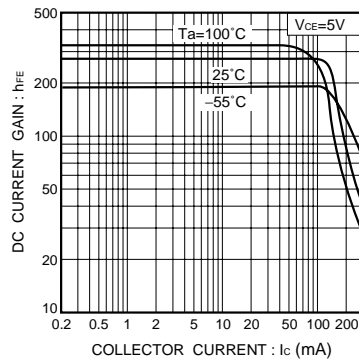


Fig.5 DC current gain vs. collector current (II)

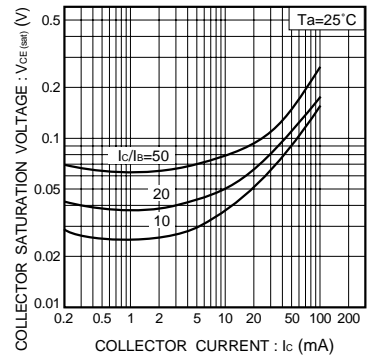


Fig.6 Collector-emitter saturation voltage vs. collector current

Transistors

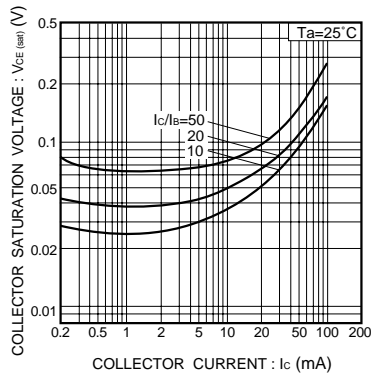


Fig.7 Collector-emitter saturation voltage vs. collector current ( I )

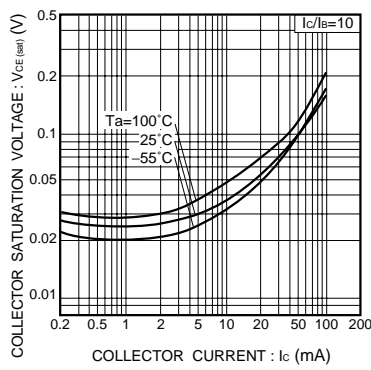


Fig.8 Collector-emitter saturation voltage vs. collector current ( II )

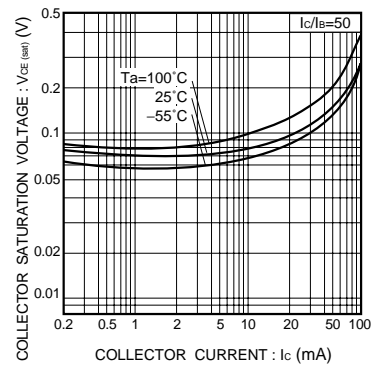


Fig.9 Collector-emitter saturation voltage vs. collector current ( III )

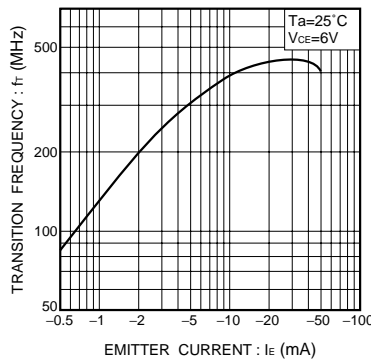


Fig.10 Gain bandwidth product vs. emitter current

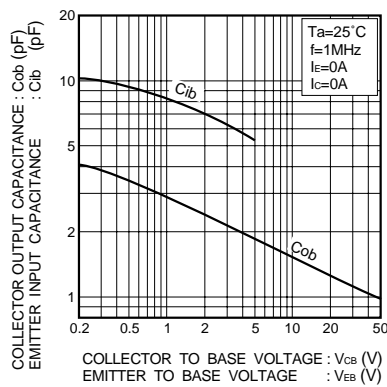


Fig.11 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

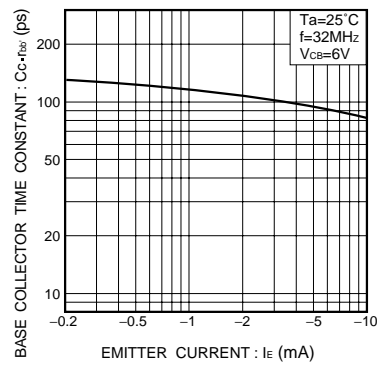


Fig.12 Base-collector time constant vs. emitter current

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