

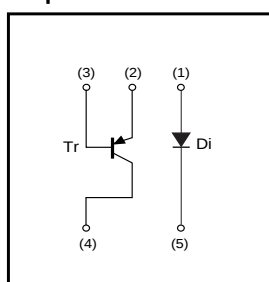
Low-frequency transistor

UML1N

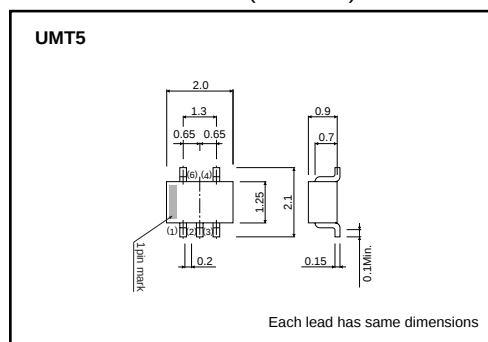
●Features

- 1) The 2SA1037AK and a diode are housed independently in a UMT package.

●Equivalent circuit



●External dimensions (Unit : mm)



●Packaging specifications

Type	FML10
Package	SMT5
Marking	L10
Code	TR
Basic ordering unit(pieces)	3000

●Absolute maximum ratings (Ta=25°C)

Tr

Parameter	Symbol	Limits	Unit
Collector-base voltage	V_{CBO}	-60	V
Collector-emitter voltage	V_{CEO}	-50	V
Emitter-base voltage	V_{EBO}	-6	V
Collector current	I_C	-0.15	A
Collector power dissipation	P_C	0.15	W
Junction temperature	T_J	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

Di

Parameter	Symbol	Limits	Unit
DC reverse voltage	V_R	80	V
Peak reverse voltage	V_{RM}	80	V
Mean rectifying current	I_O	0.1	A
Peak forward voltage	I_{FM}	0.3	A
Surge current	I_{surge}	4	A
Junction temperature	T_J	150	°C
Storage temperature	T_{stg}	-55 to +150	°C
Specified I/O frequencies	f	100	MHz

Transistors

●Electrical characteristics (Ta=25°C)

Tr

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-emitter breakdown voltage	BV_{CEO}	-50	—	—	V	$I_C = -1\text{mA}$
Collector-base breakdown voltage	BV_{CBO}	-60	—	—	V	$I_C = -50\mu\text{A}$
Emitter-base breakdown voltage	BV_{EBO}	-6	—	—	V	$I_E = -50\mu\text{A}$
Collector cutoff current	I_{CBO}	—	—	-0.1	μA	$V_{CB} = -60\text{V}$
Emitter cutoff current	I_{EBO}	—	—	-0.1	μA	$V_{EB} = -5\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	-0.5	V	$I_C/I_E = -50\text{mA}/-5\text{mA}$
DC current transfer ratio	h_{FE}	120	—	560	—	$V_{CE} = -6\text{V}$, $I_C = -1\text{mA}$
Transition frequency	f_T	—	140	—	MHz	$V_{CE} = -12\text{V}$, $I_E = 2\text{mA}$, $f = 100\text{MHz}$
Output capacitance	C_{ob}	—	4	5	pF	$V_{CB} = -12\text{V}$, $I_E = 0\text{A}$, $f = 1\text{MHz}$

Di

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_F	—	—	1.2	V	$I_F = 100\text{mA}$
Reverse current	I_R	—	—	0.1	μA	$V_R = 70\text{V}$
Capacitance between terminals	C_T	—	—	3.5	pF	$V_R = 6\text{V}$, $f = 1\text{MHz}$
Reverse recovery time	t_{rr}	—	—	4	ns	$V_R = 6\text{V}$, $I_F = 5\text{mA}$, $R_L = 50\Omega$

●Electrical characteristic curves

Tr

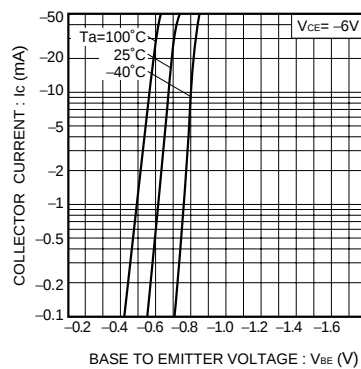


Fig.1 Grounded emitter propagation characteristics

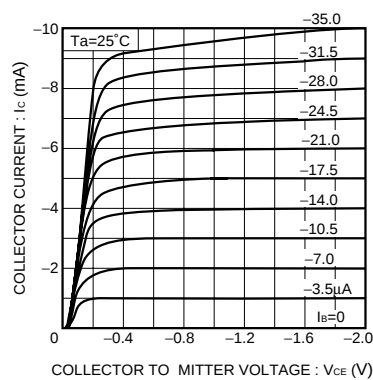


Fig.2 Grounded emitter output characteristics (I)

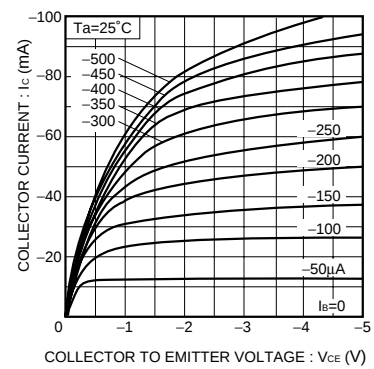


Fig.3 Grounded emitter output characteristics (II)

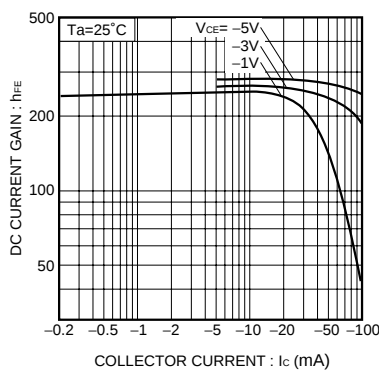


Fig.4 DC current gain vs. collector current (I)

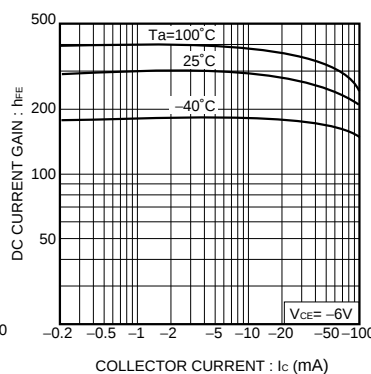


Fig.5 DC current gain vs. collector current (II)

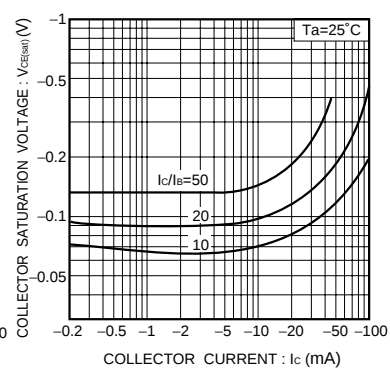


Fig.6 Collector-emitter saturation voltage vs. collector current (I)

Transistors

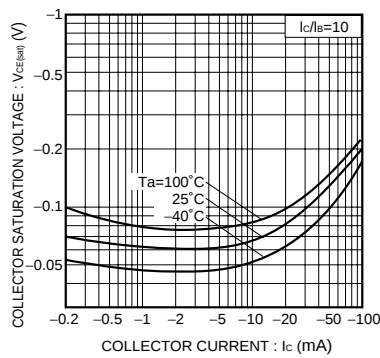


Fig.7 Collector-emitter saturation voltage vs. collector current (II)

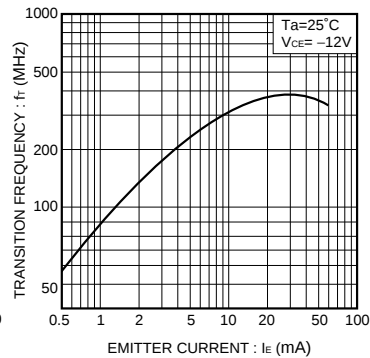
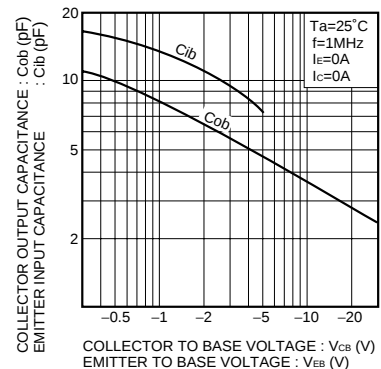


Fig.8 Gain bandwidth product vs. emitter current

Fig.9 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

Di

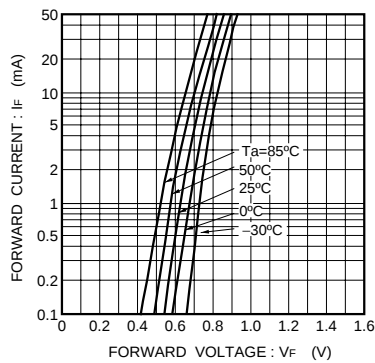


Fig.10 Forward characteristics

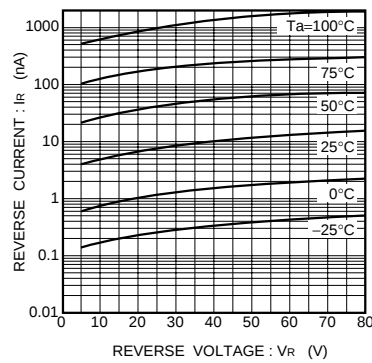


Fig.11 Reverse characteristics

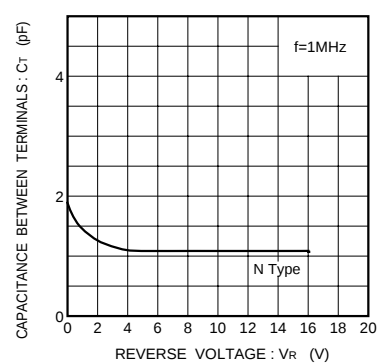


Fig.12 Capacitance between terminals characteristics

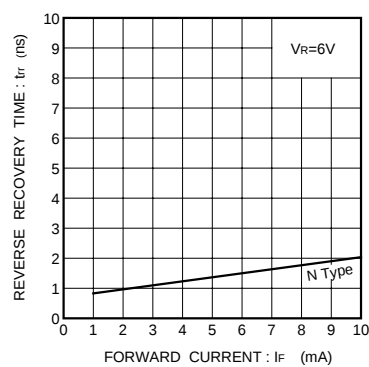
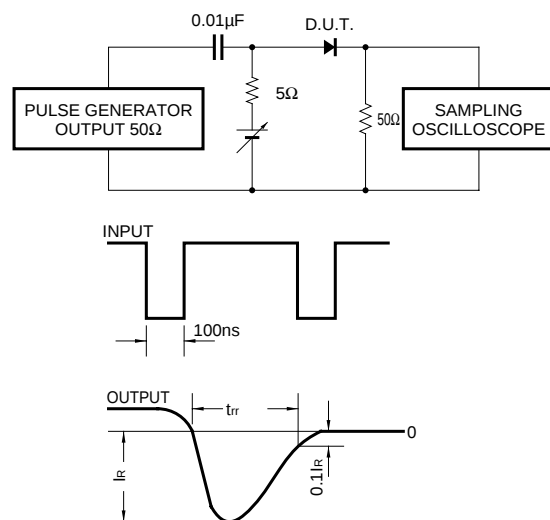


Fig.13 Reverse recovery time

Fig.14 Reverse recovery time (t_{rr}) measurement circuit

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