2SC5658 / 2SC4617EB / 2SC4617
2SC4081UB / 2SC4081 / 2SC2412K

General purpose small signal amplifier
(50V, 150mA)

Datasheet

Parameter	Value
V_{CEO}	50V
I_C	150mA

●Features

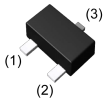
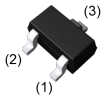
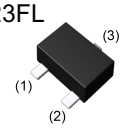
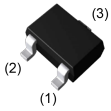
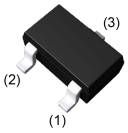
1)Low Cob.Cob=2.0pF(Typ.)

2)Complements the 2SA2029/
2SA1774EB/2SA1774/2SA1576UB/
2SA1576A/2SA1037AK.

●Application

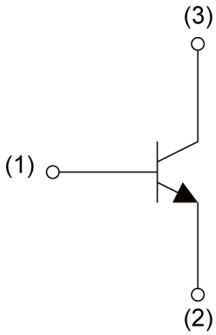
GENERAL PURPOSE SMALL SIGNAL
AMPLIFIER

●Outline

SC-105AA  2SC5658 (VMT3)	SOT-416FL  2SC4617EB (EMT3F)
SOT-416  2SC4617 (EMT3)	SOT-323FL  2SC4081UB (UMT3F)
SOT-323  2SC4081 (UMT3)	SOT-346  2SC2412K (SMT3)

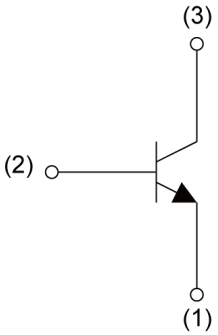
●Inner circuit

2SC5658/2SC4617EB/2SC4081UB



(1) Base
(2) Emitter
(3) Collector

2SC4617/2SC4081/2SC2412K



(1) Emitter
(2) Base
(3) Collector

●Packaging specifications

Part No.	Package	Package size	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit.(pcs)	hFE rank	Marking
2SC5658	SC-105AA	1212	T2L	180	8	8000	QRS	B
2SC4617EB	SOT-416FL	1616	TL	180	8	3000	QRS	B
2SC4617	SOT-416	1616	TL	180	8	3000	QRS	B
2SC4081UB	SOT-323FL	2021	TL	180	8	3000	QRS	B
2SC4081	SOT-323	2021	T106	180	8	3000	QRS	B
2SC2412K	SOT-346	2928	T146	180	8	3000	QRS	B

●Absolute maximum ratings (T_a = 25°C)

Parameter		Symbol	Values	Unit
Collector-base voltage		V_{CBO}	60	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage		V_{EBO}	7	V
Collector current		I_C	150	mA
		I_{CP}*1	200	mA
Power dissipation	2SC5658	P_D*2	150	mW
	2SC4617EB		150	
	2SC4617		150	
	2SC4081UB		200	
	2SC4081		200	
	2SC2412K		200	
Junction temperature		T_j	150	℃
Range of storage temperature		T_{stg}	-55 to +150	℃

●Electrical characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Collector-base breakdown voltage	BV_{CBO}	I_C = 50μA	60	-	-	V
Collector-emitter breakdown voltage	BV_{CEO}	I_C = 1mA	50	-	-	V
Emitter-base breakdown voltage	BV_{EBO}	I_E = 50μA	7	-	-	V
Collector cut-off current	I_{CBO}	V_{CB} = 60V	-	-	100	nA
Emitter cut-off current	I_{EBO}	V_{EB} = 7V	-	-	100	nA
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C = 50mA, I_B = 5mA	-	-	400	mV
DC current gain	h_{FE}	V_{CE} = 6V, I_C = 1mA	120	-	560	-
Transition frequency	f_T	V_{CE} = 12V, I_E = -2mA, f = 100MHz	-	180	-	MHz
Output capacitance	C_{ob}	V_{CB} = 12V, I_E = 0A, f = 1MHz	-	2.0	3.5	pF

hFE values are calssified as follows :

rank	Q	R	S	-	-
h_{FE}	120-270	180-390	270-560	-	-

*1 Pw=1ms, Single Pulse.

*2 Each terminal mounted on a reference land.

●Electrical characteristic curves(T_a = 25°C)

Fig.1 Ground Emitter Propagation Characteristics

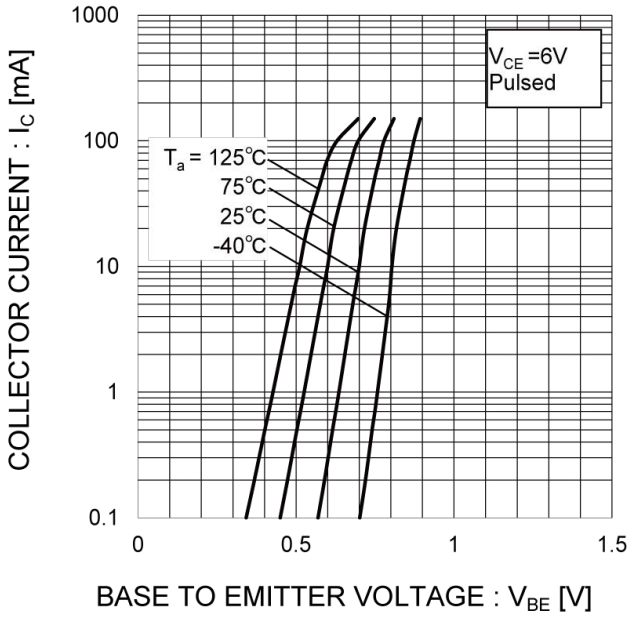


Fig.2 Grounded Emitter Output Characteristics

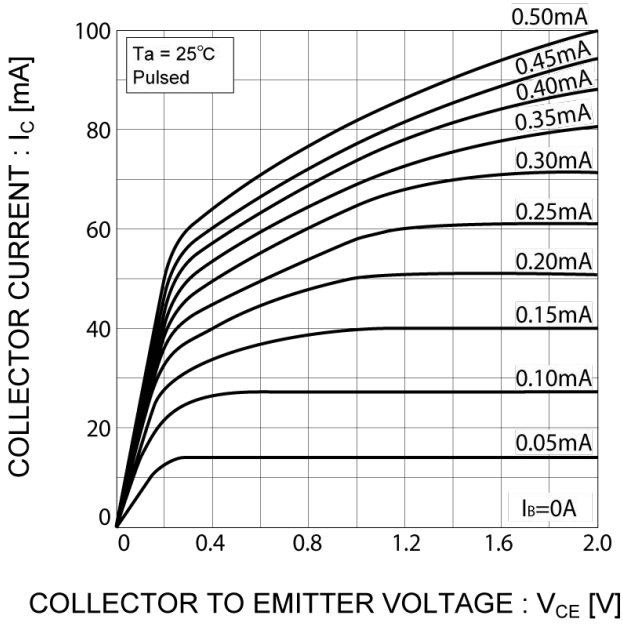


Fig.3 DC Current Gain vs. Collector Current (I)

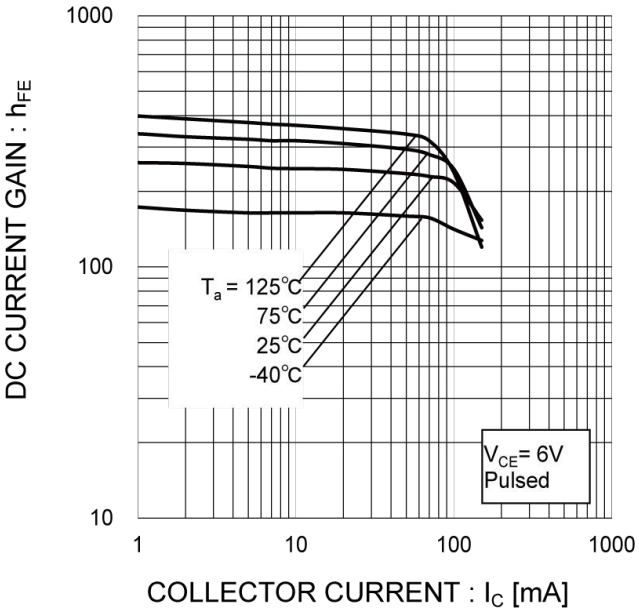
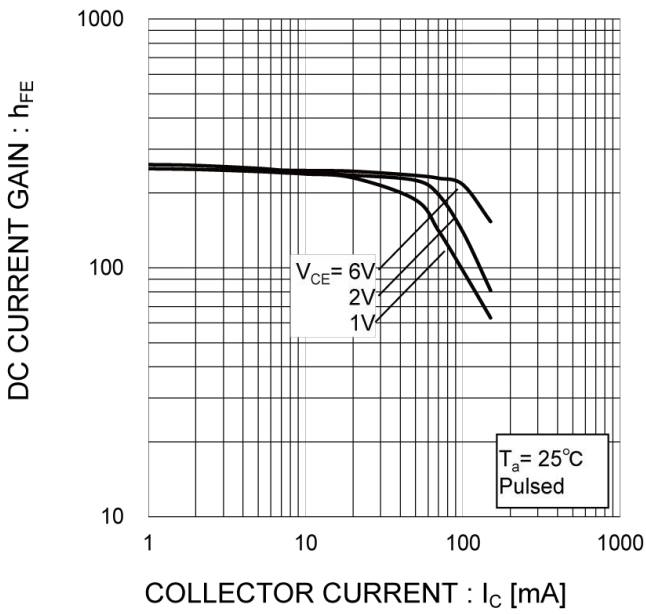


Fig.4 DC Current Gain vs. Collector Current (II)



●Electrical characteristic curves(T_a = 25°C)

Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current(I)

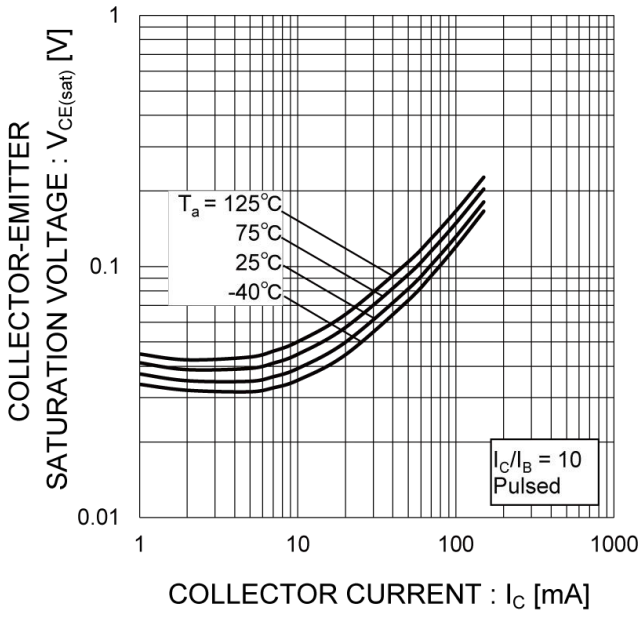


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current(II)

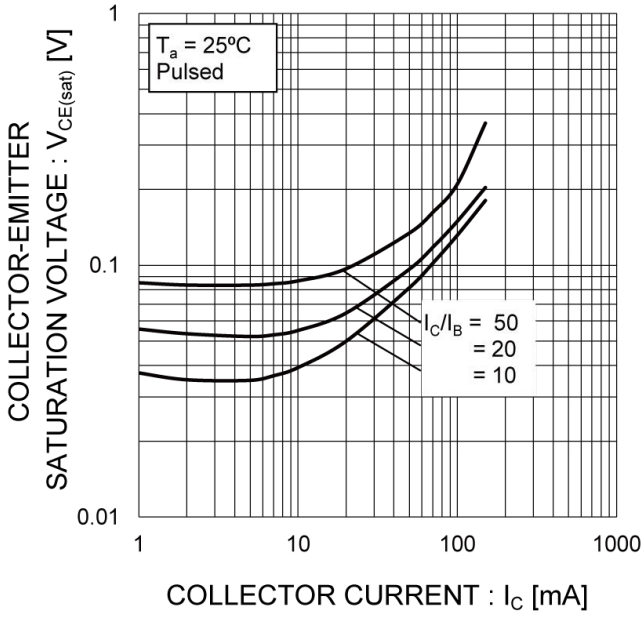


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current (I)

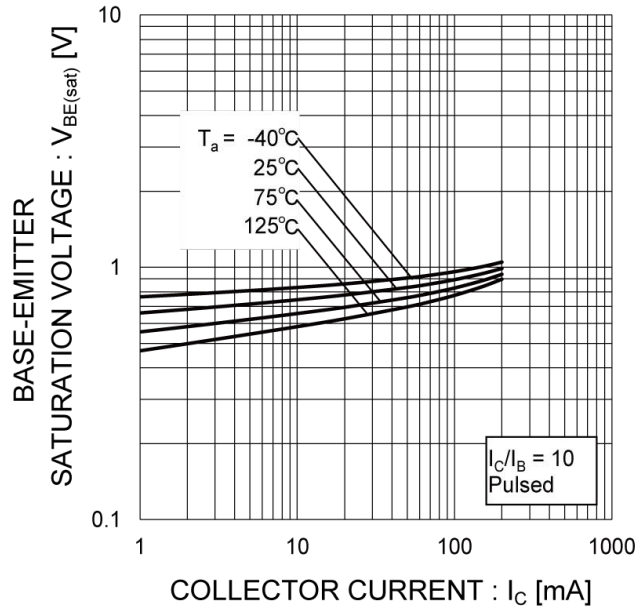
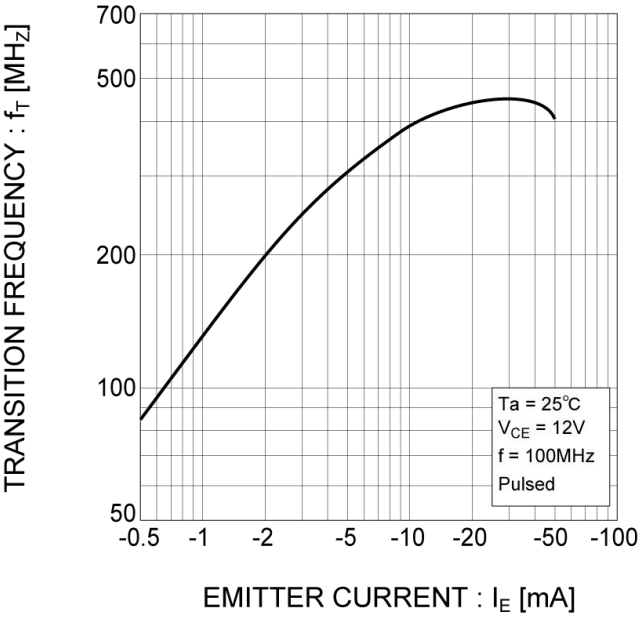


Fig.8 Gain Bandwith Product vs. Emitter Current



●Electrical characteristic curves(T_a = 25°C)

Fig.9 Collector Output Capacitance vs. Collector-Base Voltage
Emitter Input Capacitance vs. Emitter-Base Voltage

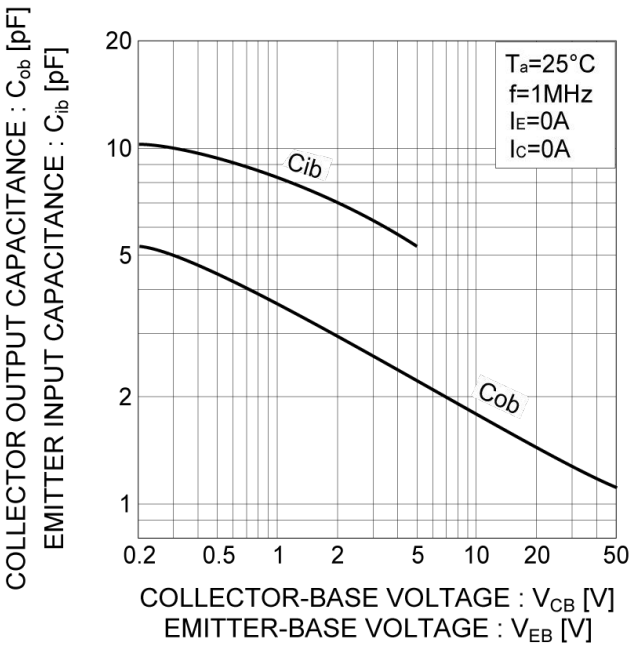


Fig.10 Safe Operating Area

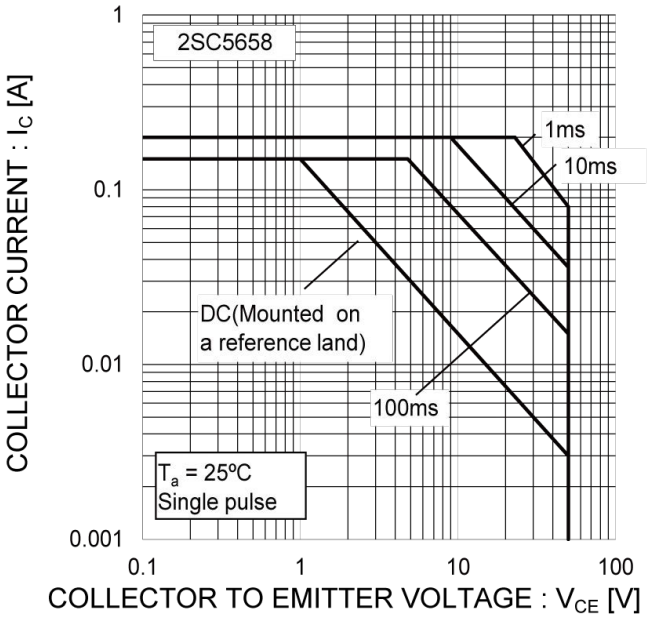


Fig.11 Safe Operating Area

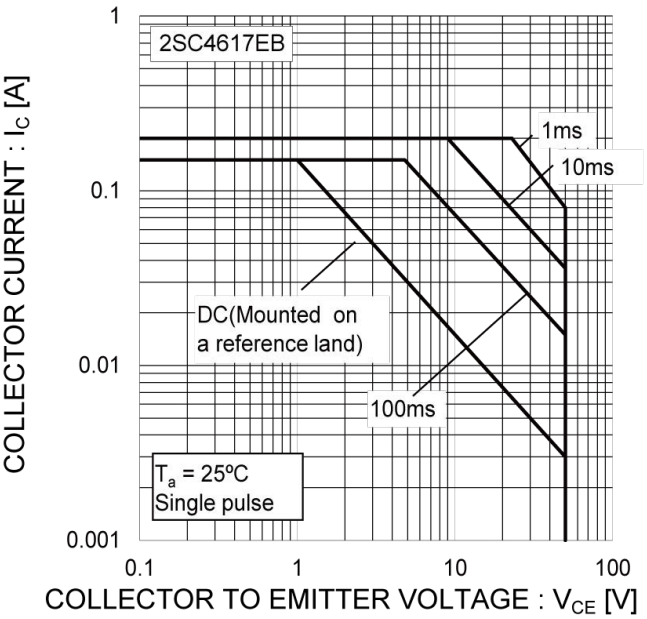
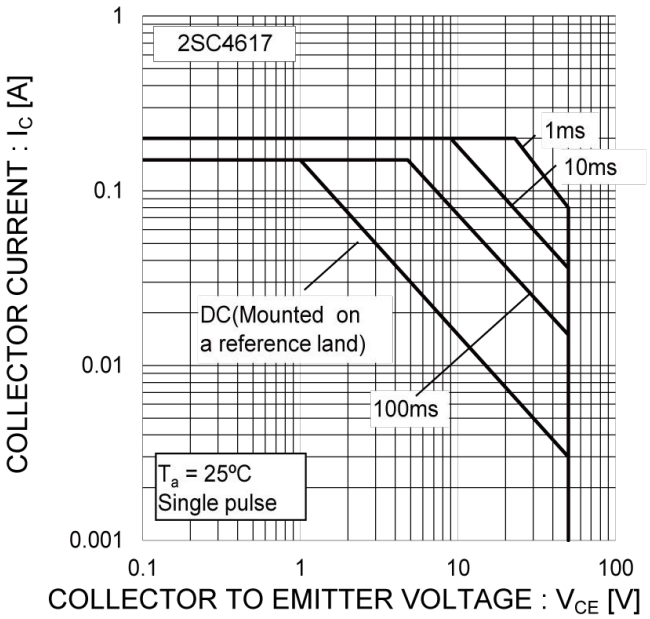


Fig.12 Safe Operating Area



●Electrical characteristic curves(Ta=25℃)

Fig.13 Safe Operating Area

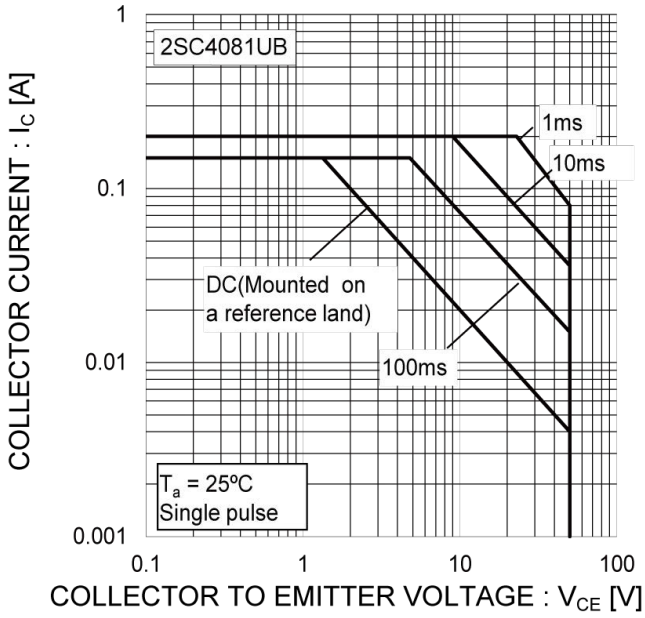


Fig.14 Safe Operating Area

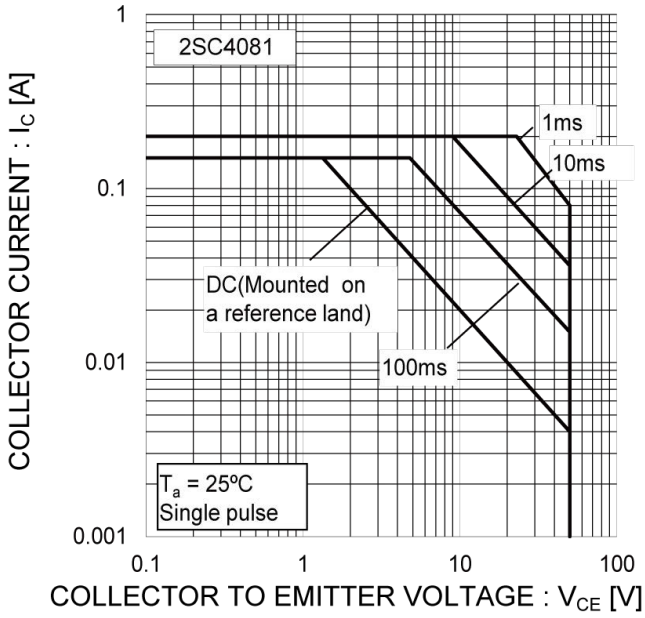
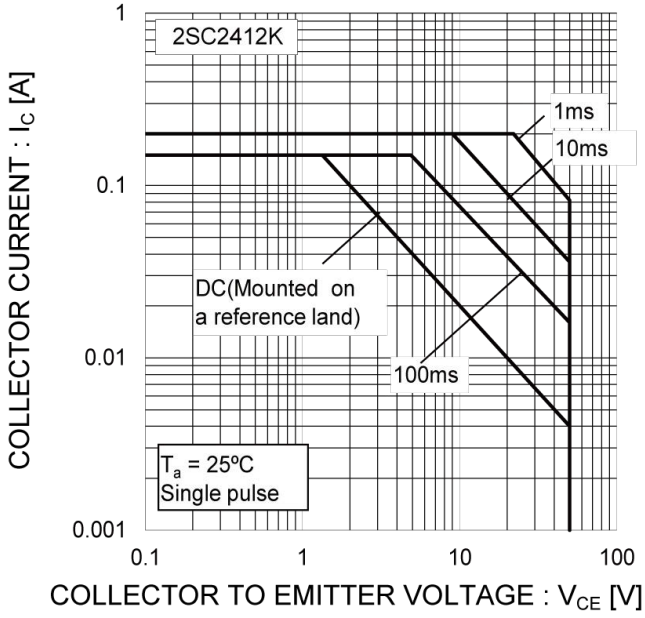
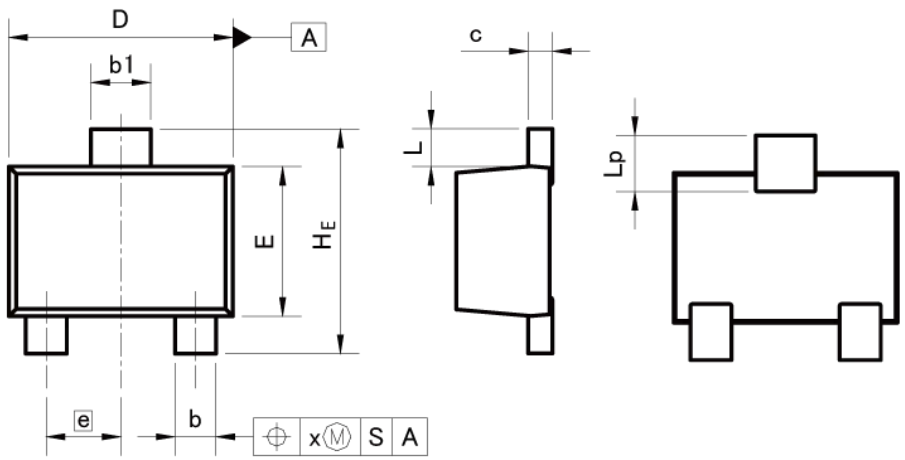


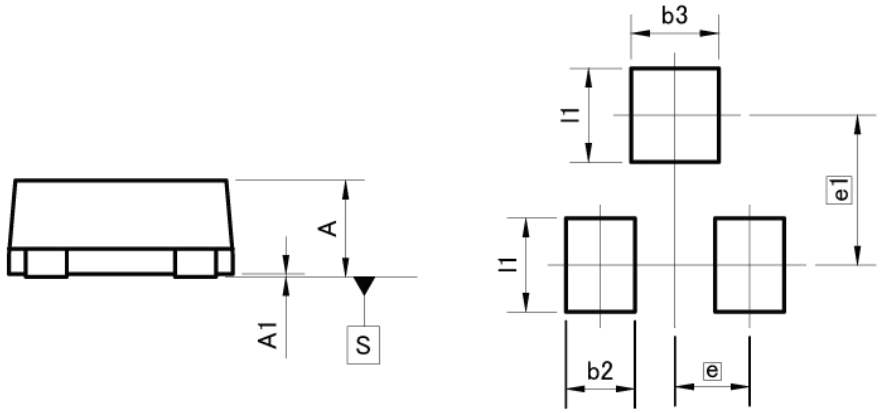
Fig.15 Safe Operating Area



●Dimensions

SOT-723
SC-105AA
(VMT3)





Pattern of terminal position areas
[Not a pattern of soldering pads]

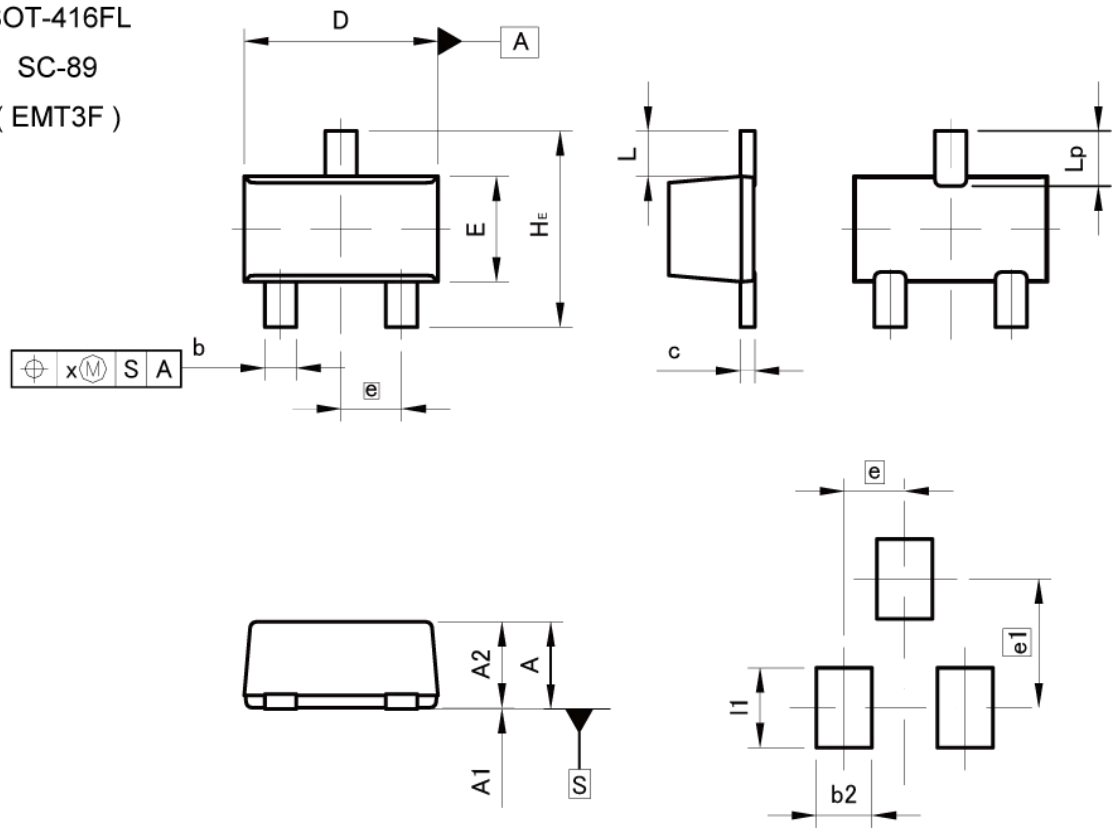
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.45	0.55	0.018	0.022
A1	0.00	0.10	0.000	0.004
b	0.17	0.27	0.007	0.011
b1	0.27	0.37	0.011	0.015
c	0.08	0.18	0.003	0.007
D	1.10	1.30	0.043	0.051
E	0.70	0.90	0.028	0.035
e	0.40		0.02	
HE	1.10	1.30	0.043	0.051
L	0.10	0.30	0.004	0.012
Lp	0.20	0.40	0.008	0.016
x	−	0.10	−	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	−	0.37	−	0.015
b3	−	0.47	−	0.019
e1	0.80		0.031	
l1	−	0.50	−	0.020

Dimension in mm/inches

●Dimensions

SOT-416FL
SC-89
(EMT3F)



Pattern of terminal position areas
[Not a pattern of soldering pads]

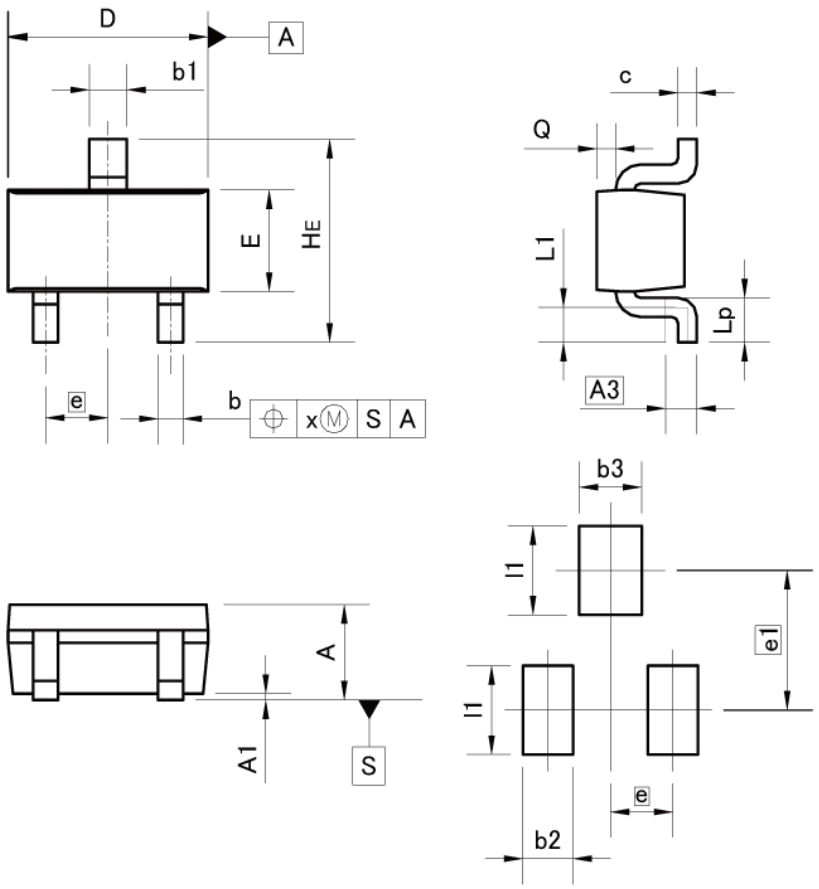
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.65	0.85	0.026	0.033
A1	0.00	0.10	0.000	0.004
A2	0.60	0.80	0.024	0.031
b	0.21	0.36	0.008	0.014
c	0.08	0.18	0.003	0.007
D	1.50	1.70	0.059	0.067
E	0.76	0.96	0.030	0.038
e	0.50		0.020	
HE	1.50	1.70	0.059	0.067
L	0.37		0.015	
Lp	0.35	0.55	0.014	0.022
x	−	0.10	−	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	−	0.46	−	0.018
e1	−	1.05	−	0.041
l1	−	0.65	−	0.026

Dimension in mm/inches

●Dimensions

SOT-416
SC-75A
(EMT3)



Pattern of terminal position areas
[Not a pattern of soldering pads]

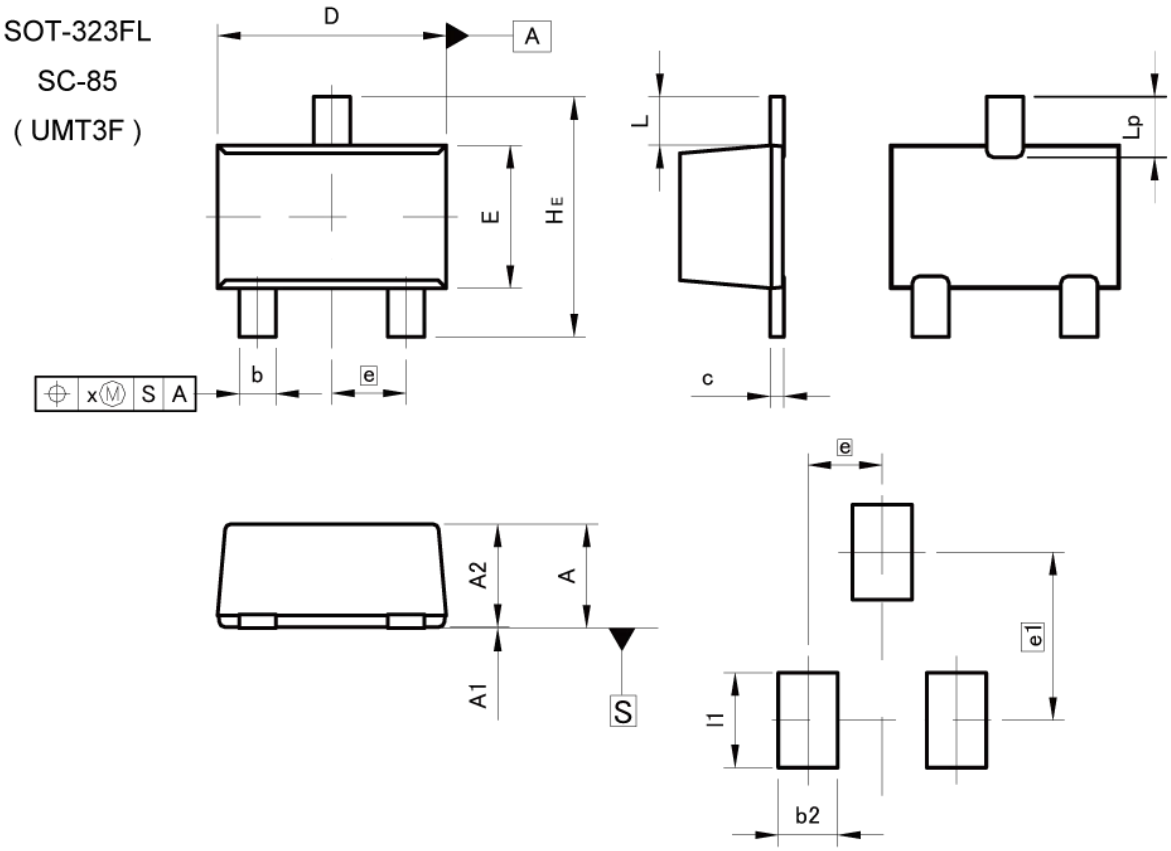
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.60	0.80	0.024	0.031
A1	0.00	0.10	0.000	0.004
A3	0.25		0.010	
b	0.15	0.30	0.006	0.012
b1	0.25	0.40	0.010	0.016
c	0.10	0.20	0.004	0.008
D	1.50	1.70	0.059	0.067
E	0.70	0.90	0.028	0.035
e	0.50		0.020	
HE	1.40	1.80	0.055	0.071
L1	0.10	–	0.004	–
Lp	0.15	–	0.006	–
Q	0.05	0.25	0.002	0.010
x	–	0.10	–	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	–	0.40	–	0.016
b3	–	0.50	–	0.020
e1	1.10		0.043	
l1	–	0.70	–	0.028

Dimension in mm/inches

●Dimensions

SOT-323FL
SC-85
(UMT3F)



Pattern of terminal position areas
[Not a pattern of soldering pads]

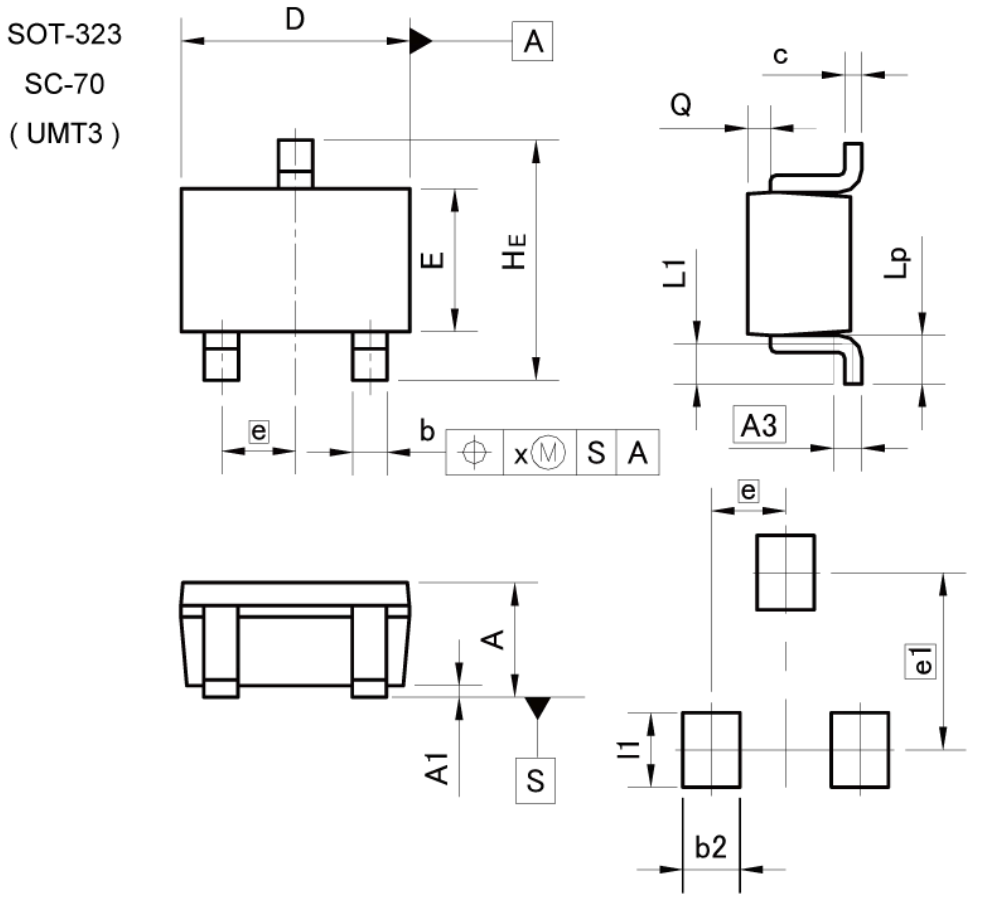
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.85	1.05	0.033	0.041
A1	0.00	0.10	0.000	0.004
A2	0.80	1.00	0.031	0.039
b	0.27	0.42	0.011	0.017
c	0.08	0.18	0.003	0.007
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
e	0.65		0.026	
HE	2.00	2.20	0.079	0.087
L	0.43		0.017	
Lp	0.43	0.63	0.017	0.025
x	–	0.10	–	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	–	0.52	–	0.020
e1	1.47		0.058	
l1	–	0.83	–	0.033

Dimension in mm/inches

●Dimensions

SOT-323
SC-70
(UMT3)



Pattern of terminal position areas
[Not a pattern of soldering pads]

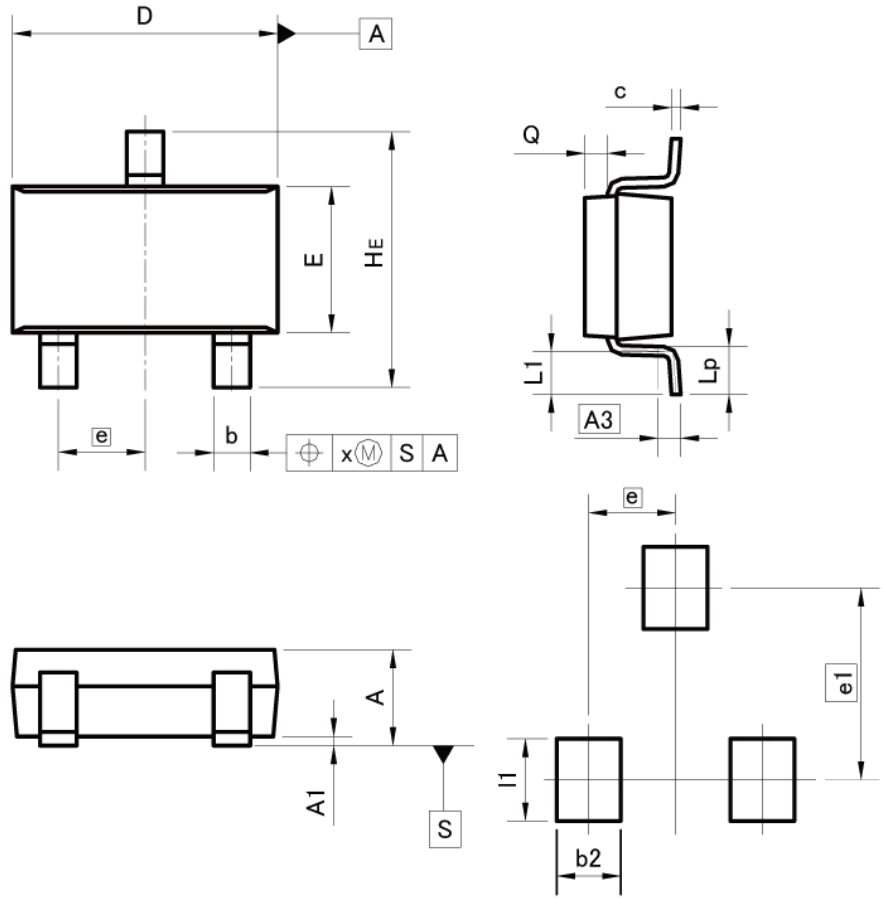
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	1.00	0.031	0.039
A1	0.00	0.10	0	0.004
A3	0.25		0.01	
b	0.25	0.40	0.01	0.016
c	0.10	0.20	0.004	0.008
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
e	0.65		0.03	
HE	2.00	2.20	0.079	0.087
L1	0.20	0.50	0.008	0.02
Lp	0.25	0.55	0.01	0.022
Q	0.10	0.30	0.004	0.012
x	–	0.10	–	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
e1	1.55		0.06	
b2	–	0.50	–	0.02
l1	–	0.65	–	0.026

Dimension in mm/inches

●Dimensions

SOT-346
SC-59
(SMT3)



Pattern of terminal position areas
[Not a pattern of soldering pads]

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.00	1.30	0.039	0.051
A1	0.00	0.10	0.000	0.004
A3	0.25		0.010	
b	0.35	0.50	0.014	0.020
c	0.09	0.25	0.004	0.010
D	2.80	3.00	0.110	0.118
E	1.50	1.80	0.059	0.071
e	0.95		0.037	
HE	2.60	3.00	0.102	0.118
L1	0.30	0.60	0.012	0.024
Lp	0.40	0.70	0.016	0.028
Q	0.20	0.30	0.008	0.012
x	–	0.10	–	0.004
y	–	0.10	–	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	–	0.60	–	0.024
e1	2.10		0.083	
l1	–	0.90	–	0.035

Dimension in mm/inches

Notes

1) The information contained herein is subject to change without notice.

2) Before you use our Products, please contact our sales representative and verify the latest specifications :

3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Poducts beyond the rating specified by ROHM.

4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.

6) The Products are intended for use in general electronic equipment (i.e. AV/OA devices, communication, consumer systems, gaming/entertainment sets) as well as the applications indicated in this document.

7) The Products specified in this document are not designed to be radiation tolerant.

8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.

9) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.

10) ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.

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