UMF28N

Power manegement (dual transistors)

Datasheet

<For Tr1>

Parameter	Value
V_{CEO}	-50V
I_C	-150mA

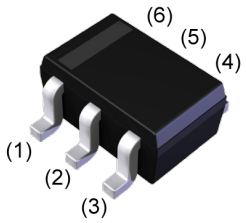
<For DTr2>

Parameter	Value
V_{CC}	50V
$I_{C(Max.)}$	100mA

●Outline

SOT-363

SC-88



UMT6

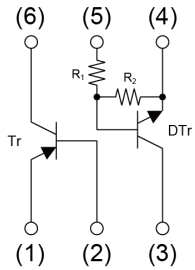
●Features

1)Power switching circuit (2SA1576A/DTC124XUA) in a single package.

2)Mounting cost and area can be cut in half.

●Inner circuit

(1) Tr Emitter
(2) Tr Base
(3) DTr OUT(Collector)
(4) DTr GND(Emitter)
(5) DTr IN(Base)
(6) Tr Collector



●Application

Power manegement

●Packaging specifications

Part No.	Package	Package size	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit.(pcs)	Marking
UMF28N	SOT-363 (UMT6)	2021	TR	180	8	3000	F28

●Absolute maximum ratings (T_a = 25°C)

<Tr1>

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	-150	mA

<DTr2>

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}	50	V
Input voltage	V_{IN}	-10 to 40	V
Output current	I_O	50	mA
Collector current	$I_{C(MAX)}$*2	100	mA

<Tr1> <DTr2>

Parameter	Symbol	Limits	Unit
Power dissipation	P_D*1*3	150	mW
Junction temperature	T_j	150	℃
Range of storage temperature	T_{stg}	-55 to 150	℃

●**Electrical characteristics** (T_a = 25°C) <For Tr1>

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
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	-6	-	-	V
Collector cut-off current	I_{CBO}	V_{CB} = -60V	-	-	-100	nA
Emitter cut-off current	I_{EBO}	V_{EB} = -6V	-	-	-100	nA
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C = -50mA, I_B = -5mA	-	-	-500	mV
DC current gain	h_{FE}	V_{CE} = -6V, I_C = -1mA	180	-	390	-
Transition frequency	f_T	V_{CE} = -12V, I_E = 2mA, f = 100MHz	-	140	-	MHz
Output capacitance	C_{ob}	V_{CB} = -12V, I_E = 0mA, f = 1MHz	-	4.0	5.0	pF

●**Electrical characteristics** (Ta = 25°C) <For DTr2>

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input voltage	$V_{I(off)}$	V_{CC} = 5V, I_O = 100μA	-	-	0.4	V
	$V_{I(on)}$	V_O = 0.3V, I_O = 2mA	2.5	-	-	V
Output voltage	$V_{O(on)}$	I_O / I_I = 10mA / 0.5mA	-	100	300	mV
Input current	I_I	V_I = 5V	-	-	360	μA
Output current	$I_{O(off)}$	V_{CC} = 50V, VI = 0V	-	-	500	nA
DC current gain	G_I	V_O = 5V, I_O = 5mA	68	-	-	-
Input resistance	R_1	-	15.4	22	28.6	kΩ
Resistance ratio	R_2/R_1	-	1.7	2.1	2.6	-
Transition frequency	f_T*2	V_{CE} = 10V, I_E = -5mA, f = 100MHz		250	-	MHz

*1 Each termunal mounted on a reference land.

*2 Characteristics of built-in transistor.

*3 120mW per element must not be exceeded.

●Electrical characteristic curves(T_a=25°C) <For Tr1>

Fig.1 Grounded emitter propagation characteristics

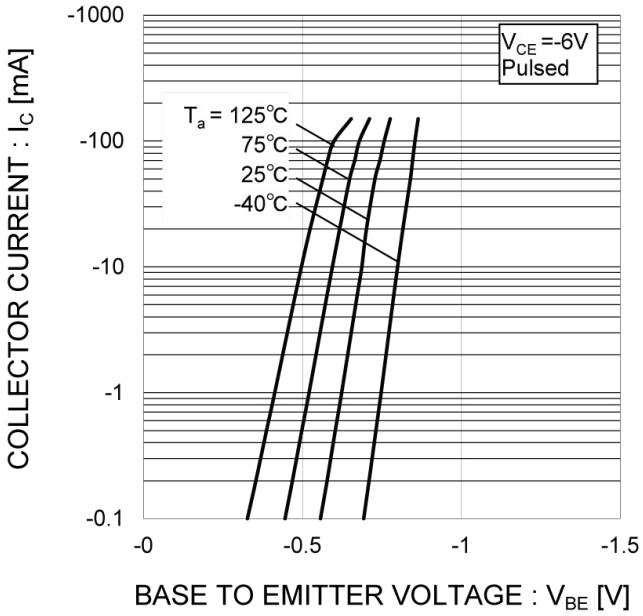


Fig.2 Grounded emitter output characteristics

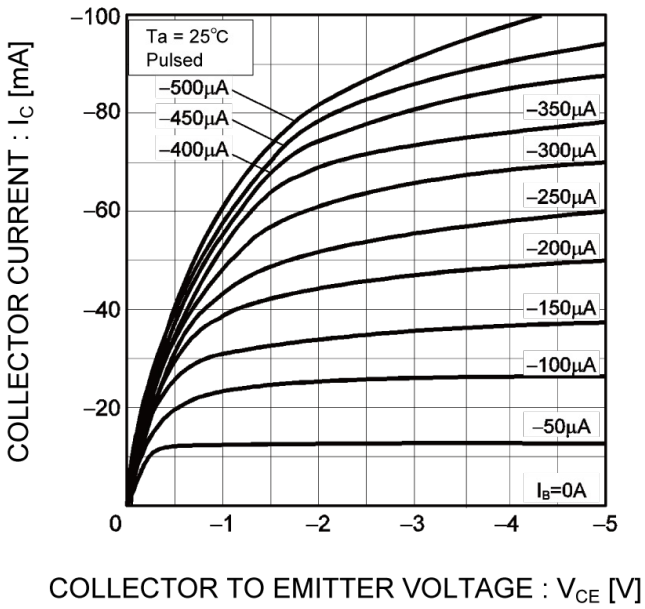


Fig.3 DC current gain vs. collector current (I)

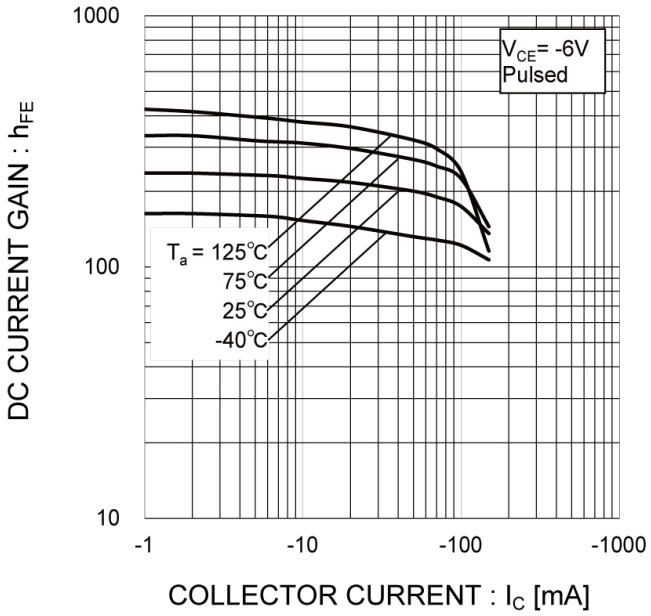
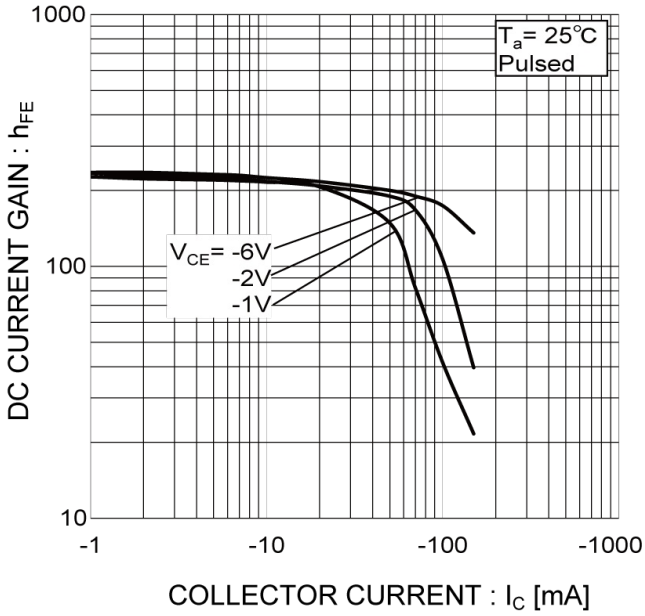


Fig.4 DC current gain vs. collector current (II)



●Electrical characteristic curves(T_a=25°C) <For Tr1>

Fig.5 Collector- emitter saturation voltage vs. collector current (I)

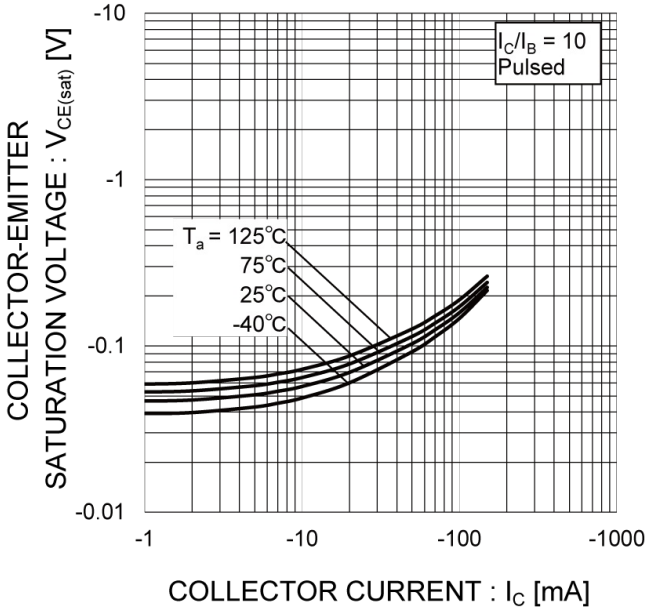


Fig.6 Collector- emitter saturation voltage vs. collector current (II)

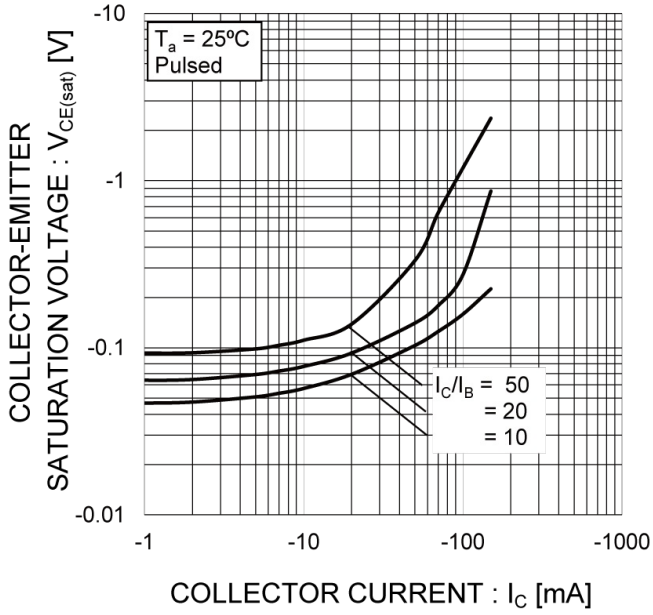


Fig.7 Base- emitter saturation voltage vs. collector current

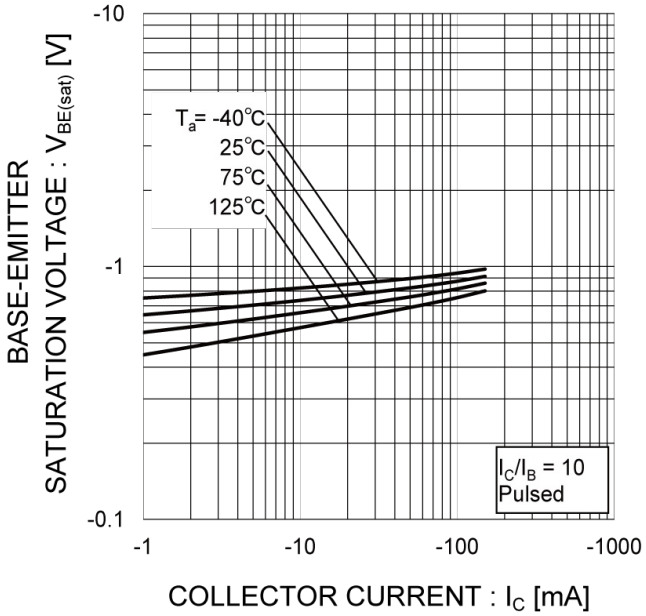
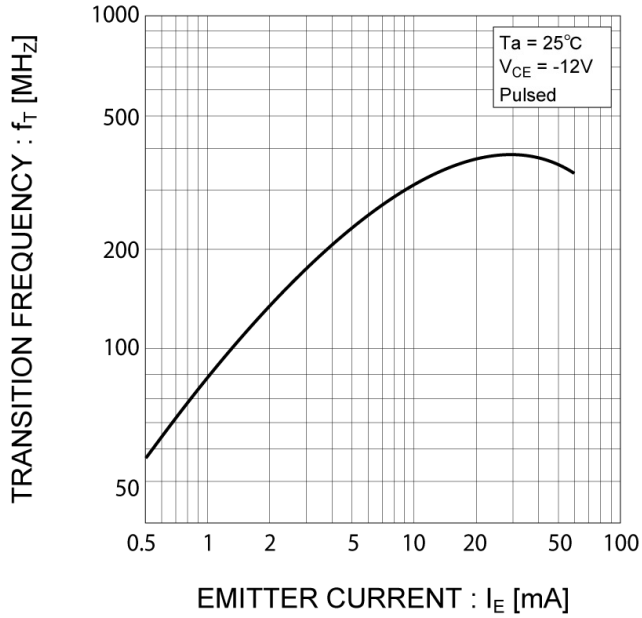
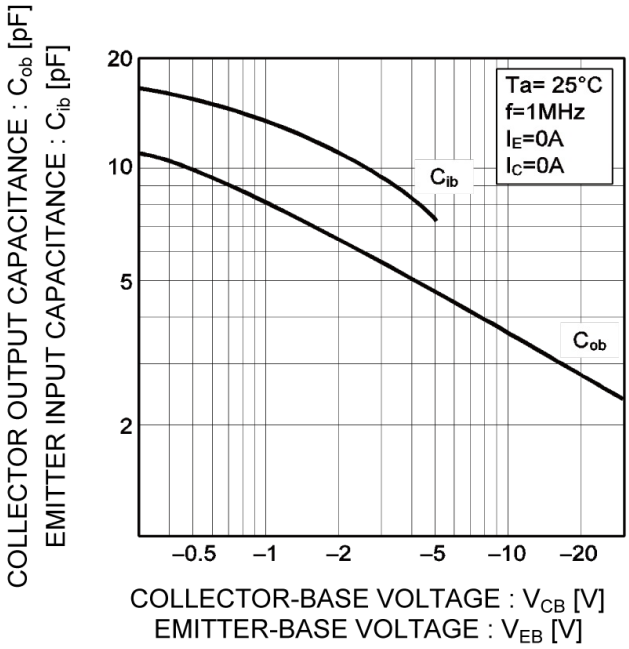


Fig.8 Gain bandwidth product vs. emitter current



●Electrical characteristic curves(T_a=25°C) <For Tr1>

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



●Electrical characteristic curves(T_a=25°C) <For DTr2>

Fig.1 Input Voltage vs. Output Current (ON Characteristics)

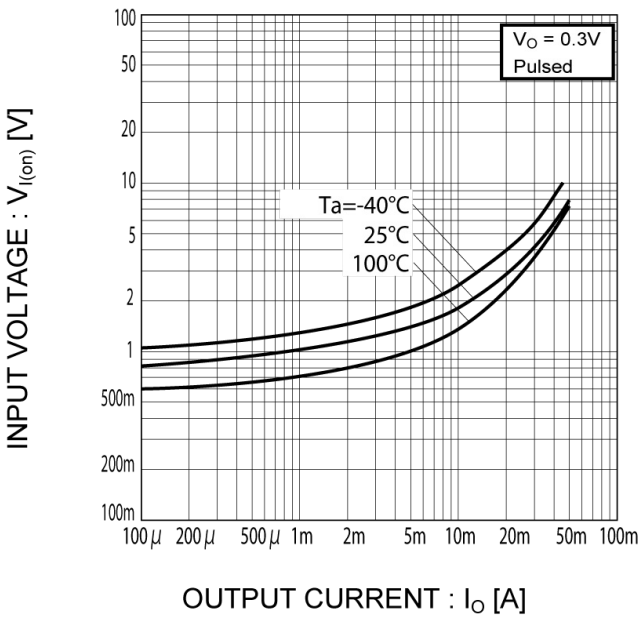


Fig.2 Output Current vs. Input Voltage (OFF Characteristics)

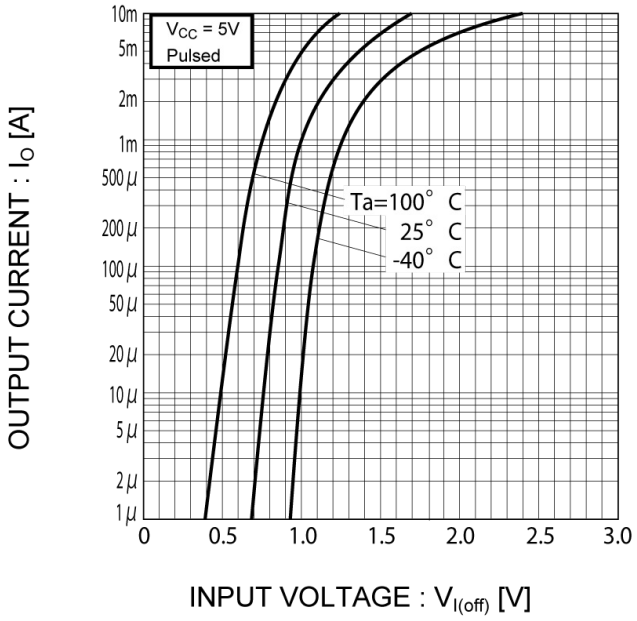


Fig.3 Output Current vs. Output Voltage

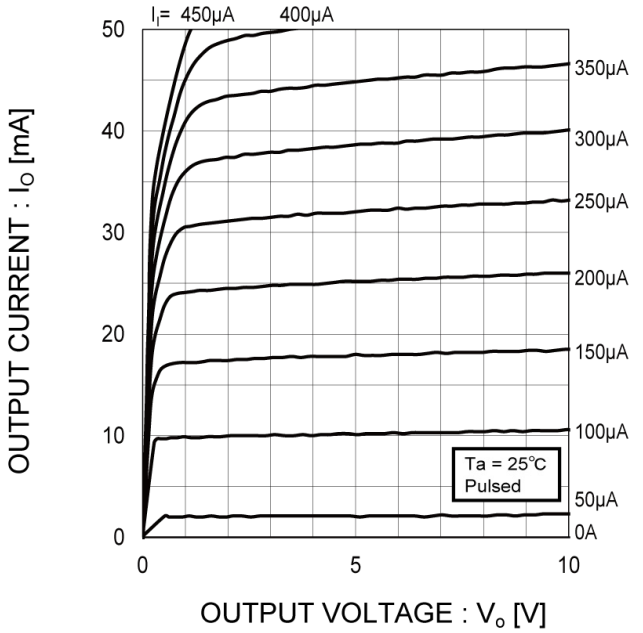
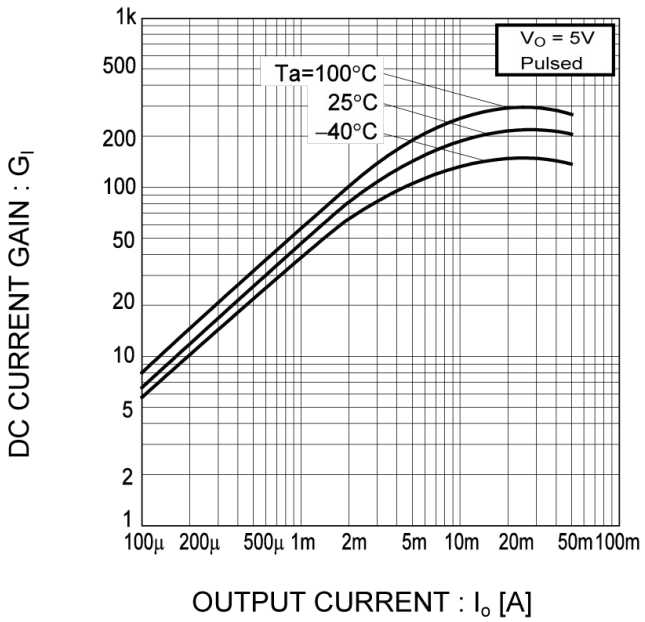
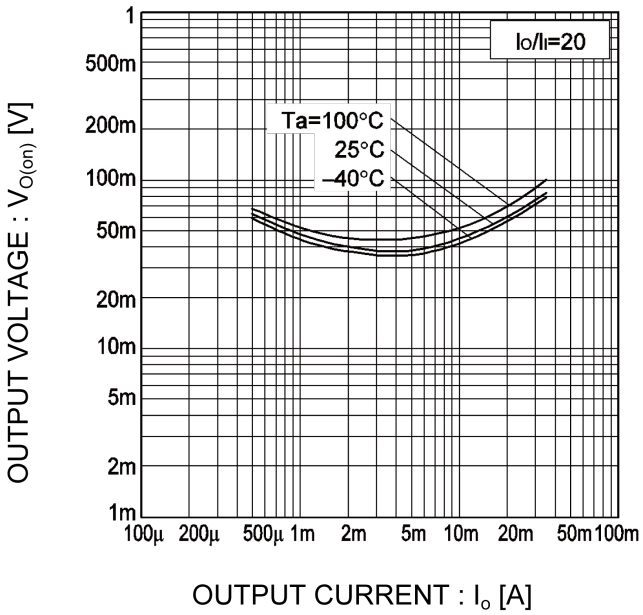


Fig.4 DC Current Gain vs. Output Current



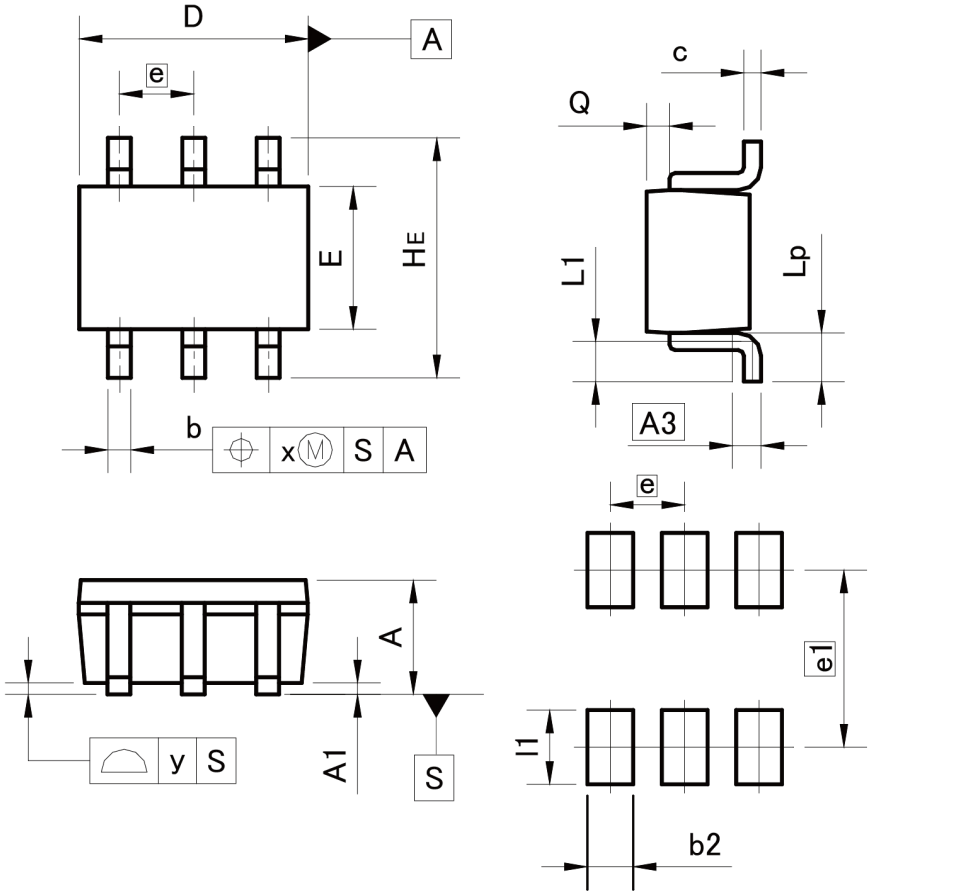
●Electrical characteristic curves(T_a=25°C) <For DTr2>

Fig.5 Output Voltage vs. Output Current



●Dimensions

UMT6



Pattern of terminal position areas
[Not a recommended 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	0.000	0.004
A3	0.25		0.010	
b	0.15	0.30	0.006	0.012
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		0.026	
HE	2.00	2.20	0.079	0.087
L1	0.20	0.50	0.008	0.020
Lp	0.25	0.55	0.010	0.022
Q	0.10	0.30	0.004	0.012
x	−	0.10	−	0.004
y	−	0.10	−	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	−	0.40	−	0.016
e1	1.55		0.061	
l1	−	0.65	−	0.026

Dimension in mm/inches

Notice

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1. Our Products are designed and manufactured for application in ordinary electronic equipments (such as AV equipment, OA equipment, telecommunication equipment, home electronic appliances, amusement equipment, etc.). If you intend to use our Products in devices requiring extremely high reliability (such as medical equipment (Note 1), transport equipment, traffic equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or failure may cause loss of human life, bodily injury or serious damage to property ("Specific Applications"), please consult with the ROHM sales representative in advance. Unless otherwise agreed in writing by ROHM in advance, ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of any ROHM's Products for Specific Applications.

(Note1) Medical Equipment Classification of the Specific Applications

JAPAN	USA	EU	CHINA
CLASSⅢ	CLASSⅢ	CLASSⅡb	CLASSⅢ
CLASSⅣ		CLASSⅢ	

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   [b] Installation of redundant circuits to reduce the impact of single or multiple circuit failure

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   [c] Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl_2, H_2S, NH_3, SO_2, and NO_2
   [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
   [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
   [f] Sealing or coating our Products with resin or other coating materials
   [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
   [h] Use of the Products in places subject to dew condensation

4. The Products are not subject to radiation-proof design.

5. Please verify and confirm characteristics of the final or mounted products in using the Products.

6. In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.

7. De-rate Power Dissipation depending on ambient temperature. When used in sealed area, confirm that it is the use in the range that does not exceed the maximum junction temperature.

8. Confirm that operation temperature is within the specified range described in the product specification.

9. ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

Precaution for Mounting / Circuit board design

1. When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.

2. In principle, the reflow soldering method must be used on a surface-mount products, the flow soldering method must be used on a through hole mount products. If the flow soldering method is preferred on a surface-mount products, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

Precautions Regarding Application Examples and External Circuits

1. If change is made to the constant of an external circuit, please allow a sufficient margin considering variations of the characteristics of the Products and external components, including transient characteristics, as well as static characteristics.

2. You agree that application notes, reference designs, and associated data and information contained in this document are presented only as guidance for Products use. Therefore, in case you use such information, you are solely responsible for it and you must exercise your own independent verification and judgment in the use of such information contained in this document. ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of such information.

Precaution for Electrostatic

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

Precaution for Storage / Transportation

1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
   [a] the Products are exposed to sea winds or corrosive gases, including Cl2, H2S, NH3, SO2, and NO2
   [b] the temperature or humidity exceeds those recommended by ROHM
   [c] the Products are exposed to direct sunshine or condensation
   [d] the Products are exposed to high Electrostatic

2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.

3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.

4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

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