

DTA114ECA-Q1

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DTA114ECA-Q1

PNP Silicon Epitaxial Planar Digital Transistor

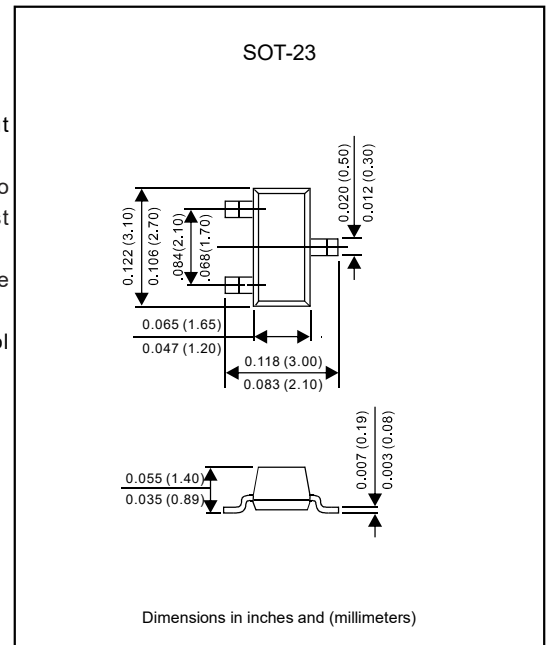
Features

- Epitaxial planar die construction.
- Built-in biasing resistors, $R_1=R_2$.
- Built-in bias resistors enable the configuration of an inverter circuit without external input resistors (see equivalent circuit).
- The bias resistors consist of thin-film resistors with complete isolation to allow negative bias of the input. There is also the advantage of almost completely eliminating parasitic effects.
- Only the on/off conditions need to be set for operation, it makes the device designed easily.
- -Q1 for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. DTA114ECA-Q1-H.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-23.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.
- Weight : Approximated 0.008 gram.

Package outline



Maximum ratings (At $T_A=25^\circ\text{C}$ unless otherwise noted)

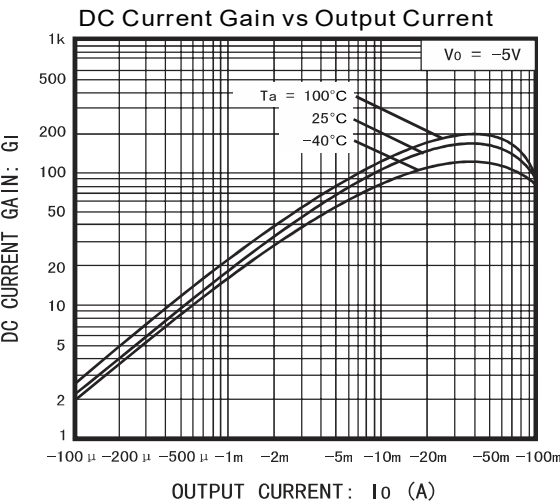
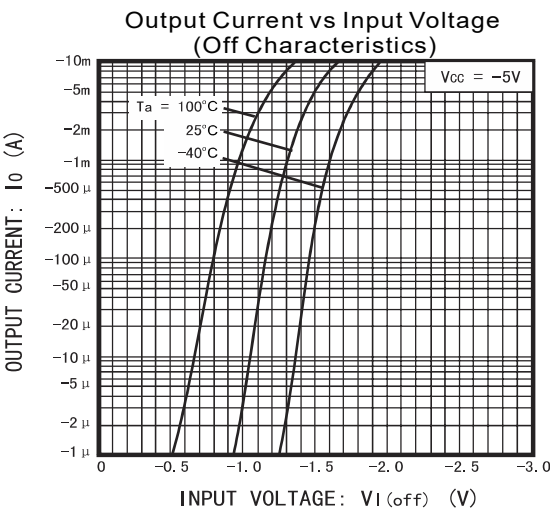
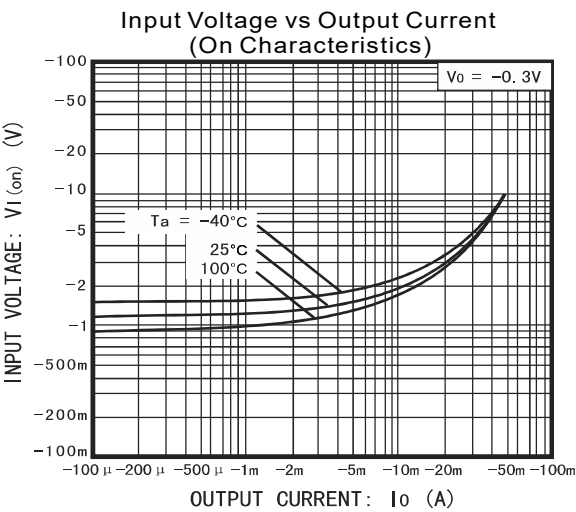
Parameter	Symbol	Value	Unit
Supply voltage	$-V_{CC}$	50	V
Input voltage	V_{IN}	-40 to +10	V
Output current	$-I_O$	50	mA
Peak collector current	$-I_{C(MAX)}$	100	mA
Power dissipation	P_D	200	mW
Thermal resistance junction to ambient	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating junction temperature range	T_J	150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

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Electrical characteristics (At T_A=25°C unless otherwise noted)

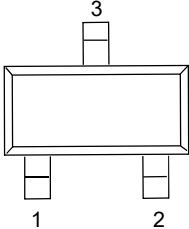
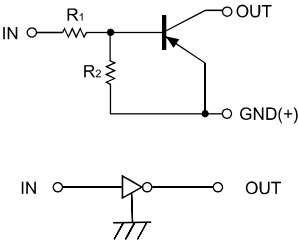
Parameter	Conditions	Symbol	MIN.	TYP.	MAX.	Unit
Input voltage	-V _{CC} =5V, -I _O =100μA	-V _{I(OFF)}	0.5	1.1		V
Input voltage	-V _O =0.3V, -I _O =10mA	-V _{I(ON)}		1.9	3	
Output voltage	-I _O /-I _I =10mA / 0.5mA	-V _{O(ON)}		0.1	0.3	V
Input current	-V _I =5V	-I _I			0.88	mA
Output current	-V _{CC} =50V, V _I =0V	-I _{O(OFF)}			0.5	μA
DC current gain	-V _O =5V, -I _O =5mA	G _I	30			
Input resistance		R ₁ (R ₂)	7	10	13	kΩ
Resistance ratio		R ₂ /R ₁	0.8	1	1.2	
Gain-bandwidth product	-V _{CE} =10V, I _E =5mA, f=100MHz	f _T		250		MHz

Rating and characteristic curves



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Pinning information

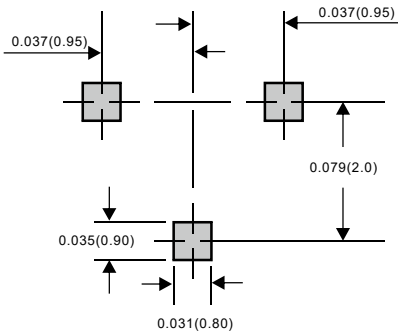
Pin	Simplified outline	Symbol
Pin1 IN Pin2 GND Pin3 OUT		

Marking

Type number	Marking code
DTA114ECA-Q1	14

Suggested solder pad layout

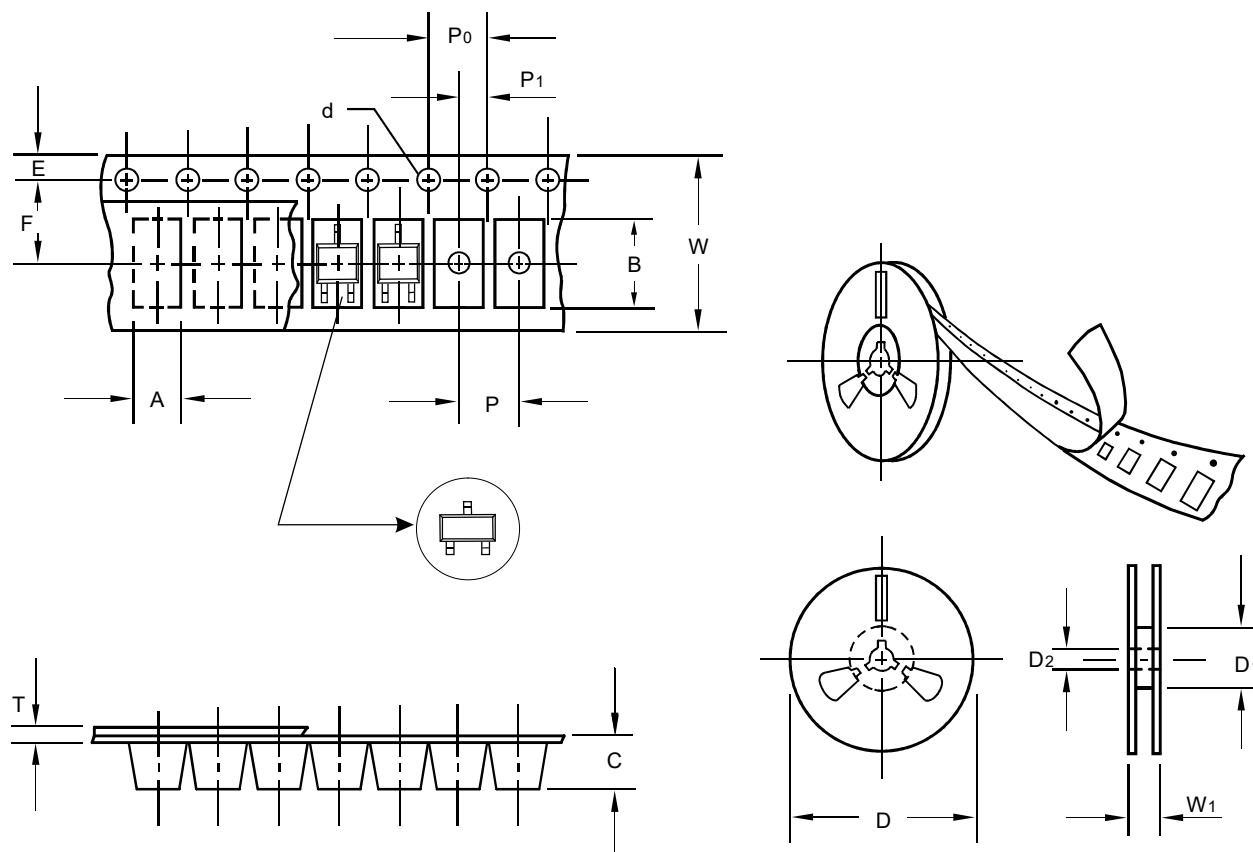
SOT-23



Dimensions in inches and (millimeters)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.1	3.30
Carrier length	B	0.1	3.20
Carrier depth	C	0.1	1.50
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	54.40
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	12.0

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

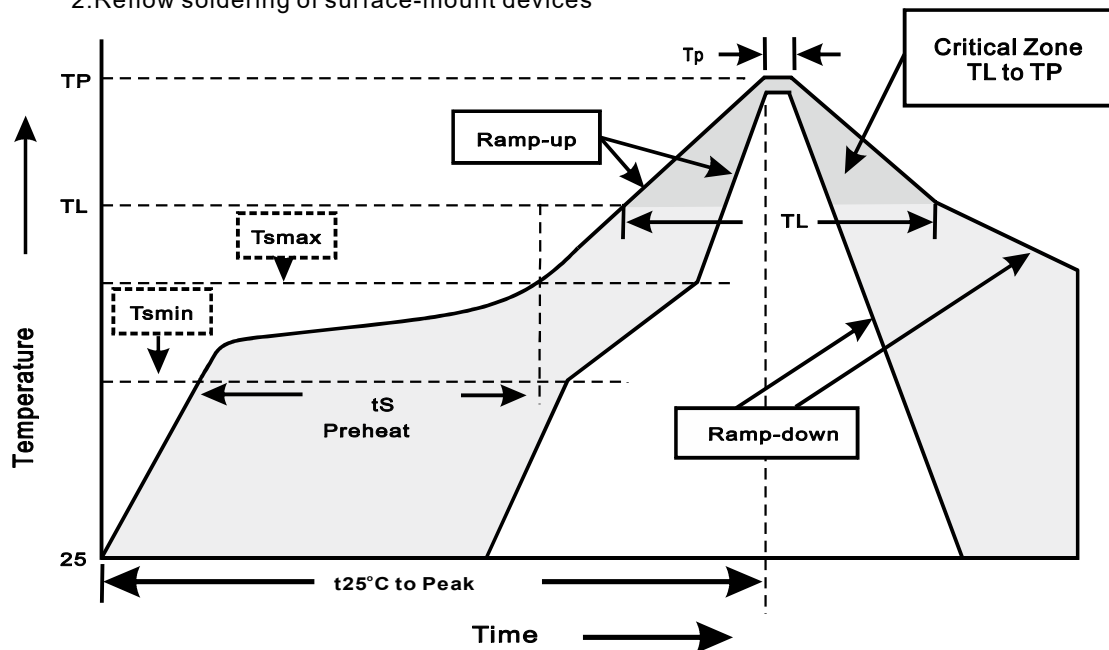
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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	11.6

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T _L to T _P)	<3°C/sec
Preheat - Temperature Min(T _{smin}) - Temperature Max(T _{smax}) - Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smax} to T _L - Ramp-upRate	<3°C/sec
Time maintained above: - Temperature(T _L) - Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _P)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

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High reliability test capabilities

Item Test

Conditions

- | | |
|--|---|
| 1. Steady State Operating Life | $T_A=25^{\circ}\text{C}$ $P_D=200\text{mW}$ Test Duration:1000hrs |
| 2. High Temperature Reverse Bias | $T_J=150^{\circ}\text{C}$, $V_{CE}=80\%$ related volage, Test Duration:1000hrs |
| 3. Temperature Cycle | $-55^{\circ}\text{C}(15\text{min})$ to $150^{\circ}\text{C}(15\text{min})$ Air to Air Transition Time<20sec
Test Cycles: 1000cycle |
| 4. Autoclave | $P=2\text{atm}$ $T_a=121^{\circ}\text{C}$ $\text{RH}=100\%$ Test Duration: 96hrs |
| 5. High Temperature Storage Life | $T_a=150^{\circ}\text{C}$ Test Duration: 1000hrs |
| 6. Solderability | 245°C , Test Duration: 5sec |
| 7. High Temperature High Humidity Reverse Bias | $T_a=85^{\circ}\text{C}$, 85%RH, $V_{CE}=80\%$ related volage, Test Duration: 1000hrs |
| 8. Resistance to Soldering Heat | 260°C , Test Duration: 10sec |
| 10. Solvent Resistance | |