

Description

The PDTC143Z Series consists of NPN digital transistors with built-in bias resistors, enabling the configuration of an inverter circuit without the need for external input resistors.

The bias resistors are thin-film resistors with complete isolation, allowing for negative biasing of the input and almost completely eliminating parasitic effects. This series simplifies device design as only the on/off conditions need to be set for operation.

Features

Built-in bias resistors for inverter circuit configuration without external input resistors

Thin-film bias resistors with complete isolation for negative input biasing and minimal parasitic effects

Simple device design with only on/off conditions requiring setting

Wide supply voltage range up to 50V

High input voltage range from -5V to +30V

Low output voltage (on) of typically 0.1V

High DC current gain with a minimum of 80

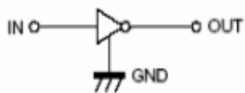
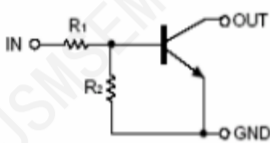
Low input current and output leakage current

High transition frequency of 250MHz

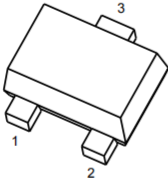
Applications

- ◆ General-purpose inverter circuits
- ◆ Digital logic applications
- ◆ Signal processing circuits
- ◆ Low-power electronic devices
- ◆ Consumer electronics
- ◆ Industrial control systems

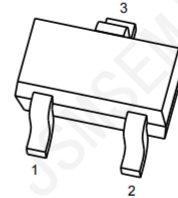
Circuit Diagram



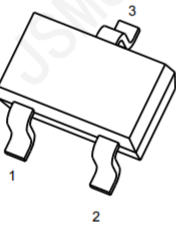
Marking Diagram

PDTC143Z
M Marking:
E23

SOT-723

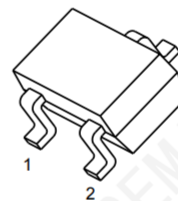
 1. IN
 2. GND
 3. OUT

PDTC143Z
E Marking:
E23

SOT-523

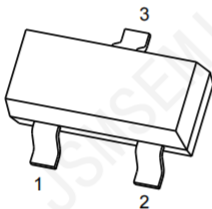
 1. IN
 2. GND
 3. OUT

PDTC143ZU
A Marking:
E23

SOT-323

 1. IN
 2. GND
 3. OUT

PDTC143ZK
A Marking:
E23

SOT-23-3L

 1. IN
 2. GND
 3. OUT

PDTC143ZC
A Marking:
E23

SOT-23

 1. IN
 2. GND
 3. OUT

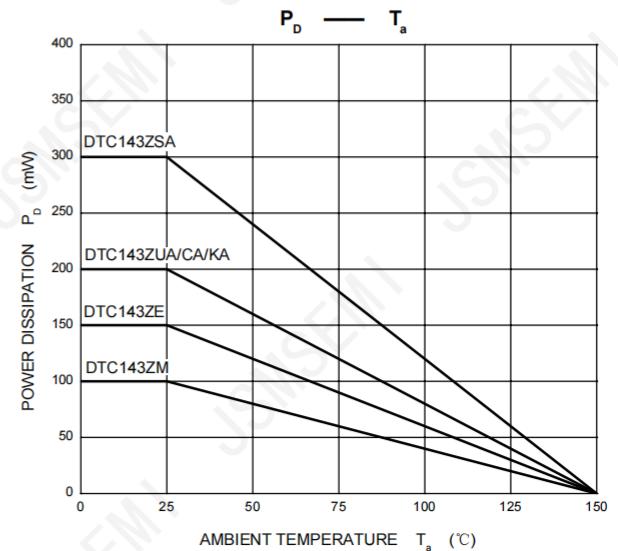
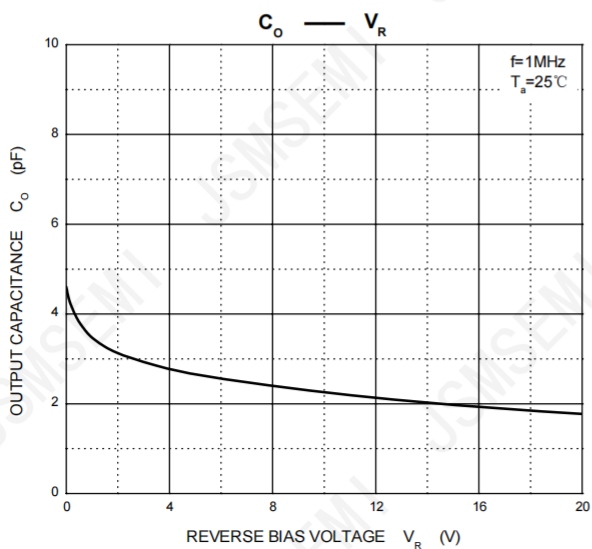
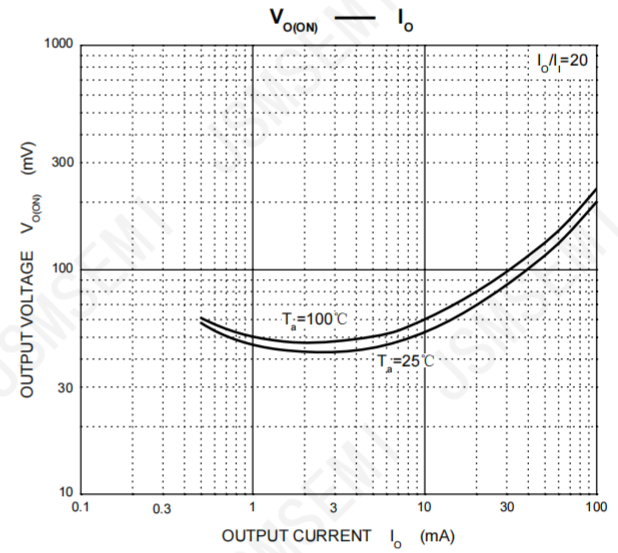
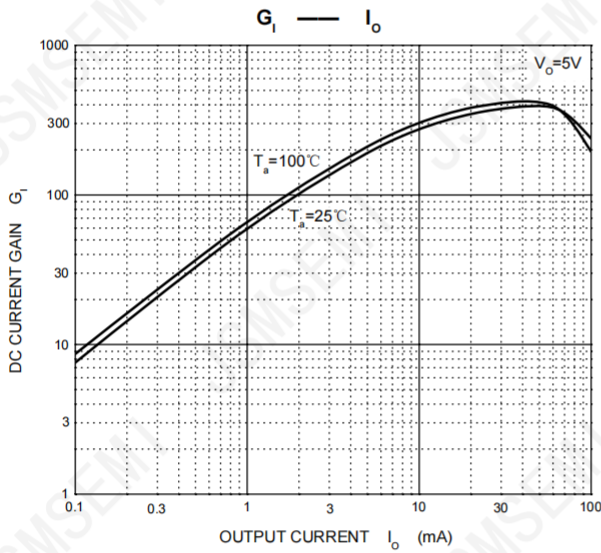
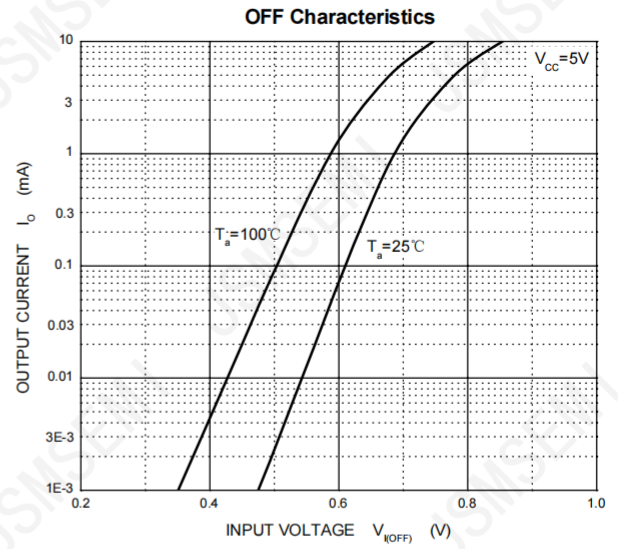
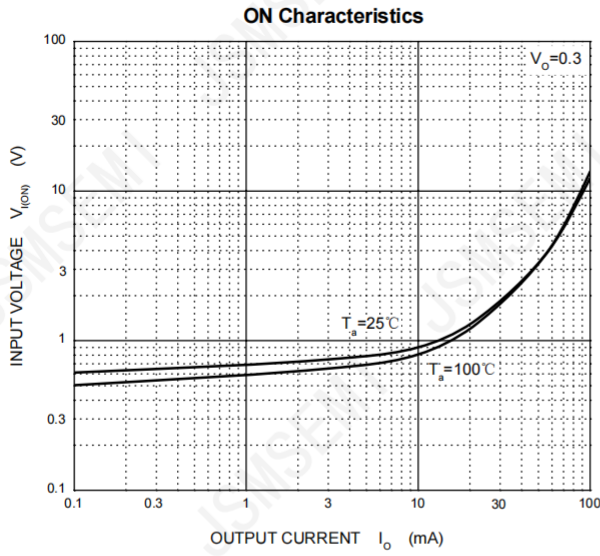
Absolute Maximum Ratings(TA=25°C unless otherwise specified)

Symbol	Parameter	Limits(PDTC143Z)						Unit
		M	E	UA	CA	KA	SA	
V _{CC}	Supply Voltage	50						V
V _{IN}	Input Voltage	-5~+30						V
I _O	Output Current	100						mA
P _D	Power Dissipation	100	150	200	200	200	300	mW
T _J ,T _{stg}	Operation Junction and Storage Temperature Range	-55~+150						°C

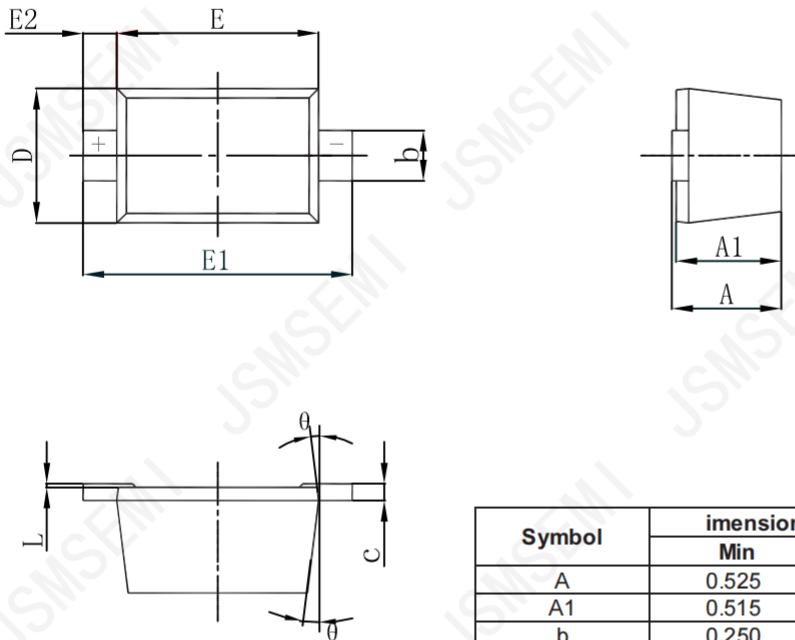
Electrical Characteristics(TA=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input voltage	$V_{I(off)}$	$V_{CC}=5V, I_O=100\mu A$	0.5			V
	$V_{I(on)}$	$V_O=0.3V, I_O=5mA$			1.3	V
Output voltage	$V_{O(on)}$	$I_O/I_I=5mA/0.25mA$		0.1	0.3	V
Input current	I_I	$V_I=5V$			1.8	mA
Output current	$I_{O(off)}$	$V_{CC}=50V, V_I=0$			0.5	μA
DC current gain	G_I	$V_O=5V, I_O=10mA$	80			
Input resistance	R_I		3.29	4.7	6.11	k Ω
Resistance ratio	R_2/R_1		8	10	12	
Transition frequency	f_T	$V_O=10V, I_O=5mA, f=100MHz$		250		MHz

Typical Performance Curves

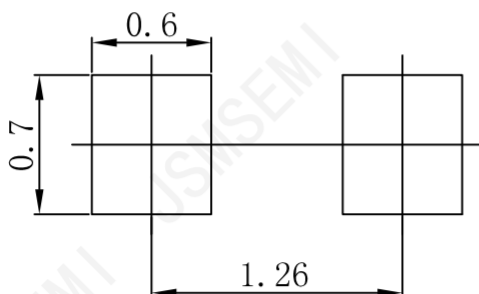


SOT-723 Package Outline Dimensions



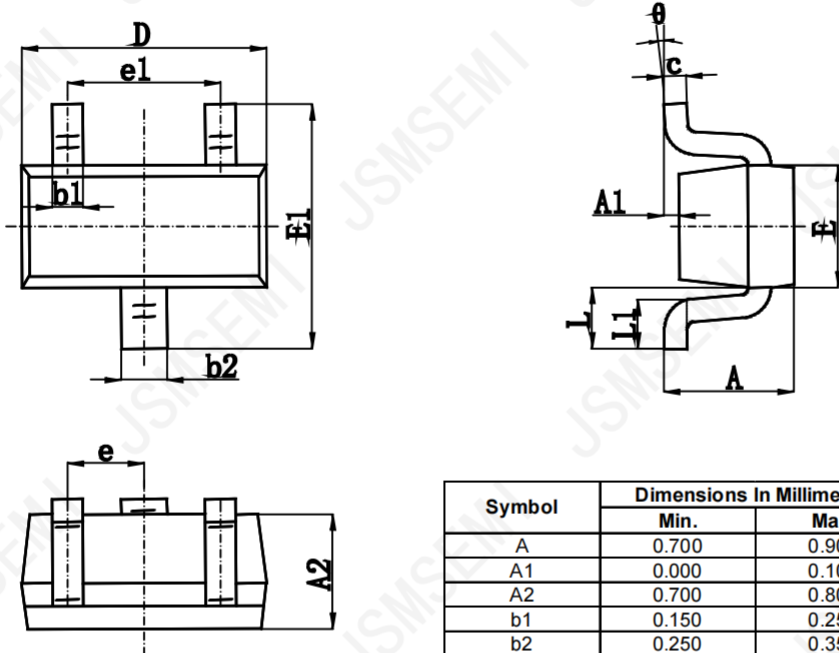
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.525	0.650	0.021	0.026
A1	0.515	0.580	0.020	0.023
b	0.250	0.350	0.010	0.014
c	0.080	0.150	0.003	0.006
D	0.550	0.650	0.022	0.026
E	0.900	1.100	0.035	0.043
E1	1.300	1.500	0.051	0.059
E2	0.200 REF		0.008 REF	
L	0.010	0.070	0.001	0.003
θ	7° REF		7° REF	

SOT-723 Suggested Pad Layout


Note:

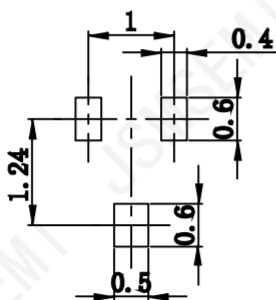
1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

SOT-523 Package Outline Dimensions



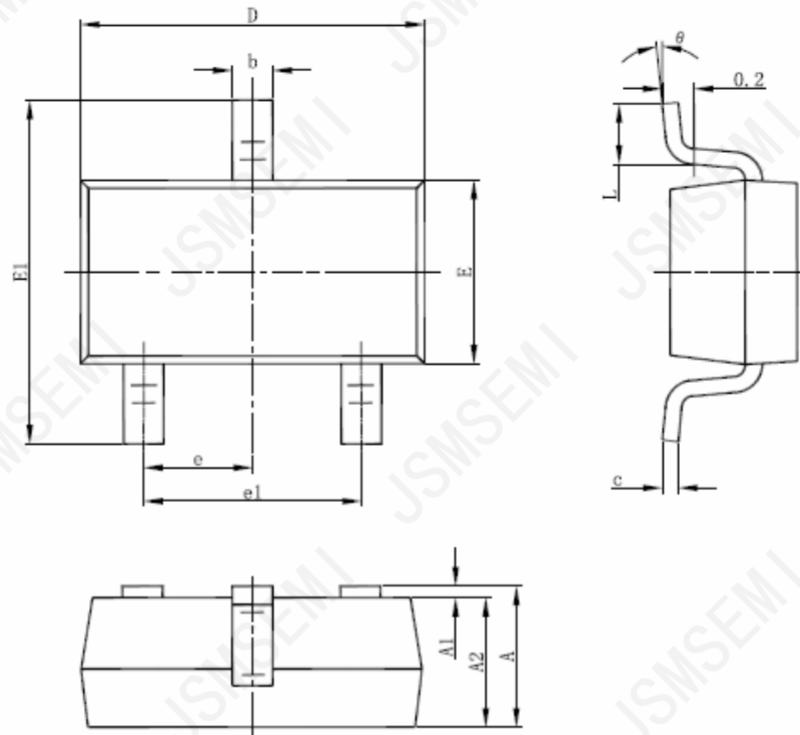
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.350	0.010	0.014
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500 TYP.		0.020 TYP.	
e1	0.900	1.100	0.035	0.043
L	0.400 REF.		0.016 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

SOT-523 Suggested Pad Layout



Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: $\pm 0.05\text{mm}$.
 3. The pad layout is for reference purposes only.

SOT-23-3L Package Outline Dimensions

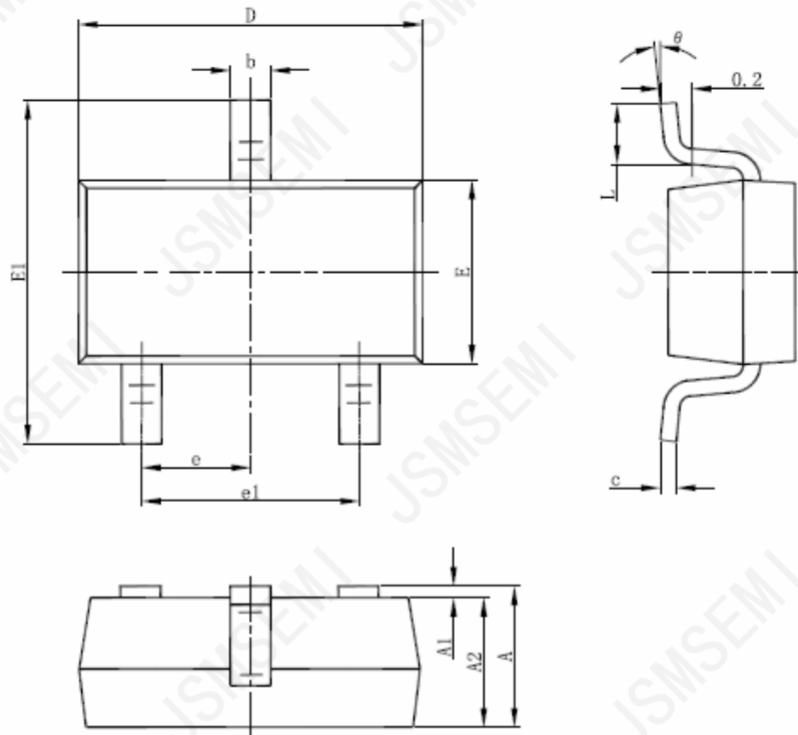


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

NOTES:

- All dimensions are in millimeters.
- Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
- Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
- Dimension L is measured in gauge plane.
- Controlling dimension is millimeter, converted inch dimensions are not necessarily exact

SOT-23-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
theta	0°	8°	0°	8°

NOTES:

1. All dimensions are in millimeters.
2. Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact

Revision History

Rev.	Change	Date
V1.0	Initial version	2/23/2024

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