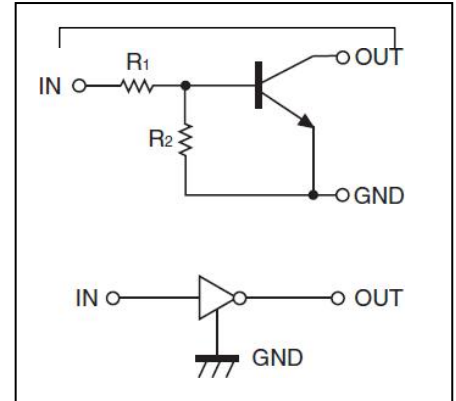# Digital Transistors (Built-in Resistors)
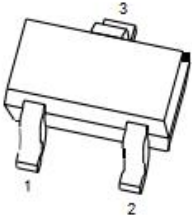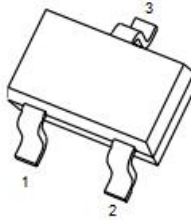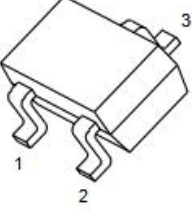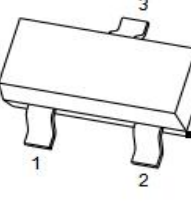
• **Equivalent Circuit** DIGITAL TRANSISTOR (NPN)

FEATURES

● Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors(see equivalent circuit)

● The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input.They also have the advantage of almost completely eliminating parasitic effects

● Only the on/off conditions need to be set for operation, making device design easy

PIN CONNENCTIONS

DTC143ZE   SOT-523

1. IN
2. GND
3. OUT

DTC143ZUA   SOT-323

1. IN
2. GND
3. OUT

DTC143ZKA   SOT-23-3L

1. IN
2. GND
3. OUT

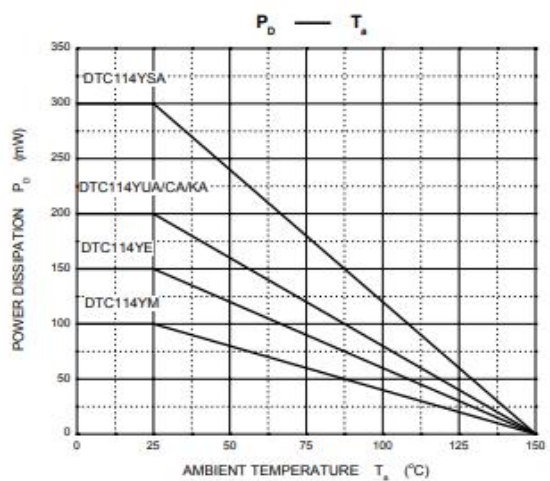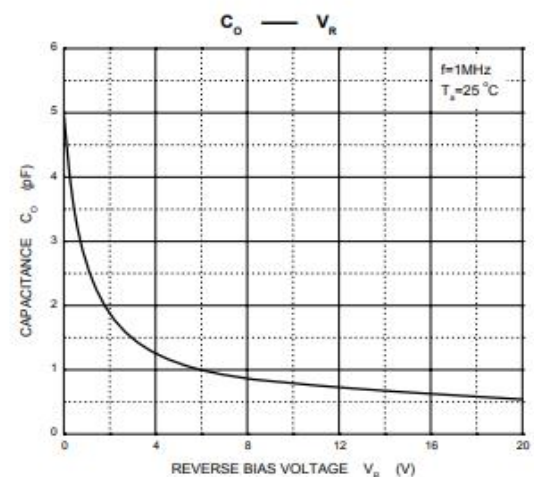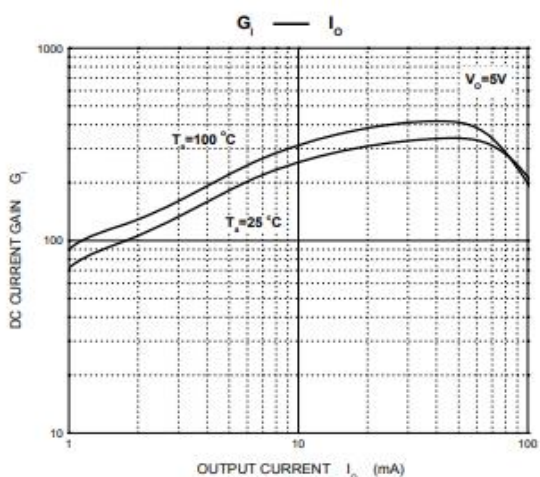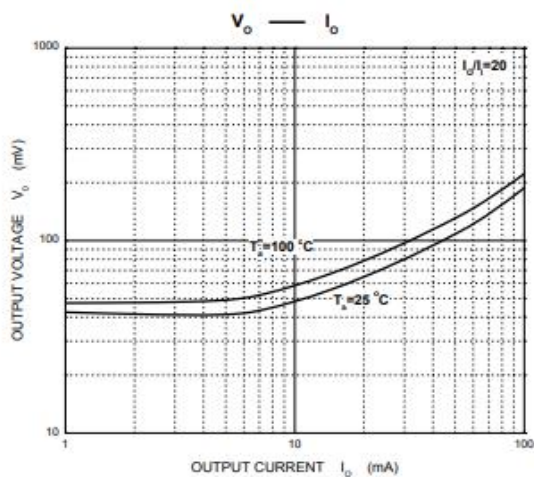DTC143ZCA   SOT-23

1. IN
2. GND
3. OUT

MAXIMUM RATINGS(Ta=25℃ unless otherwise noted)

Symbol	Parameter	Limits(DTC143Z□)						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						℃

ELECTRICAL CHARACTERISTICS (Ta=25℃ unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input voltage	$V_{I(off)}$	V_{CC}=5V,I_O=100μA	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_1		3.29	4.7	6.11	kΩ
Resistance ratio	R_2/R_1		8	10	12	
Transition frequency	f_T	V_O=10V ,I_O=5mA,f=100MHz		250		MHz

Typical Characteristics

ON Characteristics

$V_o = 0.3V$

INPUT VOLTAGE $V_{(ON)}$ (V)

$Ta = 25°C$

$T_a = 100°C$

OUTPUT CURRENT I_O (mA)

OFF Characteristics

OUTPUT CURRENT I_O (mA)

$T_a = 100°C$

$T_a = 25°C$

$V_{cc} = 5V$

INPUT VOLTAGE V_I (V)

V_o —— I_o

$I_o/I_i = 20$

OUTPUT VOLTAGE V_o (mV)

$T_a = 100°C$

$T_a = 25°C$

OUTPUT CURRENT I_O (mA)

G_I —— I_o

$V_o = 5V$

DC CURRENT GAIN G_I

$T_a = 100°C$

$T_a = 25°C$

OUTPUT CURRENT I_O (mA)

C_O —— V_R

$f = 1MHz$
$T_a = 25°C$

CAPACITANCE C_O (pF)

REVERSE BIAS VOLTAGE V_R (V)

P_D —— T_a

DTC114YSA

DTC114YUA/CA/KA

DTC114YE

DTC114YM

POWER DISSIPATION P_D (mW)

AMBIENT TEMPERATURE T_a (℃)

REVERSE VOLTAGE V_R (V)   AMBIENT TEMPERATURE T_a (℃)

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads   **SOT-523**

PACKAGE OUTLINE

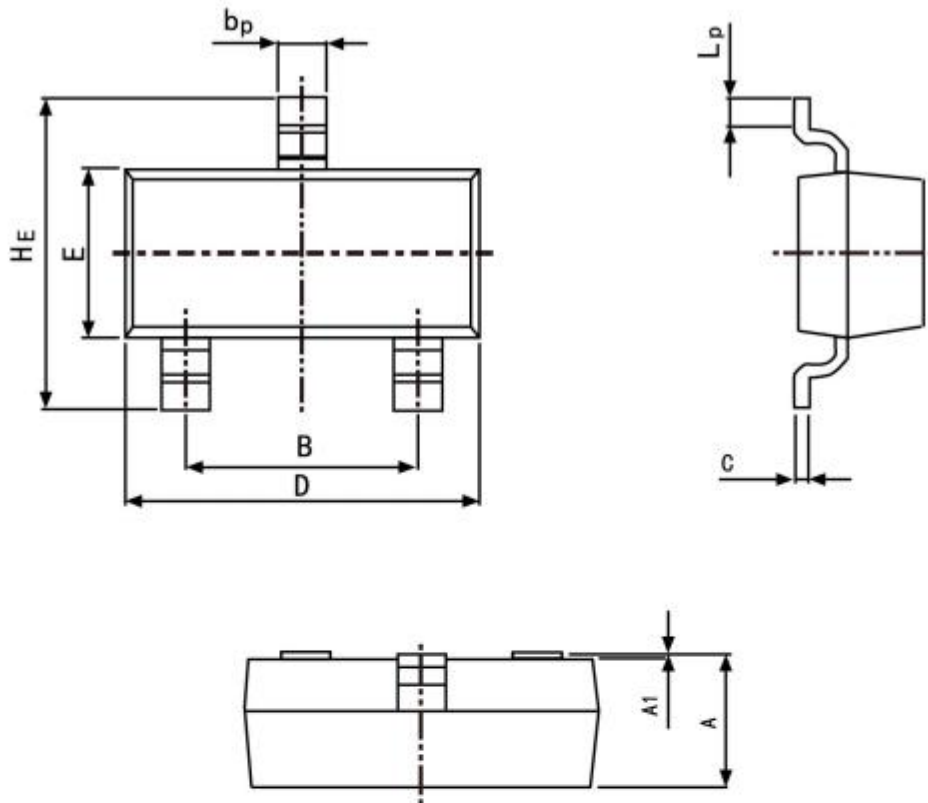**Plastic surface mounted package; 3 leads**   **SOT-323**

Package outline dimensions   SOT23-3L

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads   **SOT-23**

Symbol	Dimension in Millimeters	
	Min	Max
A	0.95	1.40
B	1.78	2.04
bp	0.35	0.50
C	0.08	0.19
D	2.70	3.10
E	1.20	1.65
HE	2.20	3.00
A1	0.100	0.013
Lp	0.20	0.50

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RN1303(TE85L,F) RN1306(TE85L,F) EMH15T2R SMUN2214T3G SMUN5335DW1T1G NSBC143ZPDP6T5G NSVDTA143ZET1G
SMUN2214T1G FMA7AT148 DTC114EUA-TP SMUN5237DW1T1G SMUN5213DW1T1G SMUN5114DW1T1G SMUN2111T1G
DTC124ECA-TP DTA114ECA-TP DTC113EM3T5G NSVMUN5135DW1T1G NSVMUN2237T1G NSVDTC143ZM3T5G
SMUN5335DW1T2G SMUN5216DW1T1G NSVMUN5316DW1T1G NSVMUN5215DW1T1G NSVMUN5213DW1T3G
NSVMUN2112T1G NSVIMD10AMT1G NSVEMC2DXV5T1G NSVDTC144WET1G NSVDTC123JET1G NSVDTA143EM3T5G
NSVB1706DMW5T1G NSBC143EDP6T5G RN2101,LF(CT NSBA144WDXV6T1G DTA115TET1G NSBC115TDP6T5G