



5423243 LEDEX INC, LUCAS PRODUCTS

81C 00127 D

T-33-05

NPN SILICON POWER TRANSISTORS

DT1311/2
DT1321/2.

The DT1311/2 and DT1321/22 transistors are NPN silicon diffused junction homogeneous base devices conforming to BS SO-44A/SB3-3A, IEC C4/B4A and JEDEC TO-5 outlines.

They are medium power devices designed to cover a wide range of applications in industrial and defence projects over a temperature range of -55°C to $+200^{\circ}\text{C}$. They are intended to be used for power switching in inverter, converter, chopper and relay control circuits. They are equally suitable for oscillators, regulators, pulse circuits, audio frequency and servo amplifiers.

QUICK REFERENCE DATA

VCBO max.

DT1311 DT1312 DT1321 DT1322

VCE(sat) max. at $I_C=0.2\text{A}$, $I_B=0.02\text{A}$
and $T_{\text{case}}=25^{\circ}\text{C}$

60V 100V 60V 100V

IC max.

0.75V

hFE min. at $V_{CE}=4\text{V}$, $I_C=200\text{mA}$ and $T_{\text{case}}=25^{\circ}\text{C}$

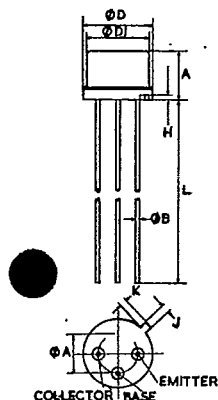
20 20 40 40

Ptot max. at $T_{\text{case}}=100^{\circ}\text{C}$

5W

MECHANICAL DETAILS

Ref.	DIMENSIONS				Notes
	Millimetres		Inches		
	Min.	Max.	Min.	Max.	
A	5.85	6.60	0.230	0.260	
ØA	4.83	5.33	0.190	0.210	
ØB	—	0.53	—	0.021	
ØD	8.64	9.39	0.340	0.370	
ØD1	8.01	8.50	0.315	0.335	
H	0.3	3.1	0.009	0.125	
J	0.712	0.863	0.028	0.034	
K	0.74	1.06	0.029	0.042	
L	38.10	—	1.500	—	



Notes:

- The transistors conform to BS SO-44A/SB3-3A, IEC C4/B4A and JEDEC TO-5 outlines.
- The millimetre dimensions are derived from the inch dimensions.

Weight 1.3 grammes

In the interest of improved product design, changes to this specification may be made at any time.

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RATINGS

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The ratings quoted are limiting values of operating and environmental conditions and are in accordance with the absolute maximum rating system defined in BS 3494 (Part 1) and IEC Publication 134.

Voltage Ratings

		DT1311	DT1312	DT1321	DT1322
V _{CB0}	Collector-base voltage at I _E =0	60V	100V	60V	100V
V _{CEO sus}	Collector-emitter sustaining voltage at I _B =0	40V	60V	40V	60V
V _{CES}	Collector-emitter voltage with emitter and base short-circuited	60V	100V	60V	100V
V _{EBO}	Emitter-base voltage at I _C =0		12V		

Current Rating

I _C	Collector current (continuous)	1.5A
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Power Ratings

P _{tot}	Total power dissipation T _{amb} =50°C (mounted in free air) T _{case} =100°C	1W 5W
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Thermal Ratings

T _{amb}	Operating ambient temperature range	-55°C to +200°C
T _{stg}	Storage temperature range	-55°C to +200°C

CHARACTERISTICS

Electrical Characteristics

		Min.	Typ.	Max.
I _{CB0}	Collector-base cut-off current V _{CB} =V _{CB0 max} , I _E =0 and T _{amb} =25°C V _{CB} =V _{CB0 max} , I _E =0 and T _{amb} =200°C		0.01µA	2 µA 2.0mA
I _{EBO}	Emitter-base cut-off current at V _{EB} =12V, I _C =0 and T _{case} =25°C			10 µA
h _{FE}	Static value of common emitter forward current transfer ratio at V _{CE} =4V, I _C =200mA and T _{amb} =25°C DT1311/2 DT1321/2	20 40		60 120
V _{CE(sat)}	Collector-emitter saturation voltage at I _C =200mA, I _B =20mA and T _{amb} =25°C			0.75V
V _{BE(sat)}	Base-emitter saturation voltage at I _C =200mA, I _B =20mA and T _{amb} =25°C			1.0V

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Small Signal Characteristics

		Min.	Typ.	Max.
h_{fe}	Small signal, common emitter forward current transfer ratio at $V_C=15V$, $I_C=50mA$, $f=1kHz$ and $T_{amb}=25^\circ C$			
	DT1311/2		45	
	DT1321/2		100	
h_{ib}	Common base input impedance at $V_C=15V$, $I_C=50mA$, $f=1kHz$ and $T_{amb}=25^\circ C$		2Ω	
h_{ob}	Common base output admittance at $V_C=15V$, $I_C=50mA$, $f=1kHz$ and $T_{amb}=25^\circ C$		$8 \mu\Omega^{-1}$	
h_{rb}	Common base voltage feedback ratio at $V_C=15V$, $I_C=50mA$, $f=1kHz$ and $T_{amb}=25^\circ C$			
	DT1311/2		6×10^{-4}	
	DT1321/2		8×10^{-4}	
C_{ob}	Collector capacitance at $V_C=15V$, $I_C=50mA$ and $T_{amb}=25^\circ C$		150 pF	
f_T	Cut-off frequency at $V_C=15V$, $I_C=50mA$ and $T_{amb}=25^\circ C$			
	DT1311/2		1.5 MHz	
	DT1321/2		2.5 MHz	

Switching Times

Measured on a Tektronix Type 545A oscilloscope
with Type R plug-in unit.

Pulse voltage = +10V; bias voltage = -5V;
series resistance = 200Ω ; $R_L = 60\Omega$;
 $I_C = 200mA$; $V_C = 12V$.

t_d	Delay time		0.3 μs	
t_r	Rise Time		2 μs	
		DT1311/2	1 μs	
		DT1321/2		
t_s	Storage time		2 μs	
		DT1311/2	3 μs	
		DT1321/2		
t_f	Fall time		1.5 μs	
		DT1311/2	2 μs	
		DT1321/2		

Thermal Characteristics

$R_{th(j-case)}$ Thermal resistance (junction to case)

$R_{th(j-amb)}$ Thermal resistance (junction to
ambient)

20 deg C/W

150 deg
C/W**LUCAS**

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INSTALLATION NOTES

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The emitter, base and collector leads are identified on the transistor outline, Page 1.
Note the collector is connected also to the case.

The leads must not be bent within 0.06in (1.5mm) of the seals.

When soldering, a thermal shunt should be used to protect the transistor.

The transistor leads may be dip-soldered at a temperature of 240°C for 10 seconds up to a point 0.1in (2.54mm) from the seals.

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