Transistor, NPN
TO-3

Description:

High voltage power transistor.
Designed for use in high-voltage, high-speed, power switching in inductive circuit, motor control, solenoid and relay drivers.

Features:

- Collector-emitter sustaining voltage - $V_{CEO\ (sus)}$ = 4,000V (Min.)
- Low collector-emitter saturation voltage - $V_{CE\ (sat)}$ = 3V (Max.) at I_C = 8A, I_B = 2.5A

Maximum Ratings

Characteristic	Symbol	BUX80	Unit
Collector-Emitter Voltage	V_{CEO}	400	V
Collector-Emitter Voltage (V_{BE} = 0)	V_{CES}	800	
Emitter-Base Voltage	V_{EBO}	10	
Collector Current - Continuous -Peak	I_C	10 15	A
Base Current-Continuous	I_B	5	
Total Power Dissipation at T_C = 25°C Derate above 25°C	P_D	100 0.8	W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +200	°C

Thermal Characteristics

Characteristics	Symbol	Max.	Unit
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.25	°C/W

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Power Derating

P_D, Power Dissipation (Watts) vs T_C, Temperature (°C)
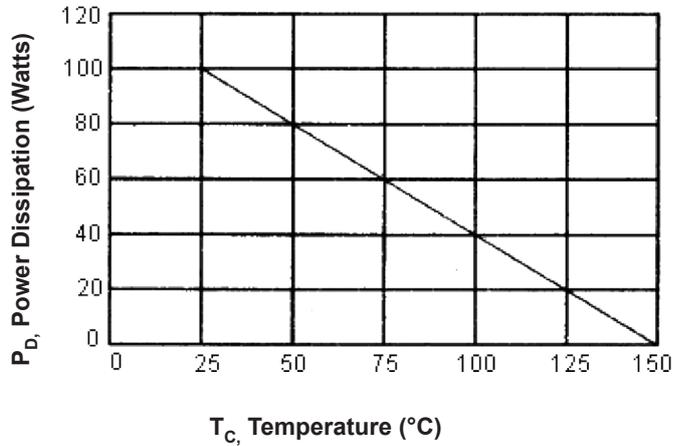
Electrical Characteristics (TC = 25°C unless otherwise noted)

Characteristic	Symbol	Min.	Max.	Unit
Off Characteristics				
Collector-Emitter Sustaining Voltage (1) (I_C = 100mA, I_B = 0, L = 25mH)	V	400	-	V
Collector Cut off Current (V_{CE} = 800V, V_{BE} = 0) (V_{CE} = 800V, V_{BE} = 0, T_C = 125°C)	I_{CES}	-	1 3	mA
Emitter Cut off Current (V_{EB} = 10V, I_C = 0)	I_{EBO}	-	10	
On Characteristics (1)				
DC Current Gain (I_C = 1.2A, V_{CE} = 5V)	h	30 (typical)	-	-
Collector-Emitter Saturation Voltage (I_C = 5A, I_B = 1mA) (I_C = 8A, I_B = 2.5mA)	$V_{CE (sat)}$	-	1.5 3	V
Base-Emitter Saturation Voltage (I_C = 5.0A, I_B = 1mA) (I_C = 8.0A, I_B = 2.5mA)	$V_{BE (sat)}$	-	1.4 1.8	

Switching Characteristics

			Symbol	Min.	Max.	Unit
Turn On Time	V_{cc} = 250V, I_C = 5A		t_{on}	-	0.5	µs
Storage Time	I_{B1} = 1A, I_{B2} = -2A		t_s	-	3.5	
Fall Time	-		t_f	-	0.5	

(1) Pulse Test : Pulse Width = 300µs, Duty Cycle ≤2%.

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DC Current Gain

$T_C = 125°C$

$25°C$

$-30°C$

$V_{CE} = 5V$

h_{FE}, DC Current Gain

I_C, Collector Current (Amperes)
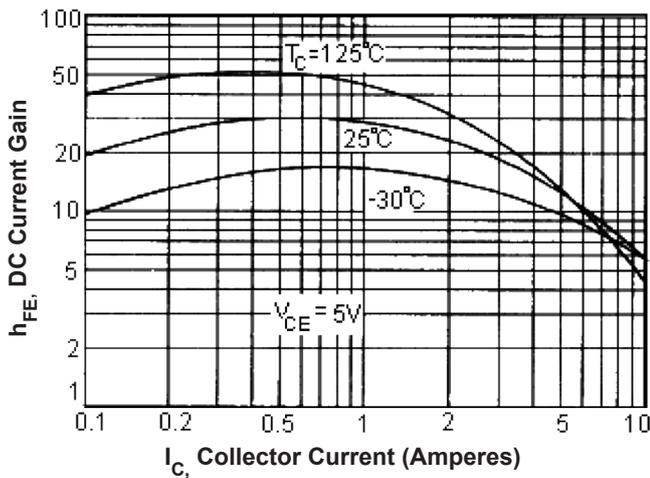
Collector Saturation Region

1A 2A 4A
3A 5A 6A $I_C = 8A$

V_{CE}, Collector-Emitter Voltage (Volts)

I_C, Collector Current (Amperes)

Base-Emitter Saturation Voltage

$I_C/I_B = 5$

$T_C = 30°C$

$25°C$

$125°C$

VBE, Base-Emitter Saturation Voltage (Volts)

I_C, Collector Current (Amperes)
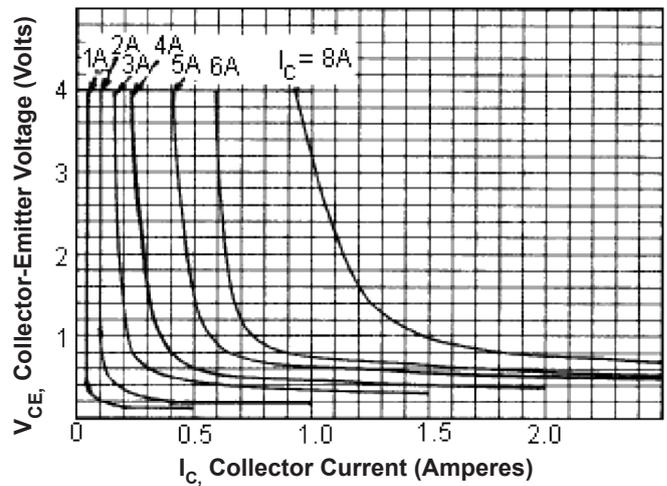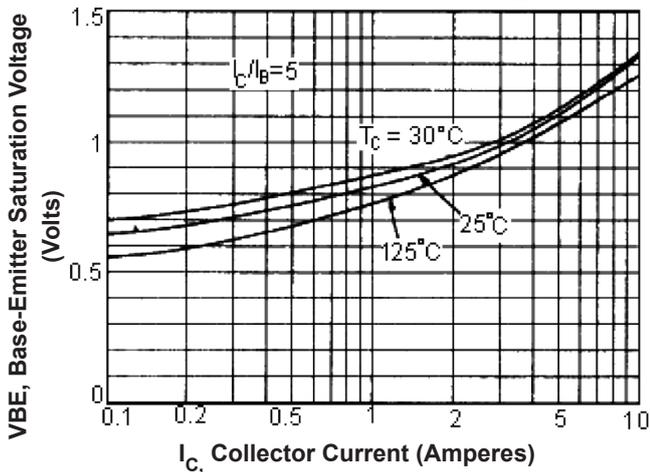
Temperature Coefficients
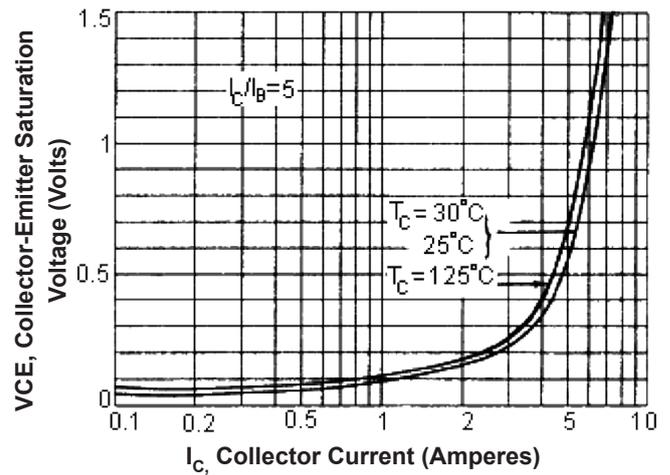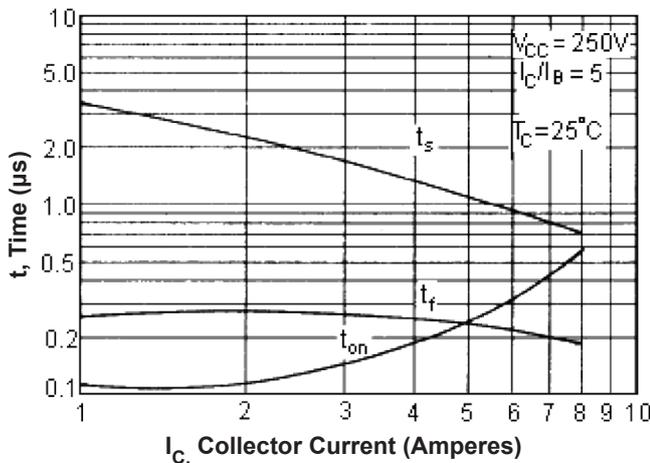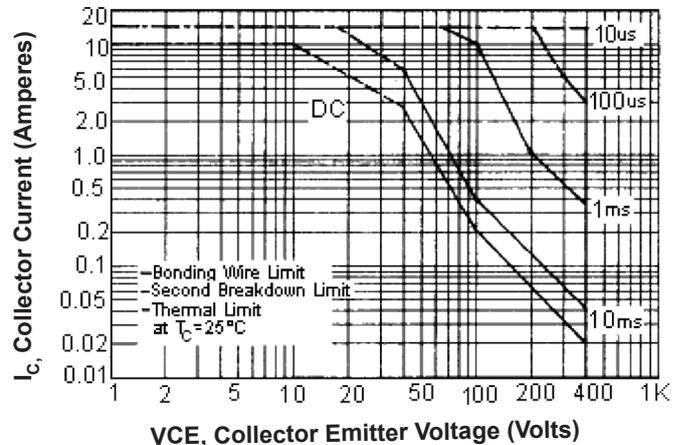
$I_C/I_B = 5$

$T_C = 30°C$
$25°C$
$T_C = 125°C$

VCE, Collector-Emitter Saturation Voltage (Volts)

I_C, Collector Current (Amperes)

Switching Time

$V_{CC} = 250V$
$I_C/I_B = 5$
$T_C = 25°C$

t_s

t_f

t_{on}

t, Time (µs)

I_C, Collector Current (Amperes)

Safe Operating Area

10us

100us

DC

1ms

10ms

Bonding Wire Limit
Second Breakdown Limit
Thermal Limit
at $T_C = 25°C$

I_C, Collector Current (Amperes)

VCE, Collector Emitter Voltage (Volts)

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Dimensions

(TO-3)
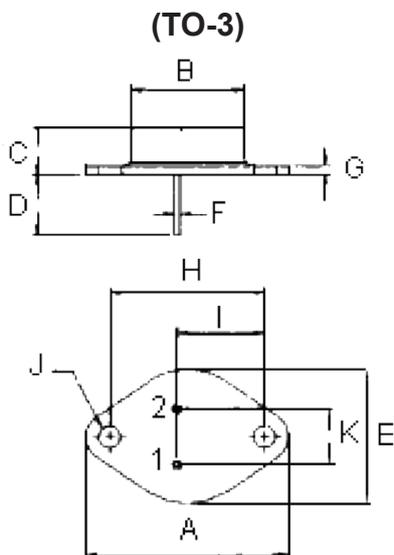
Dim.	Min.	Max.
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.2	26.67
F	0.92	1.09
G	1.38	1.62
H	29.9	30.4
I	16.64	17.3
J	3.88	4.36
K	10.67	11.18

Dimensions : (Millimetres)

Pin Configuration

Pin 1. Base

    2. Emitter

       Collector (Case)

Part Number Table

Description	Part Number
Transistor, NPN, TO-3	BUX80

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