

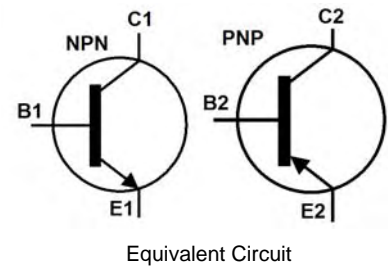
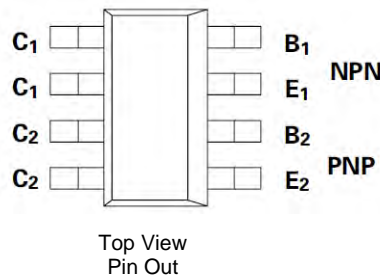
COMPLEMENTARY MEDIUM POWER HIGH GAIN TRANSISTOR IN SM-8 PACKAGE

**Features**

- NPN Transistor
  - $BV_{CEO} > 45$
  - $V_{CE(sat)} < 100mV @ I_C = 100mA$
  - Continuous Current  $I_C = 2A$
- PNP Transistor
  - $BV_{CEO} > -40V$
  - $V_{CE(sat)} < 250mV @ I_C = -500mA$
  - Continuous Current  $I_C = -2A$
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

**Mechanical Data**

- Case: SM-8 (8 LEAD SOT223)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish (E3)
- Weight: 0.117 grams (approximate)

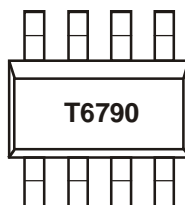


**Ordering Information** (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZDT6790TA	T6790	7	12	1,000
ZDT6790TC	T6790	13	12	4,000

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com>

**Marking Information**



T6790 = Product Type Marking Code

### Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

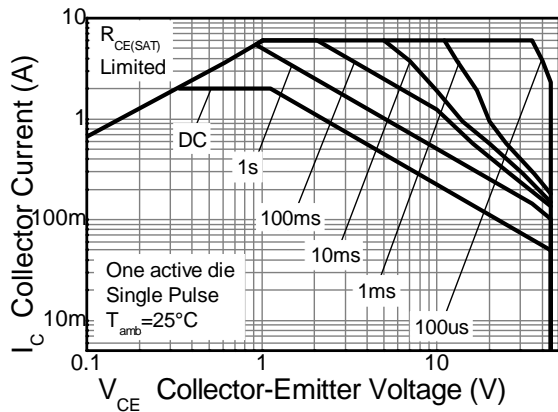
Characteristic	Symbol	NPN	PNP	Unit
Collector-Base Voltage	V <sub>CBO</sub>	45	-50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	45	-40	V
Emitter-Base Voltage	V <sub>EBO</sub>	6	-6	V
Continuous Collector Current	I <sub>C</sub>	2	-2	A
Peak Pulse Current (Note 5)	I <sub>CM</sub>	6	-6	A

### Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

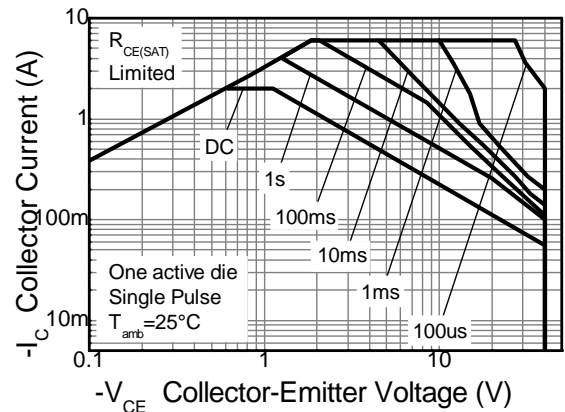
Characteristic	Symbol	Value	Unit
Collector Power Dissipation	P <sub>D</sub>	(Note 5) 2.25	W
		(Note 6) 2.75	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5) 55.60	°C/W
		(Note 6) 45.50	
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	30.68	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
5. For the device with any single die active, mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions .
  6. For the device with both die active, mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
  7. Thermal resistance from junction to solder-point (at the end of the collector lead).

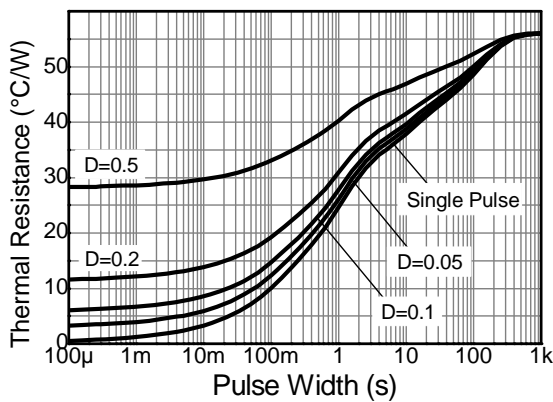
**Thermal Characteristics**



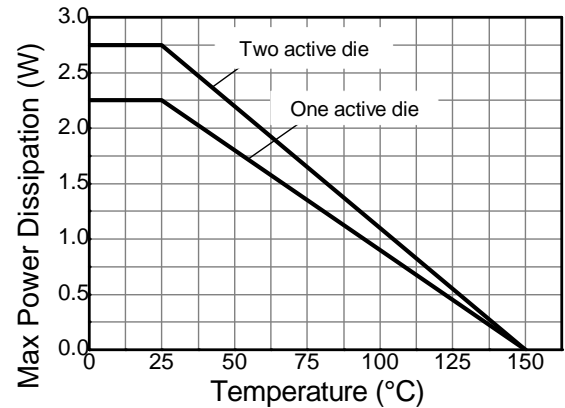
**NPN Safe Operating Area**



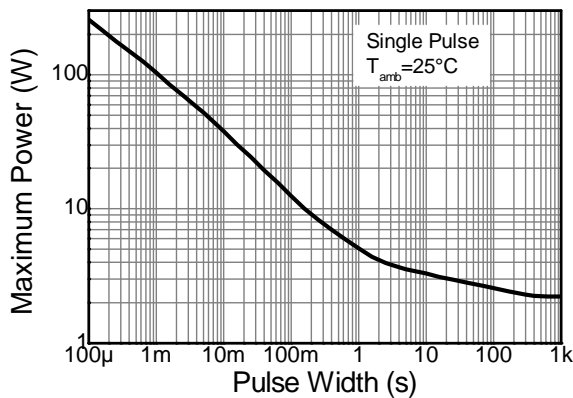
**PNP Safe Operating Area**



**Transient Thermal Impedance**



**Derating Curve**



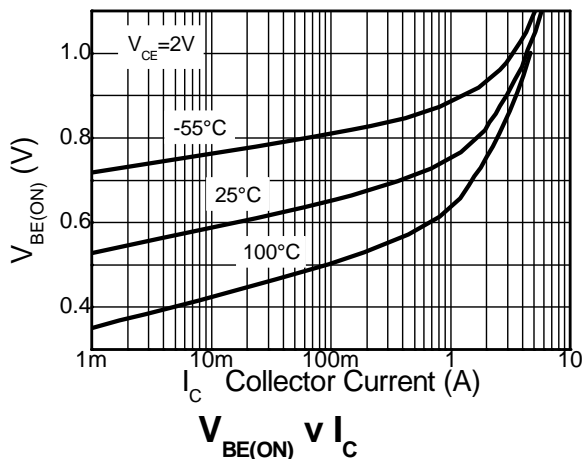
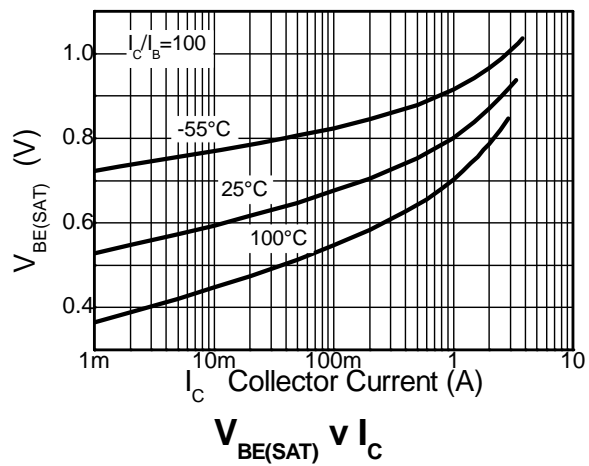
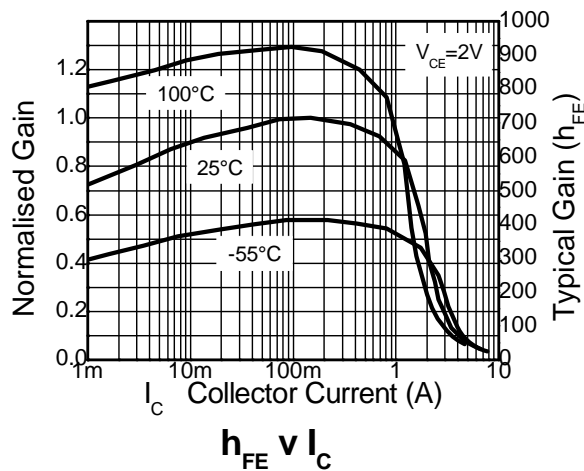
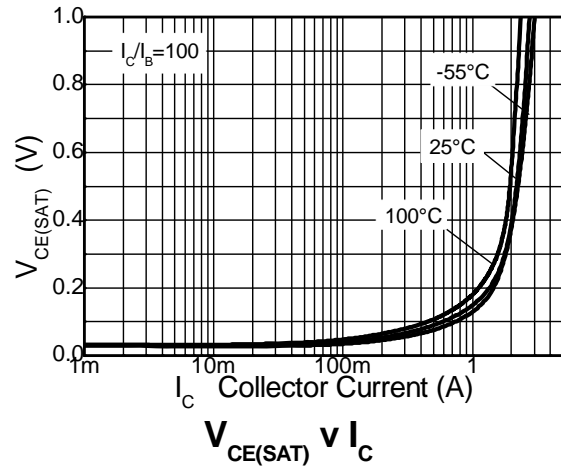
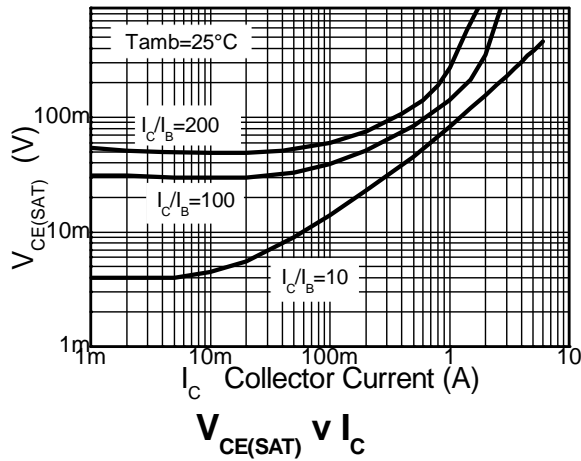
**Pulse Power Dissipation**

**NPN - Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	45	—	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV <sub>CEO</sub>	45	—	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	6	—	—	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CB0</sub>	—	—	100	nA	V <sub>CB</sub> = 35V
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	100	nA	V <sub>EB</sub> = 5V
DC Current Transfer Static Ratio (Note 8)	h <sub>FE</sub>	500	—	—	—	I <sub>C</sub> = 100mA, V <sub>CE</sub> = 2V
		400	—	—		I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
		150	—	—		I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 8)	V <sub>CE(sat)</sub>	—	—	100	mV	I <sub>C</sub> = 100mA, I <sub>B</sub> = 0.5mA
		—	—	500		I <sub>C</sub> = 1A, I <sub>B</sub> = 5mA
Base-Emitter Saturation Voltage (Note 8)	V <sub>BE(sat)</sub>	—	—	900	mV	I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA
Base-Emitter Turn-on Voltage (Note 8)	V <sub>BE(on)</sub>	—	—	900	mV	I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
Transitional Frequency (Note 8)	f <sub>T</sub>	150	—	—	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5V, f = 50MHz
Input Capacitance	C <sub>ibo</sub>	—	200	—	pF	V <sub>EB</sub> = 0.5V, f = 1MHz
Output Capacitance	C <sub>obo</sub>	—	16	—	pF	V <sub>CB</sub> = 10V, f = 1MHz
Switching Time	t <sub>on</sub>	—	33	—	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 500mA, I <sub>B1</sub> = 50mA, I <sub>B2</sub> = 50mA
	t <sub>off</sub>		1300		ns	

Note: 8. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%.

**NPN – Typical Electrical Characteristics**

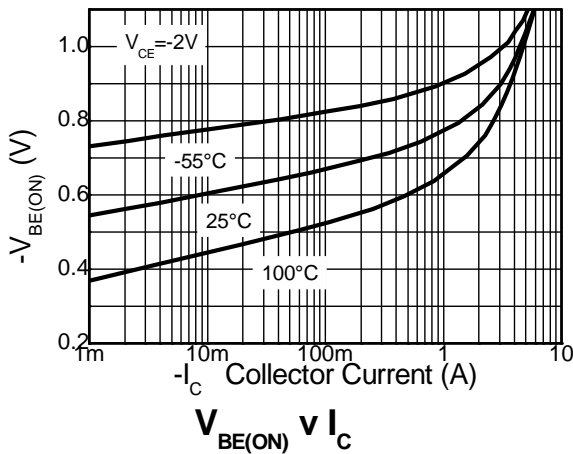
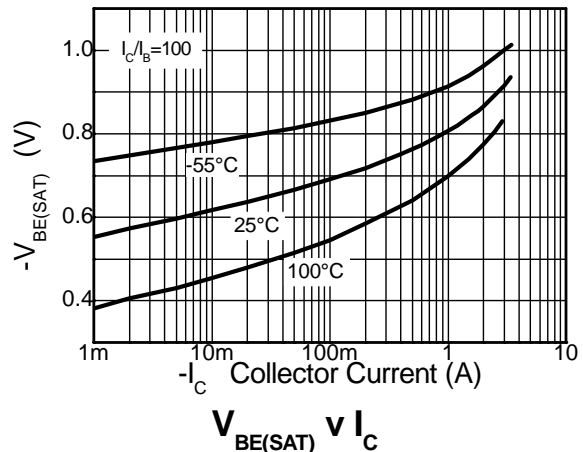
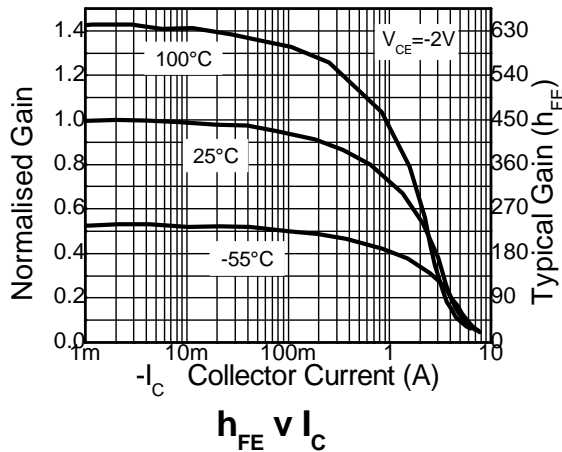
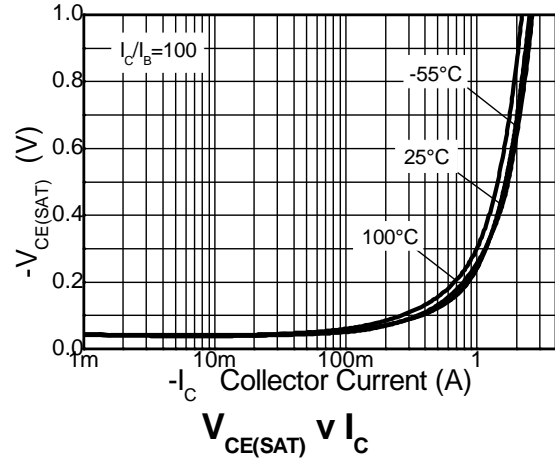
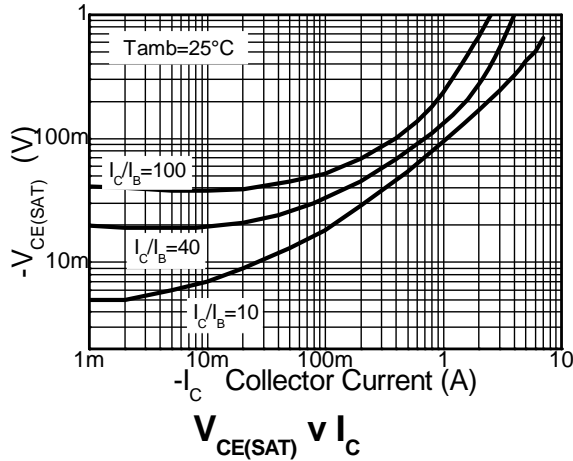


**PNP - Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

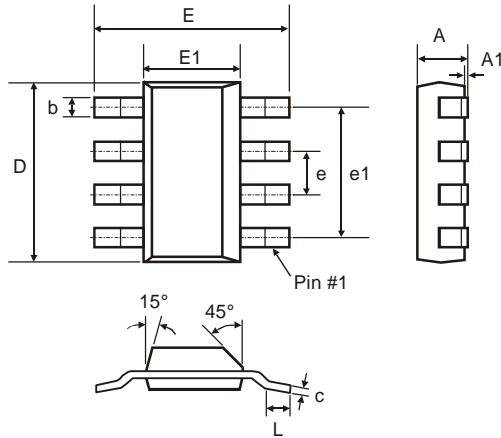
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	-50	—	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Notes 8)	BV <sub>CEO</sub>	-40	—	—	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-6	—	—	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CB0</sub>	—	—	-100	nA	V <sub>CB</sub> = -30V
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	-100	nA	V <sub>EB</sub> = -5V
DC Current Transfer Static Ratio (Notes 8)	h <sub>FE</sub>	300	—	800	—	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V
		250	—	—		I <sub>C</sub> = -500mA, V <sub>CE</sub> = -2V
		200	—	—		I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
		150	—	—		I <sub>C</sub> = -2A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage (Notes 8)	V <sub>CE(sat)</sub>	—	—	-250	mV	I <sub>C</sub> = -500mA, I <sub>B</sub> = -5mA
		—	—	-450		I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA
		—	—	-750		I <sub>C</sub> = -2A, I <sub>B</sub> = -50mA
Base-Emitter Saturation Voltage (Notes 8)	V <sub>BE(sat)</sub>	—	—	-1000	mV	I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA
Base-Emitter Turn-on Voltage (Notes 8)	V <sub>BE(on)</sub>	—	-750	—	mV	I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
Transitional Frequency (Notes 8)	f <sub>T</sub>	100	—	—	MHz	I <sub>C</sub> = -50mA, V <sub>CE</sub> = -5V, f = 50MHz
Input Capacitance	C <sub>ibo</sub>	—	225	—	pF	V <sub>EB</sub> = -0.5V, f = 1MHz,
Output Capacitance	C <sub>obo</sub>	—	24	—	pF	V <sub>CB</sub> = -10V, f = 1MHz,
Switching Time	t <sub>on</sub>	—	35	—	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -500mA, I <sub>B1</sub> = -50mA, I <sub>B2</sub> = -50mA
	t <sub>off</sub>	—	600	—	ns	

Notes: 8. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%.

**PNP – Typical Electrical Characteristics**

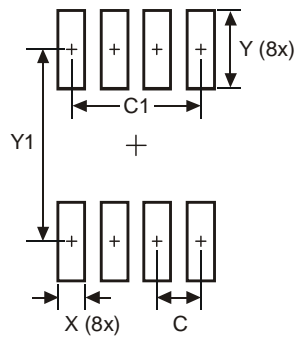


**Package Outline Dimensions**



SM-8			
Dim	Min	Max	Typ
A	-	1.7	-
A1	0.02	0.1	-
b	-	0.7	-
c	0.24	0.32	-
D	6.3	6.7	-
e	-	-	1.53
e1	-	-	4.59
E	6.7	7.3	-
E1	3.3	3.7	-
L	0.9	-	-
All Dimensions in mm			

**Suggested Pad Layout**



Dimensions	Value (in mm)
C	1.52
C1	4.6
X	0.95
Y	2.80
Y1	6.80



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