

TSC 	TSD1760 Low Vce(sat) NPN Transistor																																																																																			
TO-252  Pin assignment: 1. Base 2. Collector 3. Emitter	BV_{CEO} = 30V I_c = 3A V_{CE} (SAT), = 0.25V(typ.) @I_c / I_b = 2A / 0.2A																																																																																			
Features ◇ LOW V_{CE} (SAT). ◇ Excellent DC current gain characteristics				Ordering Information <table><tr><th>Part No.</th><th>Packing</th><th>Package</th></tr><tr><td>TSD1760CP</td><td>Tape & Reel</td><td>TO-252</td></tr></table>				Part No.	Packing	Package	TSD1760CP	Tape & Reel	TO-252																																																																							
Part No.	Packing	Package																																																																																		
TSD1760CP	Tape & Reel	TO-252																																																																																		
Structure ◇ Epitaxial planar type. ◇ Complementary to TSB1184																																																																																				
Absolute Maximum Rating (Ta = 25 °C unless otherwise noted) <table><tr><th>Parameter</th><th>Symbol</th><th>Limit</th><th>Unit</th></tr><tr><td>Collector-Base Voltage</td><td>V_{CBO}</td><td>40V</td><td>V</td></tr><tr><td>Collector-Emitter Voltage</td><td>V_{CEO}</td><td>30V</td><td>V</td></tr><tr><td>Emitter-Base Voltage</td><td>V_{EBO}</td><td>5</td><td>V</td></tr><tr><td rowspan="2">Collector Current</td><td>DC</td><td>3</td><td rowspan="2">A</td></tr><tr><td>Pulse</td><td>7 (note 1)</td></tr><tr><td>Collector Power Dissipation</td><td>P_D</td><td>1.0</td><td>W</td></tr><tr><td>Operating Junction Temperature</td><td>T_J</td><td>+150</td><td>°C</td></tr><tr><td>Operating Junction and Storage Temperature Range</td><td>T_{STG}</td><td>- 55 to +150</td><td>°C</td></tr></table> Note: 1. Single pulse, Pw = 2mS								Parameter	Symbol	Limit	Unit	Collector-Base Voltage	V _{CBO}	40V	V	Collector-Emitter Voltage	V _{CEO}	30V	V	Emitter-Base Voltage	V _{EBO}	5	V	Collector Current	DC	3	A	Pulse	7 (note 1)	Collector Power Dissipation	P _D	1.0	W	Operating Junction Temperature	T _J	+150	°C	Operating Junction and Storage Temperature Range	T _{STG}	- 55 to +150	°C																																											
Parameter	Symbol	Limit	Unit																																																																																	
Collector-Base Voltage	V _{CBO}	40V	V																																																																																	
Collector-Emitter Voltage	V _{CEO}	30V	V																																																																																	
Emitter-Base Voltage	V _{EBO}	5	V																																																																																	
Collector Current	DC	3	A																																																																																	
	Pulse	7 (note 1)																																																																																		
Collector Power Dissipation	P _D	1.0	W																																																																																	
Operating Junction Temperature	T _J	+150	°C																																																																																	
Operating Junction and Storage Temperature Range	T _{STG}	- 55 to +150	°C																																																																																	
Electrical Characteristics Ta = 25 °C unless otherwise noted <table><tr><th>Parameter</th><th>Conditions</th><th>Symbol</th><th>Min</th><th>Typ</th><th>Max</th><th>Unit</th></tr><tr><td colspan="7">Static</td></tr><tr><td>Collector-Base Voltage</td><td>I_C = 50uA, I_E = 0</td><td>BV_{CBO}</td><td>40</td><td>--</td><td>--</td><td>V</td></tr><tr><td>Collector-Emitter Breakdown Voltage</td><td>I_C = 1mA, I_B = 0</td><td>BV_{CEO}</td><td>30</td><td>--</td><td>--</td><td>V</td></tr><tr><td>Emitter-Base Breakdown Voltage</td><td>I_E = 50uA, I_C = 0</td><td>BV_{EBO}</td><td>5</td><td>--</td><td>--</td><td>V</td></tr><tr><td>Collector Cutoff Current</td><td>V_{CB} = 40V, I_E = 0</td><td>I_{CBO}</td><td>--</td><td>--</td><td>1</td><td>uA</td></tr><tr><td>Emitter Cutoff Current</td><td>V_{EB} = 4V, I_C = 0</td><td>I_{EBO}</td><td>--</td><td>--</td><td>1</td><td>uA</td></tr><tr><td>Collector-Emitter Saturation Voltage</td><td>I_C / I_B = 2.0A / 0.2A</td><td>V_{CE(SAT)}</td><td>--</td><td>0.25</td><td>0.5</td><td>V</td></tr><tr><td>DC Current Transfer Ratio</td><td>V_{CE} = 2V, I_C = 1A</td><td>h_{FE}</td><td>120</td><td>--</td><td>560</td><td></td></tr><tr><td>Transition Frequency</td><td>V_{CE} = 5V, I_C = 100mA, f = 100MHz</td><td>f_T</td><td>--</td><td>90</td><td>--</td><td>MHz</td></tr><tr><td>Output Capacitance</td><td>V_{CB} = 10V, f=1MHz</td><td>Cob</td><td></td><td>45</td><td>--</td><td>pF</td></tr></table>								Parameter	Conditions	Symbol	Min	Typ	Max	Unit	Static							Collector-Base Voltage	I _C = 50uA, I _E = 0	BV _{CBO}	40	--	--	V	Collector-Emitter Breakdown Voltage	I _C = 1mA, I _B = 0	BV _{CEO}	30	--	--	V	Emitter-Base Breakdown Voltage	I _E = 50uA, I _C = 0	BV _{EBO}	5	--	--	V	Collector Cutoff Current	V _{CB} = 40V, I _E = 0	I _{CBO}	--	--	1	uA	Emitter Cutoff Current	V _{EB} = 4V, I _C = 0	I _{EBO}	--	--	1	uA	Collector-Emitter Saturation Voltage	I _C / I _B = 2.0A / 0.2A	V _{CE(SAT)}	--	0.25	0.5	V	DC Current Transfer Ratio	V _{CE} = 2V, I _C = 1A	h _{FE}	120	--	560		Transition Frequency	V _{CE} = 5V, I _C = 100mA, f = 100MHz	f _T	--	90	--	MHz	Output Capacitance	V _{CB} = 10V, f=1MHz	Cob		45	--	pF
Parameter	Conditions	Symbol	Min	Typ	Max	Unit																																																																														
Static																																																																																				
Collector-Base Voltage	I _C = 50uA, I _E = 0	BV _{CBO}	40	--	--	V																																																																														
Collector-Emitter Breakdown Voltage	I _C = 1mA, I _B = 0	BV _{CEO}	30	--	--	V																																																																														
Emitter-Base Breakdown Voltage	I _E = 50uA, I _C = 0	BV _{EBO}	5	--	--	V																																																																														
Collector Cutoff Current	V _{CB} = 40V, I _E = 0	I _{CBO}	--	--	1	uA																																																																														
Emitter Cutoff Current	V _{EB} = 4V, I _C = 0	I _{EBO}	--	--	1	uA																																																																														
Collector-Emitter Saturation Voltage	I _C / I _B = 2.0A / 0.2A	V _{CE(SAT)}	--	0.25	0.5	V																																																																														
DC Current Transfer Ratio	V _{CE} = 2V, I _C = 1A	h _{FE}	120	--	560																																																																															
Transition Frequency	V _{CE} = 5V, I _C = 100mA, f = 100MHz	f _T	--	90	--	MHz																																																																														
Output Capacitance	V _{CB} = 10V, f=1MHz	Cob		45	--	pF																																																																														

Note : pulse test: pulse width $\leq 380\mu S$, duty cycle $\leq 2\%$

Classification Of h_{FE}			
Rank	Q	R	S
Range	120 - 270	180 - 390	270 - 560

Electrical Characteristics Curve

Figure 1. Current Gain vs Collector Current

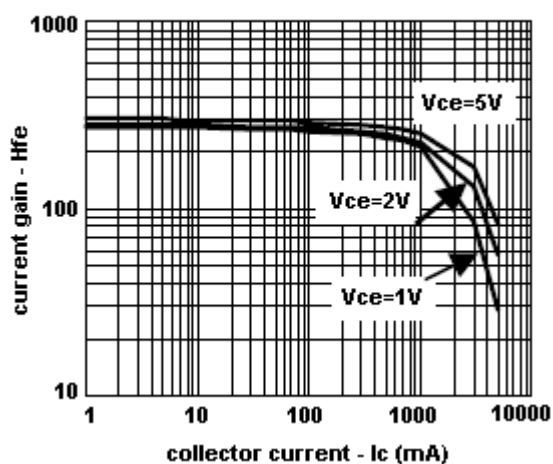


Figure 2. Saturation Voltage vs Collector Current

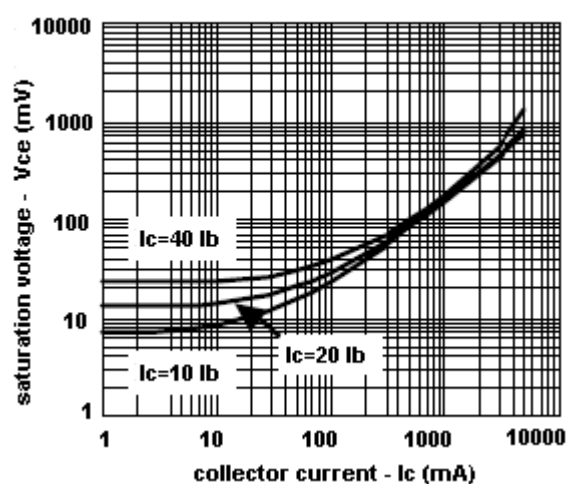


Figure 3. Saturation Voltage vs Collector Current

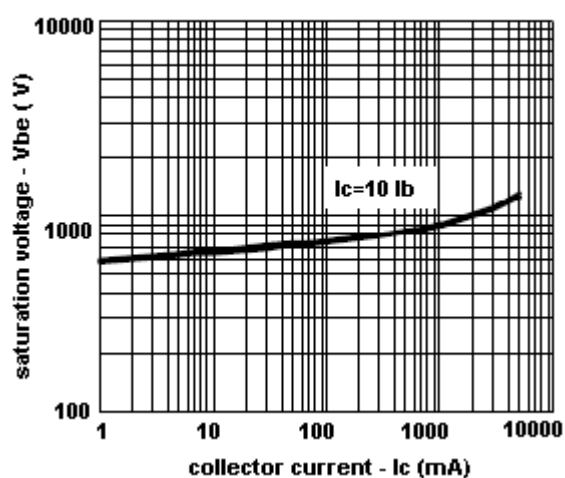
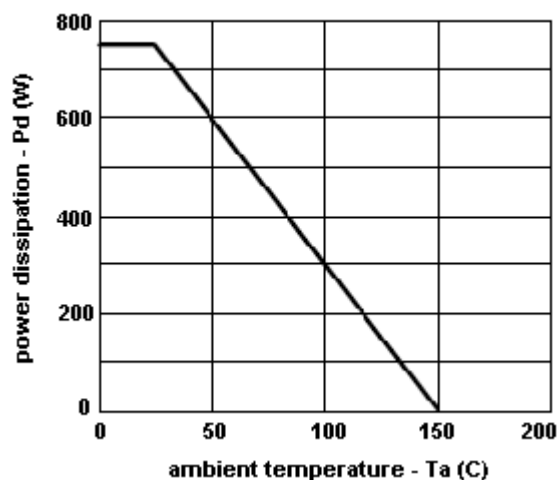
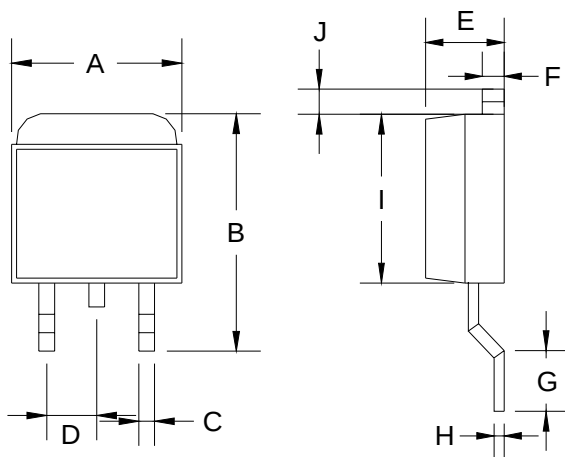


Figure 4. Power Derating Curves



TO-252 Mechanical Drawing



TO-252 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.570	6.840	0.259	0.269
B	9.250	10.400	0.364	0.409
C	0.550	0.700	0.022	0.028
D	2.560	2.670	0.101	0.105
E	2.300	2.390	0.090	0.094
F	0.490	0.570	0.019	0.022
G	1.460	1.580	0.057	0.062
H	0.520	0.570	0.020	0.022
I	5.340	5.550	0.210	0.219
J	1.460	1.640	0.057	0.065