

**Maximum Ratings: Total Device** @T<sub>A</sub> = 25°C (unless otherwise specified)

Characteristic	Symbol	Value	Unit
Operating and Storage Temperature Range	T <sub>OP</sub> , T <sub>stg</sub>	-55 to +150	°C

**Thermal Characteristics: Total Device**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	R <sub>θJA</sub>	625	°C/W

**Maximum Ratings: Sub-Component Devices** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Q1-PNP Transistor (MMBT2907A)	Q2-NPN Transistor (MMBT2906)	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-60	80	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-60	65	V
Emitter-Base Voltage	V <sub>EBO</sub>	-5.5	6	V
Collector Current - Continuous (Note 5)	I <sub>C</sub>	-600	500	mA

Note: 5. Device mounted on FR-4 substrate printed circuit board with 1 inch square 2oz copper pad area

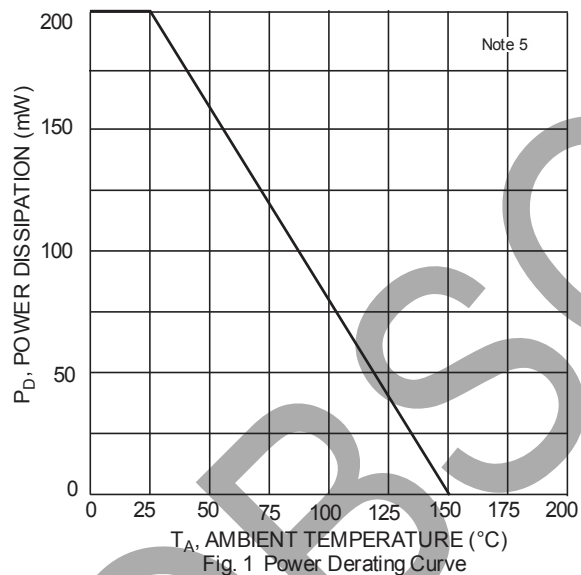
**Electrical Characteristics: PNP (MMBT2907A) Transistor (Q1)** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 6)</b>					
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	-60	—	V	I <sub>C</sub> = -10μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	-60	—	V	I <sub>C</sub> = -10mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	-5.5	—	V	I <sub>E</sub> = -10μA, I <sub>C</sub> = 0
Collector Cutoff Current	I <sub>CBO</sub>	—	-10	nA	V <sub>CB</sub> = -50V, I <sub>E</sub> = 0
Collector Cutoff Current	I <sub>CEX</sub>	—	-50	nA	V <sub>CE</sub> = -30V, V <sub>EB(OFF)</sub> = -0.5V
Base Cutoff Current	I <sub>BL</sub>	—	-50	nA	V <sub>CE</sub> = -30V, V <sub>EB(OFF)</sub> = -0.5V
<b>ON CHARACTERISTICS (Note 6)</b>					
DC Current Gain	h <sub>FE</sub>	100	—	—	I <sub>C</sub> = -100μA, V <sub>CE</sub> = -10V
		100	—	—	I <sub>C</sub> = -1.0mA, V <sub>CE</sub> = -10V
		100	—	—	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -10V
		100	300	—	I <sub>C</sub> = -150mA, V <sub>CE</sub> = -10V
		50	—	—	I <sub>C</sub> = -500mA, V <sub>CE</sub> = -10V
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	—	-0.3 -0.5	V	I <sub>C</sub> = -150mA, I <sub>B</sub> = -15mA I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	—	-0.95 -1.3	V	I <sub>C</sub> = -150mA, I <sub>B</sub> = -15mA I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Current Gain-Bandwidth Product	f <sub>T</sub>	100	—	MHz	V <sub>CE</sub> = -2.0V, I <sub>C</sub> = -10mA, f = 100MHz
<b>SWITCHING CHARACTERISTICS</b>					
Turn-On Time	t <sub>on</sub>	—	45	ns	V <sub>CE</sub> = -30V, I <sub>C</sub> = -150mA, I <sub>B1</sub> = -15mA
Delay Time	t <sub>d</sub>	—	10	ns	
Rise Time	t <sub>r</sub>	—	40	ns	
Turn-Off Time	t <sub>off</sub>	—	100	ns	V <sub>CC</sub> = -6.0V, I <sub>C</sub> = -150mA, I <sub>B1</sub> = I <sub>B2</sub> = -15mA
Storage Time	t <sub>s</sub>	—	80	ns	
Fall Time	t <sub>f</sub>	—	30	ns	

**Electrical Characteristics: NPN (MMBTA06) Transistor (Q2) @ $T_A = 25^\circ\text{C}$  unless otherwise specified**

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 6)</b>						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	80	—	—	V	$I_C = 100\mu\text{A}$ , $I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	65	—	—	V	$I_C = 1\text{mA}$ , $I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6	—	—	V	$I_E = 100\mu\text{A}$ , $I_C = 0$
Collector-Base Cutoff Current	$I_{CBO}$	—	—	100	nA	$V_{CB} = 80\text{V}$ , $I_E = 0$
Collector Cutoff Current	$I_{CES}$	—	—	100	nA	$V_{CE} = 90\text{V}$ , $V_{BE} = 0$
Emitter-Base Cutoff Current	$I_{EBO}$	—	—	100	nA	$V_{EB} = 5\text{V}$ , $I_C = 0$
<b>ON CHARACTERISTICS (Note 6)</b>						
DC Current Gain	$h_{FE}$	250	—	—	—	$V_{CE} = 1\text{V}$ , $I_C = 10\text{mA}$
		100	—	—	—	$V_{CE} = 1\text{V}$ , $I_C = 100\text{mA}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.2	0.4	V	$I_C = 100\text{mA}$ , $I_B = 10\text{mA}$
Base-Emitter Turn-on Voltage	$V_{BE(ON)}$	0.7	0.75	0.8	V	$V_{CE} = 1\text{V}$ , $I_C = 100\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	—	0.95	V	$I_C = 100\text{mA}$ , $I_B = 5\text{mA}$
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Current Gain-Bandwidth Product	$f_T$	100	—	—	MHz	$V_{CE} = 20\text{V}$ , $I_C = 10\text{mA}$ , $f = 100\text{MHz}$

Notes: 6. Short duration pulse test used to minimize self-heating effect.

**Typical Characteristics @ $T_A = 25^\circ\text{C}$  unless otherwise specified**


**PNP (MMBT2907A) Transistor (Q1) Plots**

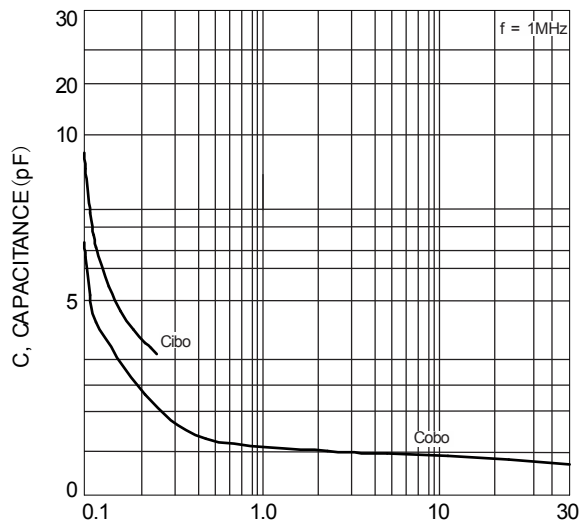


Fig. 2 Typical Capacitance

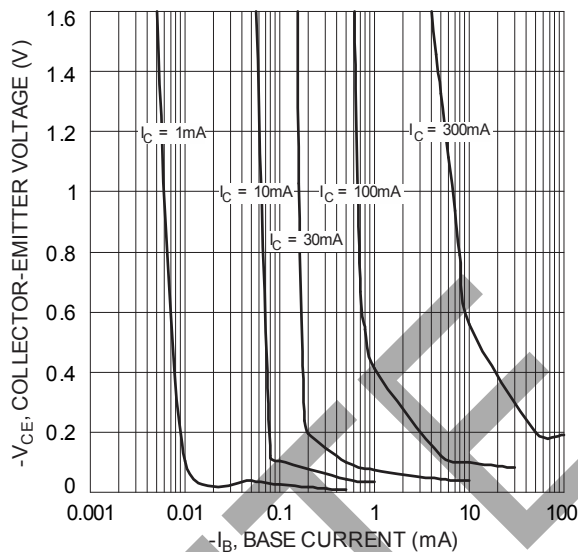


Fig. 3 Typical Collector Saturation Region

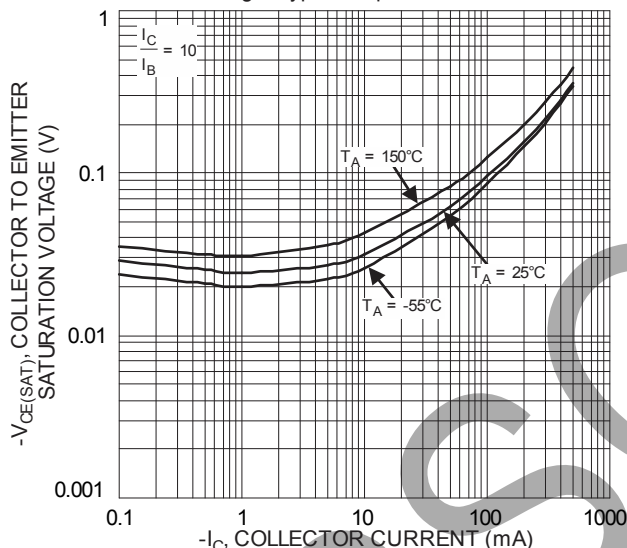


Fig. 4 Collector Emitter Saturation Voltage vs. Collector Current

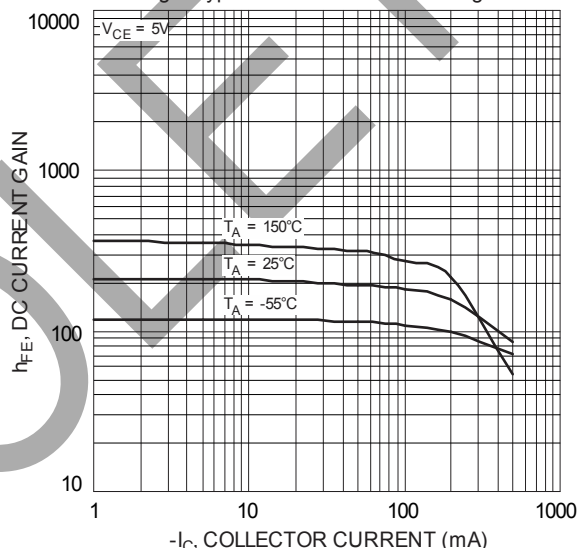


Fig. 5 Typical DC Current Gain vs. Collector Current

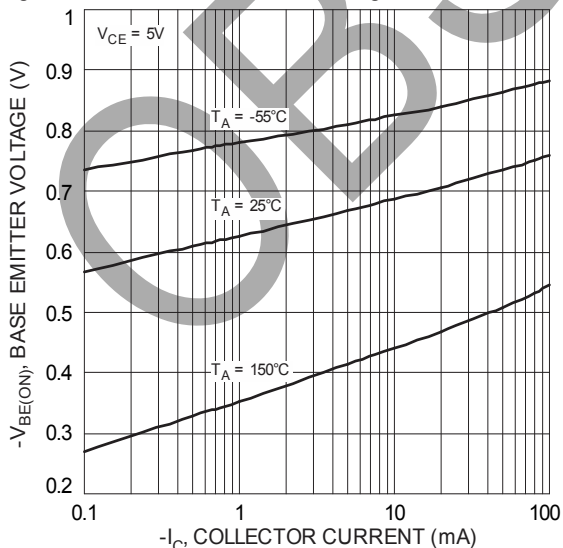


Fig. 6 Typical Base Emitter Voltage vs. Collector Current

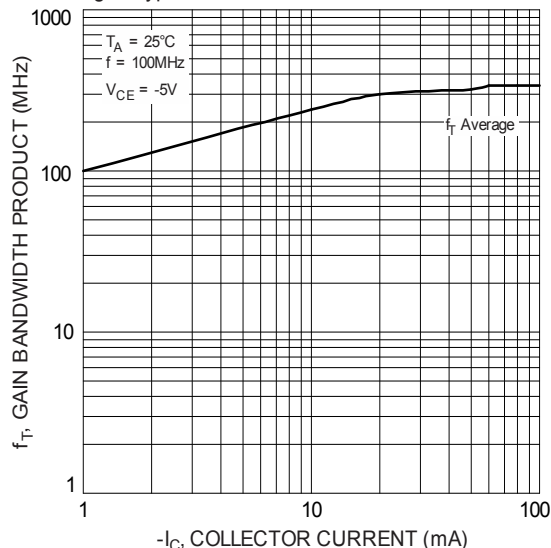


Fig. 7 Typical Gain Bandwidth Product vs. Collector Current

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**NPN (MMBTA06) Transistor (Q2) Plots**

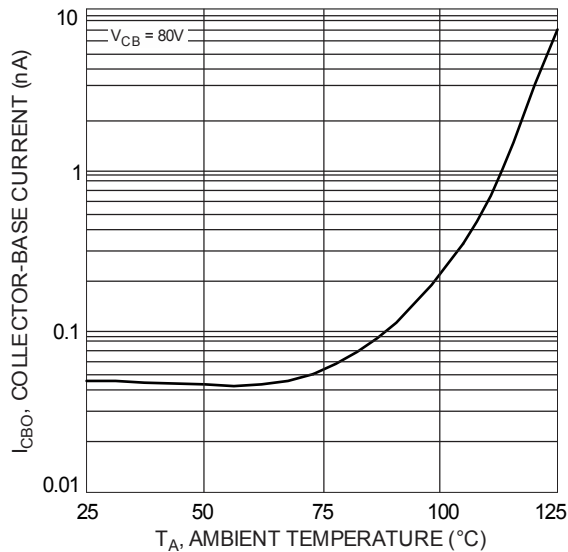


Fig. 8 Typical Collector-Cutoff Current vs. Ambient Temperature

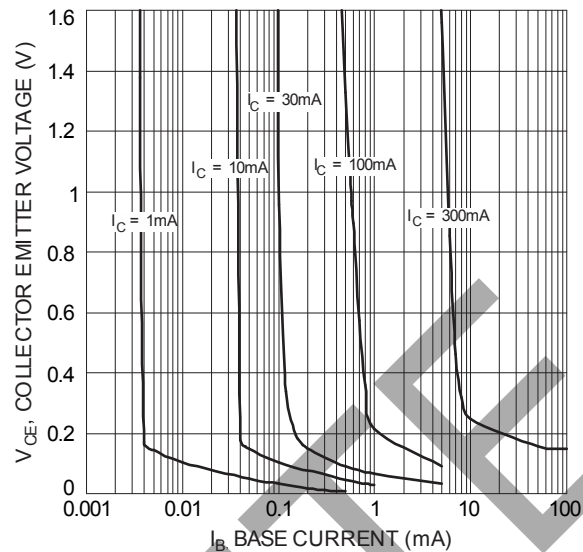


Fig. 9 Typical Collector Saturation Region

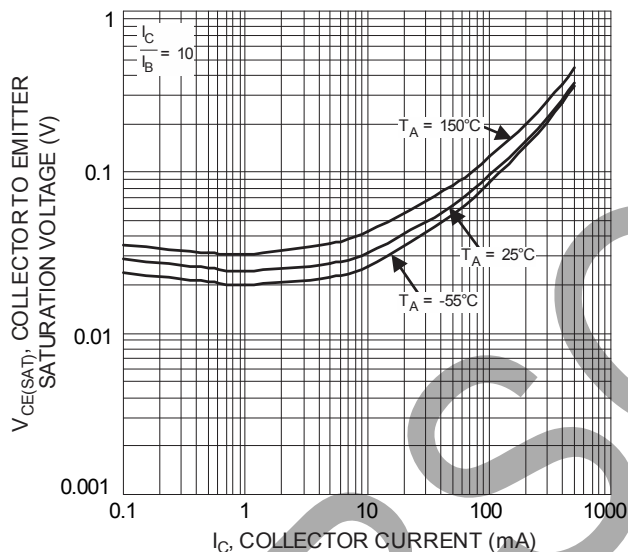


Fig. 10 Typical Collector Emitter Saturation Voltage vs. Collector Current

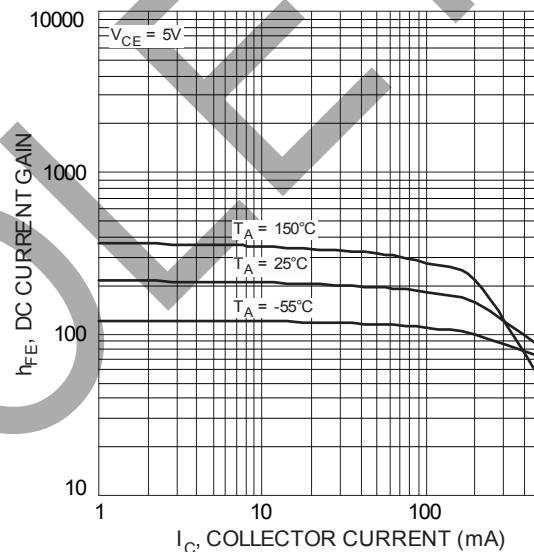


Fig. 11 Typical DC Current Gain vs. Collector Current

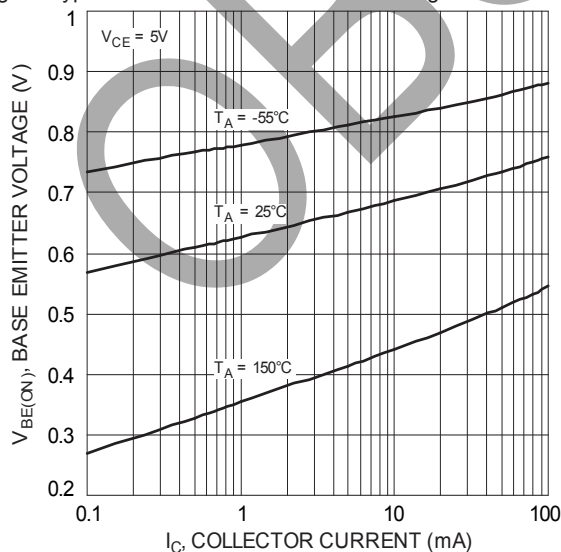


Fig. 12 Typical Base Emitter Voltage vs. Collector Current

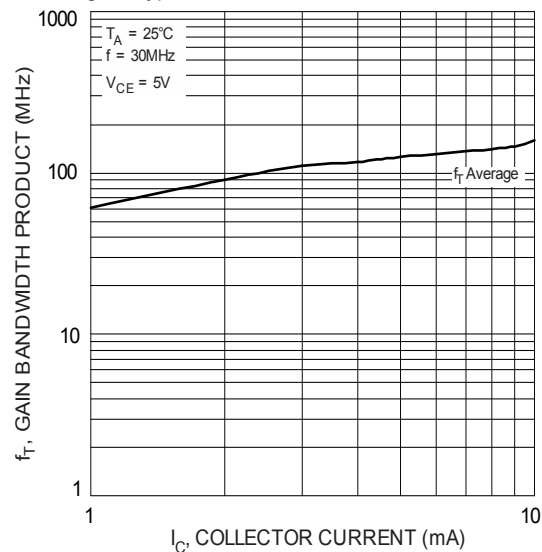
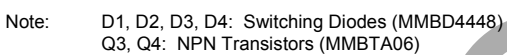
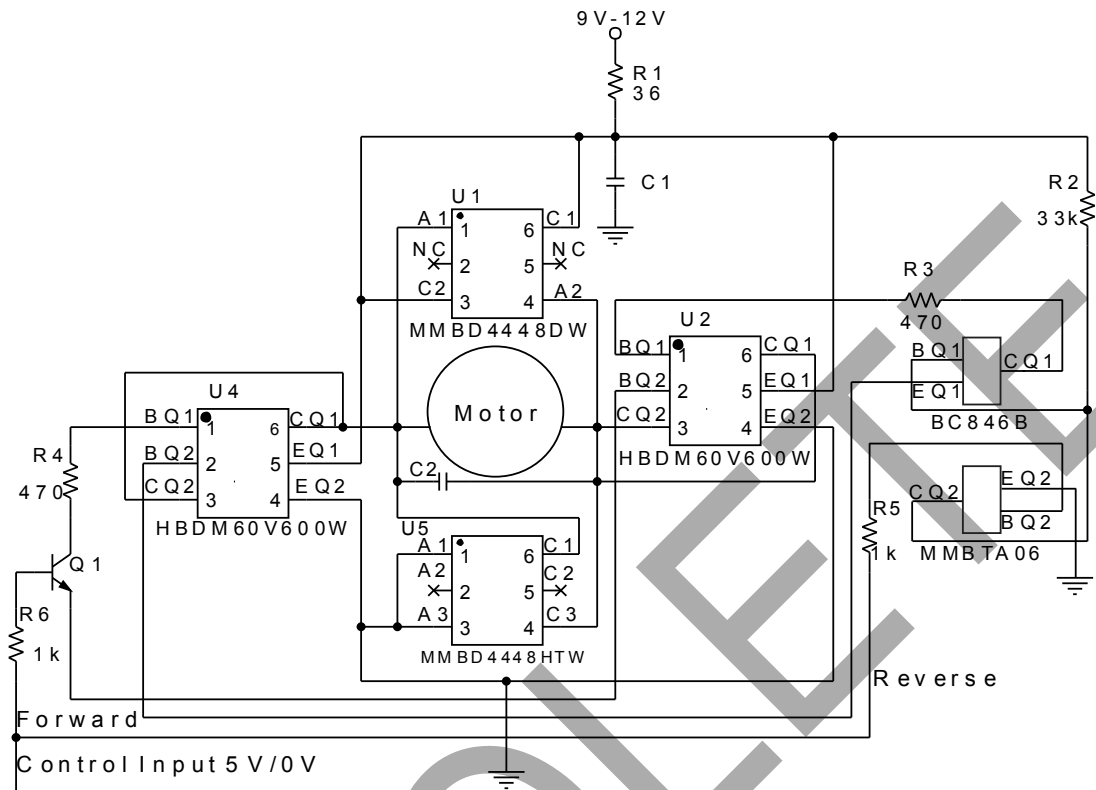


Fig. 13 Typical Gain Bandwidth Product vs. Collector Current

**OBSELETE - PART DISCONTINUED**



# Application Example Schematic (with Package Pinouts)

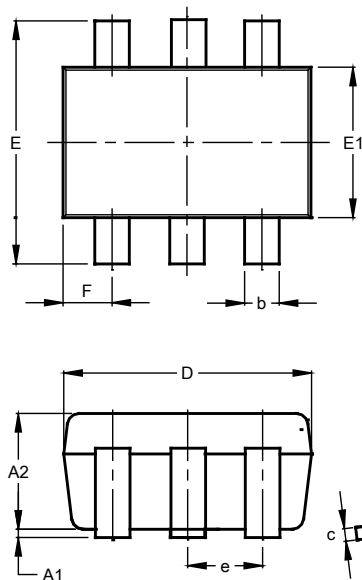


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## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT363**

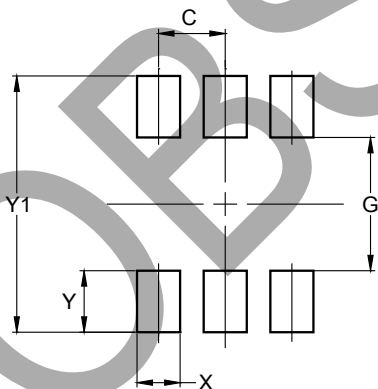


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT363**



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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