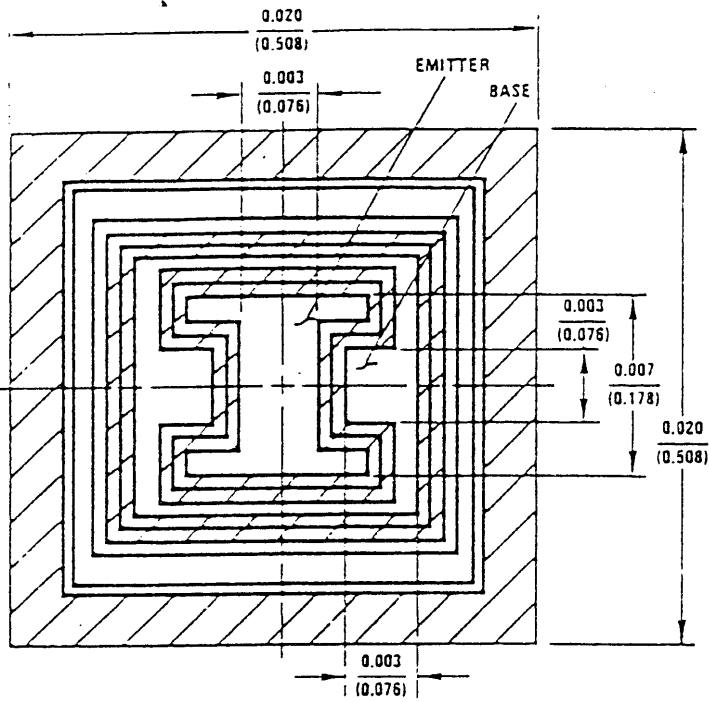


356-682

BC 212/213/214



DESCRIPTION

Process 63 is a non-overlay, double-diffused, silicon epitaxial device. Complement to Process 19.

APPLICATION

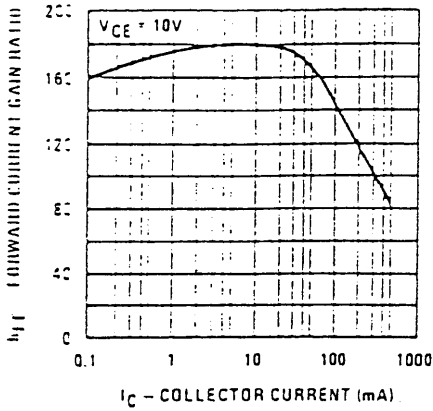
This device was designed for use as general purpose amplifiers and switches requiring collector current 500 mA.

PRINCIPAL DEVICE TYPES

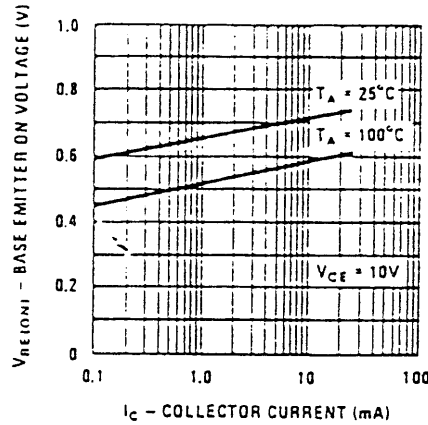
- TO-5: 2N2905
- TO-18: 2N2907
- TO-92, EBC: 2N4403
- TO-92, ECB: 2N3702
- TO-237: TN2905

Parameter	Conditions	Min	Typ	Max	Units	Note
t_{ON}	$I_C = 150 \text{ mA}, I_{B1} = 15 \text{ mA}$		30	45	ns	Figure
t_{OFF}	$I_C = 150 \text{ mA}, I_{B2} = 15 \text{ mA}$		220	290	ns	Figure
C_{CB}	$V_{CB} = 10V$		6	8	pF	
C_{EB}	$V_{EB} = 0.50V$			20	pF	
h_{fe}	$I_C = 20 \text{ mA}, V_{CE} = 20V,$ $f = 100 \text{ MHz}$	1.5	2.5			
NF (scot)	$I_C = 100 \mu A, V_{CE} = 10V, R_S = 1k$ $f = 1 \text{ kHz}$		1.5		dB	
h_{FE}	$I_C = 1 \text{ mA}, V_{CE} = 10V$	50				
h_{FE}	$I_C = 10 \text{ mA}, V_{CE} = 10V$	50				
h_{FE}	$I_C = 150 \text{ mA}, V_{CE} = 10V$	50	150	400		
h_{FE}	$I_C = 500 \text{ mA}, V_{CE} = 10V$	30				
$V_{CE(SAT)}$	$I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$			0.5	V	
$V_{CE(SAT)}$	$I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$			1.2	V	
$V_{BE(SAT)}$	$I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$			1.3	V	
$V_{BE(SAT)}$	$I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$			1.6	V	
BV_{CEO}	$I_C = 10 \text{ mA}$	35			V	
BV_{CSO}	$I_C = 100 \mu A$	50			V	
BV_{ES0}	$I_E = 10 \mu A$	6			V	
I_{CBO}	$V_{CB} = 35V$			100	nA	
I_{EBC}	$V_{EB} = 4V$			100	nA	

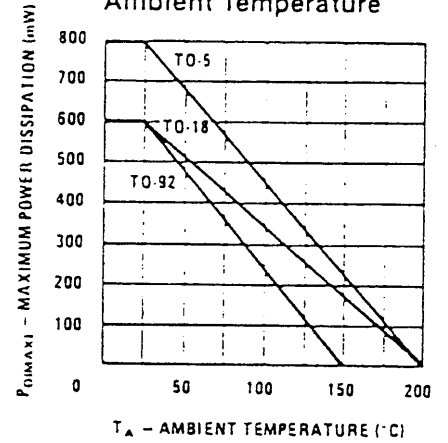
DC Pulsed Current Gain vs Collector Current



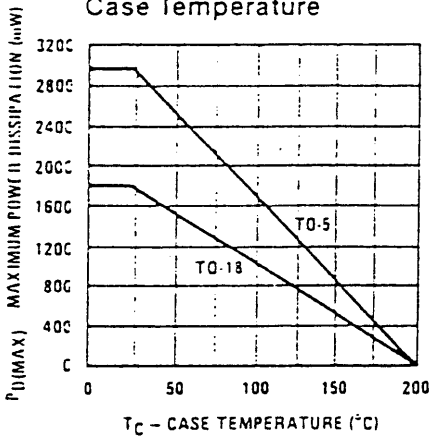
Base-Emitter ON Voltage vs Collector Current



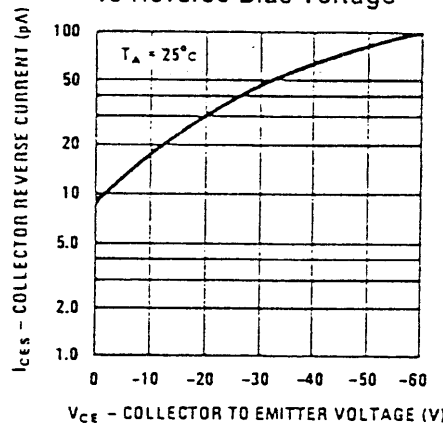
Maximum Power Dissipation vs Ambient Temperature



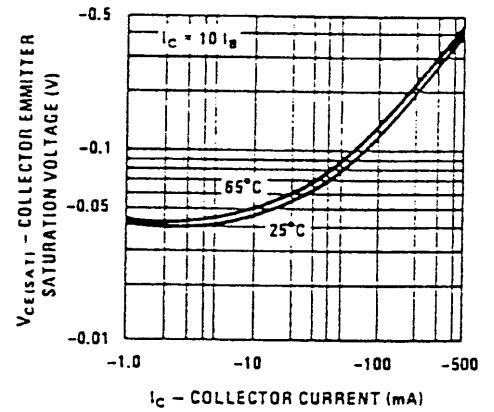
Maximum Power Dissipation vs Case Temperature



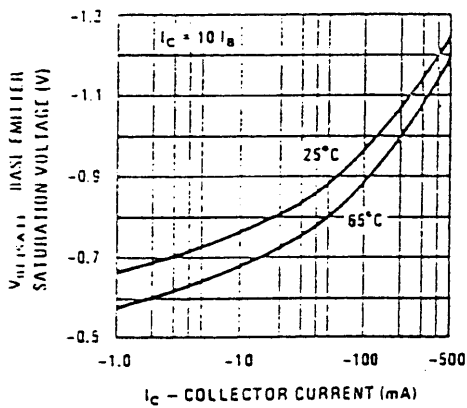
Collector Reverse Current vs Reverse Bias Voltage



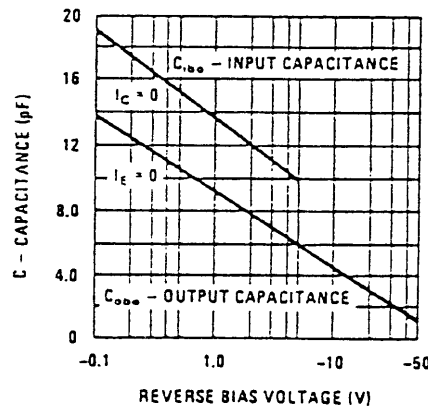
Pulsed Collector Saturation Voltage vs Collector Current



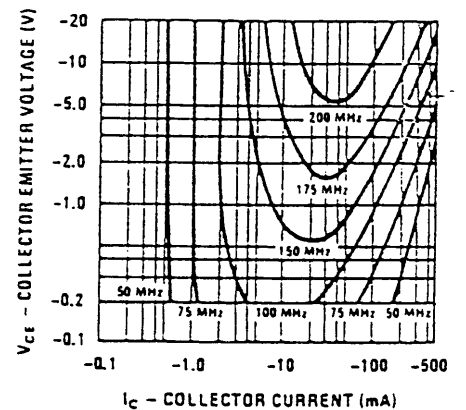
Pulsed Base Saturation Voltage vs Collector Current



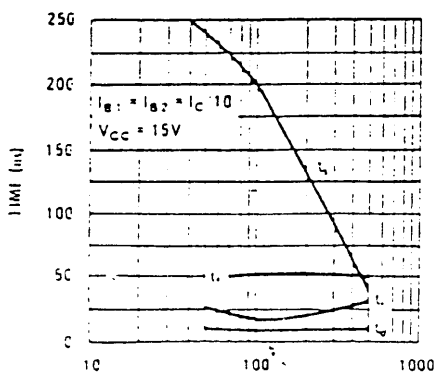
Input and Output Capacitances vs Reverse Bias Voltage



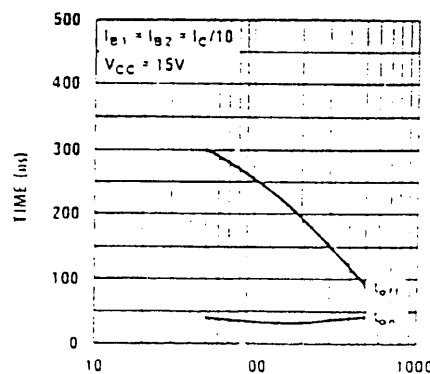
Contours of Constant Gain Bandwidth Product (fT)



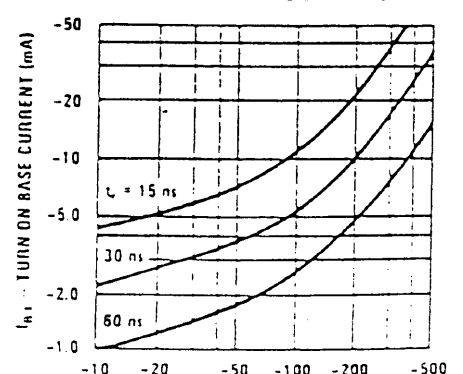
Switching Times vs Collector Current



Turn On and Turn Off Times vs Collector Current



Rise Time vs Collector and Turn On Base Currents



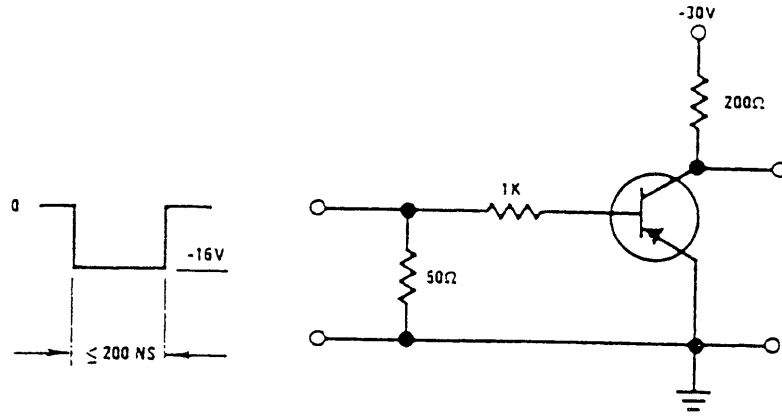


FIGURE 1. Saturated Turn On Switching Time Test Circuit

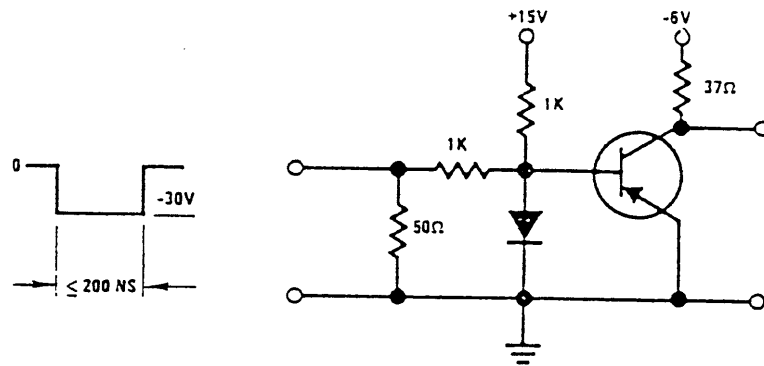
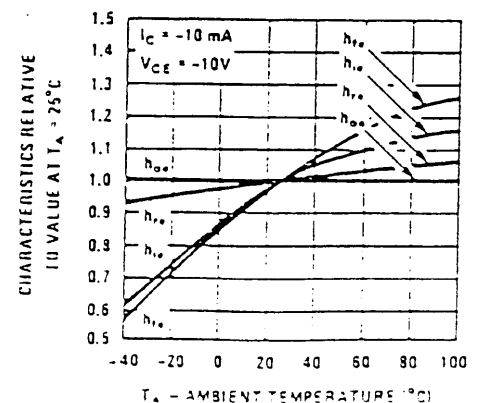
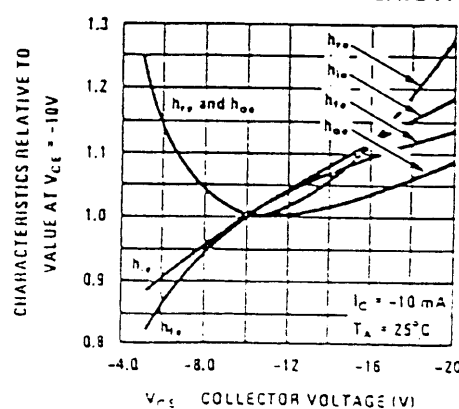
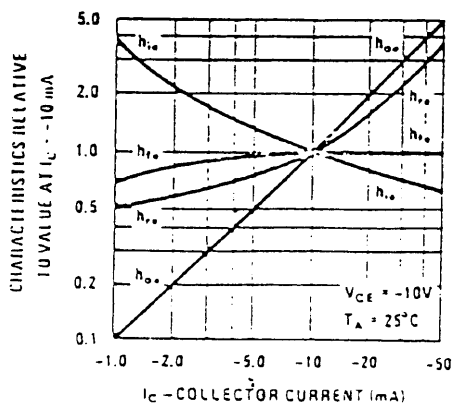


FIGURE 2. Saturated Turn Off Switching Time Test Circuit

SMALL SIGNAL CHARACTERISTICS (f = 1.0 kHz)

Symbol	Characteristic	Min	Typ	Max	Units	Conditions
h_{ie}	Input Resistance		480	2000	Ω	$I_C = 10 \text{ mA}, V_{CE} = -10$
h_{oe}	Output Conductance		80	1200	μhos	$I_C = 10 \text{ mA}, V_{CE} = -10$
h_{re}	Voltage Feedback Ratio		162	1500	$\times 10^{-6}$	$I_C = 10 \text{ mA}, V_{CE} = -10$
h_{fe}	Small Signal Current Gain	100				$I_C = 10 \text{ mA}, V_{CE} = -10$

TYPICAL COMMON EMITTER CHARACTERISTICS (f = 1.0 kHz)





PRO ELECTRON SERIES (Continued)

BC214

Type No.	Case Style	V _{CE} ^s V _{CB0} (V) Min	V _{CE0} (V) Min	V _{EB0} (V) Min	I _{CE} ^s I _{CB0} (mA) Max	V _{CE} (V)	HFE h _{FE} @ 1 kHz Min Max	I _C & V _{CE} (mA) & (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} & V _{BE(ON)} (V) Min Max	I _C (mA)	C _{oh} (pF) Max	f _T (MHz) Min Max	f _T @ I _C (mA)	t _{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
IC213LB	TO-92 (94)	45	30	5	15	30	40 80 200	0.01 2 2	0.6 0.25	1.1 0.72*	100 10 2	10	200	10		10	1	63
IC213LC	TO-92 (94)	45	30	5	15	30	40 80 350	0.01 2 2	0.6 0.25	1.1 0.72*	100 10 2	10	200	10		10	1	63
IC214	TO-92 (97)	45	30	5	15	30	40 80 140	0.01 2 2	0.6 0.25	1.1 0.72*	100 10 2	10	200	10		2	1	63
IC214A	TO-92 (97)	45	30	5	15	30	40 80 100	0.01 2 2	0.6 0.25	1.1 0.72*	100 10 2	10	200	10		2	1	63
IC214B	TO-92 (97)	45	30	5	15	30	40 80 200	0.01 2 2	0.6 0.25	1.1 0.72*	100 10 2	10	200	10		2	1	63
IC214C	TO-92 (97)	45	30	5	15	30	40 80 350	0.01 2 2	0.6 0.25	1.1 0.72*	100 10 2	10	200	10		2	1	63
IC214L	TO-92 (94)	45	30	5	15	30	100 140 120 140*	0.01 2 100 2	0.6 0.25	1.1 0.72*	100 10 2	10	200	10		2	1	63
IC214LB	TO-92 (94)	45	30	5	15	30	100 140 120 200	0.01 2 100 2	0.6 0.25	1.1 0.72*	100 10 2	10	200	10		2	1	63
IC214LC	TO-92 (94)	45	30	5	15	30	100 140 120 350	0.01 2 100 2	0.6 0.25	1.1 0.72*	100 10 2	10	200	10		2	1	63
IC217-92	TO-92 (97)	50	45	6	50	20	100 140 120 125	0.01 2 100 2	0.25	0.77* 0.6	10 100	4.5				10	1	04
IC217A-92	TO-92 (97)	50	45	6	50	20	100 140 120 125	0.01 2 100 2	0.25	0.77* 0.6	10 100	4.5				10	1	04