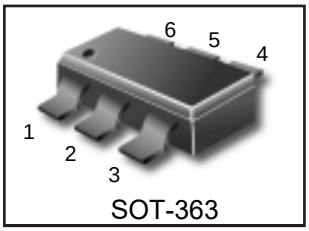
Dual General Purpose Transistor

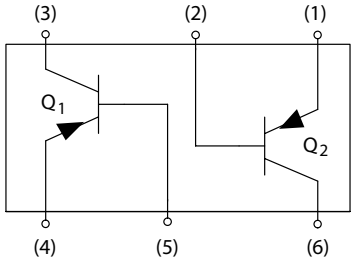
MBT2907DW
MBT2907AD
S-MBT2907DW
S-MBT2907AD

Featrues

- We declare that the material of product compliance with RoHS requirements.
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.



SOT-363



MAXIMUM RATINGS

Rating	Symbol	Value 2907DW	2907AD	Unit
Collector–Emitter Voltage	V_{CEO}	–40	–60	Vdc
Collector–Base Voltage	V_{CBO}	–60		Vdc
Emitter–Base Voltage	V_{EBO}	–5.0		Vdc
Collector Current — Continuous	I_C	–600		mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR– 5 Board, (1) T_A = 25°C	P_D	225	mW
Derate above 25°C		1.8	mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, (2) T_A = 25°C	P_D	300	mW
Derate above 25°C		2.4	mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J , T_{stg}	–55 to +150	°C

ORDERING INFORMATION

Device	Packing	Shipping
MBT2907AD S-MBT2907AD	SOT-363	3000 Units/Reel

DEVICE MARKING

(S-)MBT2907DW = M2B, (S-)MBT2907AD = 2F

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage(3)		$V_{(BR)CEO}$			Vdc
(I_C = –10 mAdc, I_B = 0)	MBT2907DW		–40	—	
	MBT2907AD		–60	—	
Collector–Emitter Breakdown Voltage(I_C = –10 µAdc, I_E = 0)		$V_{(BR)CBO}$	–60	—	Vdc
Emitter–Base Breakdown Voltage(I_E = –10 µAdc, I_C = 0)		$V_{(BR)EBO}$	–5.0	—	Vdc
Collector Cutoff Current(V_{CB} = –30Vdc, $I_{BE(OFF)}$ = –0.5Vdc)		I_{CEX}	—	–50	nAdc
Collector Cutoff Current		I_{CBO}			µAdc
(V_{CB} = –50Vdc, I_E = 0)	MBT2907DW		—	–0.020	
	MBT2907AD		—	–0.010	
(V_{CB} = –50Vdc, I_E = 0, T_A =125°C)	MBT2907DW		—	–20	
	MBT2907AD		—	–10	
Base Current(V_{CE} = –30Vdc, $V_{EB(off)}$ = –0.5Vdc)		I_B	—	–50	nAdc

1. FR–5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.
3. Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2.0%.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic		Symbol	Min	Max	Unit
ON CHARACTERISTICS					
DC Current Gain		h_{FE}			—
(I_C = –0.1mAdc, V_{CE} = –10 Vdc)	MBT2907DW		35	—	
	MBT2907AD		75	—	
(I_C =–1.0mAdc, V_{CE} = –10 Vdc)	MBT2907DW		50	—	
	MBT2907AD		100	—	
(I_C = –10 mAdc, V_{CE} = –10Vdc)	MBT2907DW		75	—	
	MBT2907AD		100	—	
(I_C = –150mAdc, V_{CE} =–10 Vdc)(3)	MBT2907DW		—	—	
	MBT2907AD		100	300	
(I_C = –500mAdc, V_{CE} =–10 Vdc)(3)	MBT2907DW		30	—	
	MBT2907AD		50	—	
Collector–Emitter Saturation Voltage(3)		$V_{CE(sat)}$			Vdc
(I_C = –150mAdc, I_B = –15 mAdc)			—	–0.4	
(I_C = –500 mAdc, I_B = –50 mAdc)			—	–1.6	
Base–Emitter Saturation Voltage(3)		$V_{BE(sat)}$			Vdc
(I_C = –150mAdc, I_B = –15 mAdc)			—	–1.3	
(I_C = –500mAdc, I_B = –50 mAdc)			—	–2.6	
SMALL–SIGNAL CHARACTERISTICS					
Current–Gain — Bandwidth Product(3),(4) (I_C = –50mAdc, V_{CE}= –20Vdc, f = 100MHz)		f_T	200	—	MHz
Output Capacitance (V_{CB} = –10 Vdc, I_E = 0, f = 1.0 MHz)		C_{obo}	—	8.0	pF
Input Capacitance (V_{EB} = –2.0Vdc, I_C = 0, f = 1.0 MHz)		C_{ibo}	—	30	pF
SWITCHING CHARACTERISTICS					
Turn–On Time	(V_{CC} = –30 Vdc, I_C = –150 mAdc, I_{B1} = –15 mAdc)	t_{on}	—	45	ns
Delay Time		t_d	—	10	
Rise Time		t_r	—	40	
Fall Time	(V_{CC} = –6.0 Vdc, I_C = –150 mAdc,I_{B1} = I_{B2} = 15 mAdc)	t_f	—	60	ns
Storage Time		t_s	—	225	
Turn–Off Time		t_{off}	—	280	

3. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%.
4. f_T is defined as the frequency at which $|h f_e|$ extrapolates to unity.

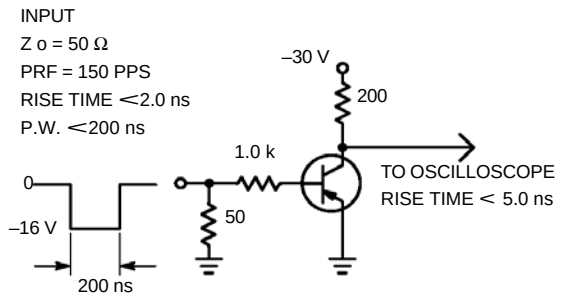


Figure 1. Delay and Rise Time Test Circuit

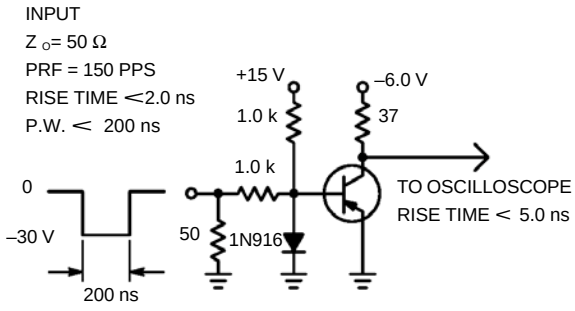


Figure 2. Storage and Fall Time Test Circuit

TYPICAL CHARACTERISTICS

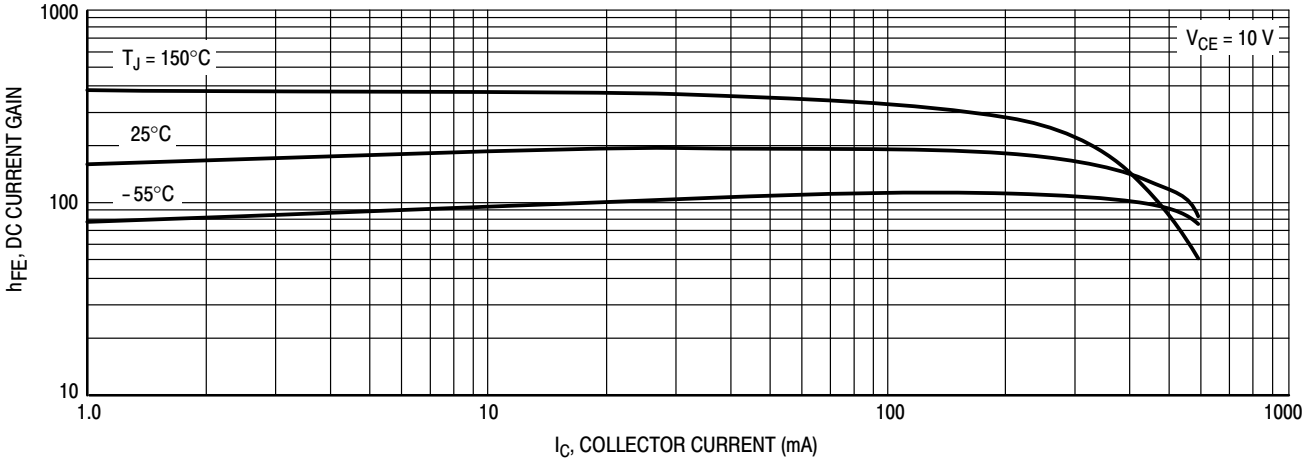


Figure 3. DC Current Gain

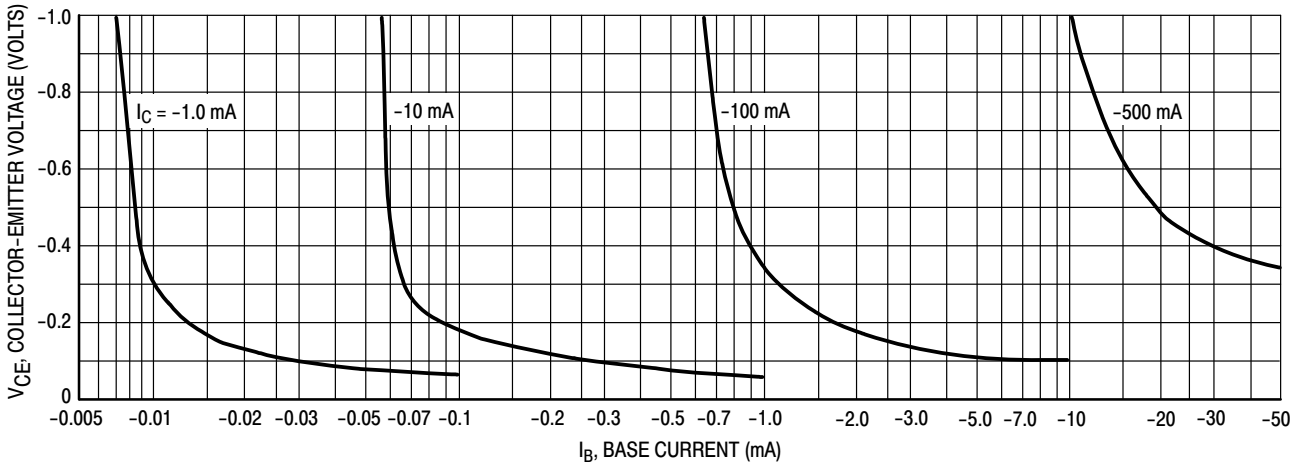


Figure 4. Collector Saturation Region

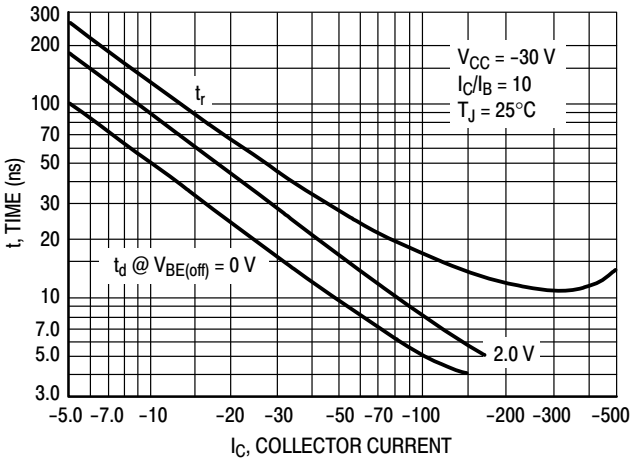


Figure 5. Turn–On Time

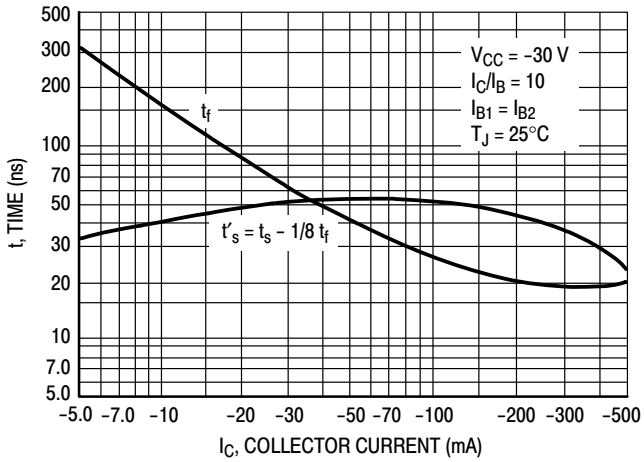


Figure 6. Turn–Off Time

TYPICAL SMALL–SIGNAL CHARACTERISTICS

NOISE FIGURE

V_{CE} = 10 Vdc, T_A = 25°C

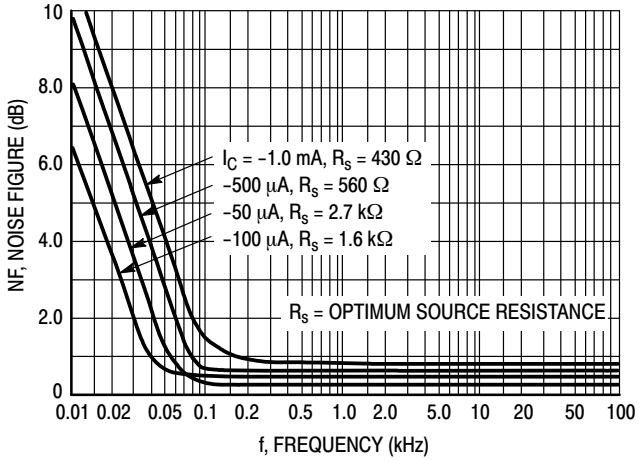


Figure 7. Frequency Effects

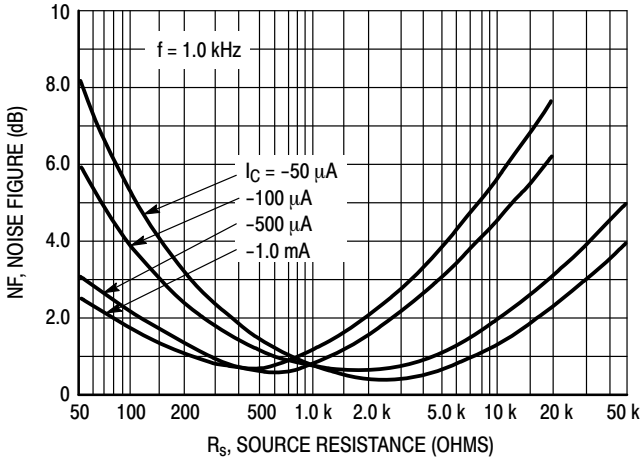


Figure 8. Source Resistance Effects

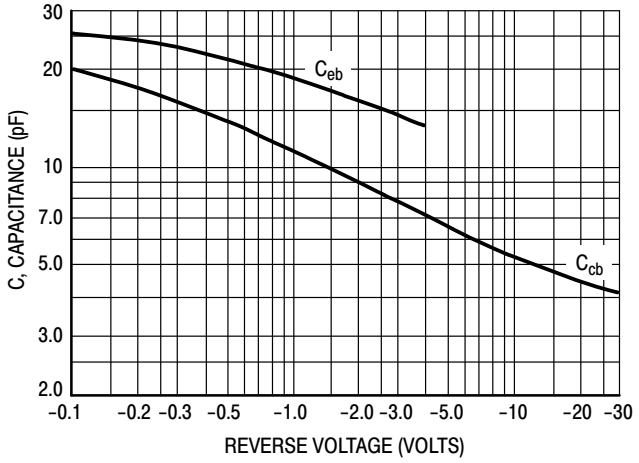


Figure 9. Capacitances

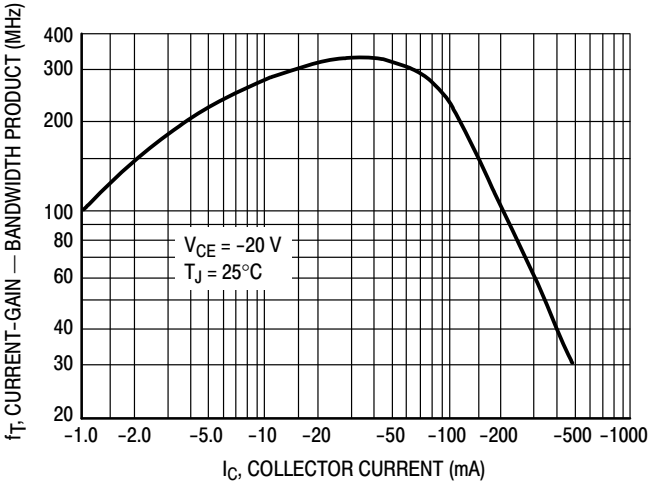


Figure 10. Current–Gain – Bandwidth Product

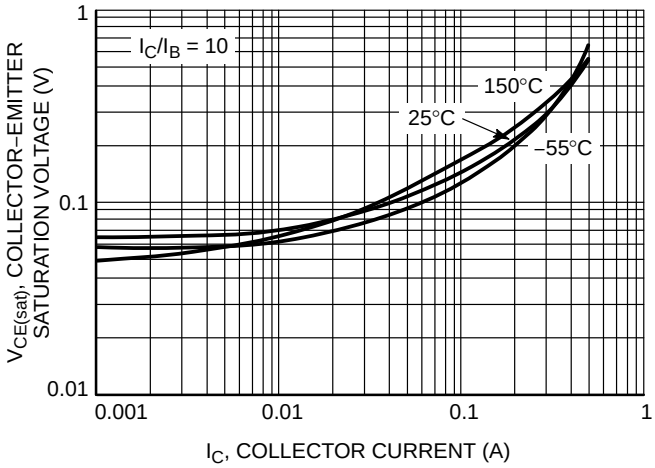


Figure 11. Collector Emitter Saturation Voltage vs. Collector Current

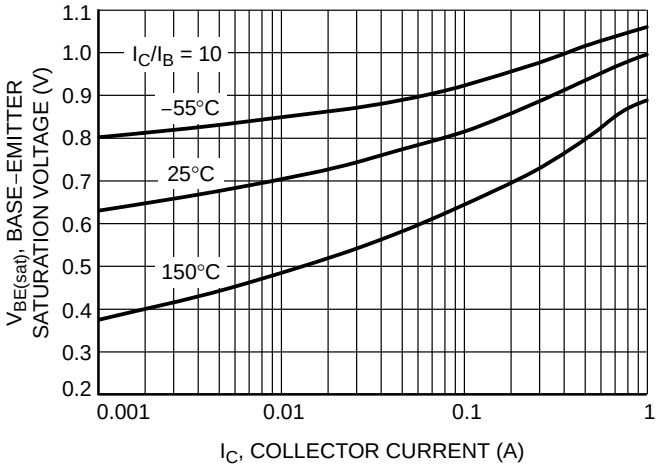


Figure 12. Base Emitter Saturation Voltage vs. Collector Current

TYPICAL SMALL−SIGNAL Characteristics

NOISE FIGURE

V_{CE} = 10 Vdc, T_A = 25°C

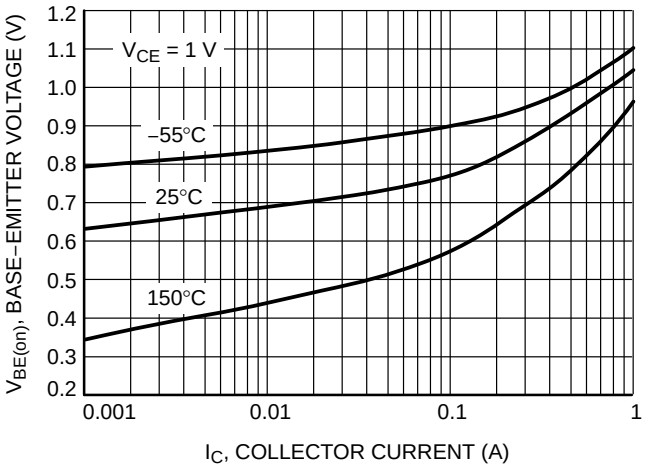


Figure 13. Base Emitter Voltage vs. Collector Current

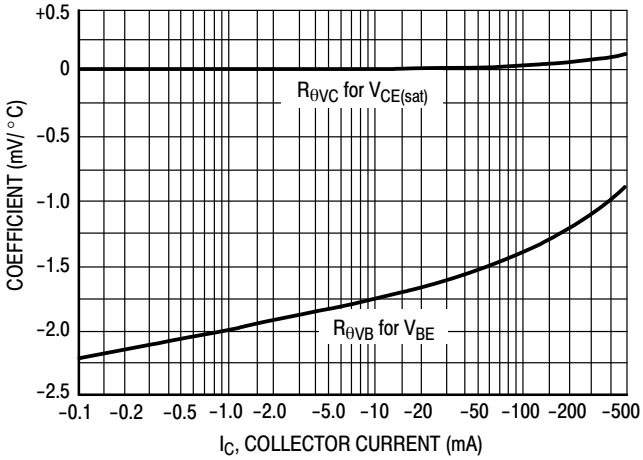


Figure 14. Temperature Coefficients

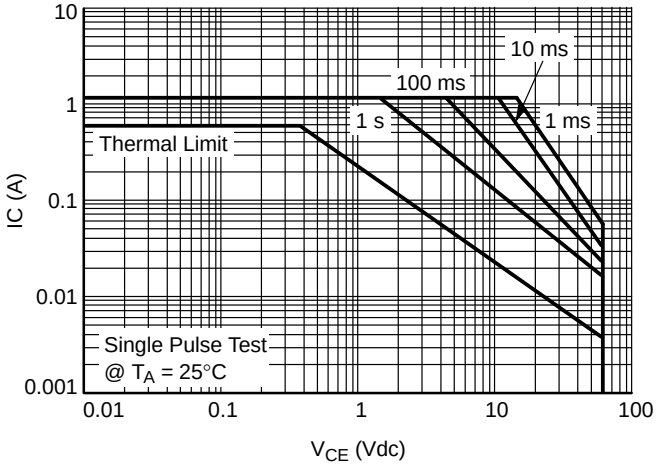


Figure 15. Safe Operating Area

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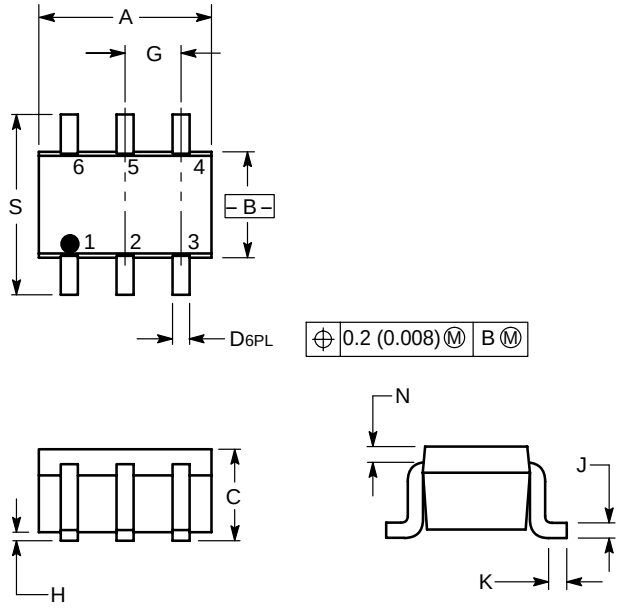

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4.EMITTER 1
5. BASE 1
6.COLLECTOR 2