



PRODUCT SPECIFICATIONS

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TYPE: IT138/71

CASE OUTLINE: TO-71

PNP SILICON DUAL DIFFERENTIAL TRANSISTOR

ABSOLUTE MAXIMUM RATING:

Collector to Base	BV_{CBO}	55**	Vdc
Emitter to Base	BV_{EBO}	7.0	Vdc
Collector to Emitter	BV_{CEO}	55	Vdc
Collector Current	I_C	100	mAdc
Power Dissipation $T_A = 25^\circ\text{C}$	P_D		Watts
Power Dissipation $T_C = 25^\circ\text{C}$	P_D	0.5 (Both Sides)	Watts
Storage Temperature	T_{stg}	-65 to +200	$^\circ\text{C}$
Operating Temperature	T_J	-65 to +200	$^\circ\text{C}$
Lead Temperature From Case	T_L		$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS $T_A @ 25^\circ\text{C}$

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector to Collector Voltage	BV_{CCO}		70			Vdc
Emitter to Base Voltage	BV_{EBO}	$I_E = 10\mu\text{A}$	7.0			Vdc
Collector to Emitter Voltage	$BV_{CEO(sus)}$	$I_C = 1.0\text{mA}$	55			Vdc
Collector to Collector Voltage	BV_{C1C2}	$I_C = 1.0\mu\text{A}$	100			Vdc
Collector Cutoff Current	I_{CBO}	$V_{CB} = 45\text{V}$			0.1	nA
Collector Cutoff Current	I_{CBO}	$V_{CB} = 45\text{V}, T_A = 150^\circ\text{C}$			0.1	μA
Collector Cutoff Current	I_{CEX}					μA
Collector Cutoff Current	I_{CEX}					μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 5.0\text{V}$			0.1	nA
D.C. Current Gain Pulsed*	h_{FE}	$I_C = 10\mu\text{A}, V_{CE} = 5.0\text{V}$	100			-
D.C. Current Gain Pulsed*	h_{FE}	$I_C = 1.0\text{mA}, V_{CE} = 5.0\text{V}$	100		800	-
D.C. Current Gain Pulsed*	h_{FE}	$I_C = 1.0\text{mA}, V_{CE} = 5.0\text{V}, T_A = -55^\circ\text{C}$	60			-
D.C. Current Gain Pulsed*	h_{FE}	$I_C = 10\text{mA}, V_{CE} = 5.0\text{V}$	80			-
D.C. Current Gain Pulsed*	h_{FE}	$I_C = 50\text{mA}, V_{CE} = 5.0\text{V}$	40			-
Saturation Voltage*	$V_{CE(sat)}$	$I_C = 1.0\text{mA}, I_B = 0.1\text{mA}$			0.3	Vdc
Saturation Voltage*	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$			0.6	Vdc
Base Emitter Voltage*	$V_{BE(sat)}$					Vdc
Base Emitter Voltage*	$V_{BE(on)}$	$I_C = 10\text{mA}, V_{CE} = 5.0\text{V}$			0.9	Vdc
Base Emitter Voltage*	$V_{BE(on)}$	$I_C = 50\text{mA}, V_{CE} = 5.0\text{V}$			1.0	Vdc
Current Gain at F =	h_{FE}					-
Emitter Transition Capacitance	C_{TE}					pF
Collector to Collector Capacitance	C_{C1-C2}					pF
Collector to Collector Leakage Current	I_{C1-C2}					nA
Output Capacitance	C_{ob}	$V_{CB} = 20\text{V}$			3.0	pF
Frequency Cutoff	f & b					MHz
Transition Frequency	f_T					MHz

Notes: *Pulse Width $\leq 300\mu\text{sec}$ 2% Duty Cycle, ** $I_C = 10\mu\text{A}$



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SMALL SIGNAL CHARACTERISTICS

	SYMBOL	MIN	TYP	MAX	UNITS
Input Impedance					Ohms
Voltage Feedback Ratio					X10-4
Base Current Differential $I_C=10\mu A, V_{CE}=5.0V$	$ I_{B1} - I_{B2} $			10	nA
Base Current Differential $I_C = 1.0mA, V_{CE} = 5.0V$	$ I_{B1} - I_{B2} $			1.0	μA
DC Current Gain Ratio	h_{FE1}/h_{FE2}				
Base-Emitter Voltage Differential $I_C=1.0mA, V_{CE}=5.0V$	$ V_{BE1}-V_{BE2} $			3.0	mV
Base-Emitter Voltage Differential Change Due to Temp $I_C=1.0mA, V_{CE}=5.0V$ $T_A = -55^{\circ}C$ to $+125^{\circ}C$	$\Delta(V_{BE1}-V_{BE2})$			10	$\mu V/^{\circ}C$

SWITCHING CHARACTERISTICS

	SYMBOL	MIN	TYP	MAX	UNITS
Turn-On Time	t_{on}				ns
Turn-Off Time	t_{off}				ns
Delay Time	t_d				ns
Rise Time	t_r				ns
Storage Time	t_s				ns
Fall Time	t_f				ns

FUNCTIONAL TEST

	SYMBOL	MIN	TYP	MAX	UNITS
Common-Emitter Amplifier Power Gain	GPE				dB
Power Output	Pout				Watt
Collector Efficiency	η				%
Power Output	Pout				Watt