

# Dual NPN Small Signal Surface Mount Transistor

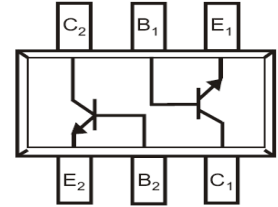


## Features:

- Epitaxial planar die construction.
- Ideal for low power amplification and switching.
- Ultra-small surface mount package
- Also available in lead free version.

## Applications:

- General switching and amplification



SOT-363

## Maximum Rating @ $T_A=25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	60	V
Collector-Emitter Voltage	$V_{CEO}$	40	
Emitter-Base Voltage	$V_{EBO}$	6	
Collector Current -Continuous	$I_C$	0.2	A
Total Power Dissipation	$P_{tot}$		W
Thermal Resistance, Junction To Ambient	$R_{\theta JA}$	625	$^\circ\text{C}/\text{W}$
Storage Temperature	$T_{stg}$	150	$^\circ\text{C}$
Junction Temperature	$T_j$	-55 to 150	

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

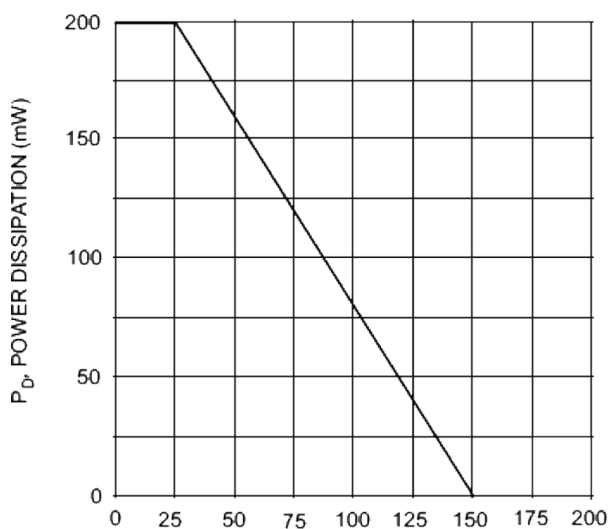
Parameter	Symbol	Conditions	Min.	Max.	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10\mu\text{A}, I_E = 0$	60		V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}, I_B = 0$	40		
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}, I_C = 0$	5		
Collector Cut-Off Current	$I_{CEX}$	$V_{CE} = 30\text{V}, V_{EB(OFF)} = 3\text{V}$	-	50	nA
Base Cut-Off Current	$I_{BL}$	$V_{CE} = 30\text{V}, V_{EB(OFF)} = 3\text{V}$			
DC Current Gain	$h_{FE}$	$V_{CE} = 1\text{V}, I_C = 0.1\text{mA}$	40	-	
		$V_{CE} = 1\text{V}, I_C = 1\text{mA}$	70	-	
		$V_{CE} = 1\text{V}, I_C = 10\text{mA}$	100	300	
		$V_{CE} = 1\text{V}, I_C = 50\text{mA}$	60	-	
		$V_{CE} = 1\text{V}, I_C = 100\text{mA}$	30	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$	-	200	mV
		$I_C = 50\text{mA}, I_B = 5\text{mA}$		300	

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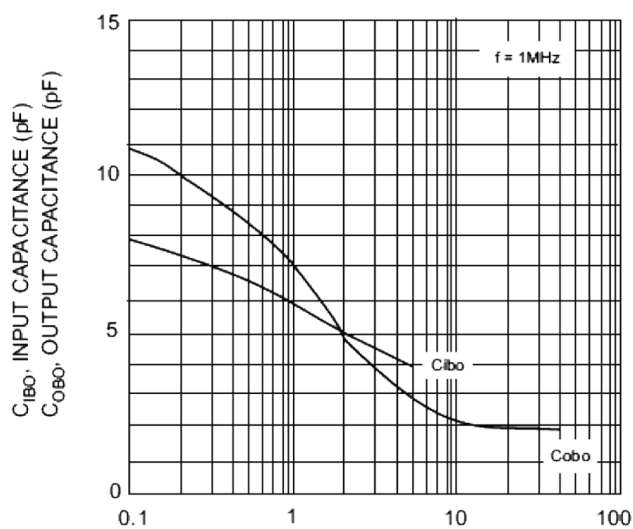


Parameter	Symbol	Conditions	Min.	Max.	Unit
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10mA, I_B = 1mA$	650	850	mV
		$I_C = 50mA, I_B = 5mA$	-	950	
Output Capacitance	$C_{obo}$	$I_E = 0, V_{CB} = 5V, f = 1MHz$	-	4	pF
Input Capacitance	$C_{ibo}$	$I_C = 0, V_{EB} = 0.5V, f = 1MHz$		8	
Transition Frequency	$f_T$	$I_C = 10mA, V_{CE} = 20V, f = 100MHz$	300	-	MHz
Noise Figure	NF	$I_C = 0.1mA, V_{CE} = 5V, R_S = 1k\Omega, f = 1kHz$	-	5	dB
Delay Time	$t_d$	$V_{CC} = 3V, V_{BE(off)} = -0.5V, I_C = 10mA, I_{B1} = 1mA$	-	35	ns
Rise Time	$t_r$				
Storage Time	$t_s$	$V_{CC} = 3V, I_C = 10mA, I_{B1} = I_{B2} = 1mA$	-	200	
Fall Time	$t_f$			50	

## Typical Characteristics @ $T_a=25^\circ C$ unless otherwise specified

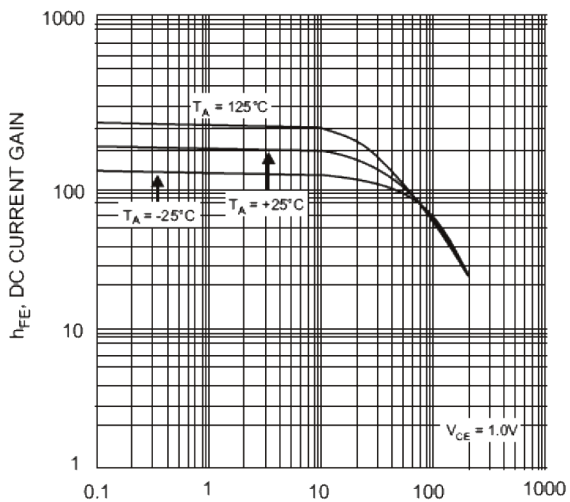


T<sub>A</sub> AMBIENT TEMPERATURE (°C)  
Fig. 1, Max Power Dissipation vs Ambient Temperature

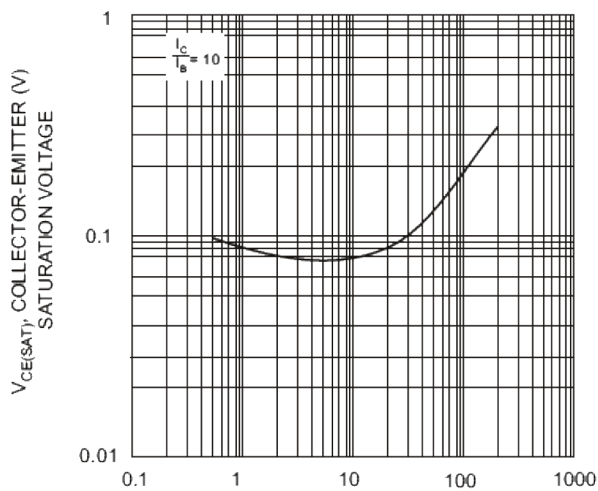


V<sub>CB</sub> COLLECTOR-BASE VOLTAGE (V)  
Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

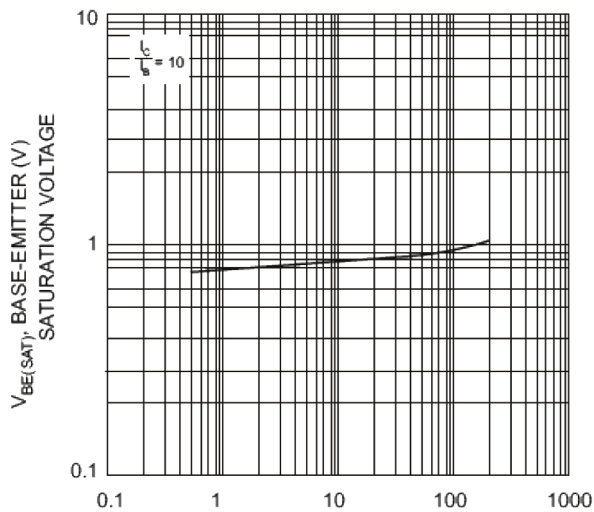
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$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 3, Typical DC Current Gain vs Collector Current



$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current



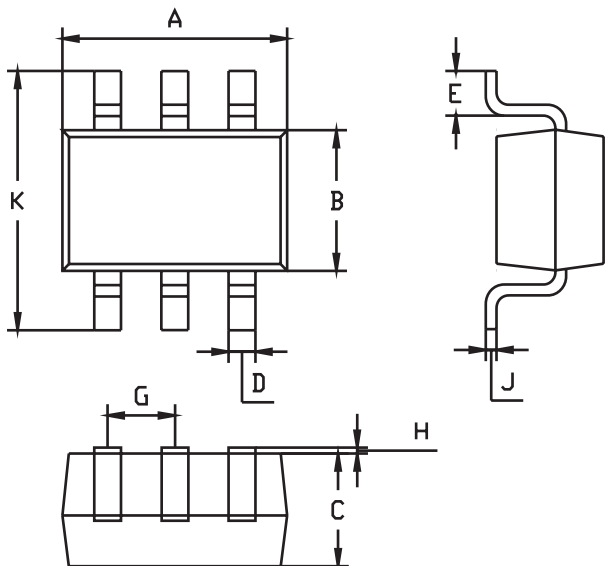
$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current



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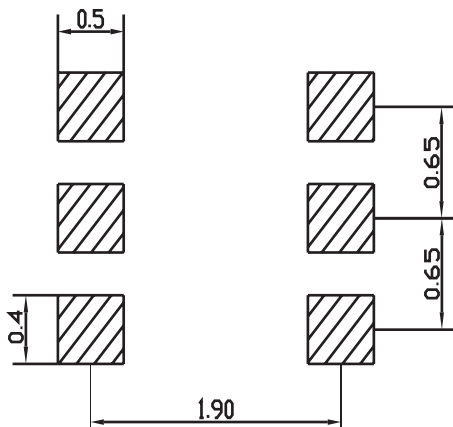
## Package Outline



SOT-363		
Dim	Min	Max
A	1.8	2.2
B	1.15	1.35
C	1Typical	
D	0.10	0.30
E	0.25	0.40
G	0.65Typical	
H	0.02	0.10
J	0.1Typical	
K	2.1	2.3
All Dimensions in mm		

## Soldering Footprint

Dimensions : Millimetres



## Part Number Table

Description	Part Number
Transistor, Array, Dual NPN, 40V, 200mA, SOT-363-6	MMDT3904-7-F

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