

**FAIRCHILD**  
SEMICONDUCTOR™

*Discrete POWER & Signal  
Technologies*

## MPS6543



### NPN RF Transistor

This device is designed for use as RF amplifiers, oscillators and multipliers with collector currents in the 100  $\mu$ A to 10 mA range. Sourced from Process 47. See MPSH11 for characteristics.

#### Absolute Maximum Ratings\*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V <sub>CEO</sub>	Collector-Emitter Voltage	25	V
V <sub>CBO</sub>	Collector-Base Voltage	35	V
V <sub>EBO</sub>	Emitter-Base Voltage	3.0	V
I <sub>C</sub>	Collector Current - Continuous	50	mA
T <sub>J</sub> , T <sub>stg</sub>	Operating and Storage Junction Temperature Range	-55 to +150	°C

\*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

#### NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

#### Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		MPS6543	
P <sub>D</sub>	Total Device Dissipation	350	mW
	Derate above 25°C	2.8	mW/°C
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	125	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	357	°C/W

**NPN RF Transistor**

(continued)

**MPS6543****Electrical Characteristics**

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
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**OFF CHARACTERISTICS**

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage*	$I_C = 1.0 \text{ mA}, I_B = 0$	25		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100 \text{ } \mu\text{A}, I_E = 0$	35		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 100 \text{ } \mu\text{A}, I_C = 0$	3.0		V
$I_{CBO}$	Collector Cutoff Current	$V_{CB} = 25 \text{ V}, I_E = 0$		0.1	$\mu\text{A}$
$I_{EBO}$	Emitter Cutoff Current	$V_{EB} = 2.0 \text{ V}, I_C = 0$		1.0	$\mu\text{A}$

**ON CHARACTERISTICS\***

$h_{FE}$	DC Current Gain	$V_{CE} = 10 \text{ V}, I_C = 4.0 \text{ mA}$	25		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$		0.35	V
$V_{BE(on)}$	Base-Emitter On Voltage	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$		0.95	V

**SMALL SIGNAL CHARACTERISTICS**

$f_T$	Current Gain - Bandwidth Product	$I_C = 4.0 \text{ mA}, V_{CE} = 10 \text{ V},$ $f = 100 \text{ MHz}$	750		MHz
$C_{ob}$	Output Capacitance	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1.0 \text{ MHz}$		1.0	pF
$r_b' C_c$	Collector-Base Time Constant	$I_E = 4.0 \text{ mA}, V_{CE} = 10 \text{ V},$ $f = 31.8 \text{ MHz}$		9.5	pS

\*Pulse Test: Pulse Width  $\leq 300 \text{ } \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$