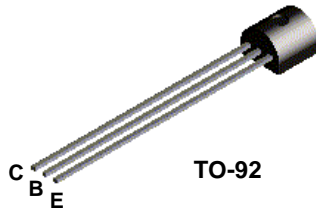




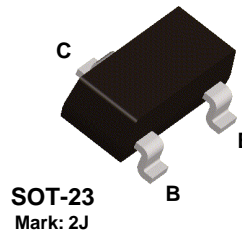
Discrete POWER & Signal Technologies

PN3640 / MMBT3640

PN3640



MMBT3640



PNP Switching Transistor

This device is designed for very high speed saturate switching at collector currents to 100 mA. Sourced from Process 65. See PN4258 for characteristics.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	12	V
V_{CBO}	Collector-Base Voltage	12	V
V_{EBO}	Emitter-Base Voltage	4.0	V
I_C	Collector Current - Continuous	200	mA
T_J, T_{stg}	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
		PN3640	*MMBT3640	
P_D	Total Device Dissipation Derate above 25°C	350	225	mW
		2.8	1.8	mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	125		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	556	°C/W

* Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

PNP Switching Transistor

(continued)

PN3640 / MMBT3640

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*	$I_C = 10 \text{ mA}, I_B = 0$	12		V
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$I_C = 100 \mu\text{A}, V_{BE} = 0$	12		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100 \mu\text{A}, I_E = 0$	12		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 100 \mu\text{A}, I_C = 0$	4.0		V
I_{CES}	Collector Cutoff Current	$V_{CE} = 6.0 \text{ V}, V_{BE} = 0$ $V_{CE} = 6.0 \text{ V}, V_{BE} = 0, T_A = 65^\circ\text{C}$		0.01 1.0	μA μA
I_B	Base Current	$V_{CE} = 6.0 \text{ V}, V_{BE} = 0$		10	nA

ON CHARACTERISTICS*

h_{FE}	DC Current Gain	$I_C = 10 \text{ mA}, V_{CE} = 0.3 \text{ V}$ $I_C = 50 \text{ mA}, V_{CE} = 1.0 \text{ V}$	30 20	120	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}$ $I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$ $I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}$ $I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}, T_A = 65^\circ\text{C}$		0.3 0.2 0.6 0.25	V V V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}$ $I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$ $I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}$	0.75 0.8	0.95 1.0 1.5	V V V

SMALL SIGNAL CHARACTERISTICS

f_T	Current Gain - Bandwidth Product	$I_C = 10 \text{ mA}, V_{CE} = 5.0 \text{ V},$ $f = 100 \text{ MHz}$	500		MHz
C_{obo}	Output Capacitance	$V_{CB} = 5.0 \text{ V}, I_E = 0,$ $f = 1.0 \text{ MHz}$		3.5	pF
C_{ibo}	Input Capacitance	$V_{BE} = 0.5 \text{ V}, I_C = 0,$ $f = 1.0 \text{ MHz}$		3.5	pF

SWITCHING CHARACTERISTICS

t_d	Delay Time	$V_{CC} = 6.0 \text{ V}, V_{BE(off)} = 1.9 \text{ V},$		10	ns
t_r	Rise Time	$I_C = 50 \text{ mA}, I_{B1} = 5.0 \text{ mA}$		20	ns
t_s	Storage Time	$V_{CC} = 6.0 \text{ V}, I_C = 50 \text{ mA},$		20	ns
t_f	Fall Time	$I_{B1} = I_{B2} = 5.0 \text{ mA}$		12	ns
t_{on}	Turn-On Time	$V_{CC} = 6.0 \text{ V}, V_{BE(off)} = 1.9 \text{ V},$ $I_C = 50 \text{ mA}, I_{B1} = 5.0 \text{ mA}$		25	ns
		$V_{CC} = 1.5 \text{ V}, I_C = 10 \text{ mA},$ $I_{B1} = I_{B2} = 0.5 \text{ mA}$		60	ns
t_{off}	Turn-Off Time	$V_{CC} = 6.0 \text{ V}, V_{BE(off)} = 1.9 \text{ V},$ $I_C = 50 \text{ mA}, I_{B1} = 5.0 \text{ mA}$		35	ns
		$V_{CC} = 1.5 \text{ V}, I_C = 10 \text{ mA},$ $I_{B1} = I_{B2} = 0.5 \text{ mA}$		75	ns

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

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