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2N3644 • 2N3645 • PN3644 • PN3645

PNP SMALL SIGNAL GENERAL PURPOSE AMPLIFIERS AND SWITCHES

ABSOLUTE MAXIMUM RATINGS

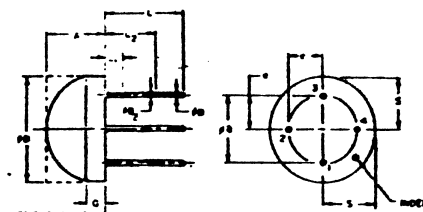
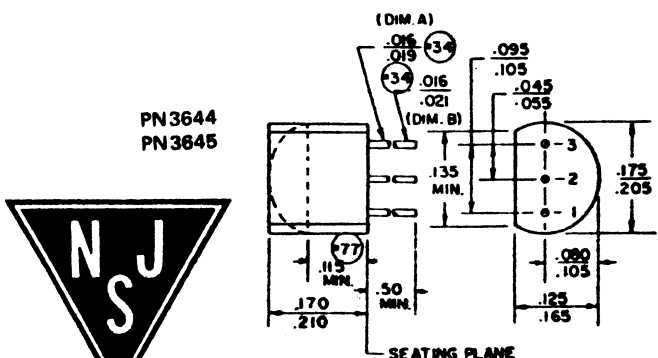
	2N3644/45	PN3644/45
Maximum Temperatures		
Storage Temperature	-55°C to +125°C	-55°C to +150°C
Operating Junction Temperature	125°C	150°C
Lead Temperature (10 seconds)	260°C	260°C
Maximum Power Dissipation (Notes 2 & 3)		
Total Dissipation at 25°C Case Temperature	0.07 W	1.0 W
at 25°C Ambient Temperature	0.3 W	0.625 W
Maximum Voltages and Current	2N/PN3645	2N/PN3644
V _{CB0} Collector to Base Voltage	-60 V	-45 V
V _{CE0} Collector to Emitter Voltage (Note 4)	-60 V	-45 V
V _{EB0} Emitter to Base Voltage	-5.0 V	-5.0 V
I _C Collector Current	500 mA	500 mA

ELECTRICAL CHARACTERISTICS (25°C Ambient Temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	2N3644 PN3644		2N3645 PN3645		UNITS	TEST CONDITIONS
		MIN.	MAX.	MIN.	MAX.		
h _{FE}	DC Current Gain	40	80	40	80		I _C = 100 μA, V _{CE} = -10 V I _C = 1.0 mA, V _{CE} = -10 V
h _{FE}	DC Pulse Current Gain	100	240	100	300		I _C = 10 mA, V _{CE} = -10 V I _C = 50 mA, V _{CE} = 1.0 V I _C = 150 mA, V _{CE} = -10 V I _C = 300 mA, V _{CE} = -2.0 V
h _{fe}	High Frequency Current Gain	2.0	2.0	2.0	2.0		I _C = 20 mA, V _{CE} = -20 V, f = 100 MHz
C _{ob}	Output Capacitance		8.0		8.0	pF	I _E = 0, V _{CB} = -10 V, f = 140 kHz
C _{ib}	Input Capacitance		35		35	pF	I _C = 0, V _{EB} = -0.5 V, f = 140 kHz
V _{CE(sat)}	Pulsed Collector Saturation Voltage		-0.25		-0.25	V	I _C = 50 mA, I _B = 2.5 mA
			-0.4		-0.4	V	I _C = 150 mA, I _B = 15 mA
			-1.0		-1.0	V	I _C = 300 mA, I _B = 30 mA
V _{CEO(sus)}	Collector to Emitter Sustaining Voltage	-45		-60		V	I _C = 10 mA (pulsed), I _B = 0
V _{BE(sat)}	Pulsed Base		-1.0		-1.0	V	I _C = 50 mA, I _B = 2.5 mA
			-1.3		-1.3	V	I _C = 150 mA, I _B = 15 mA
			-2.0		-2.0	V	I _C = 300 mA, I _B = 30 mA
V _{EB0}	Emitter to Base Breakdown Voltage	-5.0		-5.0		V	I _C = 0, I _E = 10 μA
V _{CB0}	Collector to Base Breakdown Voltage	-45		-60		V	I _C = 100 μA, I _E = 0
t _{on}	Turn On Time		40		40	ns	I _C ≈ 300 mA, I _{B1} ≈ 30 mA, V _{CC} = -30 V
t _{off}	Turn Off Time		100		100	ns	I _C ≈ 300 mA, I _{B1} ≈ I _{B2} ≈ 30 mA, V _{CE} = -30 V
I _{CS}	Collector Reverse Current		35		35	nA	V _{CE} = -30 V, V _{BE} = 0
			2.0		2.0	μA	V _{CE} = -50 V, V _{BE} = 0, T _A = 65°C
						μA	V _{CE} = -50 V, V _{BE} = 0, T _A = 65°C

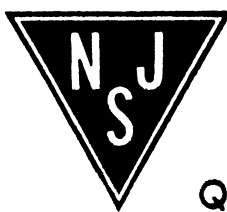
TO-92

TO-105



ALL DIMENSIONS ARE GIVEN FROM BASE UNLESS OTHERWISE NOTED

SYMBOL	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	.122	.200	3.1	5.1
B	.190	.210	4.83	5.33
C	.014	.021	.407	.533
D	.016	.019	.407	.482
E	.300	.325	7.75	8.25
F	.300	.310	7.75	7.95
G	.500	...	12.70	...
H	.750	.800	19.15	20.32
I	.080	...	2.03	...
J	.100	...	2.54	...
K	.100	...	2.54	...



Quality Semi-Conductors

2N3639 • 2N3640 • MPS3639 • MPS3640

ELECTRICAL CHARACTERISTICS (25°C Ambient Temperature unless otherwise noted) (Cont'd)

SYMBOL	CHARACTERISTIC	2N3639		2N3640		UNITS	TEST CONDITIONS
		MIN.	MAX.	MIN.	MAX.		
C_{ob}	Output Capacitance		3.5	3.5		pF	$I_E = 0, V_{CB} = -5.0 \text{ V}, f = 140 \text{ kHz}$
C_{ib}	Input Capacitance		5.5	5.5		pF	$I_E = 0, V_{CB} = 0, f = 140 \text{ kHz}$
BV_{CBO}	Collector to Base Breakdown Voltage	-6.0		-12		V	$I_C = 0, V_{EB} = -0.5 \text{ V}, f = 140 \text{ kHz}$ $I_C = 100 \mu\text{A}, I_E = 0$
BV_{CES}	Collector to Emitter Breakdown Voltage	-6.0		-12		V	$I_C = 100 \mu\text{A}, V_{BE} = 0$
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Note 4)	-6.0		-12		V	$I_C = 10 \text{ mA}, I_B = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	-4.0		-4.0		V	$I_E = 100 \mu\text{A}, I_C = 0$

SYMBOL	CHARACTERISTIC	MPS3639		MPS3640		UNITS	TEST CONDITIONS
		MIN.	MAX.	MIN.	MAX.		
t_{on}	Turn on Time (see test circuit no. 235) (see test circuit no. 219)		25 60	25 60		ns	$I_C \approx 50 \text{ mA}, I_{B1} \approx 5.0 \text{ mA}, V_{CC} = 6.0 \text{ V}$
t_{off}	Turn Off Time (see test circuit no. 235) (see test circuit no. 219)		25 60	35 75		ns	$I_C \approx 10 \text{ mA}, I_{B1} \approx 0.5 \text{ mA}, V_{CC} = -1.5 \text{ V}$
h_{fe}	High Frequency Current Gain	3.0 5.0		5.0			$I_C = 50 \text{ mA}, I_{B1} \approx I_{B2} \approx 5.0 \text{ mA}, V_{CC} = -6.0 \text{ V}$ $I_C = 10 \text{ mA}, V_{CB} = 0, f = 100 \text{ MHz}$ $I_C = 10 \text{ mA}, V_{CE} = -5.0 \text{ V}, f = 100 \text{ MHz}$
h_{FE}	DC Pulse Current Gain (Note 4)	30 20	120	30 20	120		$I_C = 10 \text{ mA}, V_{CE} = -0.3 \text{ V}$ $I_C = 50 \text{ mA}, V_{CE} = -1.0 \text{ V}$
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Note 4)		-0.16 -0.5 -0.23		-0.2 -0.6 -0.25	V	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}, V_{CE} = -1.0 \text{ V}$ $I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}, V_{CE} = -1.0 \text{ V}$ $I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}, V_{CE} = -1.0 \text{ V}$
$V_{BE(sat)}$	Base Saturation Voltage (Note 4)	-0.75 -0.8	-0.95 -1.0	-0.75 -0.8	-0.95 -1.0	V	$I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}, V_{CE} = -1.0 \text{ V}$ $I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}, V_{CE} = -1.0 \text{ V}$ $I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}, V_{CE} = -1.0 \text{ V}$
I_{CES}	Collector Reverse Current		1.5 10		1.5 10	nA	$I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}, V_{CE} = -1.0 \text{ V}$ $I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}, V_{CE} = -1.0 \text{ V}$ $I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}, V_{CE} = -1.0 \text{ V}$
						nA	$V_{CE} = -3.0 \text{ V}, V_{BE} = 0$
						nA	$V_{CE} = -6.0 \text{ V}, V_{BE} = 0$
						μA	$V_{CE} = -3.0 \text{ V}, V_{BE} = 0, T_A = 65^\circ\text{C}$
						μA	$V_{CE} = -6.0 \text{ V}, V_{BE} = 0, T_A = 65^\circ\text{C}$
C_{ob}	Output Capacitance		3.5	3.5		pF	$I_E = 0, V_{CB} = -5.0 \text{ V}, f = 140 \text{ kHz}$
C_{ib}	Input Capacitance		3.5	3.5		pF	$I_C = 0, V_{EB} = -0.5 \text{ V}, f = 140 \text{ kHz}$
BV_{CBO}	Collector to Base Breakdown Voltage	-6.0		-12		V	$I_C = 100 \mu\text{A}, I_E = 0$
BV_{CES}	Collector to Emitter Breakdown Voltage	-6.0		-12		V	$I_C = 100 \mu\text{A}, V_{BE} = 0$
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Note 4)	-6.0		-12		V	$I_C = 10 \text{ mA}, I_B = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	-4.0		-4.0		V	$I_E = 100 \mu\text{A}, I_C = 0$