Data Sheet

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Manufacturers of World Class Discrete Semiconductors

2N3009
2N3013
2N3014

NPN SILICON HIGH SPEED SWITCHING TRANSISTORS

JEDEC TO-18 CASE

DESCRIPTION

The CENTRAL SEMICONDUCTOR 2N3009, 2N3013, 2N3014 types are Silicon NPN switching Transistors designed for high speed, medium power saturated switching applications.

MAXIMUM RATINGS (T_A=25°C unless otherwise noted)

	SYMBOL	2N3009	2N3013	2N3014	UNIT
Collector-Base Voltage	V_{CBO}	40	40	40	V
Collector-Emitter Voltage	V_{CES}	40	40	40	V
Collector-Emitter Voltage	V_{CEO}	15	15	20	V
Emitter-Base Voltage	V_{EBO}	4.0	5.0	5.0	V
Collector Current	I_C	200	200	200	mA
Collector Current Peak (10μs pulse)	I_C	500	500	500	mA
Power Dissipation	P_D	360	360	300	mW
Power Dissipation (T_C=25°C)	P_D	1.2	1.2	1.2	W
Oper. and Storage Junction Temp.	T_J, T_{stg}	-65 TO +200			°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

		2N3009		2N3013		2N3014		
SYMBOL	TEST CONDITIONS	MIN	MAX	MIN	MAX	MIN	MAX	UNIT
I_{CES}	V_{CE}=20V		0.5		0.3		0.3	μA
I_B	V_{CE}=20V, V_{BE}=0		0.5		0.3		0.3	μA
BV_{CBO}	I_C=100μA	40		40		40		V
BV_{CES}	I_C=100μA	40		40		40		V
BV_{CEO}	I_C=10mA	15		15		20		V
BV_{EBO}	I_E=100μA	4.0		5.0		5.0		V
$V_{CE(SAT)}$	I_C=30mA, I_B=3.0mA		0.18		0.18		0.18	V
$V_{CE(SAT)}$	I_C=100mA, I_B=10mA		0.28		0.28		0.35	V
$V_{CE(SAT)}$	I_C=300mA, I_B=30mA		0.5		0.5		-	V
$V_{CE(SAT)}$	I_C=10mA, I_B=1.0mA		-		-		0.18	V
$V_{BE(SAT)}$	I_C=30mA, I_B=3.0mA	0.75	0.95	0.75	0.95	0.75	0.95	V
$V_{BE(SAT)}$	I_C=100mA, I_B=10mA		1.2		1.2		1.2	V
$V_{BE(SAT)}$	I_C=300mA, I_B=30mA		1.7		1.7		-	V
$V_{BE(SAT)}$	I_C=10mA, I_B=1.0mA	-	-	-	-	0.7	0.8	V
h_{FE}	V_{CE}=0.4V, I_C=30mA	30	120	30	120	30	120	
h_{FE}	V_{CE}=0.4V, I_C=10mA	-		-		25		
h_{FE}	V_{CE}=0.5V, I_C=100mA	25		25		-		
h_{FE}	V_{CE}=1.0V, I_C=100mA	-		-		25		
h_{FE}	V_{CE}=1.0V, I_C=300mA	15		15		-		
f_T	V_{CE}=10V, I_C=30mA, f=100MHz	350		350		350		MHz
C_{ob}	V_{CB}=5.0V, I_E=0, f=140kHz		5.0		5.0		5.0	pF
C_{ib}	V_{BE}=0.5, I_C=0, f=140kHz		8.0		8.0		8.0	pF
t_{on}	V_{CC}=15V, I_C=300mA, I_{B1}≈30mA		15		15		-	ns
t_{on}	V_{CC}=2.0V, I_C=30mA, I_{B1}≈3.0mA		-		-		16	ns
t_{off}	V_{CC}=15V, I_C=300mA, I_{B1}≈I_{B2}≈30mA		25		25		-	ns
t_{off}	V_{CC}=2.0V, I_C=30mA, I_{B1}≈I_{B2}≈3.0mA		-		-		25	ns