FAIRCHILD
A Schlumberger Company

1N4009/FDLL4009

Ultra High Speed Diodes

T-03-09

- t_{rr}...2 ns (MAX)
- BV...35 V (MIN) @ 5 μA

PACKAGES

1N4009	DO-35
FDLL4009	LL-34

If you need this device in the SOT package, an electical equivalent is available. See FDSO1200 family.

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures

Storage Temperature Range	−65°C to +200°C
Maximum Junction Operating Temperature	+175°C
Lead Temperature	+260°C

Power Dissipation (Note 2)

Maximum Total Power Dissipation at 25°C Ambient	500 mW
Linear Power Derating Factor	3.33 mW/°C

Maximum Voltage and Current

WIV	Working Inverse Voltage	25 V
I_O	Average Rectified Current	100 mA
I_F	Continuous Forward Current	300 mA
i_f	Peak Repetitive Forward Current	400 mA
i_f (surge)	Peak Forward Surge Current	
	Pulse Width = 1 s	1.0 A
	Pulse Width = 1 μs	4.0 A

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

SYMBOL	CHARACTERISTIC	MIN	MAX	UNITS	TEST CONDITIONS
V_F	Forward Voltage		1.0	V	I_F = 30 mA
I_R	Reverse Current		0.1 100	μA μA	V_R = 25 V V_R = 25 V, T_A = 150°C
BV	Breakdown Voltage	35		V	I_R = 5.0 μA
t_{rr}	Reverse Recovery Time		4.0 2.0	ns ns	$I_f = I_r$ = 10 mA (Note 3) I_f = 10 mA, V_r = 6.0 V, R_L = 100 Ω
C	Capacitance		4.0	pF	V_R = 0,f = 1.0 MHz

NOTES:
1. These ratings are limiting values above which the serviceability of the diode may be impaired.
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty-cycle operation.
3. Recovery to 1.0 mA.
4. For product family characteristic curves, refer to Chapter 4, D4

FAIRCHILD
A Schlumberger Company

1N/FDLL4151/4152
1N/FDLL4153/4154
High Speed Diodes

T-03-09

- C...4 pF (MAX)
- t_{rr}...2 ns (MAX) @ 10 mA, −6 V, 100 Ω.

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures

Storage Temperature Range	−65°C to +200°C
Maximum Junction Operating Temperature	+175°C
Lead Temperature	+260°C

Power Dissipation (Note 2)

Maximum Total Power Dissipation at 25°C Ambient	500 mW
Linear Power Derating Factor	3.33 mW/°C

Maximum Voltage and Currents

WIV	Working Inverse Voltage	1N4151 50 V 1N4152 30 V	1N4153 50 V 1N4154 25 V
I_O	Average Rectified Current		100 mA
I_F	Continuous Forward Current		300 mA
i_f	Peak Repetitive Forward Current		400 mA
i_f (surge)	Peak Forward Surge Current		
	Pulse Width = 1 s		1.0 A
	Pulse Width = 1 μs		4.0 A

PACKAGES

1N4151	DO-35
1N4152	DO-35
1N4153	DO-35
1N4154	DO-35
FDLL4151	LL-34
FDLL4152	LL-34
FDLL4153	LL-34
FDLL4154	LL-34

If you need this device in the SOT package, an electical equivalent is available. See FDSO1200 family.

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

SYMBOL	CHARACTERISTIC		MIN	MAX	UNITS	TEST CONDITIONS
V_F	Forward Voltage	1N4154		1.0	V	I_F = 30 mA
		1N4151		1.0	V	I_F = 50 mA
		1N4152 & 1N4153	0.49	0.55	V	I_F = 0.1 mA
			0.53	0.59	V	I_F = 0.25 mA
			0.59	0.67	V	I_F = 1.0 mA
			0.62	0.70	V	I_F = 2.0 mA
			0.70	0.81	V	I_F = 10 mA
			0.74	0.88	V	I_F = 20 mA
I_R	Reverse Current	1N4154		0.1	μA	V_R = 25 V
				100	μA	V_R = 25 V, T_A = 150°C
		1N4153, 1N4151		0.05	μA	V_R = 50 V
				50	μA	V_R = 50 V, T_A = 150°C
		1N4152		0.05	μA	V_R = 30 V
				50	μA	V_R = 30 V, T_A = 150°C
BV	Breakdown Voltage	1N4154	35		V	I_R = 5.0 μA
		1N4153, 1N4151	75		V	I_R = 5.0 μA
		1N4152	40		V	I_R = 5.0 μA
t_{rr}	Reverse Recovery Time			4.0	ns	I_f = 10 mA, I_r = 10 mA (Note 3)
				2.0	ns	I_f = 10 mA, V_r = −6.0 V, R_L = 100 Ω
C	Capacitance			4.0	pF	V_R = 0, f = 1.0 MHz

NOTES.
1. The maximum ratings are limiting values above which satisfactory performance may be impaired.
2. These are steady state limits. The factory should be consulted in applications involving pulsed or low duty cycle operation.
3. Recovery to 1.0 mA.
4. For product family characteristic curves, refer to Chapter 4, D4.

FAIRCHILD
A Schlumberger Company

1N4728 through 1N4752

1 W Silicon Zener Diodes

T-11-13

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures

Storage Temperature Range	−65°C to +200°C
Maximum Junction Operating Temperature	+200°C
Lead Temperature	+260°C

Power Dissipation (Note 2)

Maximum Total Dissipation at 50°C Ambient	1 W
Linear Power Derating Factor (from 50°C)	6.67 mW/°C
Maximum Surge Power (Note 8)	10 W

PACKAGES

All Devices DO-41

3

ELECTRICAL CHARACTERISTICS (25°C Ambient)

SYMBOL	V_Z	Z_Z	I_{ZT}	Z_{ZK}	I_{ZK}	I_R	V_{RT}	I_{ZM}	i_Z (surge)
Characteristic	Nominal Zener Voltage (Note 4) @I_{ZT}	Maximum Zener Impedance (Note 5) @I_{ZT}	Test Current	Maximum Zener Knee Impedance (Note 5) @I_{ZK}	Test Current	Maximum Reverse Current @V_{RT}	Test Voltage	Maximum Zener Current (Note 6)	Maximum Zener Surge Current (Note 3)
UNIT	V	Ω	mA	Ω	mA	μA	V	mA	mA
IN4728	3.3	10.0	76.0	400	1.0	100	1.0	276	1380
IN4729	3.6	10.0	69.0	400	1.0	100	1.0	252	1260
IN4730	3.9	9.0	64.0	400	1.0	50	1.0	234	1190
IN4731	4.3	9.0	58.0	400	1.0	10	1.0	217	1070
IN4732	4.7	8.0	53.0	500	1.0	10	1.0	193	970
IN4733	5.1	7.0	49.0	550	1.0	10	1.0	178	890
IN4734	5.6	5.0	45.0	600	1.0	10	2.0	162	810
IN4735	6.2	2.0	41.0	700	1.0	10	3.0	146	730
IN4736	6.8	3.5	37.0	700	1.0	10	4.0	133	660
IN4737	7.5	4.0	34.0	700	0.5	10	5.0	121	605
IN4738	8.2	4.5	31.0	700	0.5	10	6.0	110	550
IN4739	9.1	5.0	28.0	700	0.5	10	7.0	100	500
IN4740	10.0	7.0	25.0	700	0.25	10	7.6	91	454

NOTES
1. These ratings are limiting values above which the serviceability of the diode may be impaired.
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty-cycle operation
3. Non-recurrent square wave, PW = 8.3 ms, superimposed on Zener test current, I_{ZT}.
4. Type numbers without suffix have ± 10% tolerance on nominal V_Z. Type numbers with suffix A have ±5% tolerance on nominal V_Z.
5. The Zener impedances Z_Z and Z_{ZK} are derived by superimposing a 60 H_Z signal on test currents I_{ZT} and I_{ZK}, having an RMS value of 10% of the d.c. value of I_{ZT} and I_{ZK} respectively.
6. Maximum Zener Current (I_{ZM}) is based on the maximum Zener voltage of a 10% tolerance unit.
7. V_F = 1.2 V (max) @ I_F = 200 mA for all types. Non-recurrent square wave, PW = 8.3 ms, T_A = 55°C.
8. Non-recurrent square wave. PW = 8.3 ms, T_A = 55°C
9. For product family characteristic curves, refer to Chapter 4, D14.

1N4728 through 1N4752

T-11-13

ELECTRICAL CHARACTERISTICS (25°C Ambient)

SYMBOL	V_Z	Z_Z	I_{ZT}	Z_{ZK}	I_{ZK}	I_R	V_{RT}	I_{ZM}	i_Z (surge)
Characteristic	Nominal Zener Voltage (Note 4) @I_{ZT}	Maximum Zener Impedance (Note 5) @I_{ZT}	Test Current	Maximum Zener Knee Impedance (Note 5) @I_{ZK}	Test Current	Maximum Reverse Current @V_{RT}	Test Voltage	Maximum Zener Current (Note 6)	Maximum Zener Surge Current (Note 3)
UNIT	V	Ω	mA	Ω	mA	μA	V	mA	mA
IN4741	11.0	8.0	23.0	700	0.25	5.0	8.4	83	414
IN4742	12.0	9.0	21.0	700	0.25	5.0	9.1	76	380
IN4743	13.0	10.0	19.0	700	0.25	5.0	9.9	69	344
IN4744	15.0	14.0	17.0	700	0.25	5.0	11.4	61	304
IN4745	16.0	16.0	15.5	700	0.25	5.0	12.2	57	285
IN4746	18.0	20.0	14.0	750	0.25	5.0	13.7	50	250
IN4747	20.0	22.0	12.5	750	0.25	5.0	15.2	45	225
IN4748	22.0	23.0	11.5	750	0.25	5.0	16.7	41	205
IN4749	24.0	25.0	10.5	750	0.25	5.0	18.2	38	190
IN4750	27.0	35.0	9.5	750	0.25	5.0	20.6	34	170
IN4751	30.0	40.0	8.5	1000	0.25	5.0	22.8	30	150
IN4752	33.0	45.0	7.5	1000	0.25	5.0	25.1	27	135

FAIRCHILD
A Schlumberger Company

1N5226 through 1N5257

500 mW Silicon Zener Diodes

T-11-13

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures

Storage Temperature Range	−65°C to +200°C
Maximum Junction Operating Temperature	+200°C
Lead Temperature	+260°C

Power Dissipation (Note 2)

Maximum Total Power Dissipation at 75°C Ambient	500 mW
Linear Power Derating Factor (from 75°C)	4.0 mW/°C
Maximum Surge Power (Note 3)	10 W

PACKAGES

All Devices DO-35

3

ELECTRICAL CHARACTERISTICS (25°C Ambient unless otherwise noted)

SYMBOL	V_Z	Z_Z	I_{ZT}	Z_{ZK}	I_R		V_{RT}		TC
Characteristic	Nominal Zener Voltage (Note 4) @I_{ZT}	Maximum Zener Impedance (Note 5) @I_{ZT}	Test Current	Maximum Zener Knee Impedance (Note 5) @ I_{ZK} = 0.25 mA	Maximum Reverse Current @ V_{RT}		Test Voltage		Maximum Temperature Coefficient of V_Z (Note 6)
					±20% V_ZTolerance	± 10, 5, 2, 1% V_ZTolerance	±20, 10% V_ZTolerance	±5, 2, 1% V_ZTolerance	
UNIT	V	Ω	mA	Ω	μA	μA	V	V	%/°C
1N5226	3.3	28	20	1600	100	25	0.95	1.0	−0.070
1N5227	3.6	24	20	1700	100	15	0.95	1.0	−0.065
1N5228	3.9	23	20	1900	75	10	0.95	1.0	−0.060
1N5229	4.3	22	20	2000	50	5.0	0.95	1.0	±0.055
1N5230	4.7	19	20	1900	50	5.0	1.9	2.0	±0.030
1N5231	5.1	17	20	1600	50	5.0	1.9	2.0	±0.030
1N5232	5.6	11	20	1600	50	5.0	2.9	3.0	+0.038
1N5233	6.0	7.0	20	1600	50	5.0	3.3	3.5	+0.038
1N5234	6.2	7.0	20	1000	50	5.0	3.8	4.0	+0.045
1N5235	6.8	5.0	20	750	30	3.0	4.8	5.0	+0.050
1N5236	7.5	6.0	20	500	30	3.0	5.7	6.0	+0.058
1N5237	8.2	8.0	20	500	30	3.0	6.2	6.5	+0.062
1N5238	8.7	8.0	20	600	30	3.0	6.2	6.5	+0.065
1N5239	9.1	10	20	600	30	3.0	6.7	7.0	+0.068
1N5240	10.0	17	20	600	30	3.0	7.6	8.0	+0.075
1N5241	11.0	22	20	600	30	2.0	8.0	8.4	+0.076

NOTES:
1. These ratings are limiting values above which the serviceability of the diode may be impaired.
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty-cycle operation.
3. Non-recurrent square wave, PW = 8.3 ms, T_A = 55°C.
4. Type numbers without suffix have ±20% tolerance on nominal V_Z.
   Type numbers with suffix A have ±10% tolerance on nominal V_Z.
   Type numbers with suffix B have ±5% tolerance on nominal V_Z.
   Type numbers with suffix C have ±2% tolerance on nominal V_Z.
   Type numbers with suffix D have ±1% tolerance on nominal V_Z.
5. The Zener impedances Z_Z and Z_{ZK} are derived by superimposing a 60 H_Z signal on test currents I_{ZT} and I_{ZK}, having an RMS value of 10% of the d.c. value of I_{ZT} and I_{ZK} respectively.
6. Maximum temperature coefficients apply to 10, 5, 2 and 1% tolerance types only and are measured under the following conditions:
   IN5226A, B, C, D through IN5242A, B, C, D: I_Z = 7.5 mA, T_1 = 25°C, T_2 = 125°C.
   IN5242A, B, C, D through IN5257A, B, C, D: I_Z = I_{ZT}, T_1 = 25°C, T_2 = 125°C.
7. V_F = 1.1V (maximum) @ I_F = 200 mA for all types.
8. For product family characteristic curves, refer to Chapter 4, D13.

1N5226 through 1N5257

T-11-13

ELECTRICAL CHARACTERISTICS (25°C Ambient unless otherwise noted)

SYMBOL	V_Z	Z_Z	I_{ZT}	Z_{ZK}	I_R		V_{RT}		TC
Characteristic	Nominal Zener Voltage (Note 4) @I_{ZT}	Maximum Zener Impedance (Note 5) @I_{ZT}	Test Current	Maximum Zener Knee Impedance (Note 5) @ I_{ZK} = 0.25 mA	Maximum Reverse Current @ V_{RT}		Test Voltage		Maximum Temperature Coefficient of V_Z (Note 6)
					±20% V_ZTolerance	±10, 5, 2, 1% V_ZTolerance	±20, 10% V_ZTolerance	±5, 2, 1% V_ZTolerance	
UNIT	V	Ω	mA	Ω	μA	μA	V	V	%/°C
IN5242	12.0	30	20	600	10	1.0	8.7	9.1	+0.077
IN5243	13.0	13	9.5	600	10	0.5	9.4	9.9	+0.079
IN5244	14.0	15	9.0	600	10	0.1	9.5	10.0	+0.082
IN5245	15.0	16	8.5	600	10	0.1	10.5	11.0	+0.082
IN5246	16.0	17	7.8	600	10	0.1	11.4	12.0	+0.083
IN5247	17.0	19	7.4	600	10	0.1	12.4	13.0	+0.084
IN5248	18.0	21	7.0	600	10	0.1	13.3	14.0	+0.085
IN5249	19.0	23	6.6	600	10	0.1	13.3	14.0	+0.086
IN5250	20.0	25	6.2	600	10	0.1	14.3	15.0	+0.086
IN5251	22.0	29	5.6	600	10	0.1	16.2	17.0	+0.087
IN5252	24.0	33	5.2	600	10	0.1	17.1	18.0	+0.088
IN5253	25.0	35	5.0	600	10	0.1	18.1	19.0	+0.089
IN5254	27.0	41	4.6	600	10	0.1	20.0	21.0	+0.090
IN5255	28.0	44	4.5	600	10	0.1	20.0	21.0	+0.091
IN5256	30.0	49	4.2	600	10	0.1	22.0	23.0	+0.091
IN5257	33.0	58	3.8	700	10	0.1	24.0	25.0	+0.092

FAIRCHILD
A Schlumberger Company

1N5282

High Conductance Ultra Fast Diodes

- BV...80 V (MIN) @ 5.0 μA
- C...2.5 pF @ V_R = 0 V, f = 1.0 MHz
- t_{rr}...4.0 ns @ I_f = I_r = 10 mA to 200 mA

PACKAGES

1N5282	DO-35

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures		
Storage Temperature Range		−65°C to +200°C
Maximum Junction Operating Temperature		+175°C
Lead Temperature		+260°C
Power Dissipation (Note 2)		
Maximum Total Dissipation at 25° Ambient		500 mW
Linear Derating Factor (from 25°C)		3.33 mW/°C
Maximum Voltage and Currents		
WIV	Working Inverse Voltage	55 V
I_O	Average Rectified Current	200 mA
I_F	Continuous Forward Current	300 mA
$i_{f(surge)}$	Peak Forward Surge Current	
	Pulse Width = 1.0 s	1.0 A
	Pulse Width = 1.0 μs	4.0 A

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

SYMBOL	CHARACTERISTIC	MIN	MAX	UNITS	TEST CONDITIONS
V_F	Forward Voltage	1.05	1.30	V	I_F = 500 mA
		0.92	1.10	V	I_F = 300 mA
		0.80	0.90	V	I_F = 100 mA
		0.67	0.725	V	I_F = 10 mA
		0.55	0.60	V	I_F = 1.0 mA
		0.45	0.49	V	I_F = 0.1 mA
I_R	Reverse Current		100	nA	V_R = 55 V
			100	μA	V_R = 55 V, T_A = 150°C
BV	Breakdown Voltage	80		V	I_R = 5.0 μA
t_{rr}	Reverse Recovery Time (Note 3)		4.0	ns	I_f = I_r = 10 mA to 200 mA, R_L = 100 Ω
t_{rr}	Reverse Recovery Time		2.0	ns	I_f = 10 mA, V_r = 6.0 V
t_{fr}	Forward Recovery Time		10	ns	I_f = 200 mA (Note 4)
V_{pk}	Peak Forward Voltage		2.0	V	I_f = 500 mA (Note 5)
C	Capacitance		2.5	pF	V_R = 0, f = 1.0 MHz

NOTES.
1. The maximum ratings are limiting values above which life or satisfactory performance may be impaired.
2. These are steady-state limits. The factory should be consulted on applications involving pulsed or low duty-cycle operation.
3. Recovery to 0.1 I_r.
4. t_r = 0.4 ns, V_{fr} = 1.0 V, pulse width = 100 ns; duty cycle ≤ 1%.
5. t_r = 8.0 ns, pulse width = 1.0 μs; duty cycle ≤ 1%.
6. For product family characteristics curves, refer to Chapter 4, D4.

FAIRCHILD
A Schlumberger Company

1S920/921/922/923
FDLL920/921/922/923
General Purpose Diodes

T-01-09

- V_F . . . 1.2 (MAX) @ 200 mA
- I_R . . . 100 nA (MAX) @ RATED WIV

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures

Storage Temperature Range	−65°C to +200°C
Maximum Junction Operating Temperature	+175°C
Lead Temperature	+260°C

Power Dissipation (Note 2)

Maximum Total Dissipation at 25°C Ambient	500 mW
Linear Derating Factor (from 25°C)	3.33 mW/°C

Maximum Voltage and Currents

		1S920	1S921	1S922	1S923
WIV	Working Inverse Voltage (−65°C to +100°C)	50 V	100 V	150 V	200 V
I_O	Average Forward Current	200 mA	200 mA	200 mA	200 mA
i_f	Recurent Peak Forward Current	600 mA	600 mA	600 mA	600 mA
$I_{f(surge)}$	Peak Forward Surge Current				
	Pulse Width = 1 s	1.0 A	1.0 A	1.0 A	1.0 A
	Pulse Width = 1 μs	4.0 A	4.0 A	4.0 A	4.0 A

PACKAGES

1S920	DO-35
1S921	DO-35
1S922	DO-35
1S923	DO-35
FDLL920	LL-34
FDLL921	LL-34
FDLL922	LL-34
FDLL923	LL-34

If you need this device in the SOT package, an electical equivalent is available. See FDSO1400 family.

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

SYMBOL	CHARACTERISTIC	MIN	MAX	UNITS	TEST CONDITIONS
I_R	Inverse Current		100 10	nA μA	V_R = rated WIV V_R = rated WIV, T_A = 100°C
V_F	Forward Voltage		1.2	V	I_F = 200 mA
C	Capacitance		6.5	pF	V_R = 0, f = 1 MHz
Q_S	Stored Charge		12	nC	I_F = 10 mA, V_R = 10 V

NOTES:
1. These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty-cycle operation.
3. For product family characteristic curves, refer to Chapter 4, D1.

FAIRCHILD
A Schlumberger Company

2N/MPS/FTSO706 T-35-23
MPS/FTSO706A

NPN High Speed Logic Switches

- **V_{CER} ... 20 V (Min) @ 10 mA**
- **h_{FE} ... 20 (Min) @ 10 mA**
- **τ_s ... 60 ns (Max) 2N/MPS/FTSO706), 25 ns (Max) (MPS/FTSO706A)**
- **Complements ... MPS3640 (TO-92)**

PACKAGE

2N706	TO-118A
MPS706	TO-92
MPS706A	TO-92
FTSO706	TO-236AA/AB
FTSO706A	TO-236AA/AB

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures	**2N**	**MPS/FTSO**
Storage Temperature	-65° C to 175° C	-55° C to 150° C
Operating Junction Temperature	175° C	150° C

Power Dissipation (Notes 2 & 3)

Total Dissipation at	**2N**	**MPS**	**FTSO**
25° C Ambient Temperature	0.3 mW	0.625 W	0.350 W*
25° C Case Temperature	1.0 W	1.0 W	

Voltages & Currents	**706**	**706A**
V_{CBO} Collector to Base Voltage	25 V	25V
V_{CER} Collector to Emitter Voltage ($R_{BE} \leq 10\ \Omega$) (Note 4)	20 V	20 V
V_{EBO} Emitter to Base Voltage	3.0 V	5.0 V

Electrical Characteristics (25° C Ambient Temperature unless otherwise noted) (Note 6)

SYMBOL	CHARACTERISTIC	MPS706 MIN	MPS706 MAX	706A MIN	706A MAX	UNITS	TEST CONDITIONS
BV_{CEO}	Collector to Emitter Breakdown Voltage	15		15		V	I_C = 10 mA, I_B = 0
BV_{CER}	Collector to Emitter Breakdown Voltage	20		20		V	I_C = 10 mA, R_{BE} = 10 Ω
BV_{CBO}	Collector to Base Breakdown Voltage	25		25		V	I_C = 10 μA, I_E = 0
I_{EBO}	Emitter Cutoff Current		10		10	μA	V_{EB} = 3.0 V, I_C = 0
I_{CBO}	Collector Cutoff Current		500		500	nA	V_{CB} = 15 V, I_E = 0
h_{FE}	DC Current Gain (Note 5)	20		20	60		I_C = 10 mA, V_{CE} = 1.0 V

NOTES:

1. These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
2. These are steady state limits The factory should be consulted on applications involving pulsed or low duty cycle operations
3. These ratings give a maximum junction temperature of 175° C and junction-to-case thermal resistance of 150° C/W (derating factor of 6.7 mW/° C) for 2N706. These ratings give a maximum junction temperature of 150° C and (TO-92) junction-to-case thermal resistance of 125° C/W (derating factor of 8.0 mW/° C), junction-to-ambient thermal resistance of 200° C/W (derating factor of 5.0 mW/° C) for MPS706 and MPS706A; (TO-236) junction-to-ambient thermal resistance of 357° C/W (derating factor of 2.8 mW/° C).
4. Rating refers to a high current point where collector to emitter voltage is lowest.
5. Pulse conditions: length ≤ 12 μs; duty cycle = 1% for MPS706, MPS706A; length = 300μs; duty cycle = 1% for 2N706.
6. For product family characteristic curves, refer to Curve Set T132 for 2N706; T162 for MPS706 and MPS706A.

* Package mounted on 99.5% alumina 8 mm x 8 mm x 0.6 mm.

ELECTRICAL CHARACTERISTICS (25° C Ambient Temperature unless otherwise noted) (Note 6)

SYMBOL	CHARACTERISTIC	MPS706 MIN	MPS706 MAX	706A MIN	706A MAX	UNITS	TEST CONDITIONS
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Note 5)		0.6		0.6	V	I_C = 10 mA, I_B = 1.0 mA
$V_{BE(sat)}$	Base to Emitter Saturation Voltage (Note 5)		0.9	0.7	0.9	V	I_C = 10 mA, I_B = 1.0 mA
C_{ob}	Output Capacitance		6.0		6.0	pF	V_{CB} = 10 V, I_E = 0, f = 100 kHz
h_{fe}	High Frequency Current Gain	2.0		2.0			I_C = 10 mA, V_{CE} = 15 V, f = 100 MHz
r_b'	Base Resistance		50		50	Ω	I_E = 10 mA, V_{CE} = 15 V, f = 300 MHz
τ_s	Charge Storage Time Constant (test circuit no. 3111)		60		25	ns	I_C = 10 mA, V_{CC} = 10 V, I_{B1} = I_{B2} = 10 mA
t_{on}	Turn On Time (test circuit no. 589)		40		40	ns	I_C = 10 mA, I_{B1} = 3.0 mA, V_{CC} = 3.0 V
t_{off}	Turn Off Time (test circuit no. 589)		75		75	ns	I_C = 10 mA, I_{B1} = 3.0 mA, I_{B2} = 1.5 mA, V_{CC} = 3.0 V

SYMBOL	CHARACTERISTIC	2N706 MIN	2N706 MAX	UNITS	TEST CONDITIONS
BV_{CER}	Collector to Emitter Breakdown Voltage	20		V	I_C = 10 mA, R_{BE} = 10 Ω
BV_{CBO}	Collector to Base Breakdown Voltage	25		V	I_C = 10 μA, I_E = 0
I_{CBO}	Collector Cutoff Current		300	nA	V_{CB} = 15 V, I_E = 0
h_{FE}	DC Current Gain (Note 5)	20			I_C = 10 mA, V_{CE} = 1.0 V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Note 5)		0.6	V	I_C = 10 mA, I_B = 1.0 mA
$V_{BE(sat)}$	Base to Emitter Saturation Voltage (Note 5)		0.6	V	I_C = 10 mA, I_B = 1.0 mA
C_{ob}	Output Capacitance		6.0	pF	V_{CB} = 10 V, I_E = 0, f = 100 kHz
h_{fe}	High Frequency Current Gain	2.0			I_C = 10 mA, V_{CE} = 15 V, f = 100 MHz
τ_s	Charge Storage Time Constant (test circuit no. 3111)		60	ns	I_C = 10 mA, V_{CC} = 10 V, I_{B1} = I_{B2} = 10 mA