NEC®

SILICON SNAP-OFF DIODE

ND1142-7F
ND1143-7F

FEATURES

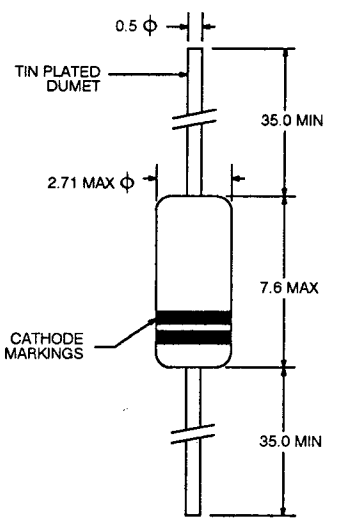
- LOW SERIES RESISTANCE
- HIGH RELIABILITY
- LOW COST

DESCRIPTION AND APPLICATIONS

The ND4142 and ND1143 snap-off diodes are especially designed for frequency multiplier applications. Since the series resistance is low, a high efficiency can be obtained when they are used in multi-stage multipliers. They are suitable for use in the VHF-UHF band.

OUTLINE DIMENSIONS (Units in mm)

OUTLINE 7F



Cp = 0.2 pF
Lp = 3.0 nH

Color Code: (From Cathode)
ND1142 - Orange, Red
ND1143 - Orange, Green

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

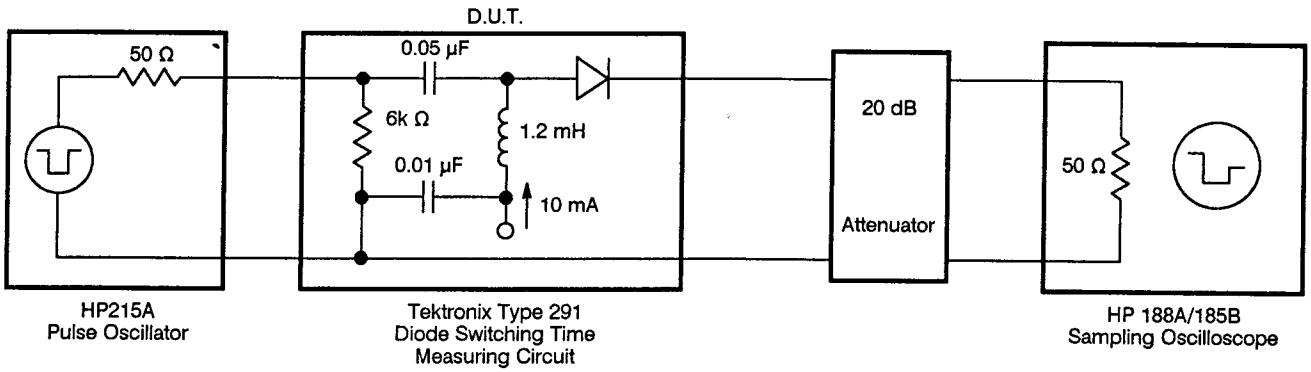
SYMBOLS	PARAMETERS	UNITS	RATINGS
P_T	Total Power Dissipation (T_C = 65°)	mW	300
T_{STG}	Storage Temperature	°C	-65 to +150
T_J	Junction Temperature	°C	150

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

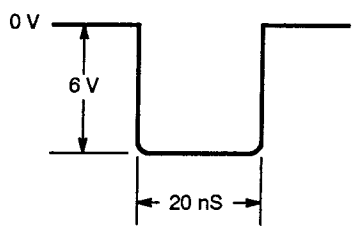
PART NUMBER EIAJ* REGISTERED CODE NUMBER PACKAGE OUTLINE			ND1142-7F SV14B 7F			ND1143-7F SV14C 7F		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX
V_R	Reverse Voltage, I_R = 10 μA	V	30	40		30	40	
I_R	Reverse Current, V_R = 27 V	μA			1			1
C_T	Total Capacitance,**V_R = 0 V, f = 1 MHz	pF	1		2	2		4
tT	Transition Time (See Transition Time Measuring Circuit)	pS		100	200		100	200
τ	Lifetime (See Lifetime Measuring Circuit)	nS	20	50		20	50	
η	Multiplication Efficiency, 110 to 660 MHz, P_{IN} = 100 mW	%	40	50		40	50	

NOTES:
*Electronic Industries Association - Japan.
**Excluding Case Capacitance of 0.3 pF.

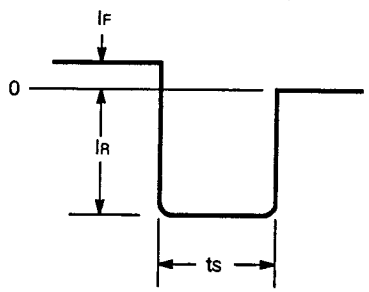
LIFETIME MEASURING CIRCUIT



Input Pulse Wave Form



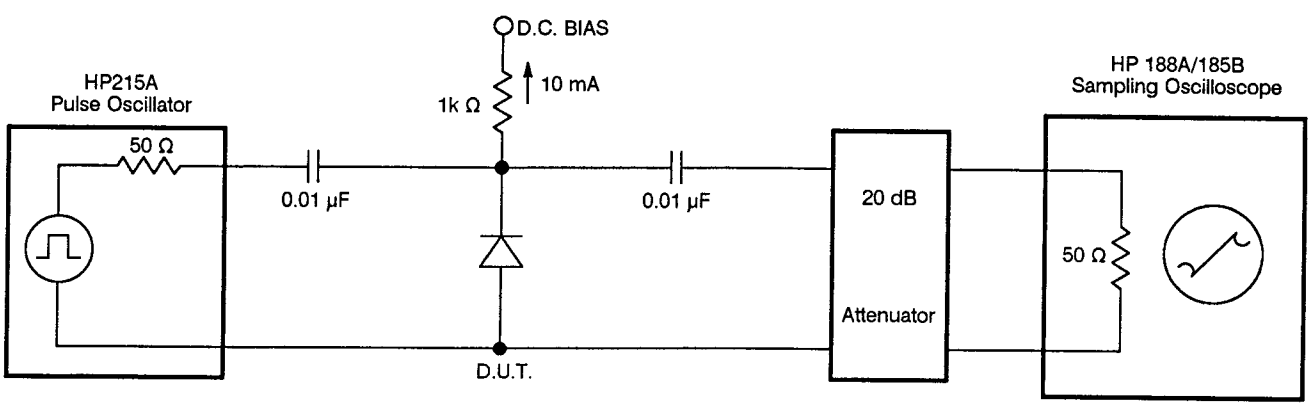
Output Pulse Wave Form (Observed)



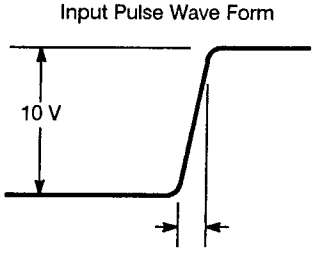
Forward Current I_F = 10 mA, Reverse Current I_R = 6 V/50 Ω = 120 mA.
Lifetime can be obtained from ts of the above wave form as follows:

$$\tau = \frac{ts}{\int n\,(1 + \frac{I_F}{I_R})} = 13\ ts$$

TRANSITION TIME MEASURING CIRCUIT

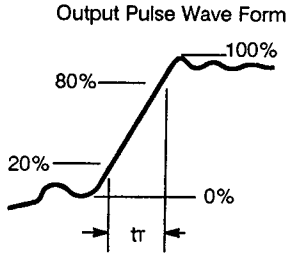


Input Pulse Wave Form



Rise Time < 1 ns

Output Pulse Wave Form



NEC®

SILICON SNAP-OFF DIODE

ND1242-5F
ND1243-5F

FEATURES

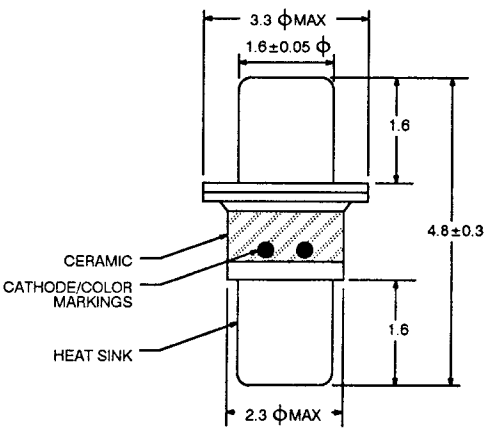
- LOW CONVERSION LOSS
- HIGH MULTIPLICATION RATIO
- ULTRA SHORT REVERSE TURN ON TIME
- HERMETICALLY SEALED METAL/CERAMIC PACKAGE

DESCRIPTION AND APPLICATIONS

The ND1242 and ND1243 are developed mainly to be used as frequency-multipliers of high efficiency with their output in the microwave region. Due to a special impurity-diffusion technique in the silicon body, they feature a distinct snap-off action when driven back to the reverse-biased region from the forward-biased region. Consequently, they are able to achieve a low conversion loss when operated as frequency multipliers of higher multiplication ratio, e.g., 10 or 20. Moreover, the extremely small pill package makes it convenient to mount them on strip-line-type transmission line.

OUTLINE DIMENSIONS (Units in mm)

OUTLINE 5F



Cp = 0.35 pF
Lp = 0.06 nH

PART NUMBER	COLOR DOT	
ND1242	Black	Orange
ND1243	Red	Orange

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
T_{OP}	Operating Temperature	°C	-65 to +150
T_J	Junction Temperature	°C	+150
P_T	Power Dissipation	W	1
I_F	Forward Current	mA	100
V_R	Reverse Voltage	V	40

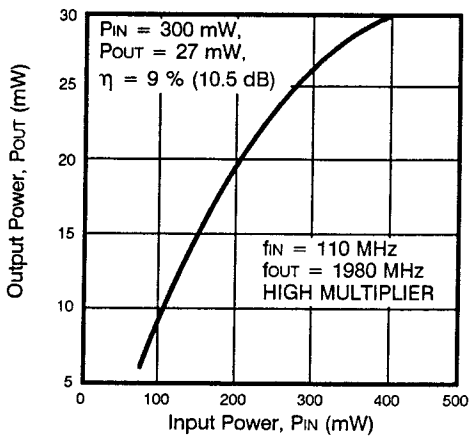
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

PART NUMBER EIAJ* REGISTERED NUMBER PACKAGE OUTLINE			ND1242-5F SV24A 5F			ND1243-5F SV24B 5F		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX
I_R	Leakage Current at V_R = 30 V	mA			10			10
C_T	Total Capacitance** V_R = 0 V, f = 1 MHz	pF	0.4		0.8	0.8		1.6
t_T	Transition Time at I_F = 10 mA, V_R = 10 V	ps			200		150	200
τ	Lifetime at I_F = 10 mA, V_R = 6 V	nS	20			20		
η	Multiplication Efficiency at Multiplication Factor = x 18, F_{IN} = 110 MHz, P_{IN} = 100 mW	%	8	10		8	10	

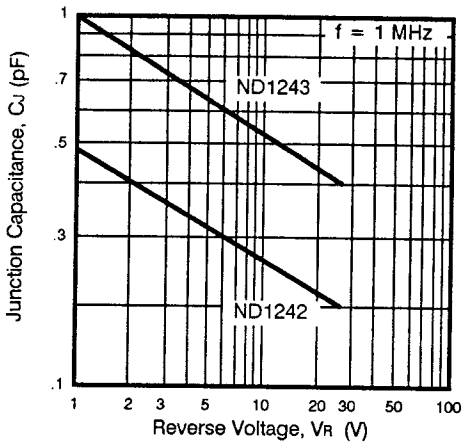
*Electronic Industrial Association of Japan.
**Excluding package capacitance 0.35 pF.

TYPICAL PERFORMANCE CHARACTERISTICS (T_A = 25°C)

OUTPUT POWER vs. INPUT POWER



ND1242-5F, ND1243-5F
JUNCTION CAPACITANCE vs.
REVERSE VOLTAGE



NEC®

SILICON SNAP-OFF DIODE

ND1551-7F
ND1561-5F
ND1571-5F

FEATURES

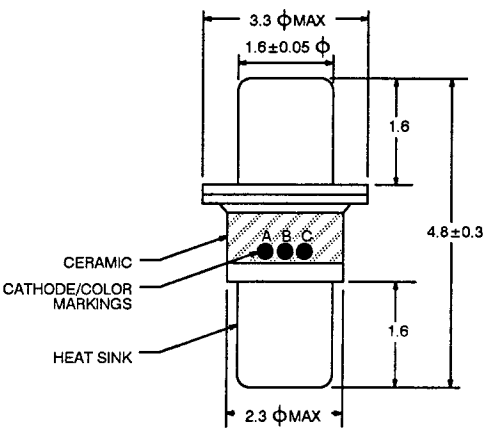
- ULTRA SHORT REVERSE TURN ON TIME
- HIGH RELIABILITY
- LOW COST

DESCRIPTION AND APPLICATIONS

The ND1551, 61, 71 are snap-off diodes especially designed for high speed switching in pulse circuits. Snap-off diodes are sometimes called step-recovery diodes or charge storage diodes. The reverse recovery time is very small and they are suitable for the shaping of high speed switching pulse and pulse modulation. The ND1551-7F is suitable for normal circuits. The ND1561-5F and ND1571-5F are suitable for strip line circuits. Typical applications are in sampling oscilloscopes and in high speed pulse generators.

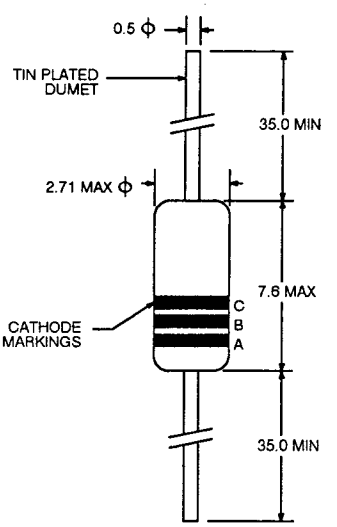
OUTLINE DIMENSIONS (Units in mm)

OUTLINE 5F



Cp = 0.35 pF
Lp = 0.06 nH

OUTLINE 7F



Cp = 0.2 pF
Lp = 3.0 nH

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_R	Reverse Voltage ND1551-7F, ND1561-5F ND1571-5F	 V V	 25 20
I_F	Forward Current ND1551-7F, ND1561-5F ND1571-5F	 mA mA	 150 100
T_{STG}	Storage Temperature	°C	-65 to +150
T_J	Junction Temperature	°C	150

Color Code

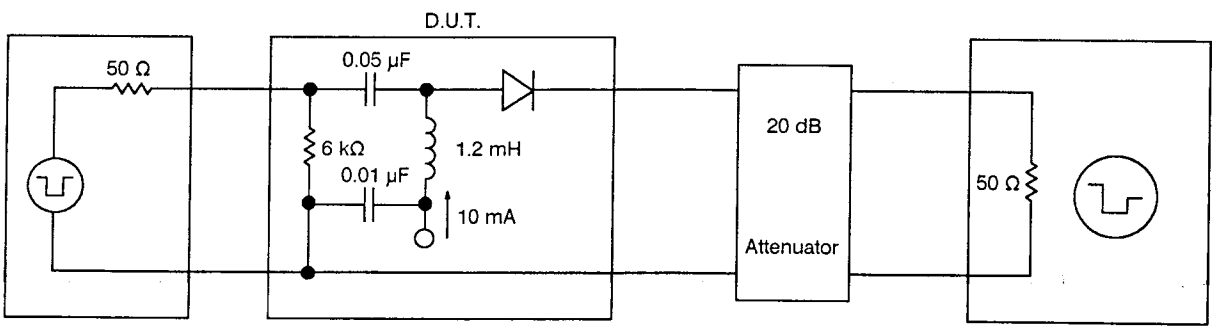
PART NUMBER	(A)	(B)	(C)
ND1551	Gray	Green	Green
ND1561	Gray	Green	Blue
ND1571	Gray	Green	Purple

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

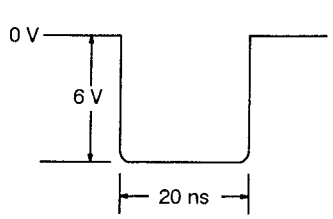
PART NUMBER EIAJ* REGISTERED NUMBER PACKAGE OUTLINE			ND1551-7F 1S1855 7F			ND1561-5F 1S1856 5F			ND1571-5F 1S1857 5F		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
V_R	Reverse Voltage at I_R = 10 μA	V	25			25			20		
I_R	Reverse Current at V_R = 18 V	nA			50			50			50
C_T	Total Capacitance** at V_R = 0 V, f = 1 MHz	pF		3	4		1.5	2		0.9	1.2
tr	Transition Time (See Transition Time Measuring Circuit)	pS		200	300		100	120		65	80
τ	Lifetime (See Lifetime Measuring Circuit)	nS	20	35		20	35		10	25	

*Electronic Industrial Association of Japan.
**Includes case capacitance of 0.35 pF.

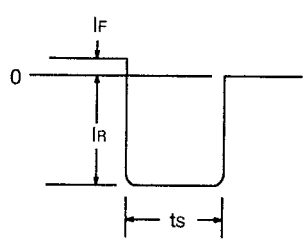
LIFETIME MEASURING CIRCUIT



Input Pulse Wave Form



Output Pulse Wave Form

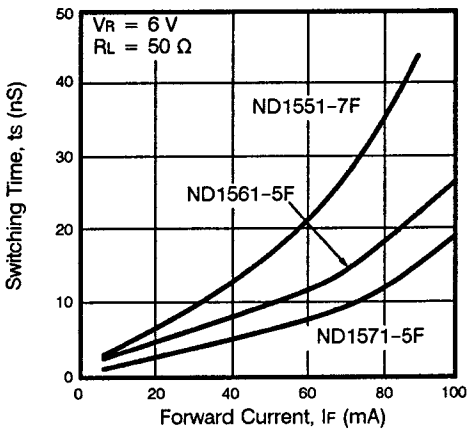


Forward Current I_F = 10 mA, Reverse Current I_R = 6 V/50 Ω = 120 mA.
Lifetime can be obtained from ts of the above wave form as follows:

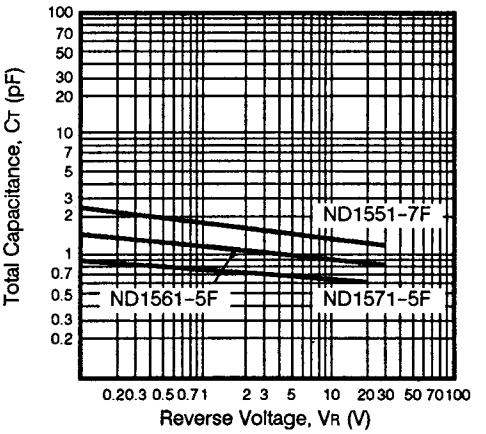
$$\tau = \frac{ts}{ln\left(1+\frac{I_F}{I_R}\right)} = 13\ ts$$

TYPICAL PERFORMANCE CHARACTERISTICS (T_A = 25°C)

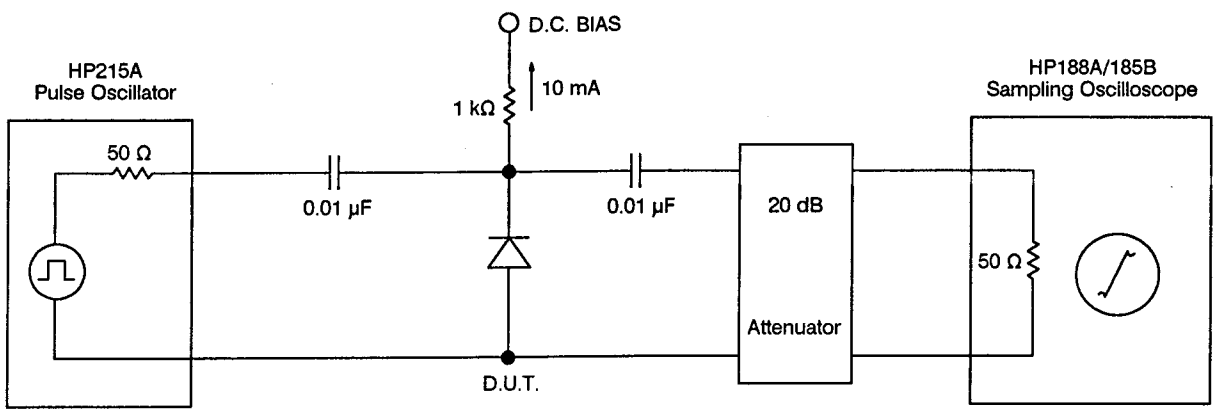
SWITCHING TIME vs. FORWARD CURRENT



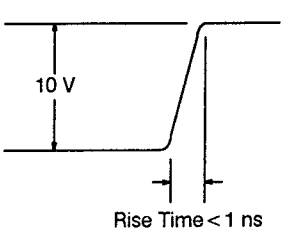
TOTAL CAPACITANCE vs. REVERSE VOLTAGE



TRANSITION TIME MEASURING CIRCUIT



Input Pulse Wave Form



Output Pulse Wave Form