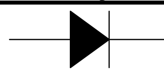
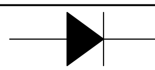
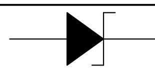
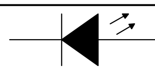
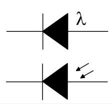
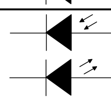
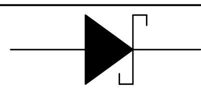
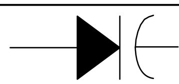
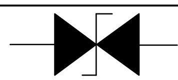
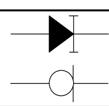
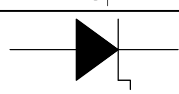
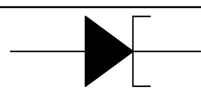
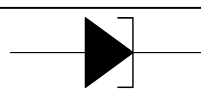
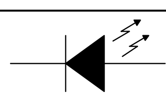
DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CAMBRIDGE, MASSACHUSETTS 02139

Types of Diodes

Diode Name	Diode Symbol	Used for:	Special Characteristics
Rectifier Diode, Fast Switching Rectifier		Converting AC to DC; Linear and switching power supplies	Can be had in very high current capacities, too slow for hf signal use.
Signal Diode		HF rectification, detection	Small t_r = few ns
Zener Diode		Voltage reference, regulation	Used in reverse breakdown
Light-emitting Diode [LED]		Indication, 7-segment displays	V_F 's vary with color
Photodiode		Light detection, mech.-electrical conversion; solar cell	Reverse current is increased by light; in FWD direction=solar cell
Optocoupler		Electrical isolation	LED and photodiode in an opaque package
Schottky Diode		VHF rectification, detecting small signals	No stored charges, >300 MHz, 0.25V V_F [metal jn]
Varactor Diode		Tuning radio and TV receivers	Fairly linear C with V_R
Varistor		AC line spike protection	2 back-back zeners
Current Regulator		Constant current source	
Step-recovery Diode		"snap" diode generates harmonics, f multipliers	Exploits reverse-current phenomenon
Back Diode		Very small signal rectification	V_R smaller than V_F
Tunnel Diode		High frequency oscillators	Part of forward char. has negative resistance
Laser Diode		Reading, writing CD, DVD etc.	
PIN Diode		RF switching diode	

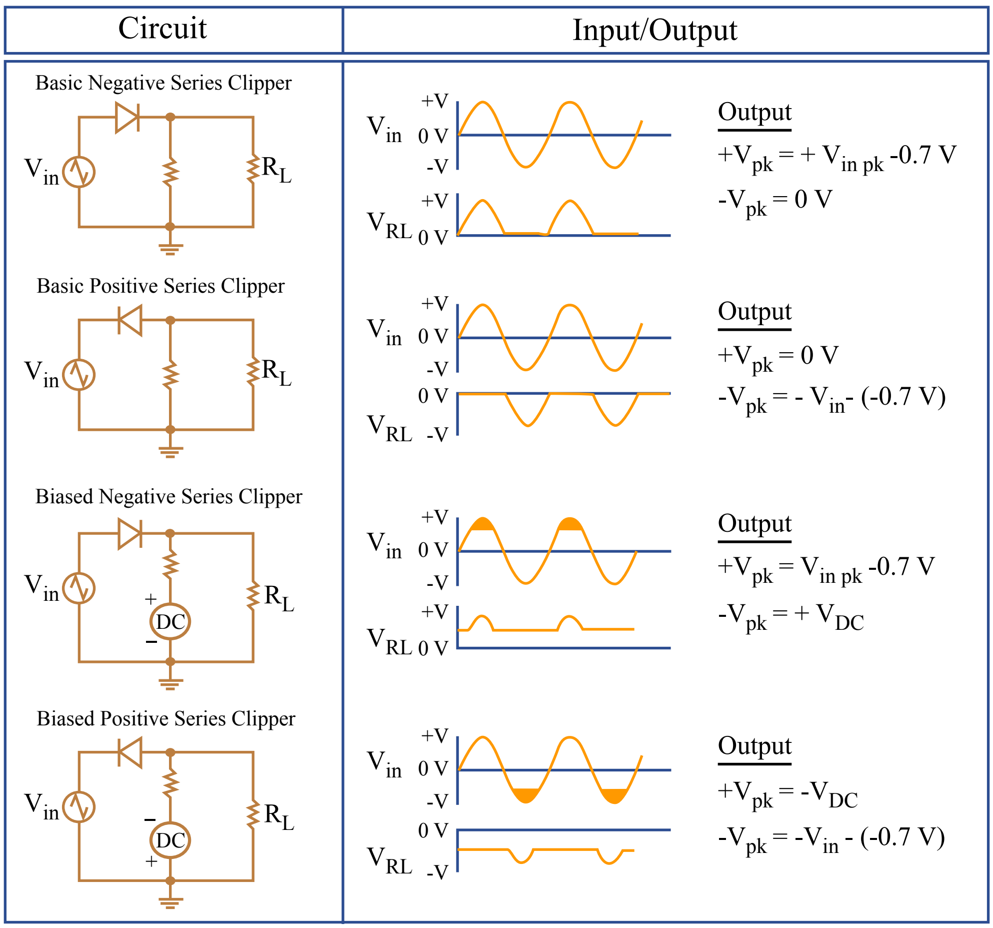
DIODES

Type	$V_{R(max)}$[a] (V)	$I_{R(max)}$[b] (μA)	Continuous V_F @ (V)	Continuous I_F (mA)	Peak V_F @ (V)	Peak I_F (A)	Reverse recovery (ns)	Capacitance (10V) (pF)	Class	Comments
PAD-1	45	1pA@20V	0.8	5	–	–	–	0.8	lowest I_R	Siliconix
FJT1100	30	0.001	–	–	1.1	0.05	–	1.2	very low I_R	1pA@5V, 10pA@15V
ID101	30	10pA@10V	0.8	1	1.1	0.03	–	0.8	very low I_R	Intersil; dual
1N3595	150	3	0.7	10	<1.0	0.2	3000	8.0	low I_R	1nA@125V
1N914	75	5	0.75	10	1.1	0.1	4	1.3	gen purp sig diode	indus std; same as 1N4148
1N6263	60	10	0.4	1	0.7	0.01	0	1.0	Schottky: low V_F	
1N3062	75	50	<1.0	20[b]	–	–	2	0.6	low cap, sig diode	1pF at 0 volts
1N4305	75	50	0.6	1	–	–	4	1.5	controlled V_F	
1N4002 }	100	50	0.9	1000	2.3	25	3500	15	1-amp rect	indus std; 7-member fam
1N4007 }	1000	50	0.9	1000	2.3	25	5000	10		
1N5819	40	10000	0.4	1000	1.1	20	–	50	pwr Schottky	lead mounted
1N5822	40	20000	0.45	3000	1.3	50	–	180	pwr Schottky	lead mounted
1N5625	400	50	1.1	5000	2.0	50	2500	45	5-amp rect	lead mounted
1N1183A	50	1000	1.1	40000	1.3	100	–	–	high curr rect	1N1183RA reverse

(a) $V_{R(max)}$ is repetitive peak reverse voltage, 25°C, 10μA leakage.

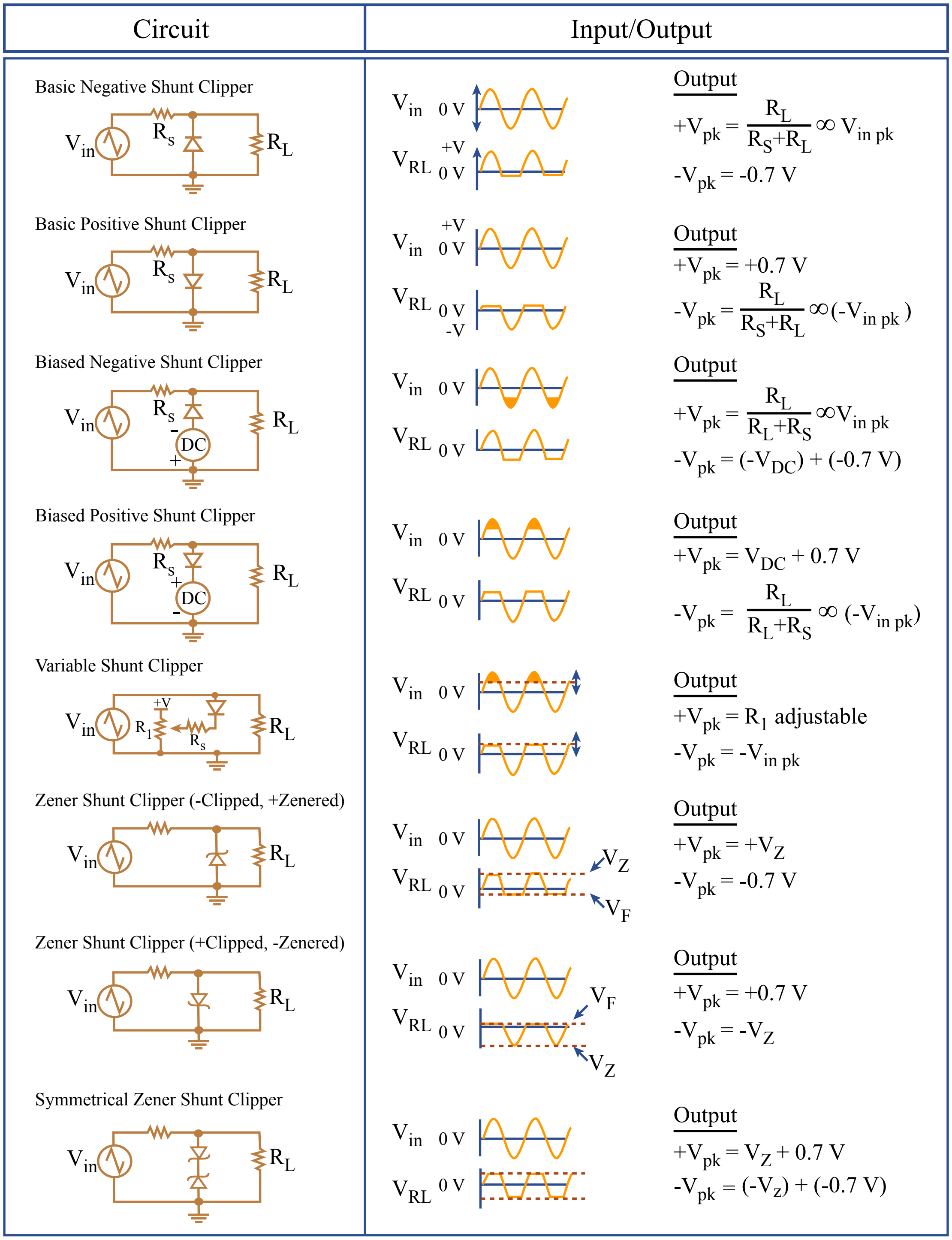
(b) $I_{R(max)}$ is reverse leakage current at V_R and 100°C ambient temperature.

Figure by MIT OpenCourseWare.



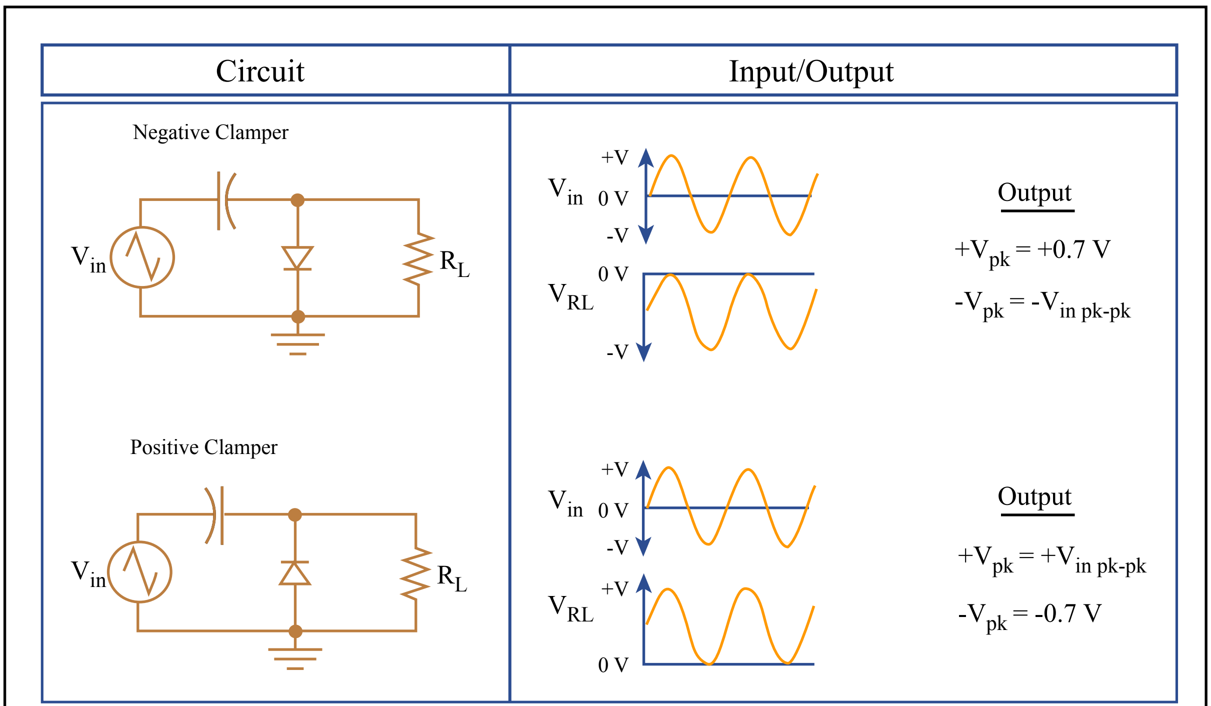
Diode Series Clipper Circuits.

Figure by MIT OpenCourseWare.



Diode Shunt Clipper Circuits.

Figure by MIT OpenCourseWare.



Diode Clamper Circuits.

Figure by MIT OpenCourseWare.