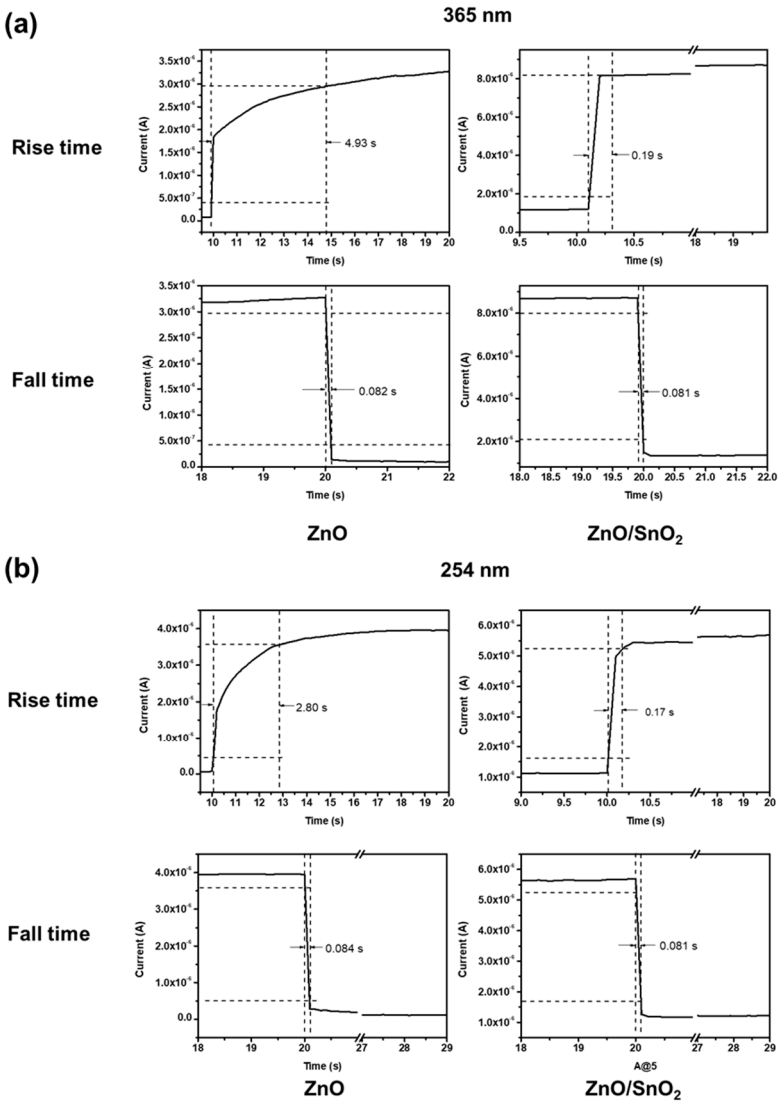

Figure S1. Magnified time-domain photoresponse of ZnO and ZnO/SnO_2 PDs under (a) 365nm and (b) 254nm UV light at a fixed bias condition of –5V.

Table S1. Summary table of other ZnO- or SnO_2- based photodetectors previously reported

Material	**Wavelength**	**Bias**	**Light intensity**	**Dark current**	**Photocurrent**	**Iph/ Idark**	**Responsivity**	**Rise time**	**Fall time**	Ref.
ZnO(NW) + SIG	365nm	5V	30μW/cm^2	0.15nA	0.68μA	4533	-	-	0.3s	1
ZnO(NR)	-	5V	-	-	-	2060	1.12x10^3 A/W	3s	1s	2

ZnO(NS)-HfO2	450nm	1V	-	1pA	-	-	$6.83x10^3$ A/W	0.3s	0.31s	3
ZnO(NF)-NiO	-	0V	-	-	-	-	0.415 mA/W	7.5s	4.8s	4
rGO+ZnO+GQD	-	2V	-	35.6μA/cm^2	128 μA/cm^2	3.59	12.8 A/W	4.26s	10.97s	5
ZnO(film)	-	-	-	-	-	$>10^2$	2.2 A/W	0.2s	0.3s	6
ZnO(NP film)	365nm	-2V	0.1 mW/cm2	0.66μA	80μA	120	-	64ms	70ms	7
ZnO-SnO2(single)	300nm	2V	-	200fA	300pA	1500		162.9s	75.5s	8
SnO2	365nm	0.4 mV	0.2mWcm^{-2}	32pA	1.43nA	44	15	250s	506s	9
SnO2(amorphous)	370nm	0V	107Wcm^{-2}	-	-	6018	0.36	0.72s	1.78s	10
Z-S nanofiber	300nm	10V	0.45	1.7pA	7.9nA	4600	-	32.2s	7.8s	11
S-Z Nanowires	365nm	5V	17100	35.3μA	53.5μA	1.52	-	>100s	328s	12
S-Z Brush-like	325nm	5V	24	3μA	40μA	13.3	-	>10s	>10s	13
ZnO – SnO2	365nm	-5V		2.07μA	10.64μA	5.14	5.4 mA/W	0.19s	0.08s	Our work
	254nm	-5V		2.07μA	6.93μA	3.35	3.46 mA/W	0.17s	0.08s	

*NF=Nanofiber , *NP=Nanoparticle, *NW=Nanowire, *NR=Nanorod, *NS=Nanosheet

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