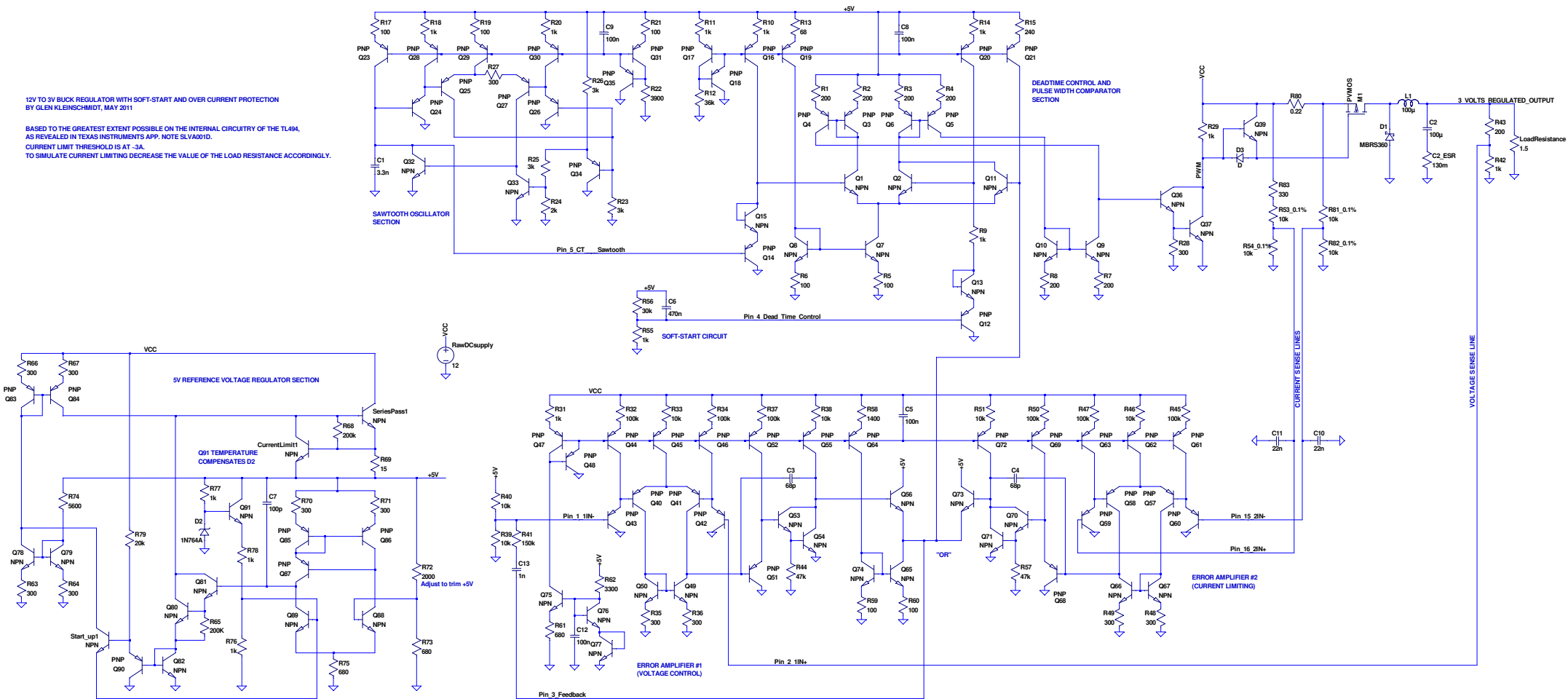


12V TO 3V BUCK REGULATOR WITH SOFT-START AND OVER CURRENT PROTECTION
BY GLEN KLEINSCHMIDT, MAY 2011

BASED TO THE GREATEST EXTENT POSSIBLE ON THE INTERNAL CIRCUITRY OF THE TL494,
AS REVEALED IN TEXAS INSTRUMENTS APP. NOTE SLV4001D.
CURRENT LIMIT THRESHOLD IS AT -3A.
TO SIMULATE CURRENT LIMITING DECREASE THE VALUE OF THE LOAD RESISTANCE ACCORDINGLY.



```
.tran 0 1m 0 1u startup
.options plotwinsize=0
.model 1N766A D(Is=1.5n Rs=.5 Cj=.72p nbv=2 bvs=3.14 Ibv=1m)
.model NPN NPN(Is=2.38E-14 NF=1.008 ISE=3.56E-15 NE=1.541 BF=294.3 IKF=.00839 VAF=21.11 NR=1.005 ISC=2.85E-13 NC=1.243 BR=7.946 IKR=0.1144 VAR=25.9 IRB=1.00E-06 RBM=1 RE=0.4683 RC=0.85 XTb=0 EG=1.11 XTIs=3 CJE=1.35E-11 VJE=0.65 MJE=0.3279 TF=4.39E-10 XTF=120 VTF=2.643 ITF=0.1485 PTF=0 CJC=3.728E-12 VJC=0.3997 MJC=0.2955 XCJC=0.6193 TR=1.00E-32 CJS=0.75 MJS=0.333 FC=0.9579 Vceo=45 Icrating=100m mfg=Philips)
.model PNP PNP(Is=3.83E-14 NF=1.008 ISE=1.22E-14 NE=1.528 BF=344.1 IKF=0.08039 VAF=21.11 NR=1.005 ISC=2.85E-13 NC=1.28 BR=14.84 IKR=0.047 VAR=32.02 RB=1.00E-06 RBM=1 RE=0.6202 RC=0.5713 XTb=0 EG=1.11 XTIs=3 CJE=1.23E-11 VJE=0.6106 MJE=0.378 TF=5.60E-10 XTF=3.414 VTF=5.233 ITF=0.1485 PTF=0 CJC=1.08E-11 VJC=0.1022 MJC=0.3563 XCJC=0.6288 TR=1.00E-32 CJS=0.75 MJS=0.333 FC=0.8027 Vceo=45 Icrating=100m mfg=Philips)
.model D D(Is=2.52n Rs=588 N=1.792 Cj=.4p Ms=-4 It=20n Iav=200m Vpk=75)
.model PVMOS VDMOS(pden Rg=3 Rds=24m Rsi=18m Vto=-1 Kp=15 Cgdmax=1n Cgdmin=.13n Cjsw=1.7n Cjsw=5n Is=50p Rbs=30m)
```