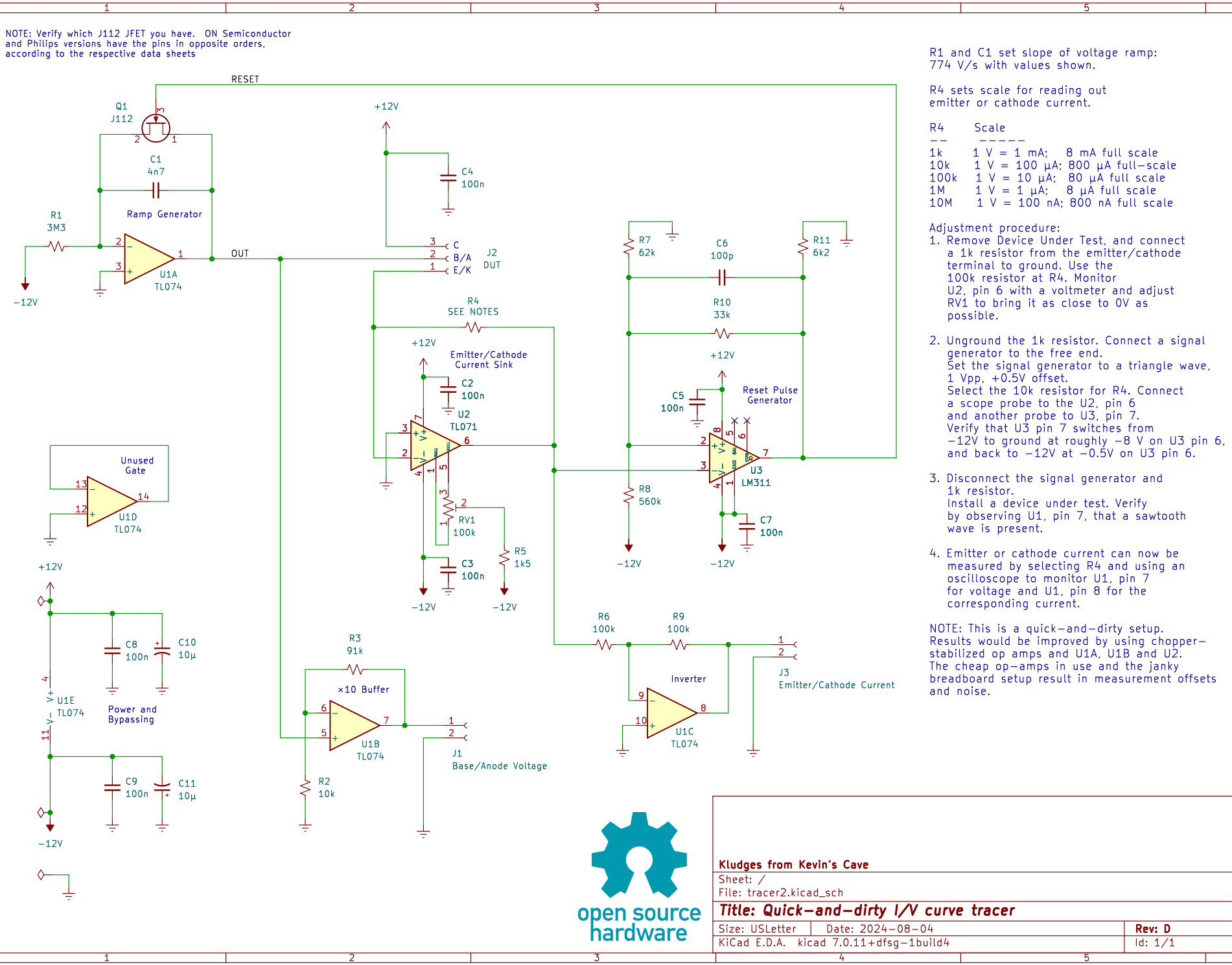
NOTE: Verify which J112 JFET you have. ON Semiconductor and Philips versions have the pins in opposite orders, according to the respective data sheets
RESET
Q1
J112
C1
4n7
Ramp Generator
R1
3M3
U1A
TL074
OUT
−12V
+12V
C4
100n
J2
DUT
C
B/A
E/K
R4
SEE NOTES
Emitter/Cathode
Current Sink
C2
100n
U2
TL071
RV1
100k
R5
1k5
C3
100n
R7
62k
C6
100p
R11
6k2
R10
33k
C5
100n
Reset Pulse
Generator
U3
LM311
R8
560k
C7
100n
Unused
Gate
U1D
TL074
C8
100n
C10
10µ
U1E
TL074
Power and
Bypassing
C9
100n
C11
10µ
R3
91k
×10 Buffer
U1B
TL074
R2
10k
J1
Base/Anode Voltage
R6
100k
R9
100k
Inverter
U1C
TL074
J3
Emitter/Cathode Current
R1 and C1 set slope of voltage ramp:
774 V/s with values shown.
R4 sets scale for reading out
emitter or cathode current.
R4 Scale
1k 1 V = 1 mA; 8 mA full scale
10k 1 V = 100 µA; 800 µA full−scale
100k 1 V = 10 µA; 80 µA full scale
1M 1 V = 1 µA; 8 µA full scale
10M 1 V = 100 nA; 800 nA full scale
Adjustment procedure:
1. Remove Device Under Test, and connect a 1k resistor from the emitter/cathode terminal to ground. Use the 100k resistor at R4. Monitor U2, pin 6 with a voltmeter and adjust RV1 to bring it as close to 0V as possible.
2. Unground the 1k resistor. Connect a signal generator to the free end. Set the signal generator to a triangle wave, 1 Vpp, +0.5V offset. Select the 10k resistor for R4. Connect a scope probe to the U2, pin 6 and another probe to U3, pin 7. Verify that U3 pin 7 switches from −12V to ground at roughly −8 V on U3 pin 6, and back to −12V at −0.5V on U3 pin 6.
3. Disconnect the signal generator and 1k resistor. Install a device under test. Verify by observing U1, pin 7, that a sawtooth wave is present.
4. Emitter or cathode current can now be measured by selecting R4 and using an oscilloscope to monitor U1, pin 7 for voltage and U1, pin 8 for the corresponding current.
NOTE: This is a quick−and−dirty setup. Results would be improved by using chopper−stabilized op amps and U1A, U1B and U2. The cheap op−amps in use and the janky breadboard setup result in measurement offsets and noise.
open source hardware
Kludges from Kevin's Cave
Sheet: /
File: tracer2.kicad_sch
Title: Quick−and−dirty I/V curve tracer
Size: USLetter
Date: 2024−08−04
Rev: D
KiCad E.D.A. kicad 7.0.11+dfsg−1build4
Id: 1/1