

RF device Operating Life Test

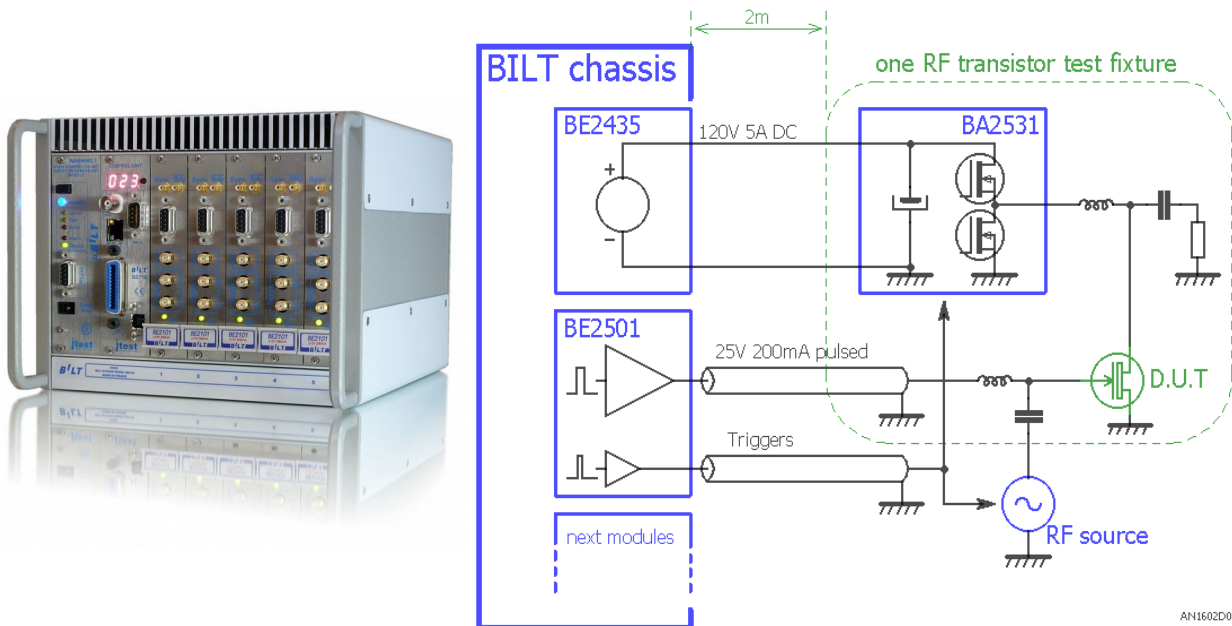
The Bilt system offers a highly integrated and low cost solution for biasing RF transistors in any pulsed mode application. The pulse can be performed by switching either the Gate, the Drain or/and the RF signal.

The pulse sequence is fully programmable using a time resolution of 20ns. Drain and Gate are monitored synchronously for voltage and current measurement.

The BA2531 drain pulse controller, located close to the device and fitted with a very large capacitor, delivers large current pulses at low frequency while maintaining a small voltage drop.

Safe operation is guaranteed by:

- A very fast Drain current breaker, also called "Efuse" function
- A Drain DC power supply designed to drive safely a very large capacitor value and a switching load.
- A fast trigger performs the shutdown of the Drain before any gate bias interruption.



AN1602D01

One RF transistor biasing requires 2 modules plugged inside the Bilt chassis:

- BE2435 (240W) or BE2436 (120W) - The Drain power supply and USB driver for BA2531
- BE2501 - The Gate source, delivers both the pulsed signal and triggers for synchronization.

The next module slots inside the Bilt Chassis are available for either:

- building a multichannel test bench
- adding additional modules for devices requiring more than one Drain and one gate signal.
- adding additional functions: RF control module, thermal control module, auxiliary DC source...

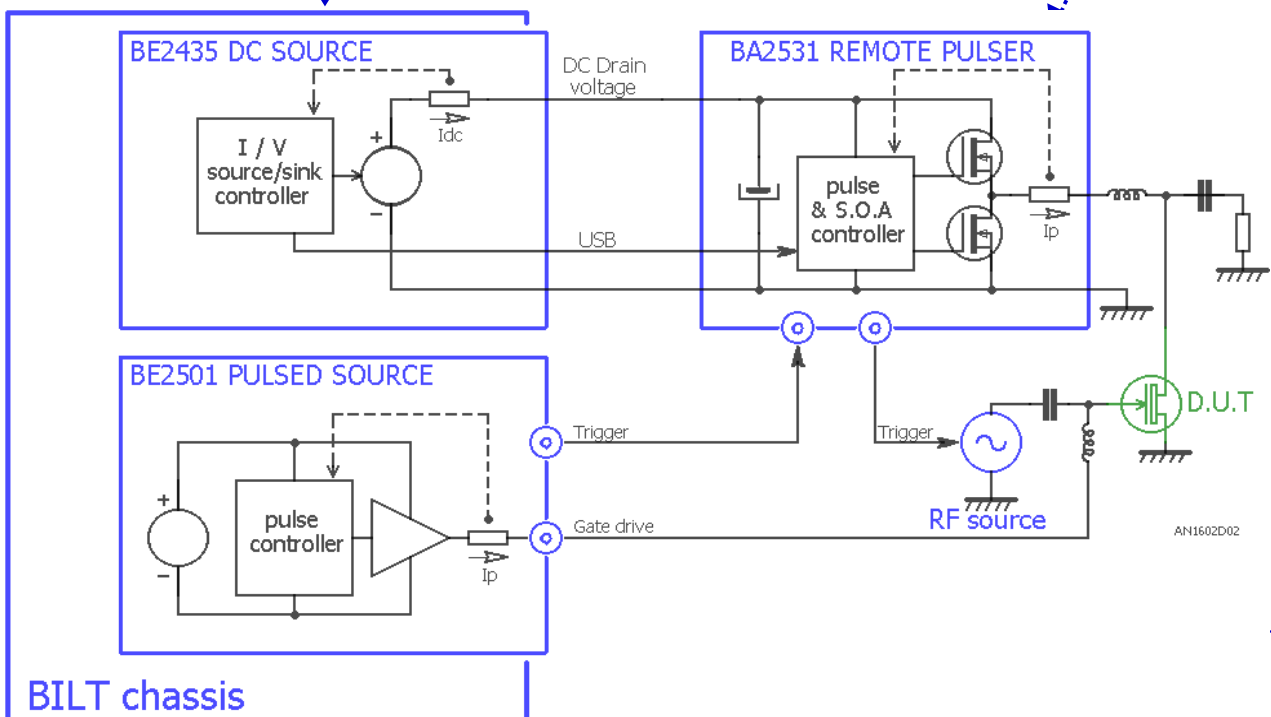
Focus on the Bilt system solution:

BE2431 isolated DC voltage source:

- ▶ up to 120V or 5A
- ▶ 18 bit programming resolution
- ▶ stable for any load capacitor
- ▶ 240W source and 25W sink capability
- ▶ remote sense voltage read back
- ▶ programmable DC current compliance
- ▶ USB interface to the remote pulser

BA2531 remote pulse controller

- ▶ fast power switch, 2 levels: pulse & ground
- ▶ up to 120V 30A pulsed, 5A dc
- ▶ large storage capacitor rated 60V or 120V
- ▶ 100ns smart ultra fast current breaker
- ▶ 20ns resolution programmable timing
- ▶ 500ns pulse measurement settling time
- ▶ 16 bit voltage and current read-back sampler



Software features:

- ▶ Driver for EasyStress software, to perform any multichannel and user configurable test bench.
- ▶ Complete free software package provided, including BiltLab, a turnkey PC software and NI Labview® drivers

- ▶ Up to $\pm 25V \pm 200mA$
- ▶ Linear power amplifier, 50Ω output impedance
- ▶ 2 programmable levels: quiescent & pulsed
- ▶ 20 ns resolution programmable timing
- ▶ $0,5\mu s$ pulse measurement settling time
- ▶ 16 bit voltage and current read-back sampler
- ▶ 2 current ranges: $\pm 5mA$ and $\pm 200mA$
- ▶ triggers in/out for overall synchronization

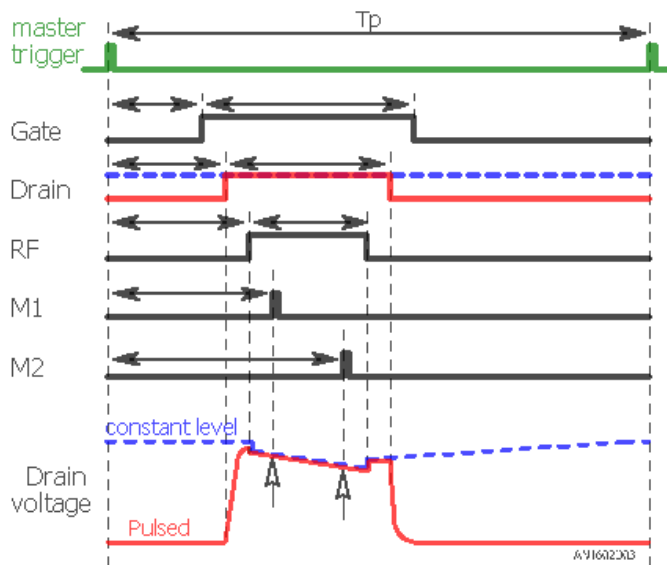
Pulse control and monitoring:

The switching operation is defined by programming for each signal:

- pulse enable or constant level
- pulse position
- pulse length

Then, according to the 2 sampling time positions M1 & M2, measurements are proceeded continuously for both current & voltage, Drain & gate.

These 8 channel measurements are both available for displaying at run-time and memorization of the drift throughout the test.



The example shows sampling M1 & M2 inside the current pulse for voltage drop monitoring, using either constant level or pulsed mode.

Working point area

The following table shows the relationship between several limiting parameters:

F the Switching frequency, and **D** the duty cycle, defines **Ton** the pulse length

Ip the pulse drain current level

Vd the drain voltage level

Pdc the average drain power.

Vdrop the resulting drain voltage drop during the pulse

| | timing F,D,Ton | Ip | Vd ⁽²⁾ | Pdc | Vdrop ⁽¹⁾ |
|---|----------------------|------|-------------------|------|----------------------|
| Largest current and power pulse | 1/120Hz * 12% = 1ms | 30A | 60V | 220W | 1,8V |
| High voltage & high current | 1/600Hz * 6% = 100µs | 30A | 120V | 220W | 1,8V |
| Largest DC & RMS current | 1/250Hz * 25% = 1ms | 20A | 45V | 220W | 1,2V |
| shortest pulse, highest frequency | 1/100KHz * 20% = 2µs | 9A | 120V | 220W | 0,5V |
| minimum current level for Efuse protection | 1/10KHz * 10% = 10µs | 0,3A | 120V | 3,6W | 0 |

(1) Vdrop is a maximum value, calculated for constant drain voltage mode.

(2)When using a voltage greater than 60V, the storage capacitor value is divided by 4.

Product summary

| | |
|-------------------------------|--|
| <u>BN103</u> | 5-slot chassis, USB, Ethernet, 100-230V power line, 250Watts |
| <u>BE2501</u> | +25V 200mA pulsed voltage source module |
| <u>BA2531</u> | 120V 30A remote pulse controller |
| <u>BE2430</u> | 120V 5A DC source module and USB driver for BA2531 |

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