

# **Dynamic parameters of drivers IGBT- and MOSFET-transistors**

In the Table are represented all dynamic parameters of drivers-analogues of type DR2180P-Bx

Parameter	Symbol	Unit	Value			Page
			min	typ.	max	
Duration of switch-on (switch-off) delay between input and output	$t_{d\ on(off)}$	$\mu s$			0.5	4
«Dead time» between changes of signal on outputs of first and second channels *	$t_{DT}$	$\mu s$	2			5
Rise time (fall) of output signal	$t_r\ (f)$	ns			0.15	6
Delay time of non-saturation protection operation **	$t_{BLOCK1}$	$\mu s$	2			7
Time of smooth emergency transistor switch-off	$t_{off}$	$\mu s$		1.5		7
Blocking time of control transistor after an «emergency»	$t_{BLOCK2}$	ms		70		8
Delay time of emergency signal operation	$t_{d\ (on-err)}$	$\mu s$			2	9

\* - the parameter is set by a consumer; on the researched driver is set minimal time

\*\* - the parameter is set by a consumer; on the researched driver is set duration 4.5  $\mu s$  (typ.)

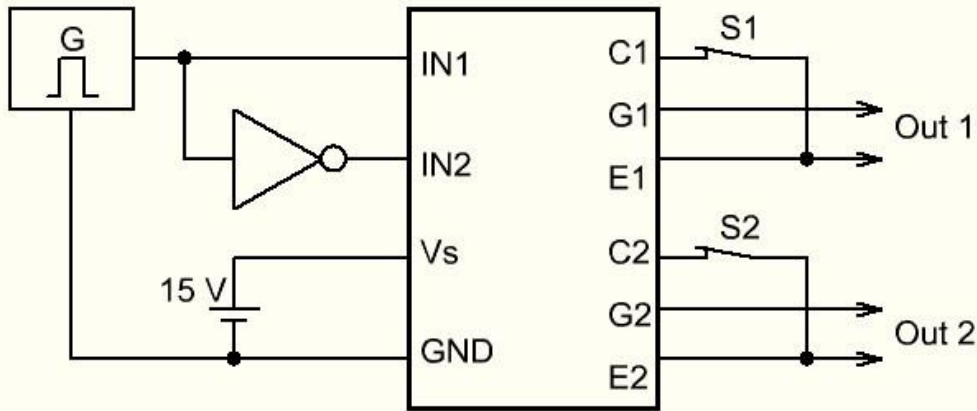


Figure 1

All measures carried out using driver **DR2180P-B3** without load on outputs

Figure 1 – Functional circuit of the driver switch-on

Switches S1, S2 are connected at the usual driver operation and disconnected at imitation of an emergency mode

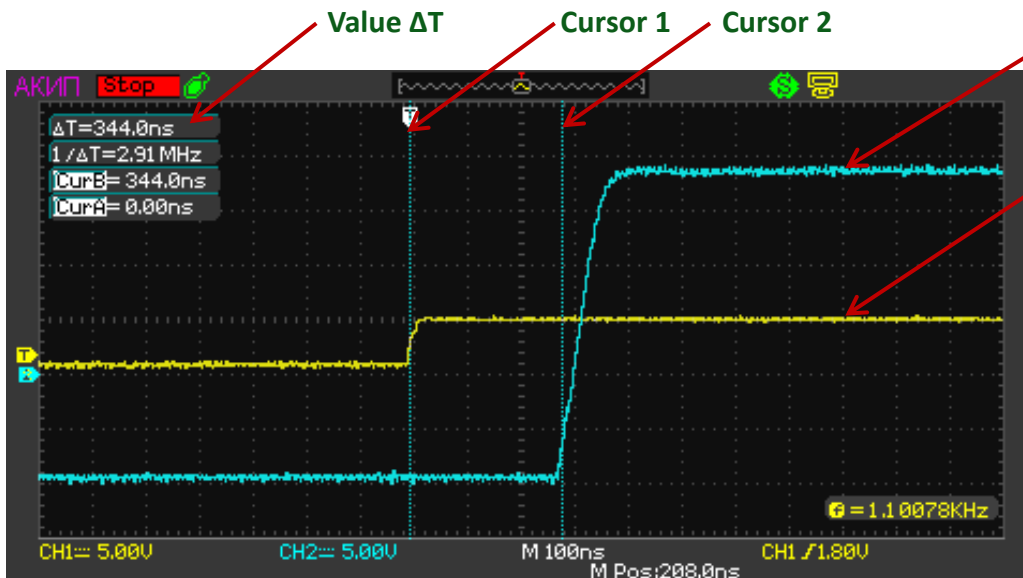


Figure 2

Channel 2

Channel 1

Figure 2 – An example of tracing

The cursors are set at start and end points of the report of the measured time interval.

Value  $\Delta T$  shows a time interval between the cursors.

## On/ off delay time

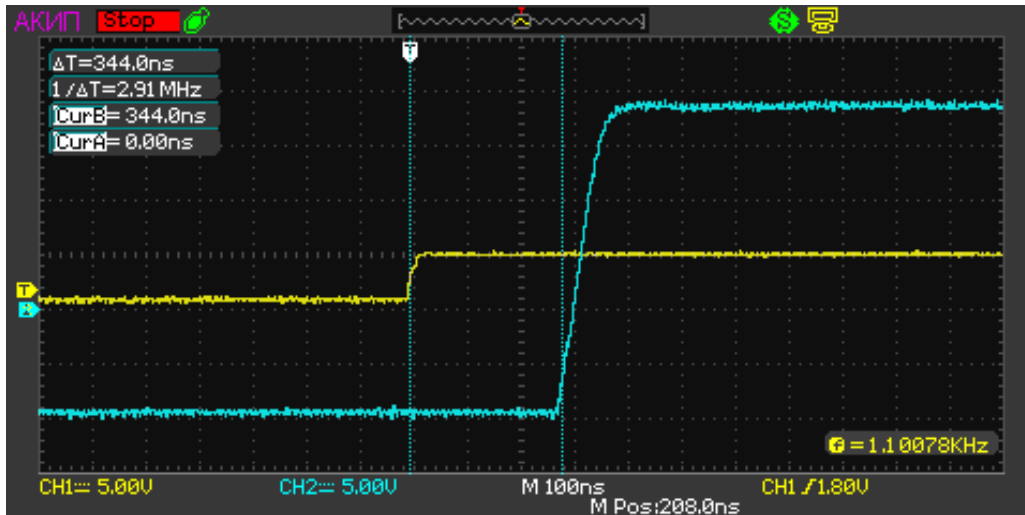


Figure 1

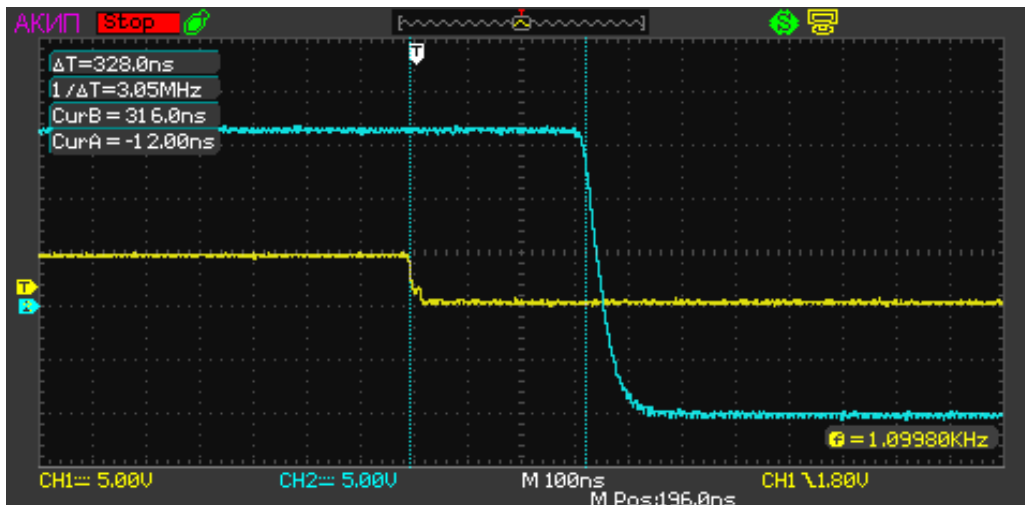


Figure 2

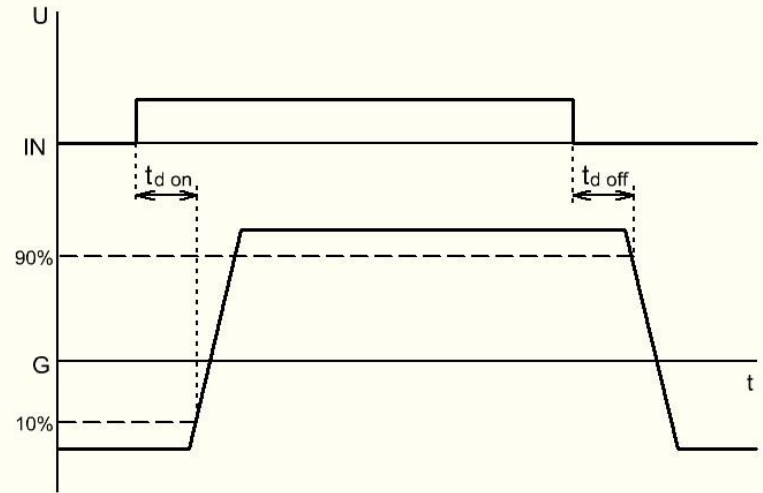


Figure 1 – Switch-on delay ( $t_{\text{d on}}$ )  
 $\Delta T = 344\text{ ns}$ , at rate of  $< 0.5\ \mu\text{s}$

Figure 2 – Switch-off delay ( $t_{\text{d off}}$ )  
 $\Delta T = 328\text{ ns}$ , at rate of  $< 0.5\ \mu\text{s}$

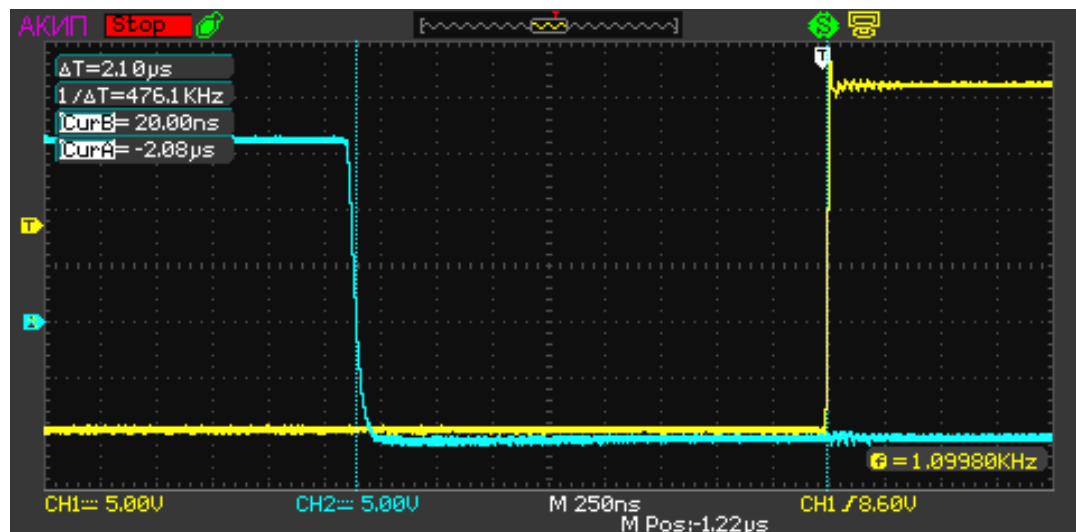


Figure 1

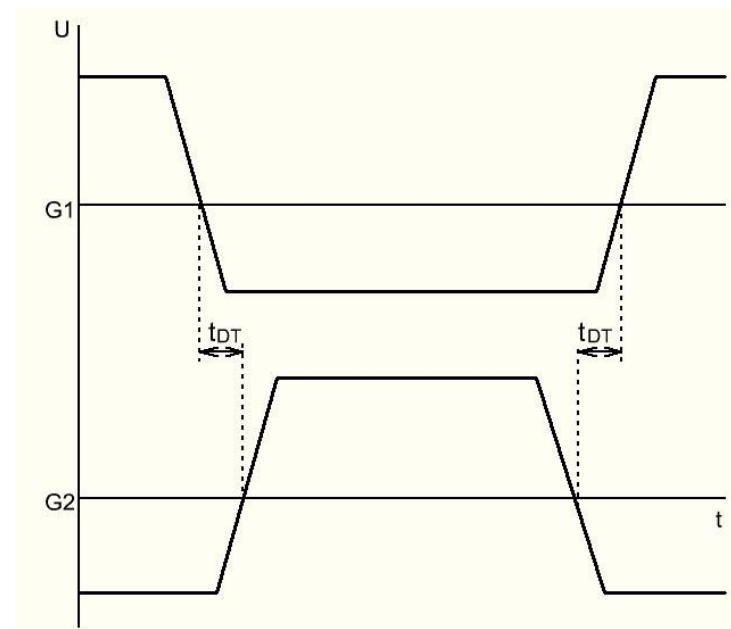


Figure 1 – «Dead time» between channels (**tdt**)  
 $\Delta T = 2.1 \mu s$ , at rate of  $> 2 \mu s$

## Output signal rise/fall time

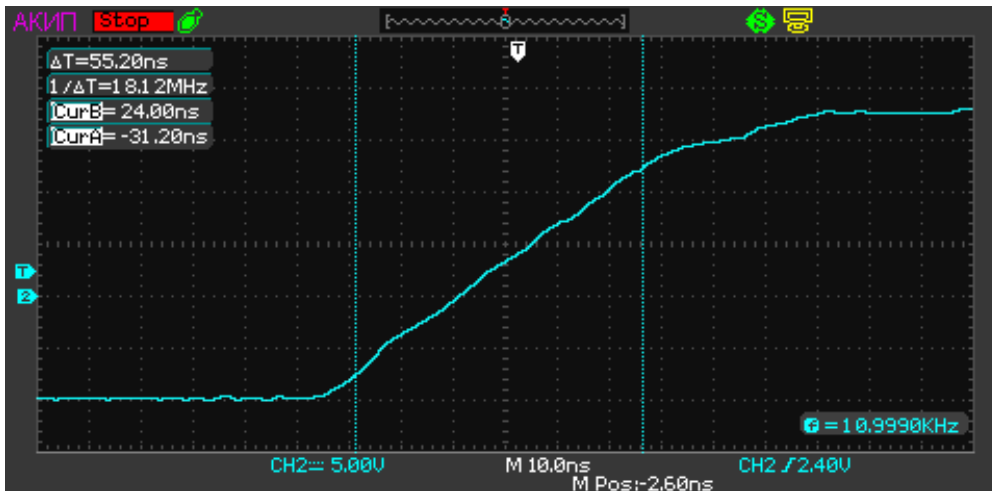


Figure 1

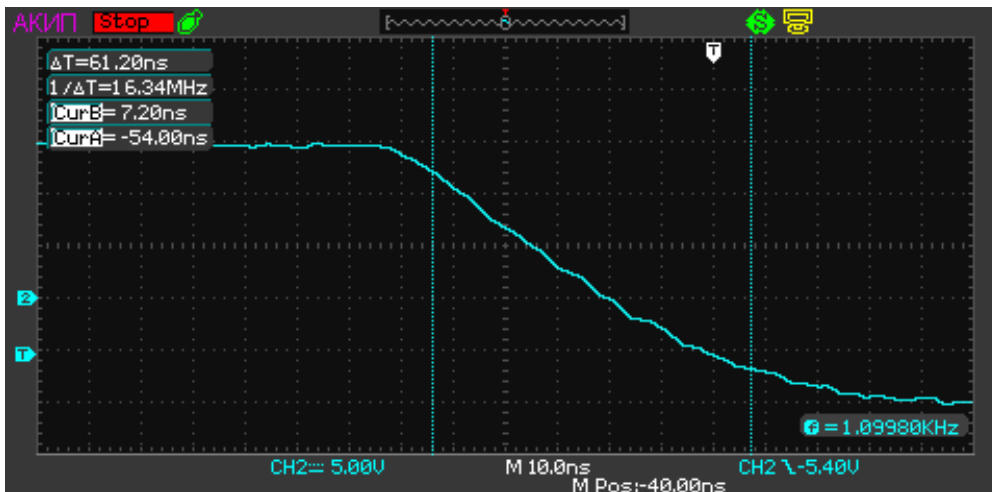


Figure 2

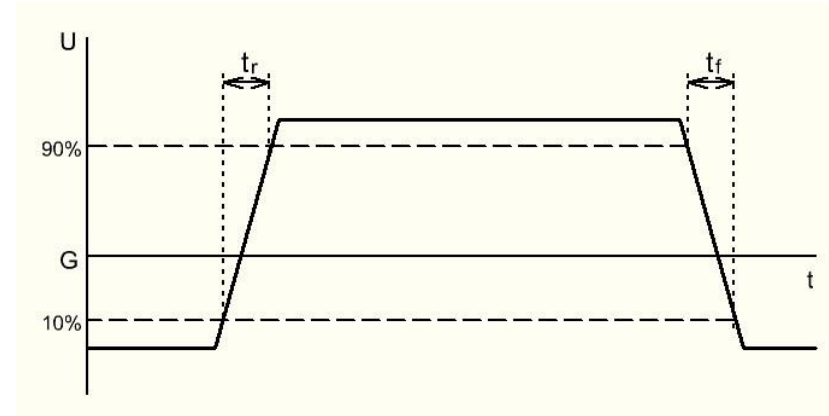


Figure 1 – Rise time ( $t_r$ )

$\Delta T = 55$  ns, at rate of  $< 150$  ns

Figure 2 – Fall time ( $t_f$ )

$\Delta T = 61$  ns, at rate of  $< 150$  ns

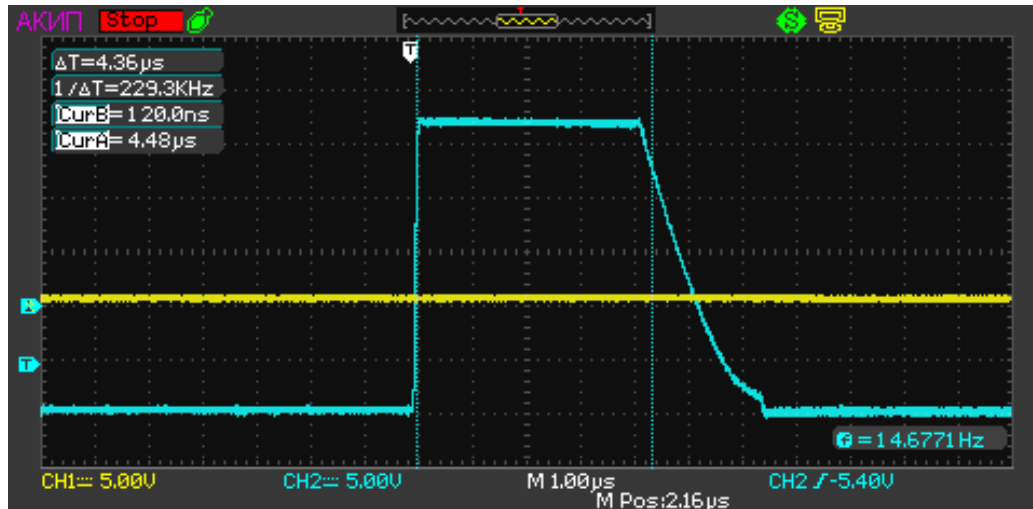


Figure 1

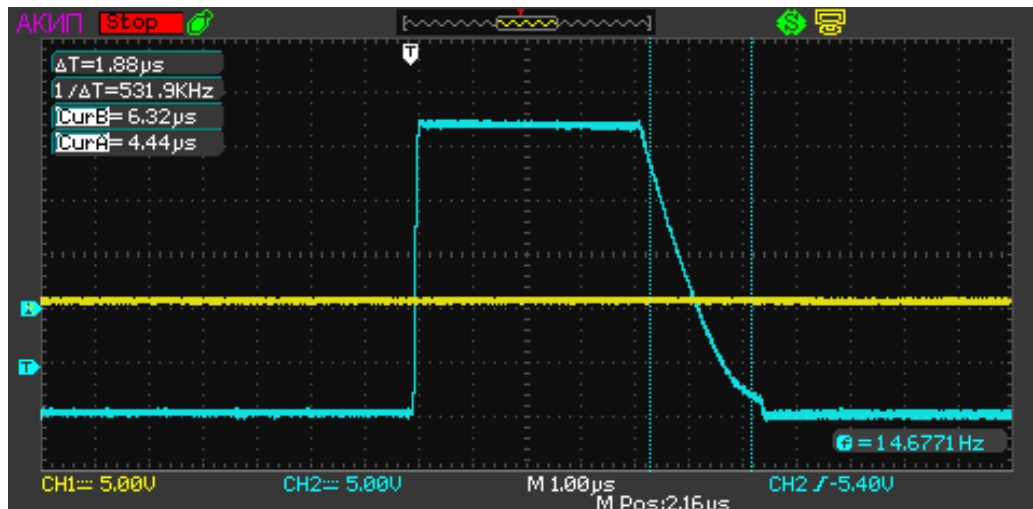


Figure 2

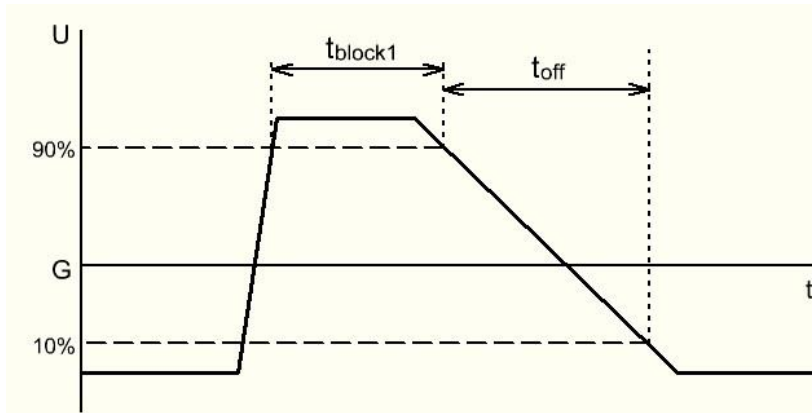
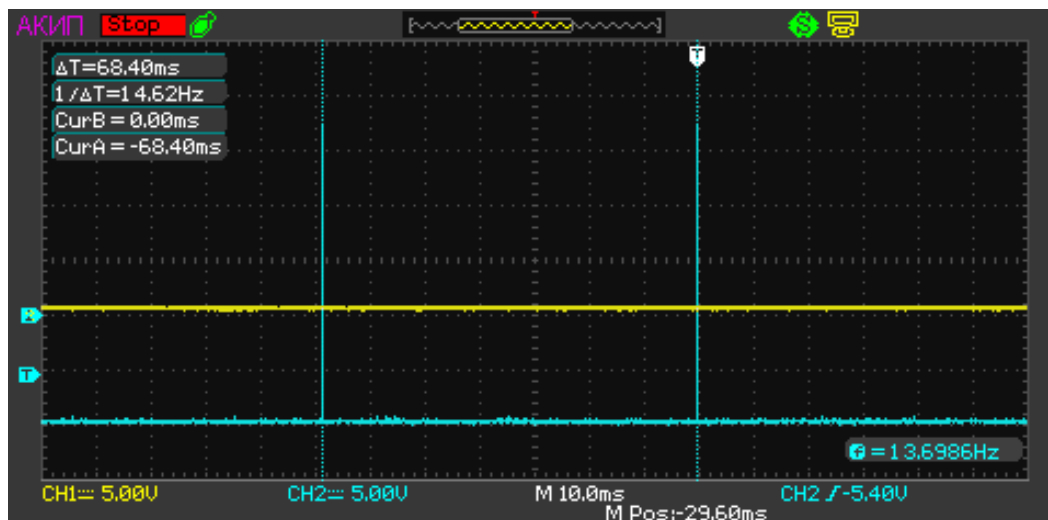


Figure 1 – Operation delay of non-saturation protection ( **$t_{block1}$** )

$\Delta T = 4.36 \mu s$ , at rate of  $4.5 \mu s$  (typ.)

Figure 2 – Duration of smooth emergency switch-off ( **$t_{off}$** )

$\Delta T = 1.88 \mu s$ , at rate of  $1.5 \mu s$  (typ.)



**Figure 1**

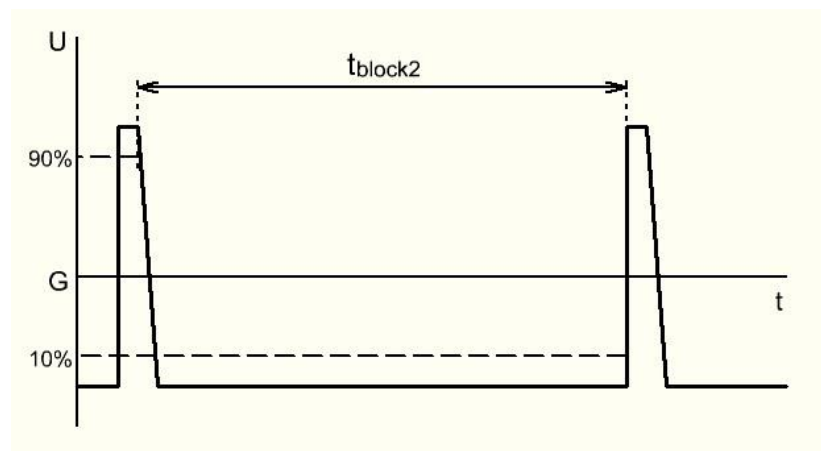
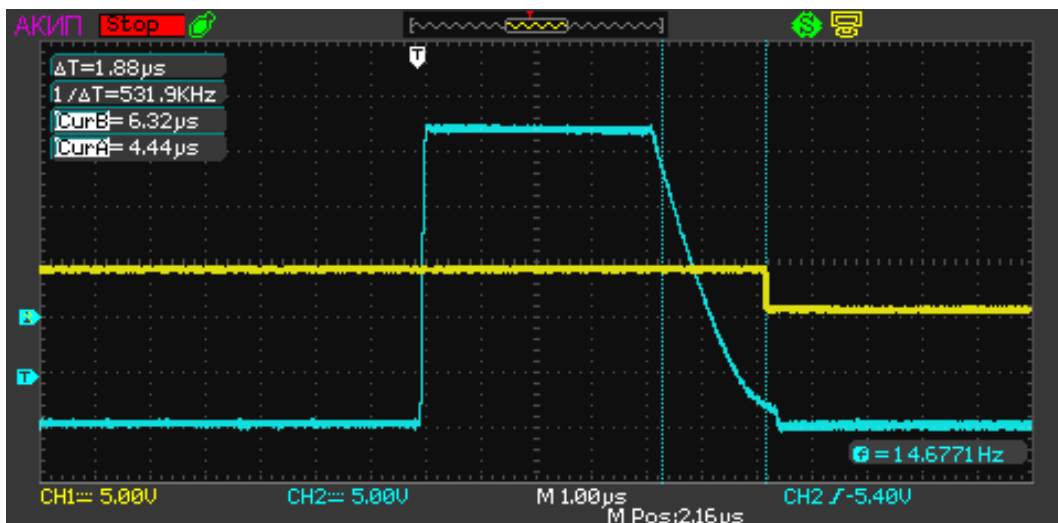


Figure 1 – Duration of blocking in an emergency mode ( $t_{\text{block}2}$ )  
 $\Delta T = 68.4\text{ms}$ , at rate of 70 ms (typ.)





**Figure 1**

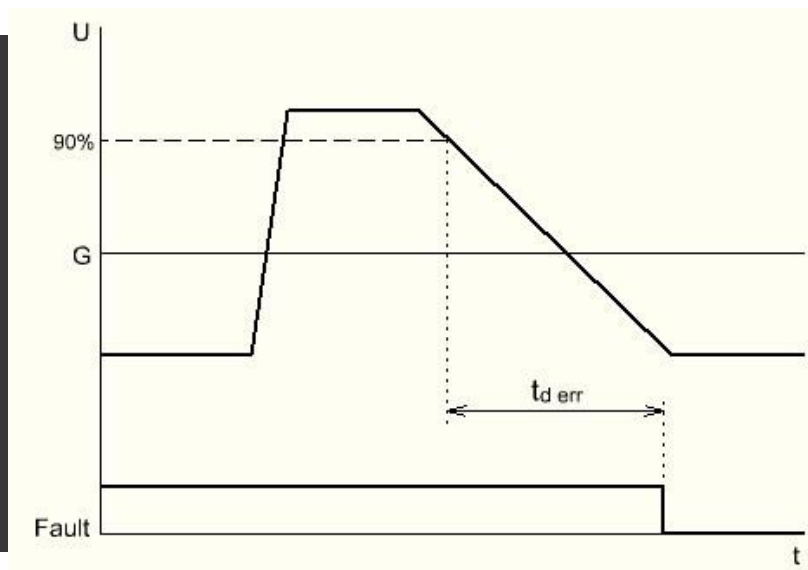


Figure 1 – Output «Fault» operation delay  
**( $t_{d \text{ err}}$ )**  
 $\Delta T = 1.88 \mu s$ , at rate of  $< 2 \mu s$

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