

Absolute Maximum Ratings $T_C = 25^{\circ}\text{C}$, Unless Otherwise Specified

			UNITS
Drain to Source Voltage (Note 1)	V_{DSS}	100	V
Drain to Gate Voltage ($R_{GS} = 20\text{k}\Omega$) (Note 1)	V_{DGR}	100	V
Gate to Source Voltage	V_{GS}	± 20	V
Drain Current			
Continuous (Figure 2)	I_D	56	A
Pulsed Drain Current	I_{DM}	Figure 4	
Pulsed Avalanche Rating	E_{AS}	Figures 6, 14, 15	
Power Dissipation	P_D	200	W
Derate Above 25°C		1.35	W/ $^{\circ}\text{C}$
Operating and Storage Temperature	T_J, T_{STG}	-55 to 175	$^{\circ}\text{C}$
Maximum Temperature for Soldering			
Leads at 0.063in (1.6mm) from Case for 10s.	T_L	300	$^{\circ}\text{C}$
Package Body for 10s, See Techbrief 334	T_{pkg}	260	$^{\circ}\text{C}$

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

1. $T_J = 25^{\circ}\text{C}$ to 150°C .

Electrical Specifications $T_C = 25^{\circ}\text{C}$, Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS	
OFF STATE SPECIFICATIONS							
Drain to Source Breakdown Voltage	BV _{DSS}	I _D = 250μA, V _{GS} = 0V (Figure 11)	100	-	-	V	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 95V, V _{GS} = 0V	-	-	1	μA	
		V _{DS} = 90V, V _{GS} = 0V, T _C = 150°C	-	-	250	μA	
Gate to Source Leakage Current	I _{GSS}	V _{GS} = ±20V	-	-	±100	nA	
ON STATE SPECIFICATIONS							
Gate to Source Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 250μA (Figure 10)	2	-	4	V	
Drain to Source On Resistance	r _{DS(ON)}	I _D = 56A, V _{GS} = 10V (Figure 9)	-	0.021	0.025	Ω	
THERMAL SPECIFICATIONS							
Thermal Resistance Junction to Case	R _{θJC}	(Figure 3)	-	-	0.74	°C/W	
Thermal Resistance Junction to Ambient	R _{θJA}	TO-247	-	-	30	°C/W	
		TO-220, TO-263	-	-	62	°C/W	
SWITCHING SPECIFICATIONS (V _{GS} = 10V)							
Turn-On Time	t _{ON}	V _{DD} = 50V, I _D ≅ 56A, R _L = 0.89Ω, V _{GS} = 10V, R _{GS} = 5.1Ω	-	-	110	ns	
Turn-On Delay Time	t _{d(ON)}		-	15	-	ns	
Rise Time	t _r		-	60	-	ns	
Turn-Off Delay Time	t _{d(OFF)}		-	20	-	ns	
Fall Time	t _f		-	25	-	ns	
Turn-Off Time	t _{OFF}		-	-	70	ns	
GATE CHARGE SPECIFICATIONS							
Total Gate Charge	Q _{g(TOT)}	V _{GS} = 0V to 20V	V _{DD} = 50V, I _D ≅ 56A, R _L = 0.89Ω I _{g(REF)} = 1.0mA (Figure 13)	-	110	130	nC
Gate Charge at 10V	Q _{g(10)}	V _{GS} = 0V to 10V		-	57	75	nC
Threshold Gate Charge	Q _{g(TH)}	V _{GS} = 0V to 2V		-	3.7	4.5	nC
Gate to Source Gate Charge	Q _{gs}			-	9.8	-	nC
Gate to Drain “Miller” Charge	Q _{gd}			-	24	-	nC

Electrical Specifications $T_C = 25^\circ\text{C}$, Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
CAPACITANCE SPECIFICATIONS						
Input Capacitance	C_{ISS}	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$ (Figure 12)	-	2000	-	pF
Output Capacitance	C_{OSS}		-	500	-	pF
Reverse Transfer Capacitance	C_{RSS}		-	65	-	pF

Source to Drain Diode Specifications

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Source to Drain Diode Voltage	V_{SD}	$I_{SD} = 56\text{A}$	-	-	1.25	V
Reverse Recovery Time	t_{rr}	$I_{SD} = 56\text{A}$, $dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	110	ns
Reverse Recovered Charge	Q_{RR}	$I_{SD} = 56\text{A}$, $dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	320	nC

Typical Performance Curves

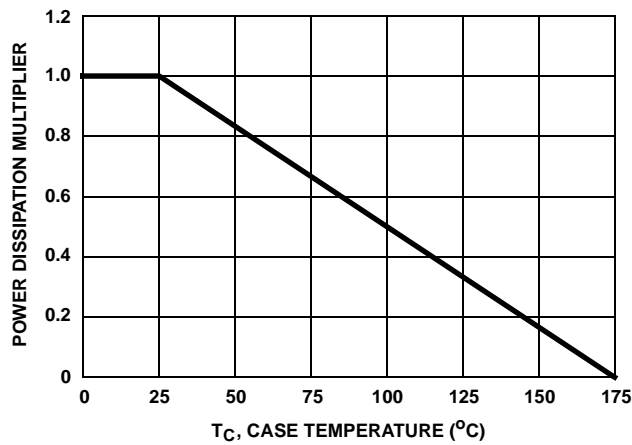


FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

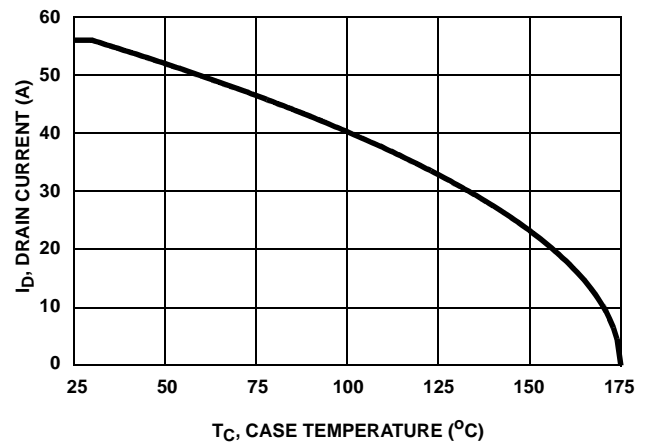


FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

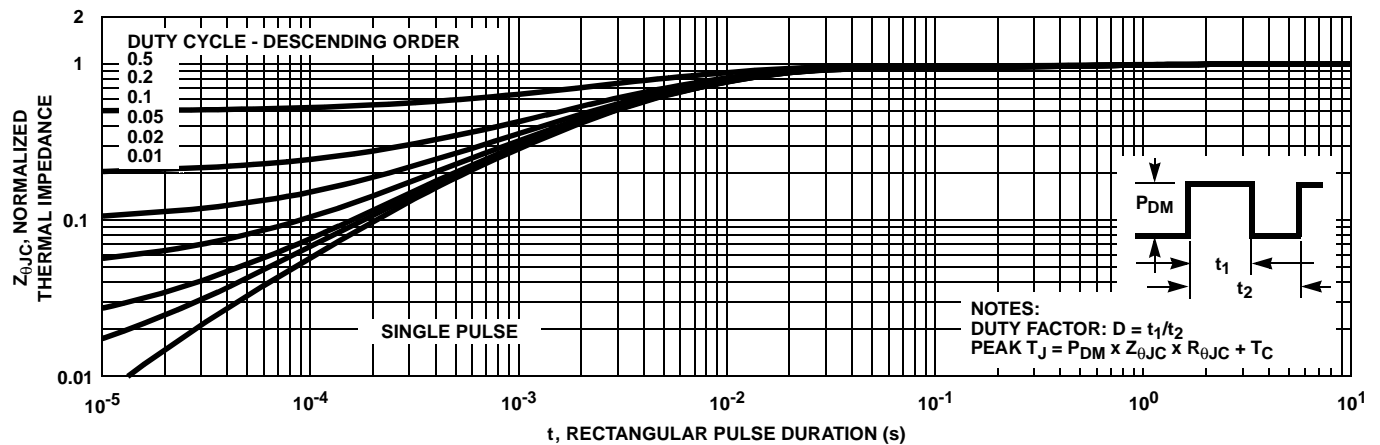


FIGURE 3. NORMALIZED MAXIMUM TRANSIENT THERMAL IMPEDANCE

Typical Performance Curves (Continued)

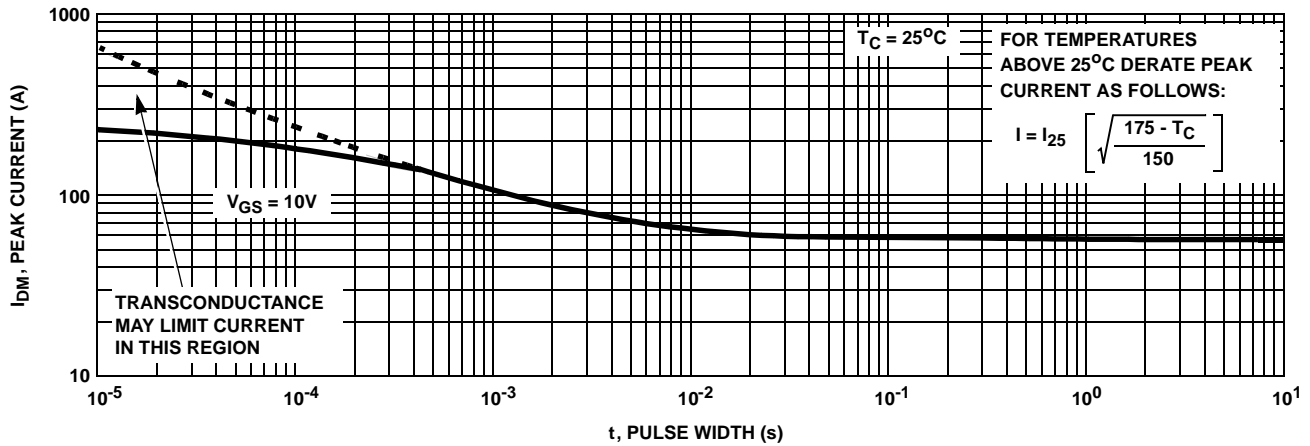


FIGURE 4. PEAK CURRENT CAPABILITY

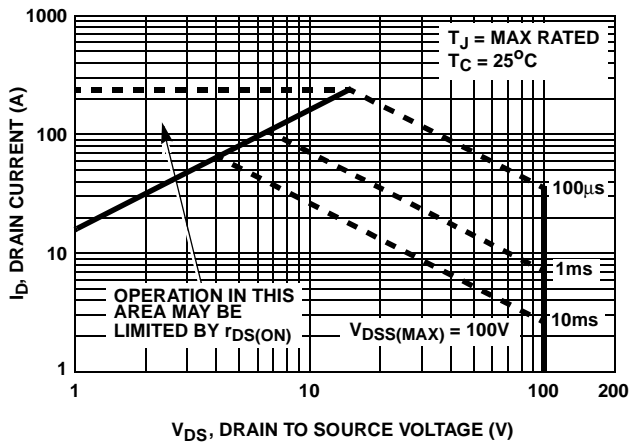
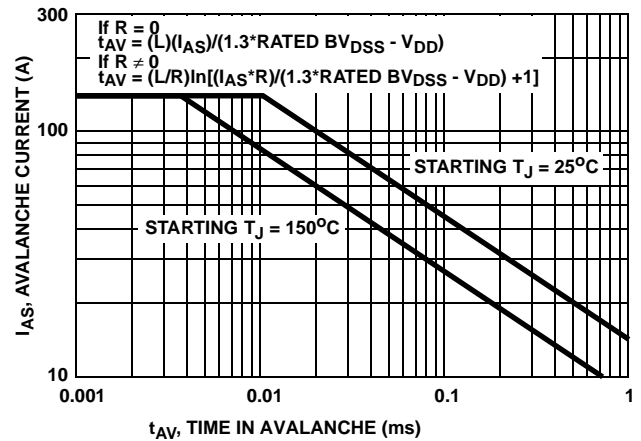


FIGURE 5. FORWARD BIAS SAFE OPERATING AREA



NOTE: Refer to ON Semiconductor Application Notes AN9321 and AN9322.

FIGURE 6. UNCLAMPED INDUCTIVE SWITCHING CAPABILITY

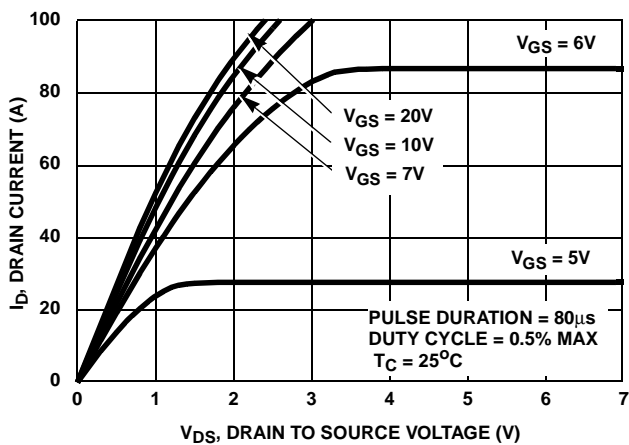


FIGURE 7. SATURATION CHARACTERISTICS

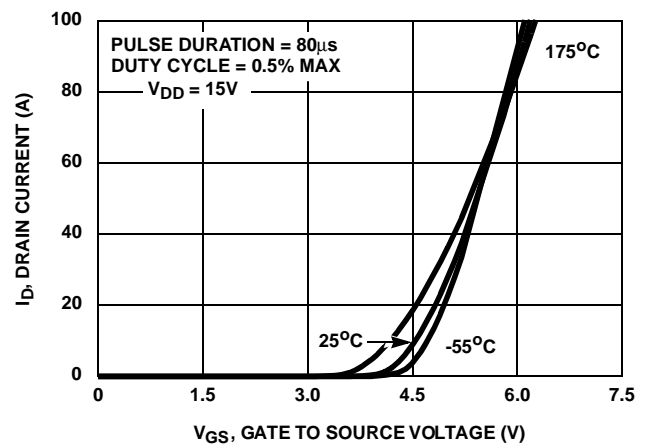


FIGURE 8. TRANSFER CHARACTERISTICS

Typical Performance Curves (Continued)

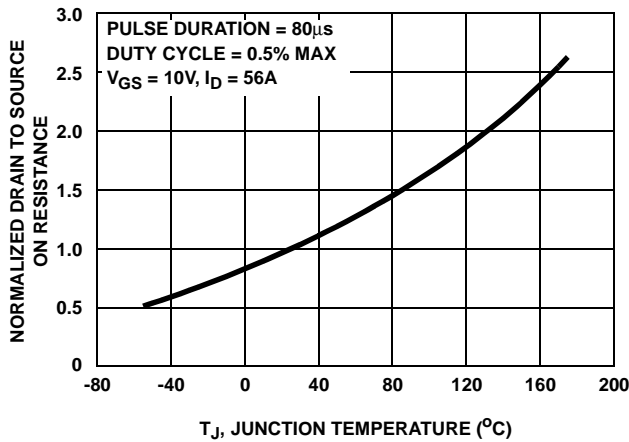


FIGURE 9. NORMALIZED DRAIN TO SOURCE ON RESISTANCE vs JUNCTION TEMPERATURE

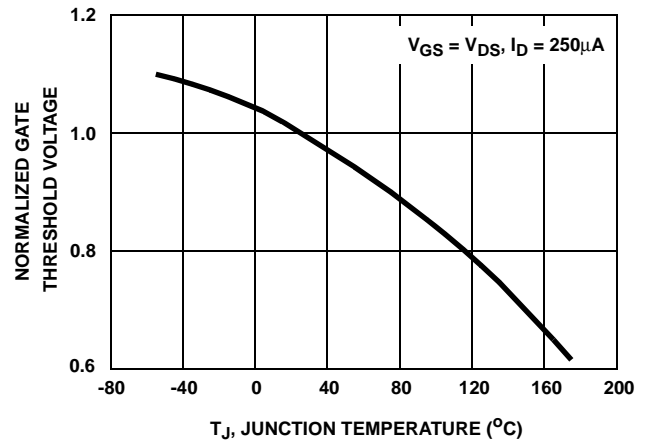


FIGURE 10. NORMALIZED GATE THRESHOLD VOLTAGE vs JUNCTION TEMPERATURE

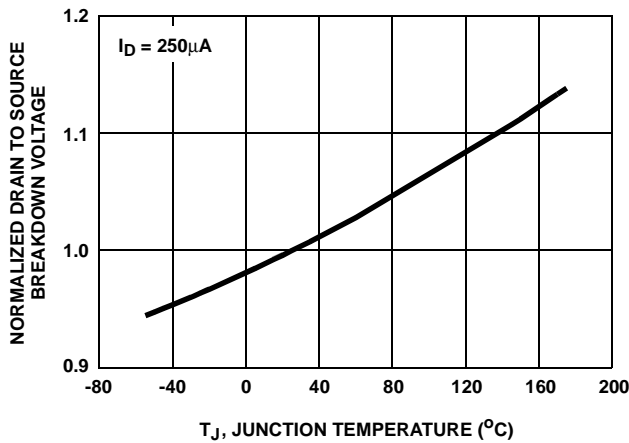


FIGURE 11. NORMALIZED DRAIN TO SOURCE BREAKDOWN VOLTAGE vs JUNCTION TEMPERATURE

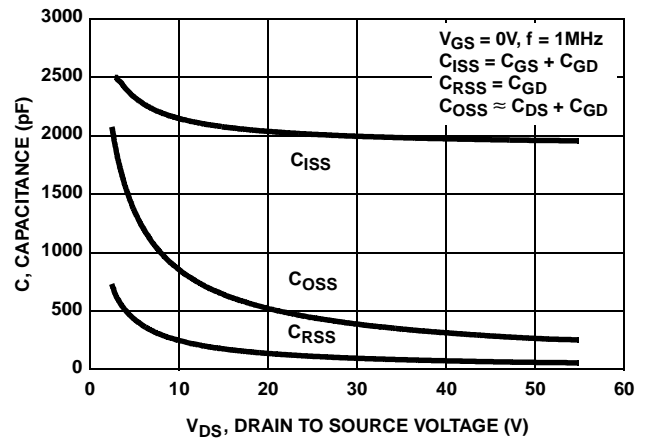
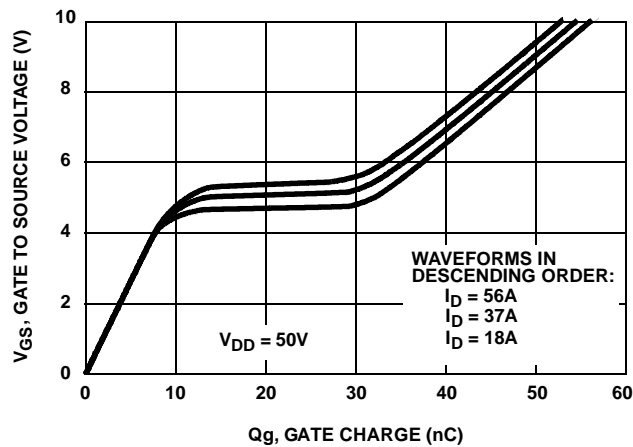


FIGURE 12. CAPACITANCE vs DRAIN TO SOURCE VOLTAGE



NOTE: Refer to ON Semiconductor Application Notes AN7254 and AN7260.
FIGURE 13. GATE CHARGE WAVEFORMS FOR CONSTANT GATE CURRENT

Test Circuits and Waveforms

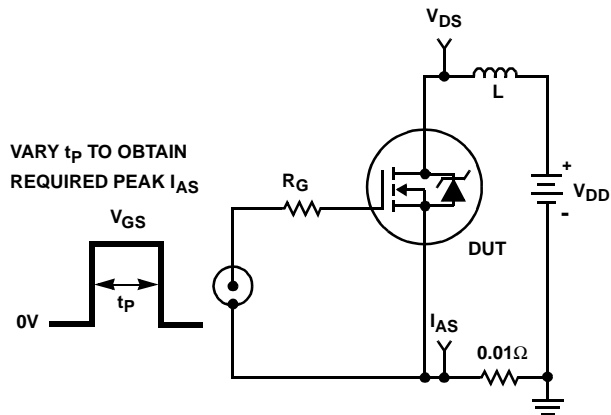


FIGURE 14. UNCLAMPED ENERGY TEST CIRCUIT

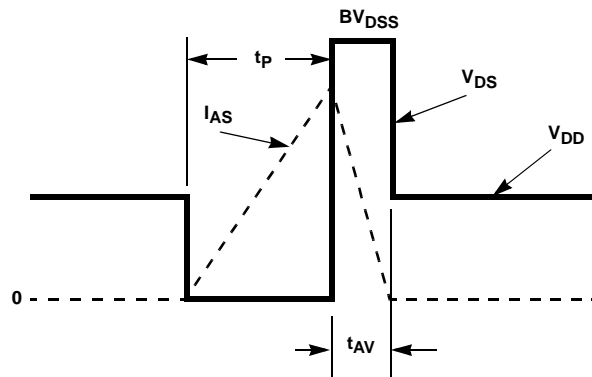


FIGURE 15. UNCLAMPED ENERGY WAVEFORMS

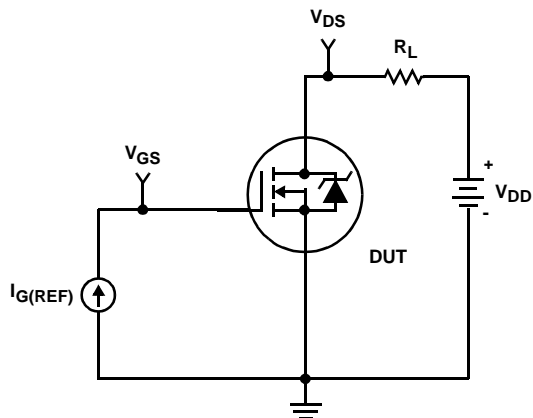


FIGURE 16. GATE CHARGE TEST CIRCUIT

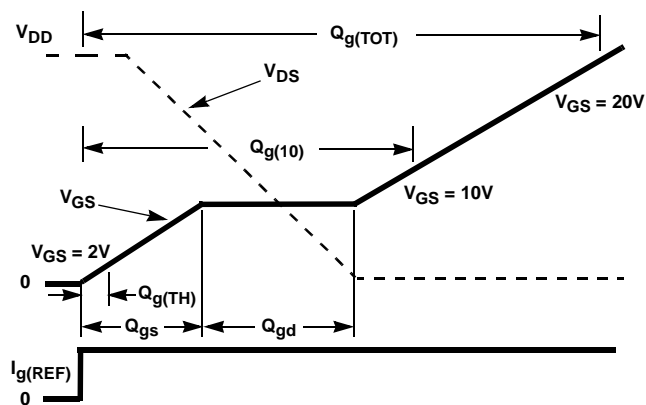


FIGURE 17. GATE CHARGE WAVEFORM

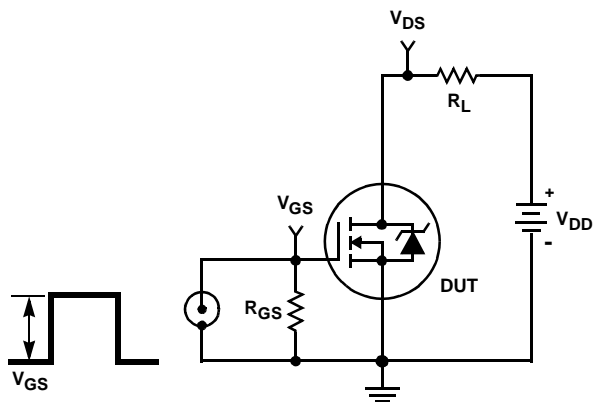


FIGURE 18. SWITCHING TIME TEST CIRCUIT

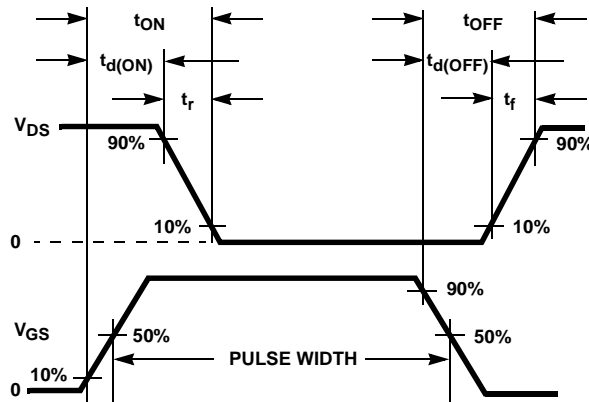



FIGURE 19. RESISTIVE SWITCHING WAVEFORMS

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