

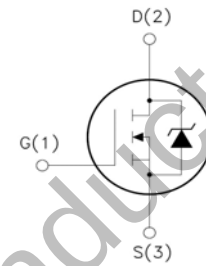
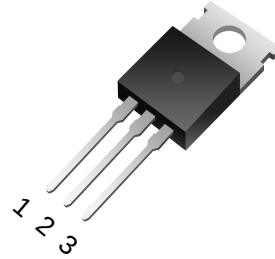


WGP90N25G

Features:

- ☐ Advanced Trench Technology
- ☐ Excellent Switching Characteristics
- ☐ Extended Safe Operating Area
- ☐ Ultra Low Gate Charge: $Q_g=62.7\text{nC}$ (Typ.)
- ☐ $V_{DS}=250\text{V}$, $I_D=90\text{A}$
- ☐ $R_{ds(on)}:15.5\text{m}\Omega$ (Typ.) @ $V_G=10\text{V}$
- ☐ 100% Avalanche Tested

TO-220



1. Gate (G)
2. Drain (D)
3. Source (S)

Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	250	V
Continuous drain current	I_D	90	A
$T_C = 25^\circ\text{C}$ (Silicon limit)		180	
$T_C = 25^\circ\text{C}$ (Package limit)		57	
$T_C = 100^\circ\text{C}$ (Silicon limit)			
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D \text{ pulse}}$	360	A
Avalanche energy, single pulse ($I_D = 53\text{A}$, $R_g = 25\Omega$) ^[1]	E_{AS}	690	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	291	W
Operating junction and storage temperature	T_j, T_{stg}	$-55 \dots +150$	$^\circ\text{C}$

※. Notes:

1. EAS is tested at starting $T_j = 25^\circ\text{C}$, $L = 0.5\text{mH}$, $I_{AS} = 53\text{A}$, $V_{GS} = 10\text{V}$.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.43	$^\circ\text{C/W}$
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	

Electrical Characteristic (at $T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Drain-source breakdown voltage	BV_{DSS}	250	-	-	V	$V_{GS}=0V, I_D=250\mu A$
		250	-	-	V	$V_{GS}=0V, I_D=1mA$
Gate threshold voltage	$V_{GS(th)}$	2.0	3.0	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-	1 100	μA	$V_{DS}=250V, V_{GS}=0V$ $T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	15.5	18.5	m Ω	$V_{GS}=10V, I_D=40A$
Transconductance	g_{fs}	58.5	87.7	131.6	S	$V_{DS}=5V, I_D=40A$

Dynamic Characteristic

Input Capacitance	C_{iss}	3005	4508	6762	pF	$V_{GS}=0V, V_{DS}=125V,$ $f=1MHz$
Output Capacitance	C_{oss}	201	302	453		
Reverse Transfer Capacitance	C_{rss}	3.8	7.6	15.2		
Gate Total Charge	Q_G	41.8	62.7	94.1	nC	$V_{GS}=10V, V_{DS}=125V,$ $I_D=40A$
Gate-Source charge	Q_{gs}	18.5	27.8	41.7		
Gate-Drain charge	Q_{gd}	3.9	7.7	15.4		
Turn-on delay time	$t_{d(on)}$	-	14.4	-	ns	$V_{GS}=10V, V_{DD}=125V,$ $R_{G_ext}=2.7\Omega$
Rise time	t_r	-	48.4	-		
Turn-off delay time	$t_{d(off)}$	-	52.1	-		
Fall time	t_f	-	30.8	-		
Gate resistance	R_G	-	3.2	-	Ω	$V_{GS}=0V, V_{DS}=0V,$ $f=1MHz$

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.85	1.4	V	$V_{GS}=0V, I_{SD}=40A$
Body Diode Reverse Recovery Time	t_{rr}	-	167.0	-	ns	$I_F=40A,$ $dI/dt=100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	-	1055.0	-	nC	

Typical Electrical & Thermal Characteristics

Fig 1: Output Characteristics

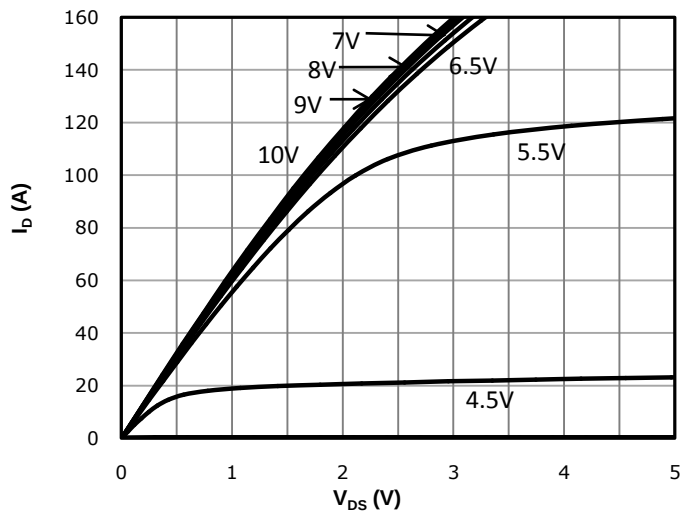


Fig 2: Transfer Characteristics

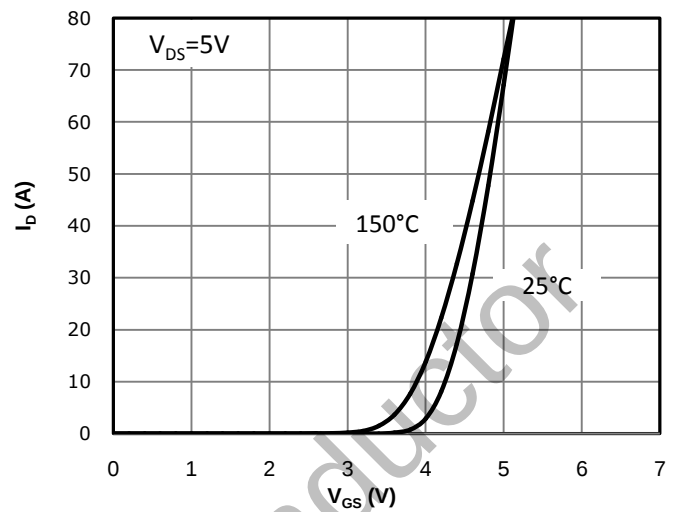


Fig 3: Rds(on) vs Drain Current and Gate Voltage

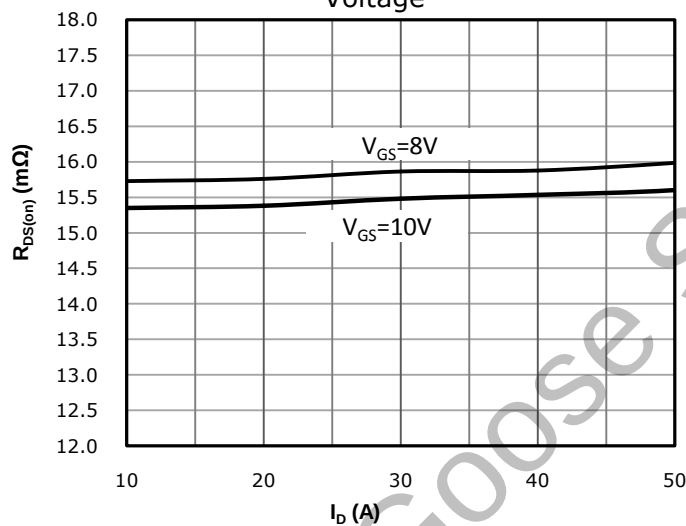


Fig 4: Rds(on) vs Gate Voltage

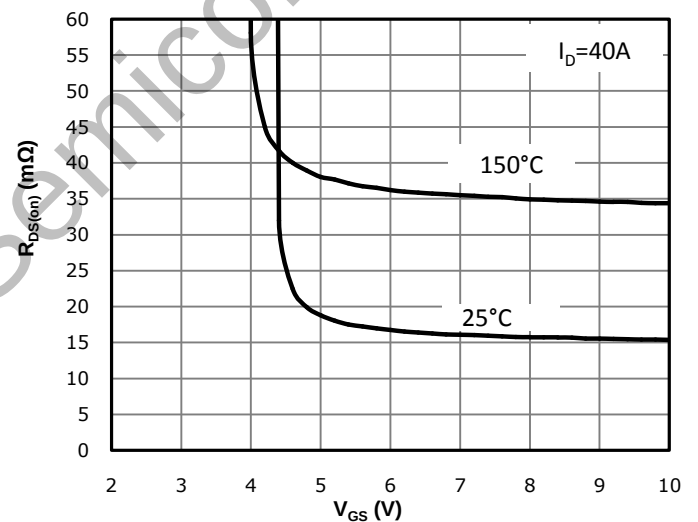


Fig 5: Rds(on) vs. Temperature

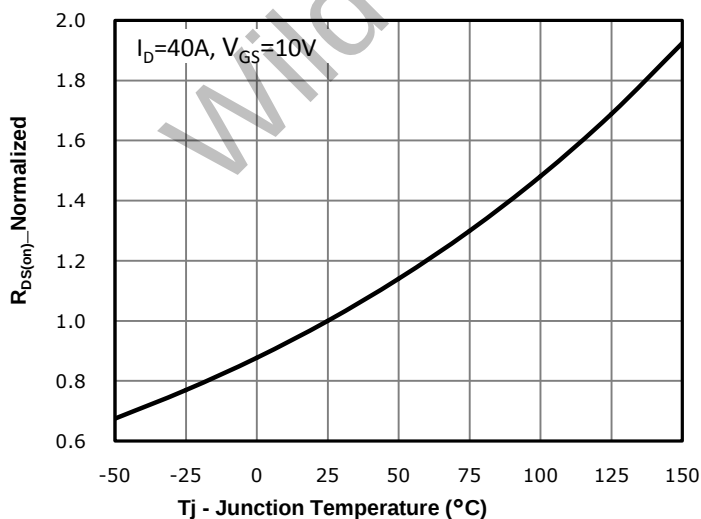
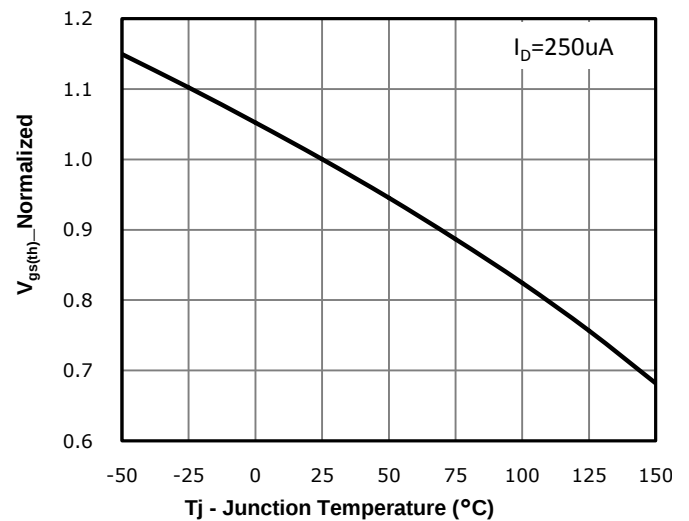


Fig 6: Vgs(th) vs. Temperature



Typical Electrical & Thermal Characteristics

Fig 7: BVdss vs. Temperature

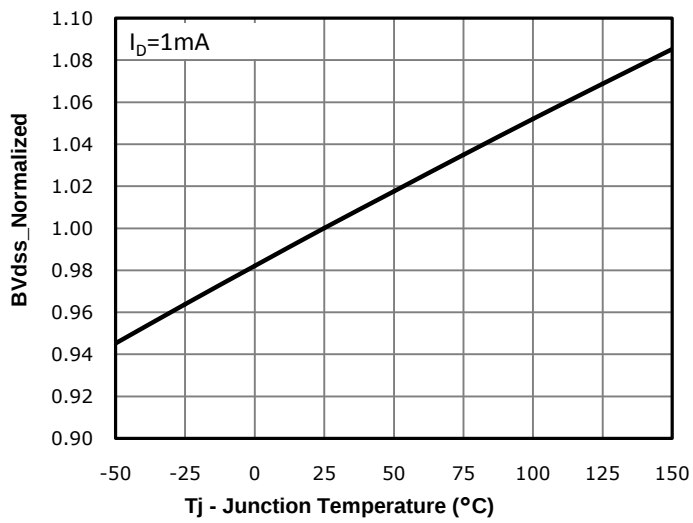


Fig 8: Capacitance Characteristics

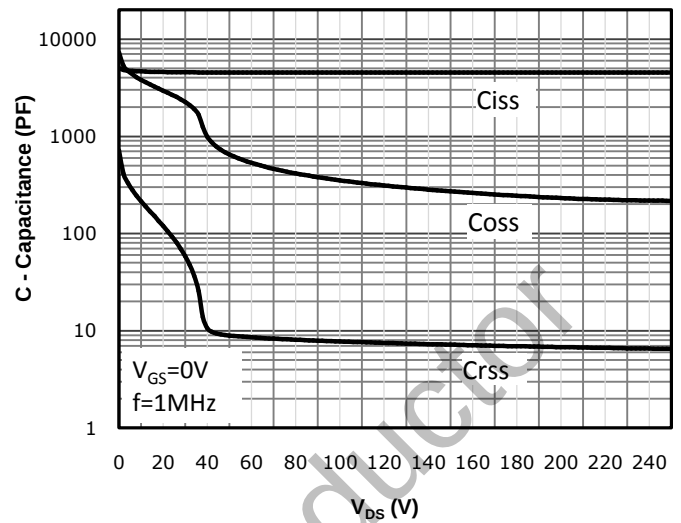


Fig 9: Gate Charge Characteristics

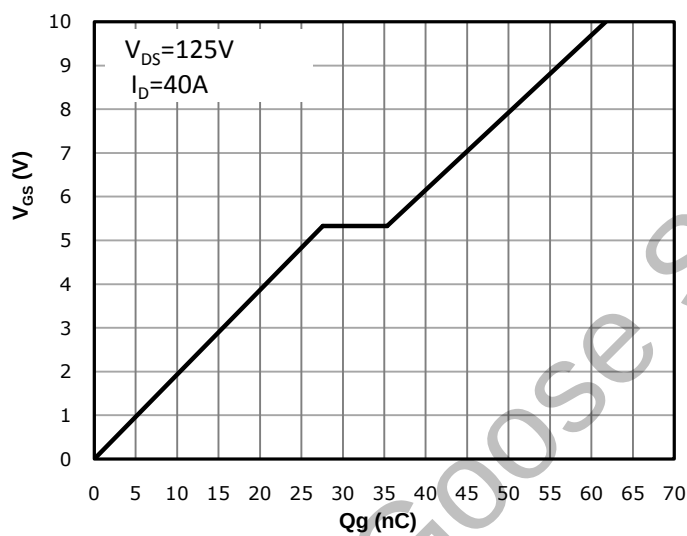


Fig 10: Body-diode Forward Characteristics

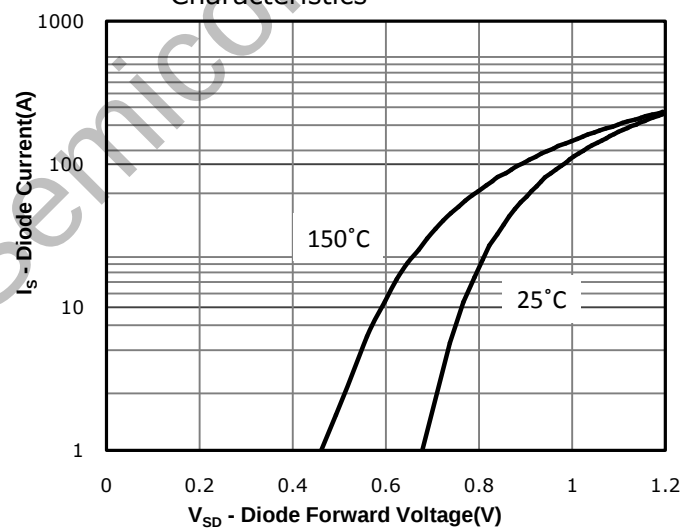


Fig 11: Power Dissipation

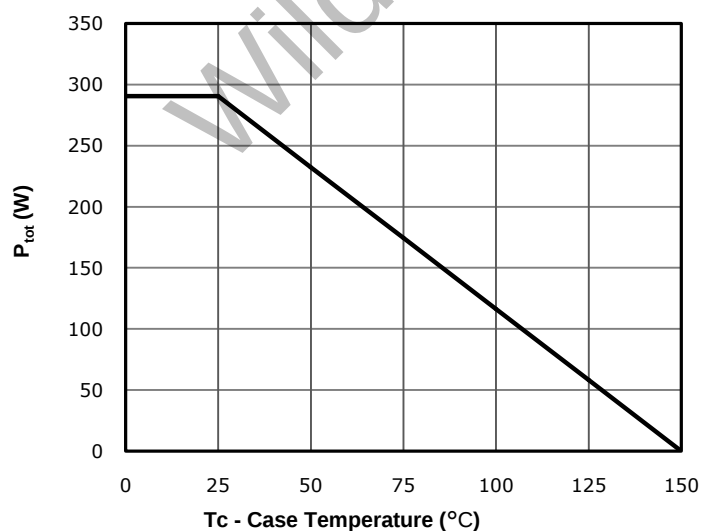
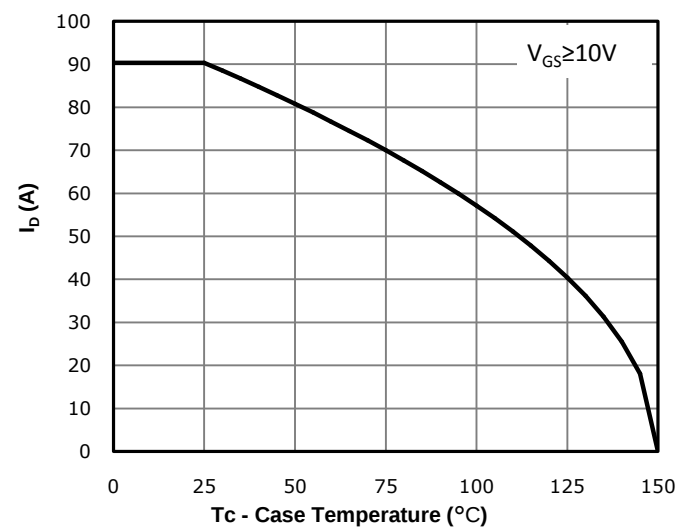


Fig 12: Drain Current Derating



Typical Electrical & Thermal Characteristics

Fig 13: Safe Operating Area

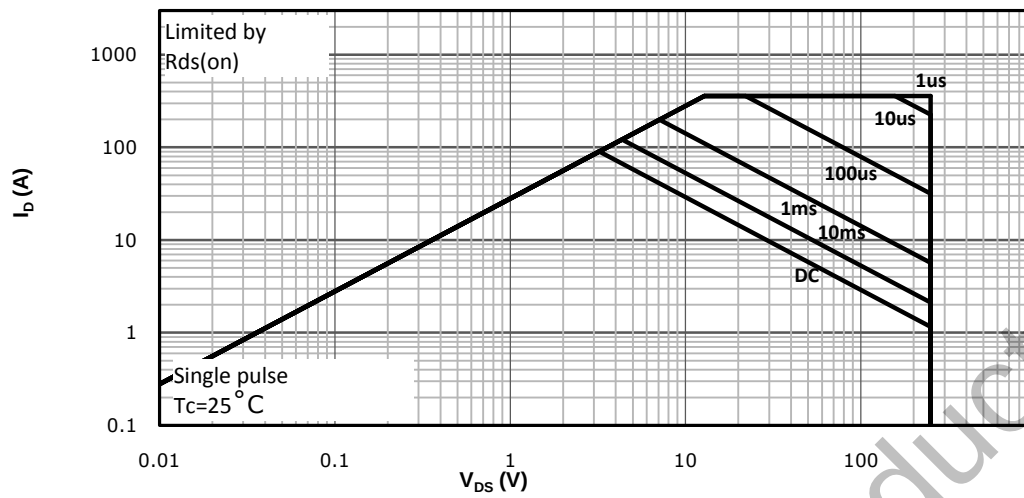
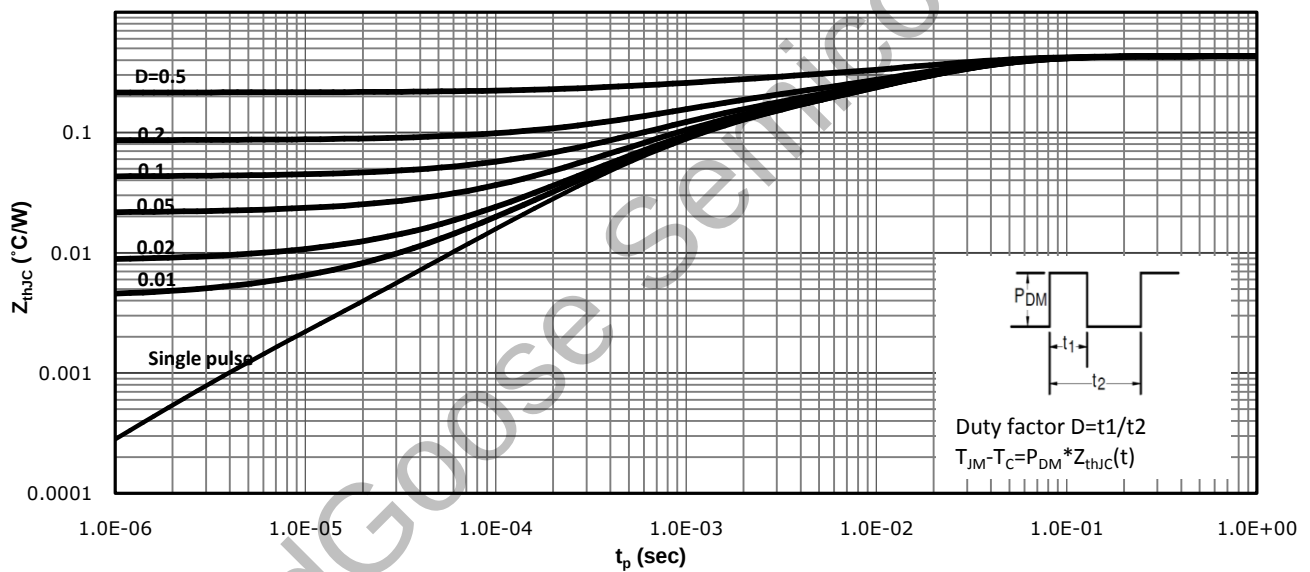
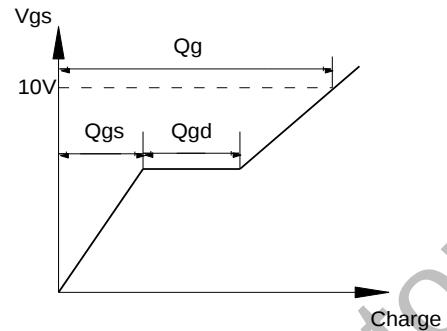
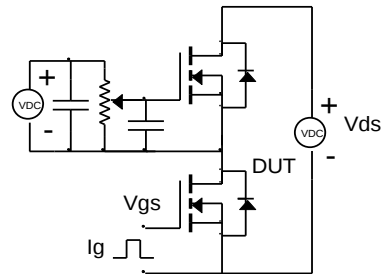


Fig 14: Max. Transient Thermal Impedance

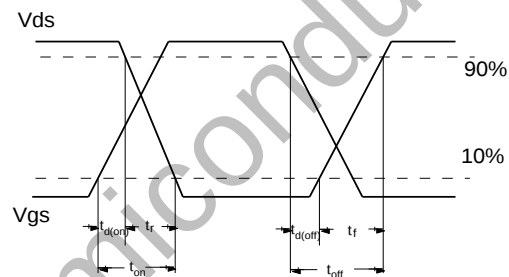
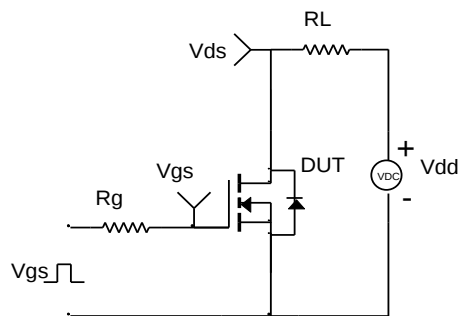


Test Circuit

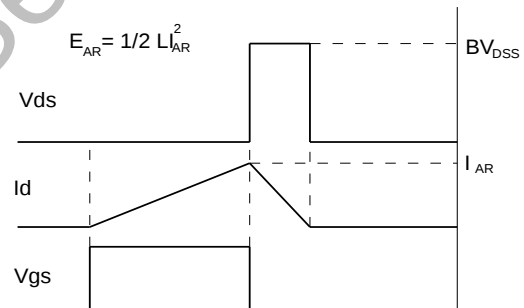
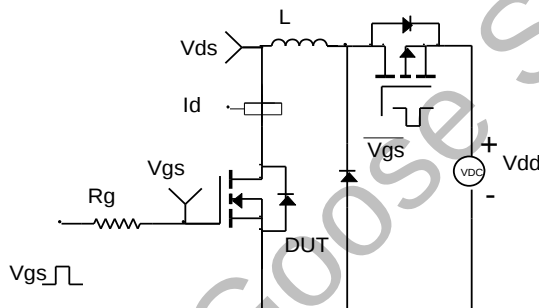
Gate Charge Test Circuit & Waveform



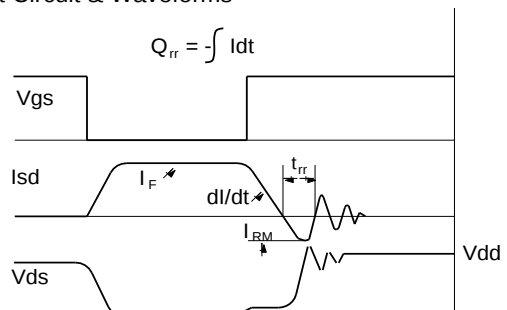
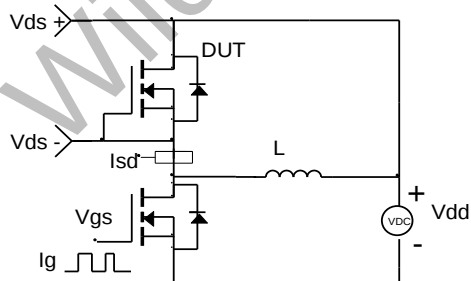
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Unit: mm

