

## 1. Features

- Uses advanced SGT technology
- Extremely low  $R_{DS(on)}$ .typ=1.25m $\Omega$ @ $V_{GS}=10V$
- Excellent gate charge x  $R_{DS(on)}$  product(FOM)

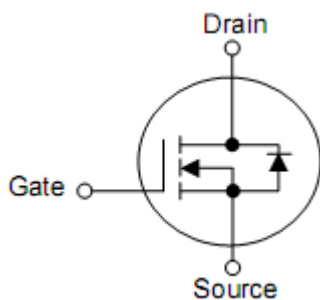
## 2. Application

- Motor control and drives
- Battery management
- DC/DC Converters
- General purpose applications

## 3. Pin configuration



TOLL-8



Pin	Function
1	Gate
9	Drain
2,3,4,5,6,7,8	Source

#### 4. Ordering Information

Part Number	Package	Brand
KCT1808A	TOLL-8	KIA

#### 5. Absolute maximum ratings

$T_C=25\text{ }^\circ\text{C}$  unless otherwise specified

Parameter	Symbol	Ratings	Unit
Drain-to-Source Voltage	$V_{DS}$	80	V
Continuous Drain Current	$I_D$	$T_C=25\text{ }^\circ\text{C}$ (Silicon limited)	260
		$T_C=25\text{ }^\circ\text{C}$ (Package limited)	240
		$T_C=100\text{ }^\circ\text{C}$ (Silicon limited)	170
Pulsed drain current ( $T_C = 25\text{ }^\circ\text{C}$ , $t_p$ limited by $T_{Jmax}$ )	$I_{DP}$	750	A
Avalanche energy, single pulse ( $L=0.5\text{mH}$ , $R_g=25\Omega$ )	$E_{AS}$	2862	mJ
Gate-Source voltage	$V_{GS}$	$\pm 20$	V
Power dissipation	$P_{tot}$	250	W
Junction & Storage Temperature Range	$T_J$ & $T_{STG}$	-55 to 150	$^\circ\text{C}$

#### 6. Thermal characteristics

Parameter	Symbol	Ratings	Units
Thermal resistance, Junction-case	$R_{\theta JC}$	0.5	$^\circ\text{C/W}$
Thermal resistance, junction-ambient	$R_{\theta JA}$	52	$^\circ\text{C/W}$

## 7. Electrical characteristics

(T<sub>J</sub>=25°C, unless otherwise notes)

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	80	-	-	V
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA, T <sub>J</sub> =25°C	2	3	4	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	-	-	1	μA
		V <sub>DS</sub> =64V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	-	-	10	μA
Gate-source leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V	-	-	100	nA
Drain-source on-state resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =50A, T <sub>J</sub> =25°C	-	1.25	2	mΩ
Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =40A	-	227	-	S
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =40V, f=1MHz	-	15022	-	pF
Output Capacitance	C <sub>oss</sub>		-	2523	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	1303	-	
Gate Total Charge	Q <sub>G</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =40V, I <sub>D</sub> =50A	-	205	-	nC
Gate-Source charge	Q <sub>gs</sub>		-	54	-	
Gate-Drain charge	Q <sub>gd</sub>		-	46	-	
Turn-on delay time	t <sub>d(on)</sub>	T <sub>J</sub> =25°C, V <sub>GS</sub> =10V, V <sub>DS</sub> =40V, R <sub>L</sub> =3Ω	-	38	-	ns
Rise time	t <sub>r</sub>		-	132	-	
Turn-off delay time	t <sub>d(off)</sub>		-	126	-	
Fall time	t <sub>f</sub>		-	153	-	
Gate resistance	R <sub>G</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	-	1.85	-	Ω
Body Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> =50A	-	0.8	1.2	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =30A, dI/dt=500A/μs	-	112	-	ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =30A, dI/dt=500A/μs	-	220	-	nC

## 8. Typical Characteristics

Fig 1: Output Characteristics

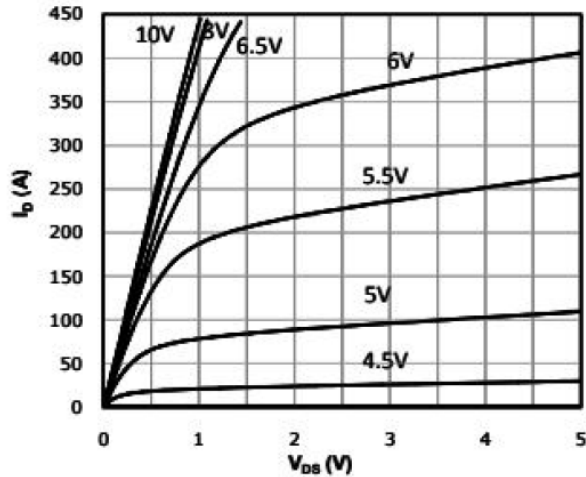


Fig 2: Transfer Characteristics

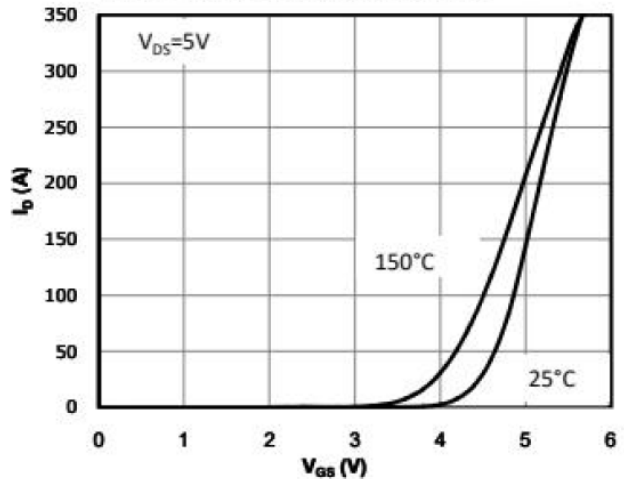


Fig 3: Rds(on) vs Drain Current and Gate Voltage

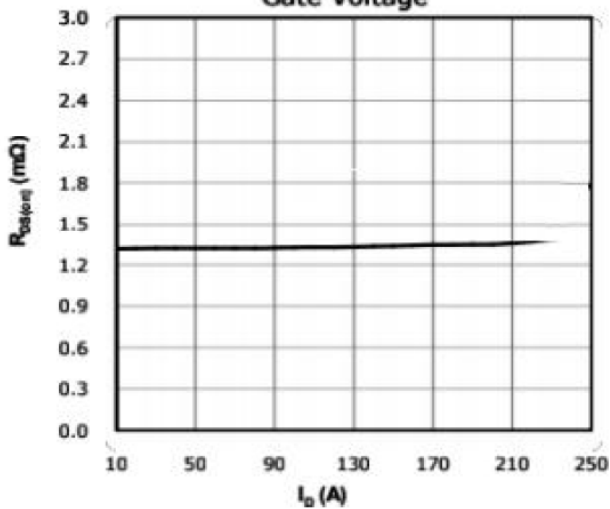


Fig 4: Rds(on) vs Gate Voltage

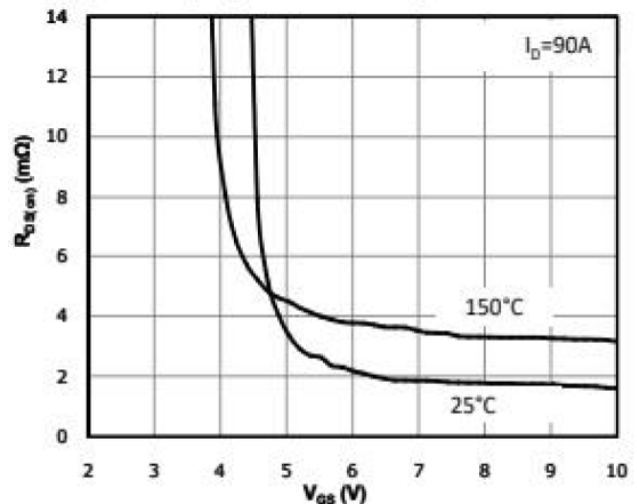


Fig 5: Rds(on) vs. Temperature

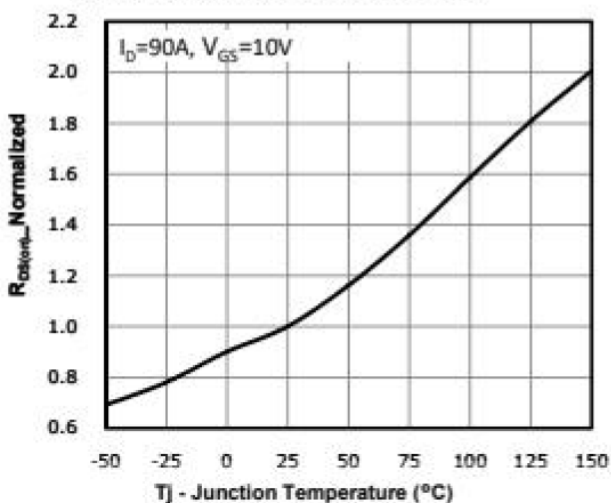


Fig 6: Capacitance Characteristics

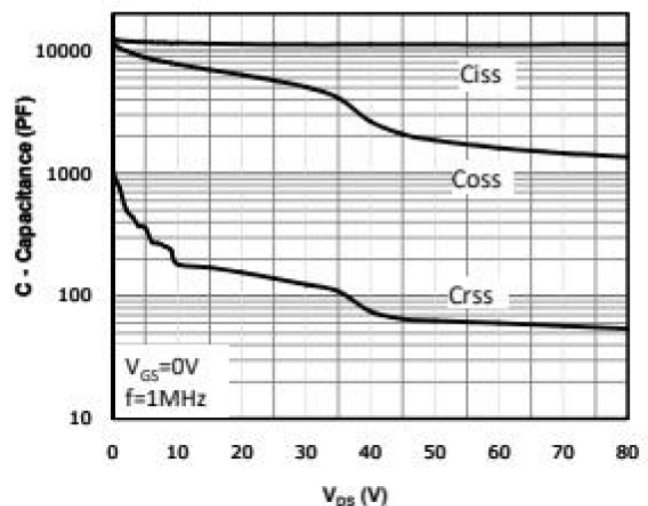


Fig 7:  $V_{gs(th)}$  vs. Temperature

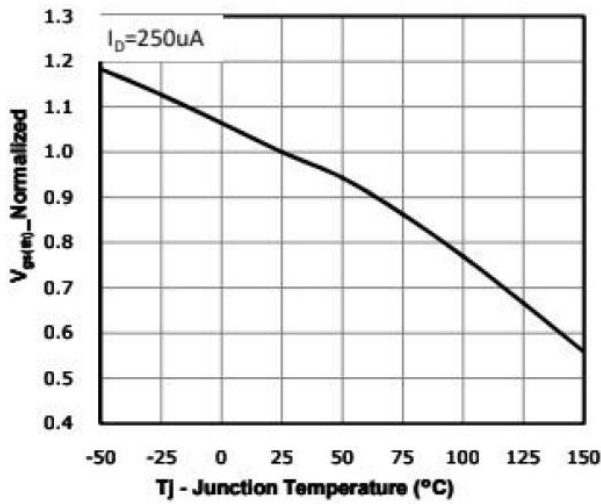


Fig 8:  $BV_{dss}$  vs. Temperature

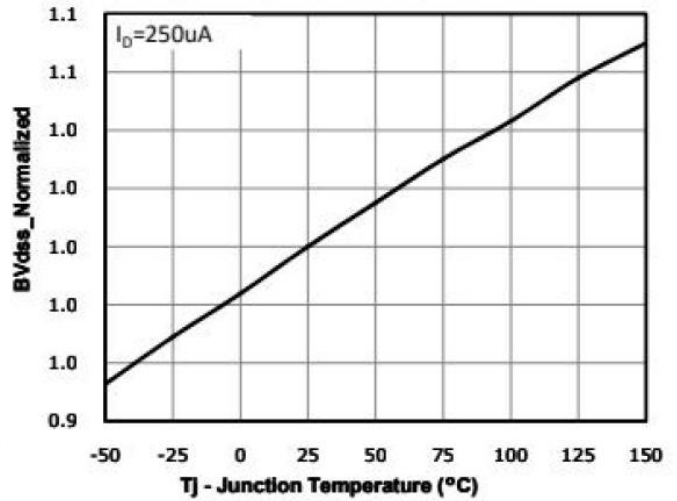


Fig 9: Gate Charge Characteristics

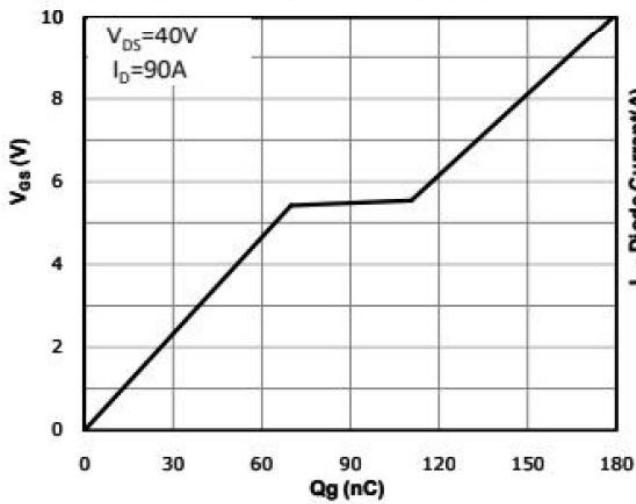


Fig 10: Body-diode Forward Characteristics

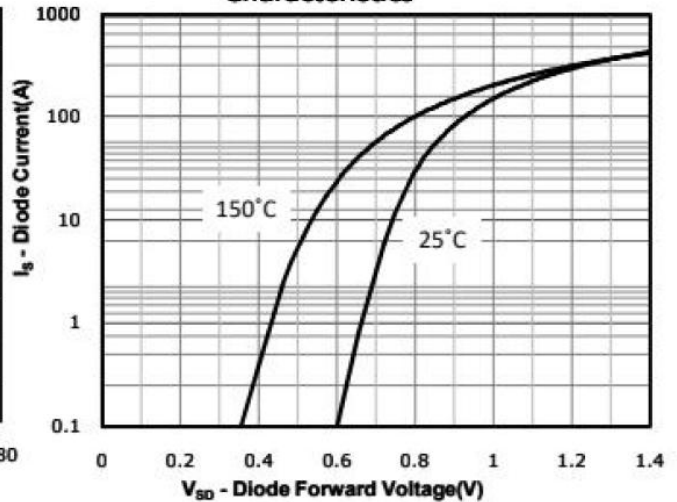


Fig 11: Power Dissipation

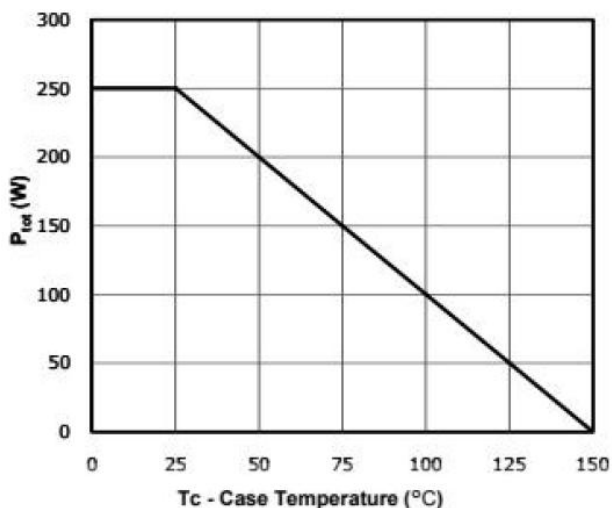
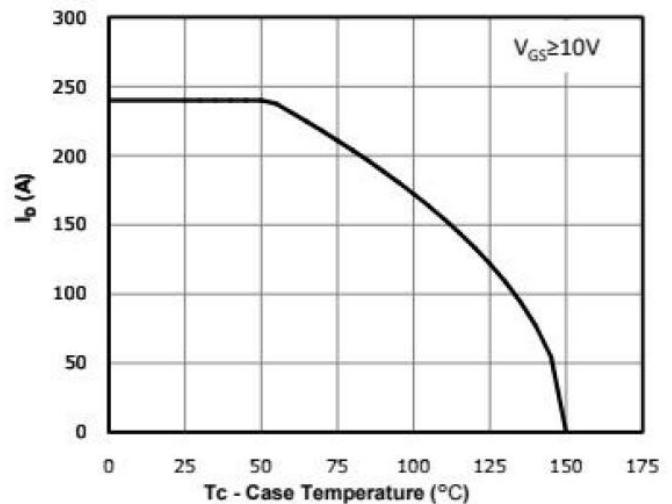
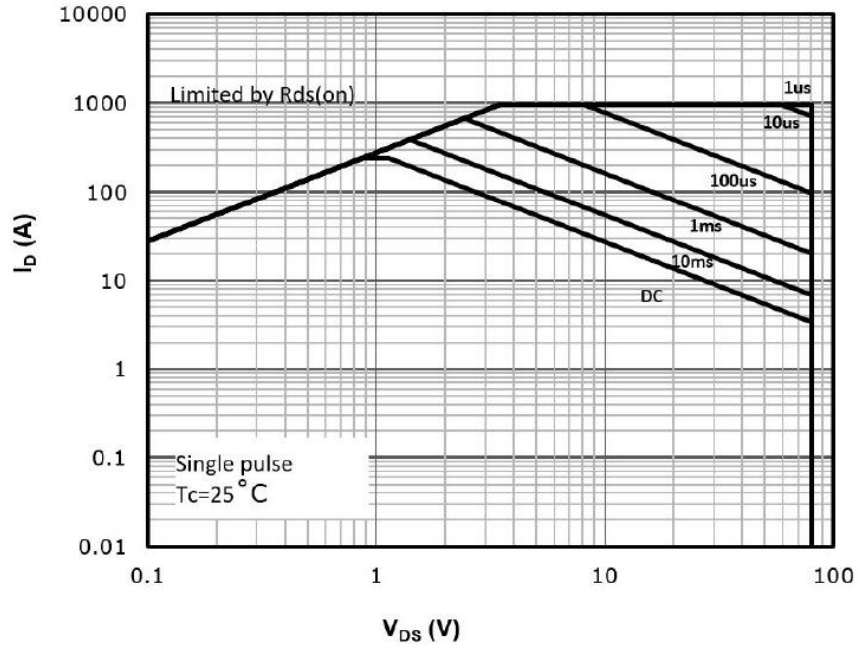


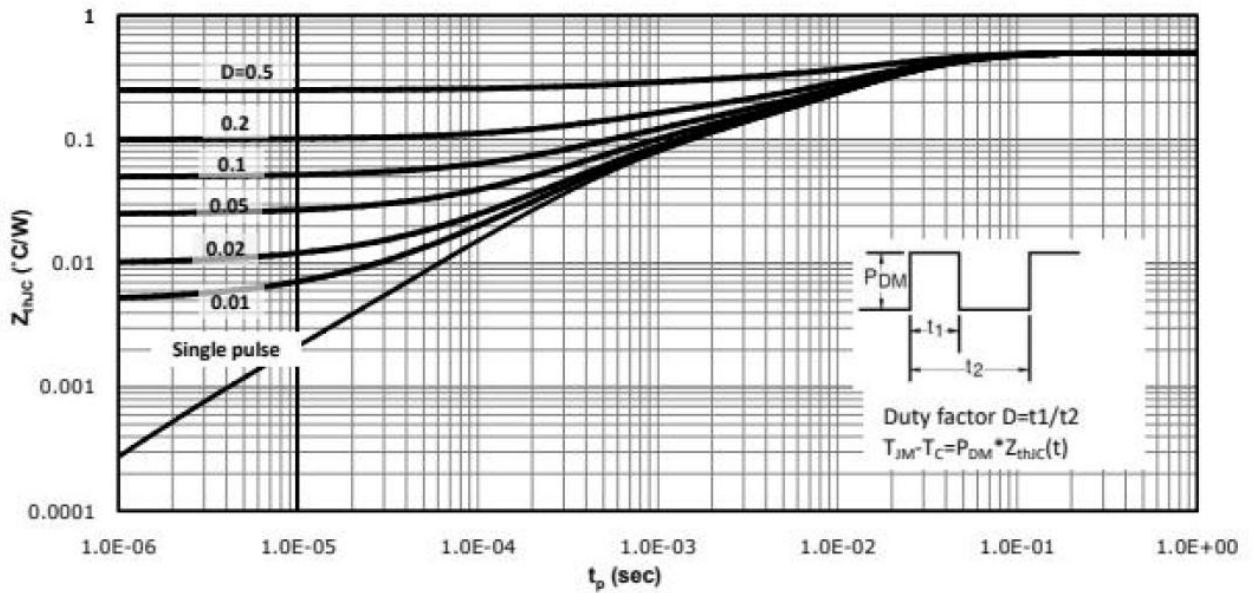
Fig 12: Drain Current Derating



**Fig 13: Safe Operating Area**

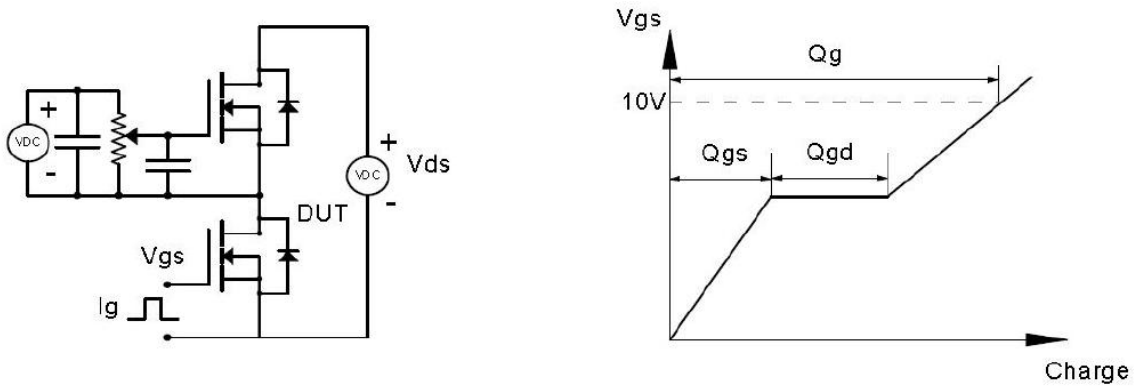


**Fig 14: Max. Transient Thermal impedance**

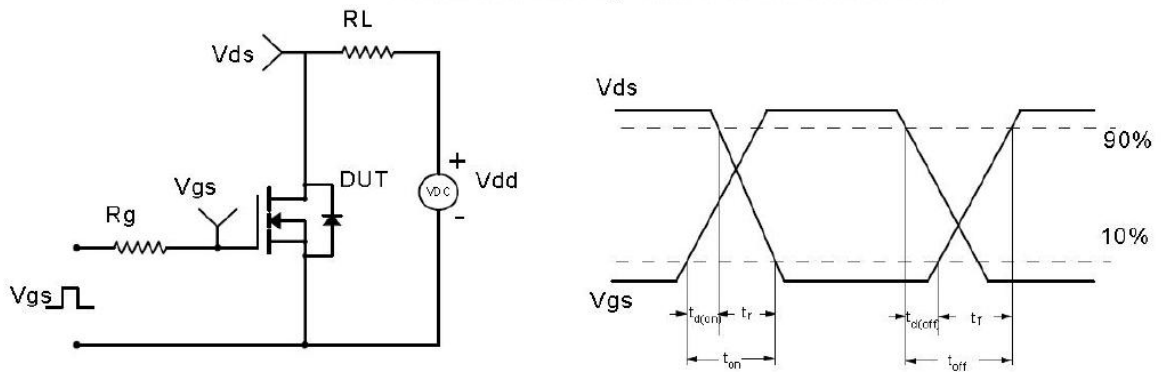


**9. Test Circuit & Waveform**

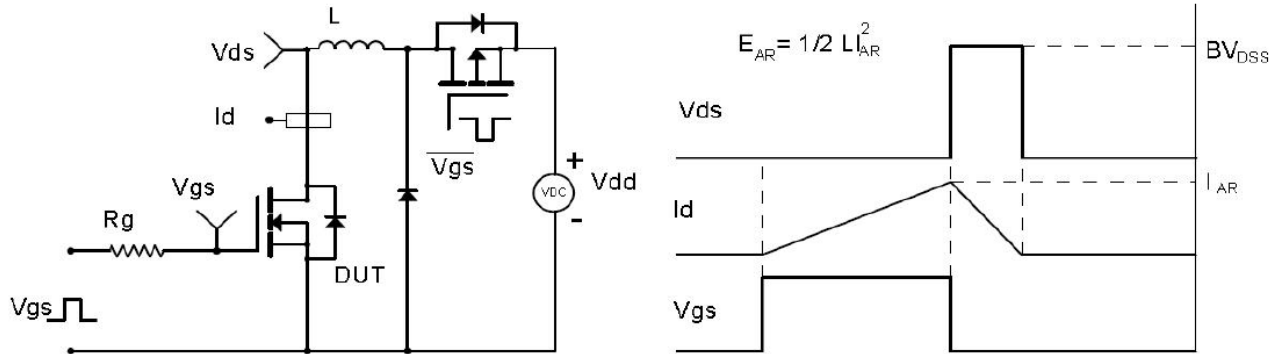
Gate Charge Test Circuit & Waveform



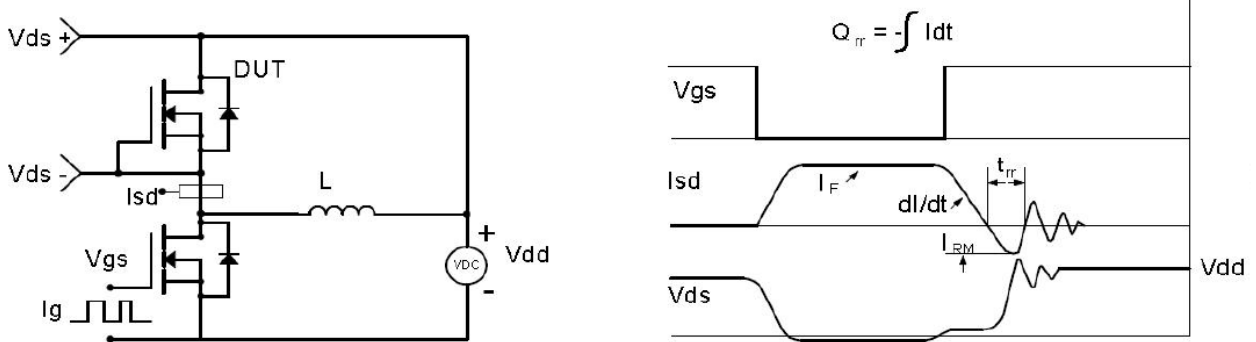
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms





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