

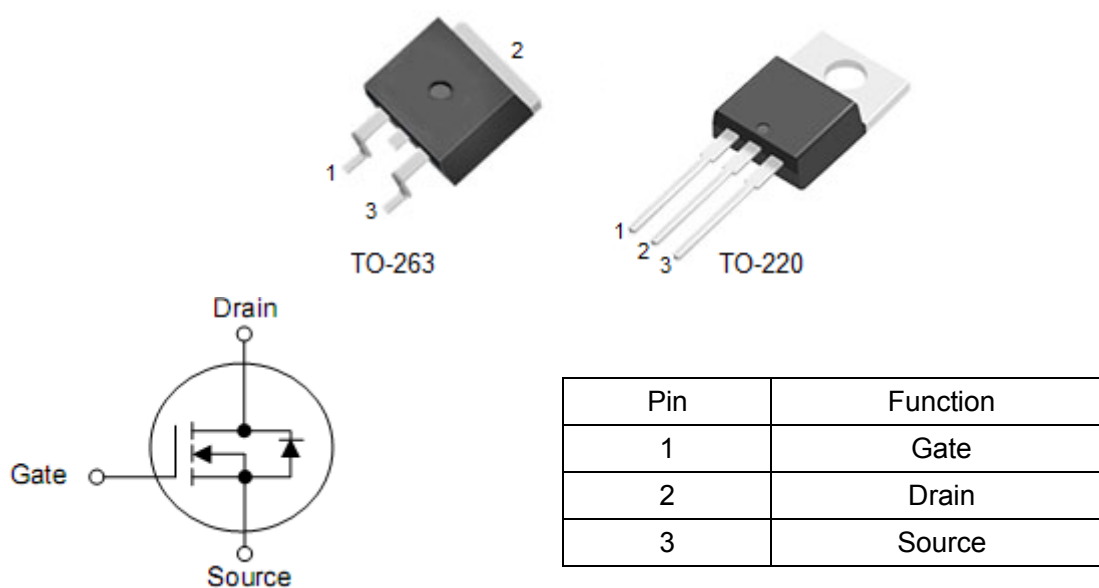
1. Features

- $R_{DS(ON)}=2.8m\Omega(typ.)@V_{GS}=10V$
- Very Low On-resistance $R_{DS(ON)}$
- High ruggedness
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

2. Applications

- PWM Application
- Power Management
- Load switch

3. Symbol



4. Ordering Information

Part Number	Package	Brand
KNB2706A	TO-263	KIA
KNP2706A	TO-220	KIA

5. Absolute maximum ratings

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

Parameter		Symbol	Rating		Units
			TO-263	TO-220	
Drain-source voltage		V_{DSS}	60		V
Continuous drain current	$T_C=25^{\circ}\text{C}$	I_D	150		A
	$T_C=100^{\circ}\text{C}$	I_D	98		A
Pulsed drain current -Pulsed ¹⁾		I_{DM}	450		A
Gate-source voltage		V_{GS}	± 20		V
Single pulse avalanche energy ²⁾		E_{AS}	552		mJ
Repetitive Avalanche Energy ¹⁾		E_{AR}	240		mJ
Peak Diode Recovery dv/dt ³⁾		dv/dc	4.5		V/ns
Power dissipation	$T_C=25^{\circ}\text{C}$	P_D	238	320	W
	Derate above 25°C		-	2.56	W/ $^{\circ}\text{C}$
Operating junction and storage temperature range		T_J, T_{STG}	-55 to 150		$^{\circ}\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T_L	300		$^{\circ}\text{C}$

*Drain current limited by maximum junction temperature.

6. Thermal characteristics

Parameter	Symbol	Rating		Unit
		TO-263	TO-220	
Thermal resistance junction-case	$R_{\theta JC}$	0.53	0.39	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	-	62.5	$^{\circ}\text{C/W}$

7. Electrical characteristics

(T_C=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	60	-	-	V
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250uA, Referenced to 25°C	-	0.06	-	V/°C
Drain-source leakage current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1	uA
		V _{DS} =48V, T _C =150°C			10	uA
Gate-source forward leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Gate threshold voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250uA	2.2	-	3.6	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A	-	2.8	3.6	mΩ
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V f=1MHz	-	8850	-	pF
Output capacitance	C _{oss}		-	610	-	pF
Reverse transfer capacitance	C _{rss}		-	730	-	pF
Turn-on delay time	t _{d(on)}	V _{DD} =30V, R _G =25Ω, I _D =50A ^{4),5)}		20		ns
Rise time	t _r			38		ns
Turn-off delay time	t _{d(off)}			49		ns
Fall time	t _f			30		ns
Total gate charge(10V)	Q _g	V _{DS} =30V, I _D =50A V _{GS} =10V ^{4),5)}	-	200	-	nC
Gate-source charge	Q _{gs}		-	35	-	nC
Gate-drain charge	Q _{gd}		-	72	-	nC
Maximum Continuous Drain-Source Diode Forward Current	I _S	—	-	-	150	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}	—	-	-	450	A
Diode forward voltage	V _{SD}	I _S =50A, V _{GS} =0V,	-	-	1.2	V
Reverse Recovery Time	t _{rr}	V _{GS} =0V, I _S =50A, di _F /dt=100A/μs ⁴⁾	-	62	-	nS
Reverse Recovery Charge	Q _{rr}		-	105	-	nC

Note:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. I_{AS}=I_D, V_{DD}=20V, R_G=25Ω, Starting T_J=25°C
3. I_{SD}≤I_D, di/dt≤200A/us, V_{DD}≤BV_{DSS}, Starting T_J=25°C
4. Pulse Test : Pulse width≤300us, Duty cycle≤2%
5. Essentially independent of operating temperature

8. Typical operating characteristics

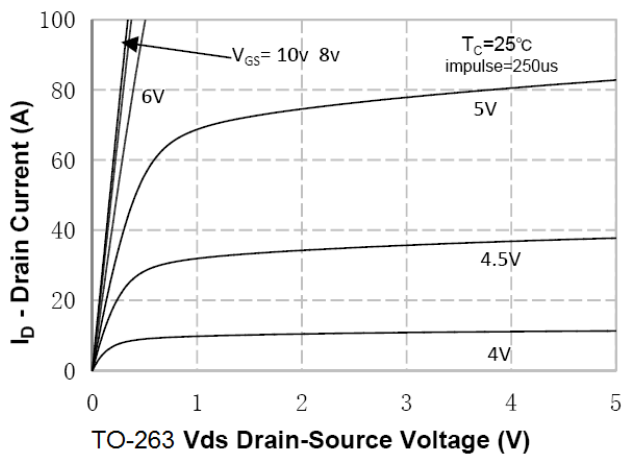


Figure 1. On-Region Characteristics

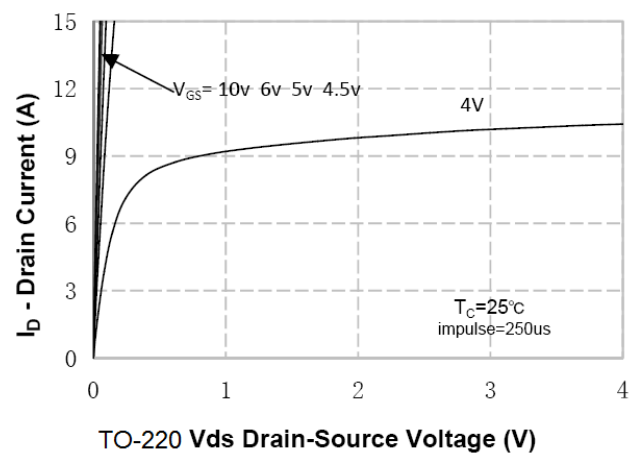


Figure 2. On-Region Characteristics

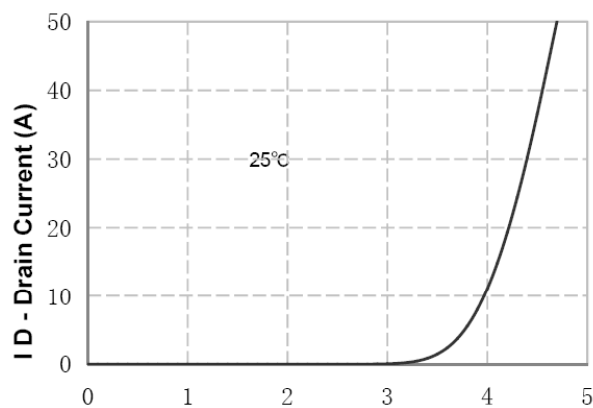


Figure 3. Transfer Characteristics

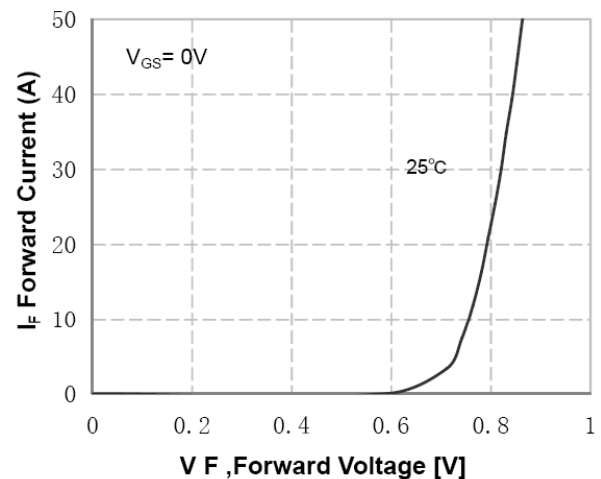


Figure 4. Body Diode Forward Voltage Variation vs Source Current

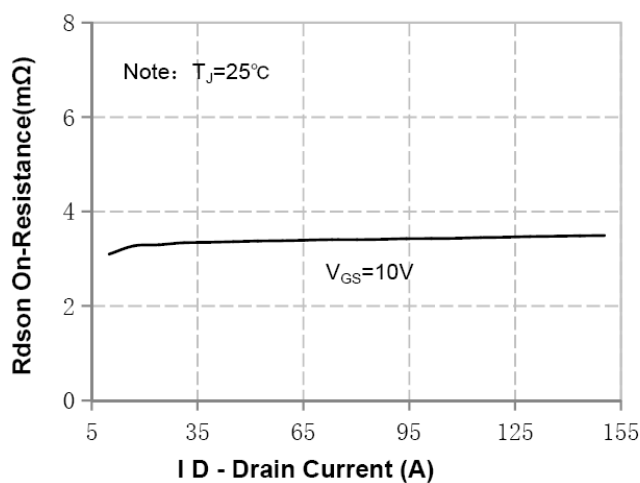


Figure 5. On-Resistance Variation vs Drain Current and Gate Voltage

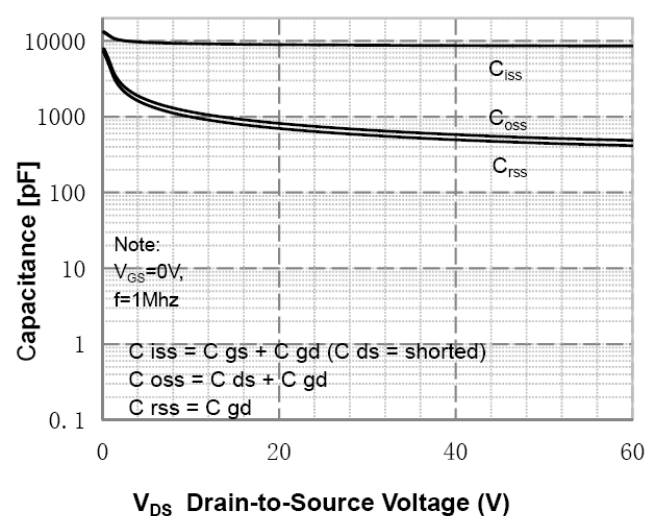


Figure 6. Capacitance Characteristics

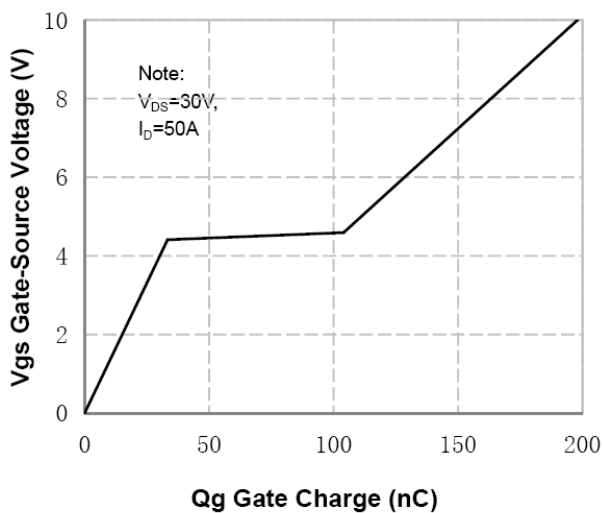


Figure 7. Gate Charge Characteristics

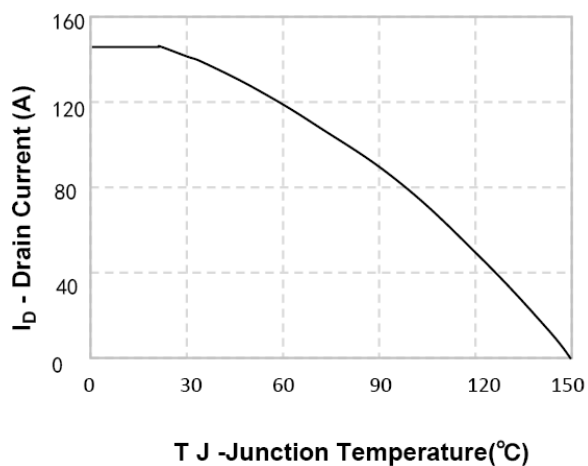


Figure 8. Maximum PContinuous Drain Current vs Case Temperature

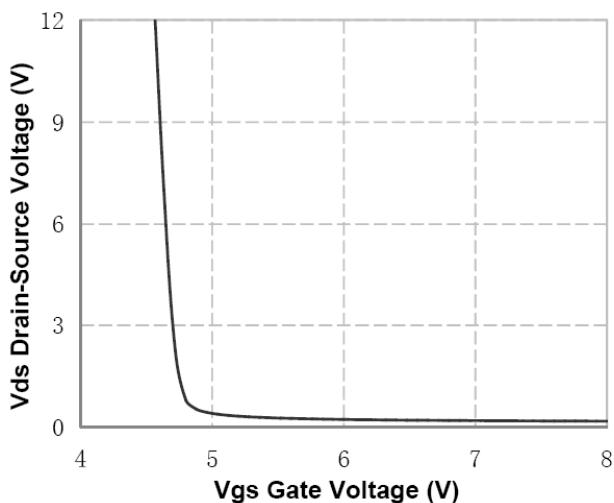


Figure 9. Vds Drain-Source Voltage vs Gate Voltage

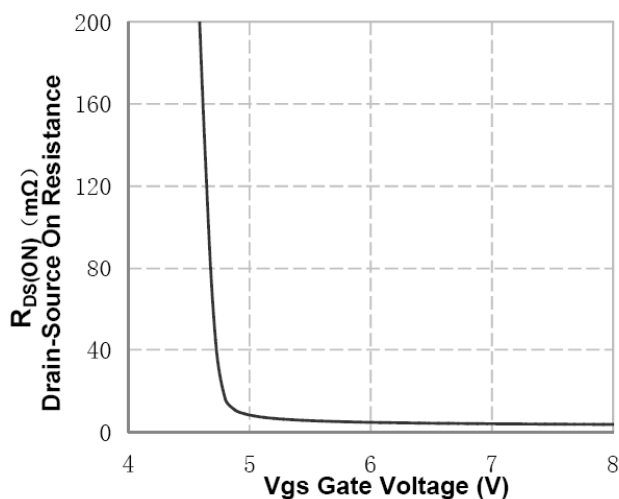


Figure 10. On-Resistance vs Gate Voltage

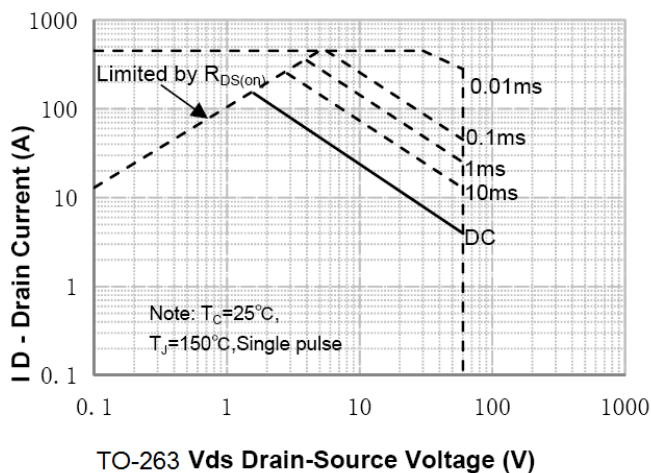


Figure 11. Maximum Safe Operating Area

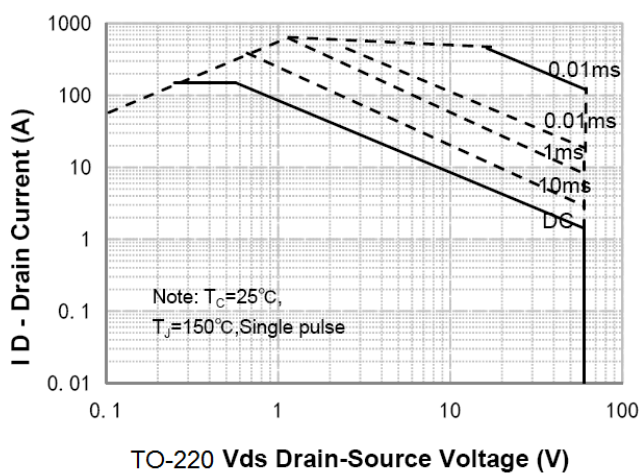


Figure 12. Maximum Safe Operating Area

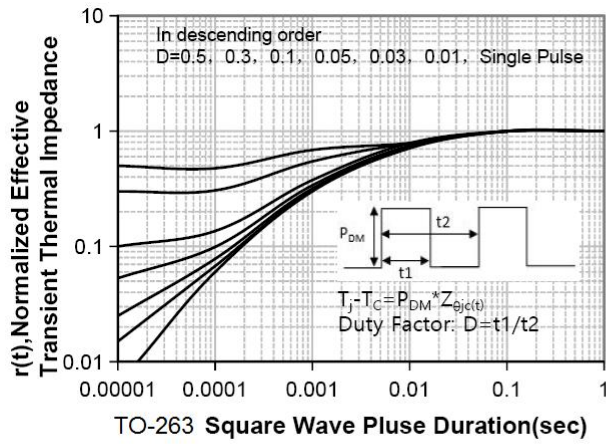


Figure 13. Transient Thermal Response Curve

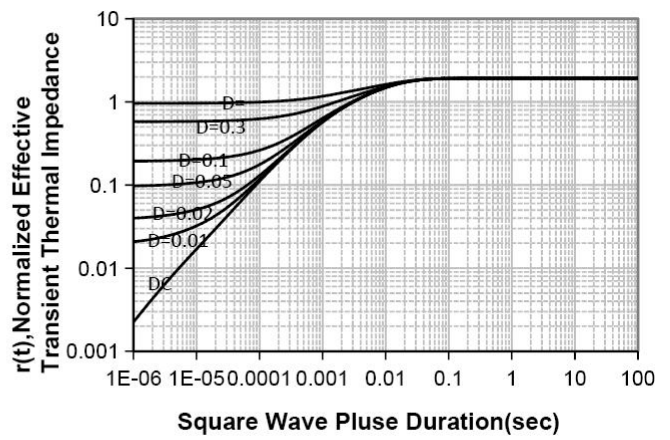
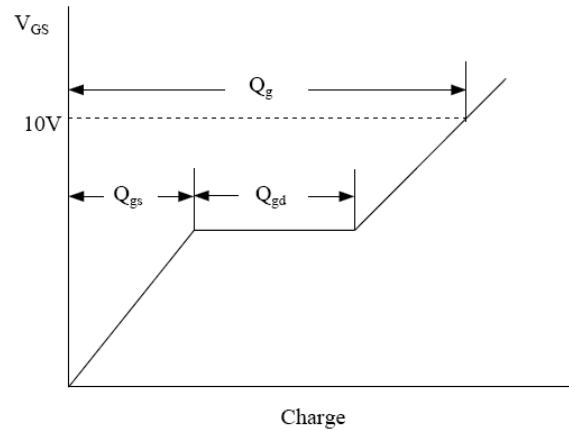
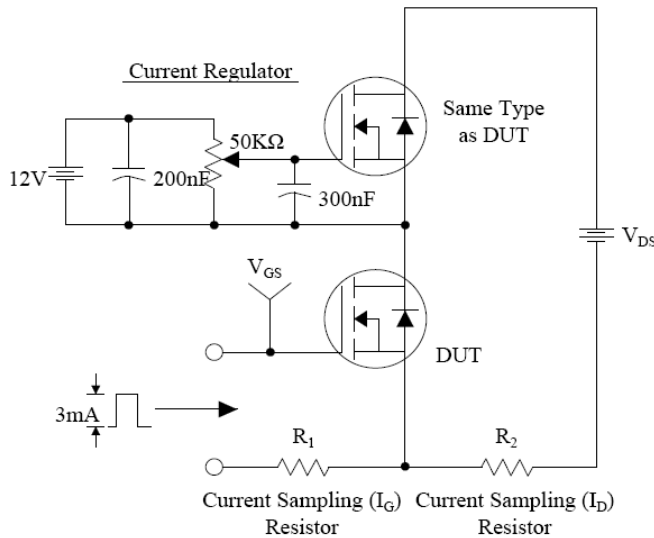


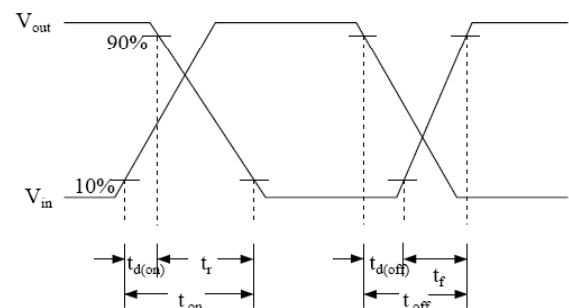
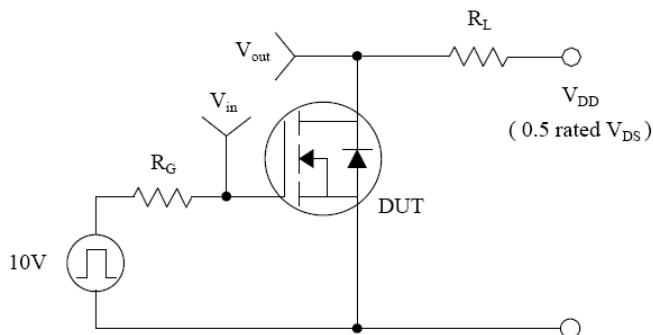
Figure 14. Transient Thermal Response Curve

9. Test Circuits and Waveforms

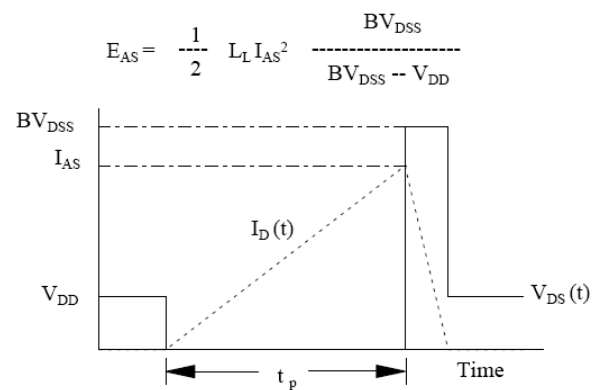
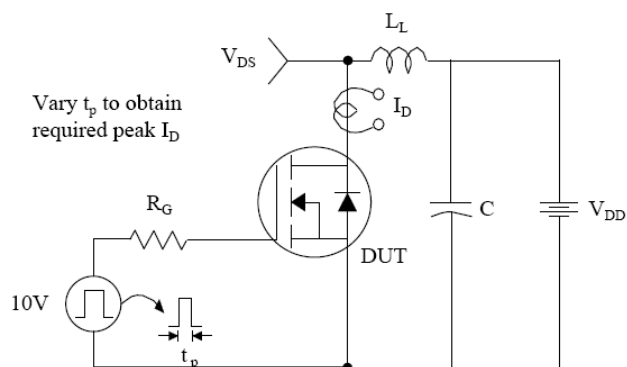
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms

