Maplesemi

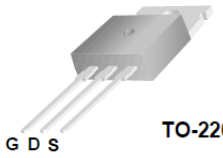
SLP60R190S2D /SLF60R190S2D
600V N-Channel SUPER - JMOSFET With FRD

Description

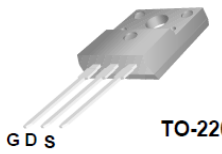
This SJ-FET MOSFET is new generation of high voltage produced using Maple semi's advanced Multi-EPI technology.
This advanced technology has been tailored to minimize Conduction loss, provide superior switching performance, and withstand extreme dv/dt rate and higher avalanche energy.
Especially tailored to minimize on-state resistance, provide superior switching SJ-FET is suitable for various AC/DC power conversion in switching mode operation for higher efficiency.

Features

- 20A, 650V, $R_{DS(on)\,typ.}$=0.175Ω@V_{GS} = 10 V
- Fast-Recovery body diode
- Multi-Epi process SJ-FET
- Ultra Low Gate Charge (typ. Qg = 36.5nC)
- 100% avalanche tested
- Improved dv/dt capability



TO-220



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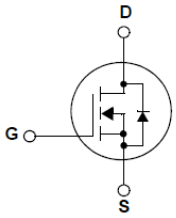


Absolute Maximum Ratings

T_C = 25° C unless otherwise noted

Symbol	Parameter	SLP60R190S2D	SLF60R190S2D	Unit
V_{DSS}	Drain-Source Voltage	600		V
I_D	Drain Current -Continuous (TC = 25℃) -Continuous (TC = 100℃)	20* 12.6*		A
I_{DM}	Drain Current - Pulsed (Note 1)	65		A
V_{GSS}	Gate-Source voltage	±30		V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	485		mJ
I_{AS}	Avalanche current, repetitive or not-repetitive (pulse width limited by Tj max)	3.5		A
dv/dt	Peak Diode Recovery dv/dt (Note 3)	15		V/ns
dVds/dt	Drain Source voltage slope (Vds=480V)	50		V/ns
P_D	Power Dissipation (TC = 25℃)	150	34	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150		℃
T_L	Maximum Lead Temperature for Soldering Purpose, 1/16" from Case for 10 Seconds	260		℃

* Drain current limited by maximum junction temperature. Maximum duty cycle D=0.75.

Thermal Characteristics

Symbol	Parameter	SSP65R190SFD	SSF65R190SFD	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.83	3.7	℃/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink Typ.	0.5	-	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	80	℃/W

Electrical Characteristics

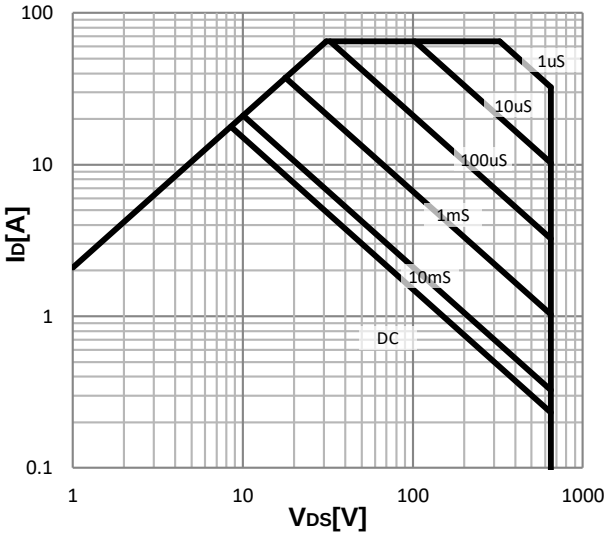
T_C = 25° C unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Off Characteristics						
BVDSS	Drain-Source Breakdown Voltage	VGS = 0V, ID = 250μA, TJ = 25℃	650	-	-	V
		VGS = 0V, ID = 250μA, TJ = 150℃	-	650	-	V
ΔBVDSS/ΔTJ	Breakdown Voltage Temperature Coefficient	ID = 250μA, Referenced to 25℃	-	0.6	-	V/℃
IDSS	Zero Gate Voltage Drain Current	VDS = 650V, VGS = 0V -TC = 125℃	-	1 300	4 -	μA μA
IGSSF	Gate-Body Leakage Current, Forward	VGS = 30V, VDS = 0V	-	-	100	nA
IGSSR	Gate-Body Leakage Current, Reverse	VGS = -30V, VDS = 0V	-	-	-100	nA
On Characteristics						
VGS(th)	Gate Threshold Voltage	VDS = VGS, ID = 250μA	3.0	4.0	5.0	V
RDS(on)	Static Drain-Source On-Resistance	VGS = 10V, ID = 10A	-	0.175	0.21	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	VDS = 100V, VGS = 0V, f = 1.0MHz	-	1505	-	pF
Coss	Output Capacitance		-	68	-	pF
Crss	Reverse Transfer Capacitance		-	2.1	-	pF
Qg	Total Gate Charge	VDS = 480V, ID = 10A, VGS = 10V (Note 4)	-	36.5	-	nC
Qgs	Gate-Source Charge		-	8.7	-	nC
Qgd	Gate-Drain Charge		-	12.5	-	nC
Rg	Gate resistance	f=1 MHz, open drain	-	9.8	-	Ω
Switching Characteristics						
td(on)	Turn-On Delay Time	VDS = 400V, ID = 10A RG = 3.3Ω, VGS = 10V (Note 4)	-	38	-	ns
tr	Turn-On Rise Time		-	39	-	ns
td(off)	Turn-Off Delay Time		-	170	-	ns
tf	Turn-Off Fall Time		-	47	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
IS	Maximum Continuous Drain-Source Diode Forward Current		-	-	20	A
ISM	Maximum Pulsed Drain-Source Diode Forward Current		-	-	65	A
VSD	Drain-Source Diode Forward Voltage	VGS = 0V, IS = 20A	-	0.9	1.4	V
trr	Reverse Recovery Time	VGS = 0V, VDS = 400V, IS = 10A, dIF/dt =100A/μs	-	120	-	ns
Qrr	Reverse Recovery Charge		-	0.6	-	μC
Irrm	Peak Reverse Recovery Current		-	10	-	A

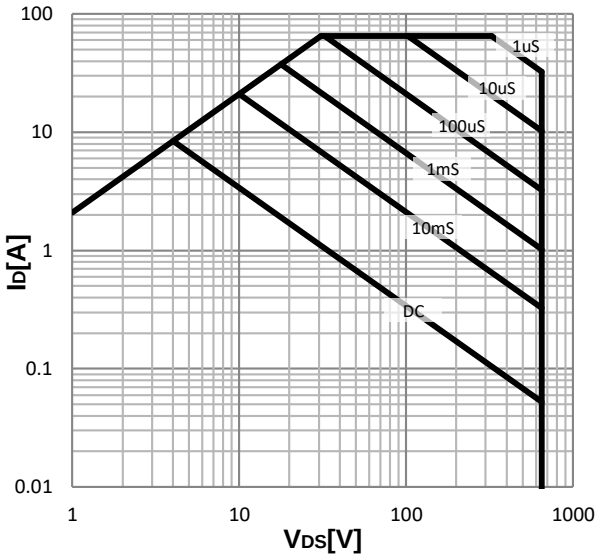
NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. ID=I_{AS}, VDD=50V, Starting TJ=25 ℃
3. I_{SD}≤ID, di/dt ≤ 200A/us, V_{DD} ≤ BV_{DSS}, Starting TJ = 25 ℃
4. Essentially Independent of Operating Temperature Typical Characteristics

Typical Performance Characteristics



Safe operating area TC=25 ℃
parameter: tp; SLP60R190S2D



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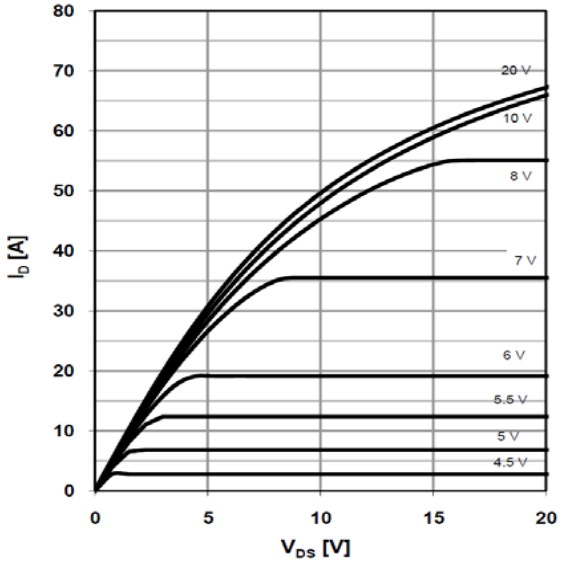
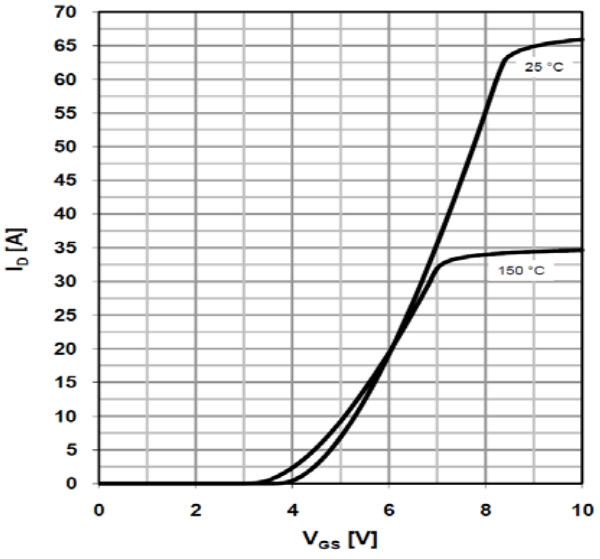
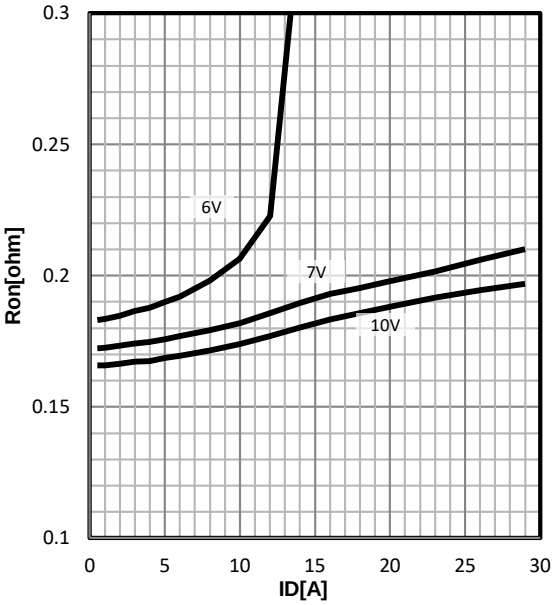


Typ. output characteristics T_j=25 ℃
parameter: VGS

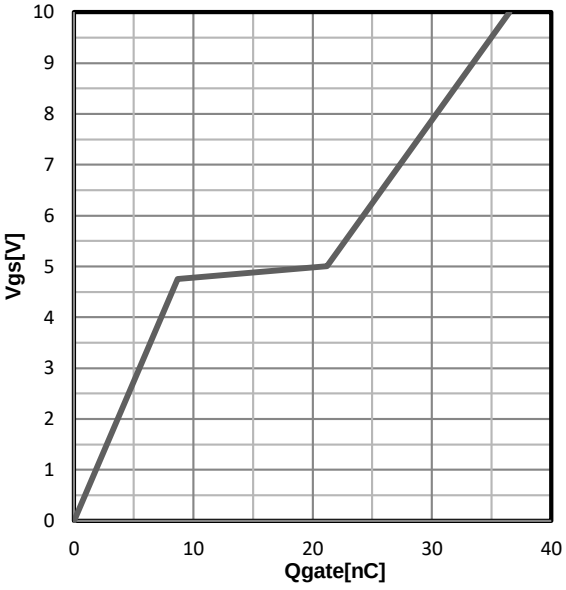


Typ. transfer characteristics

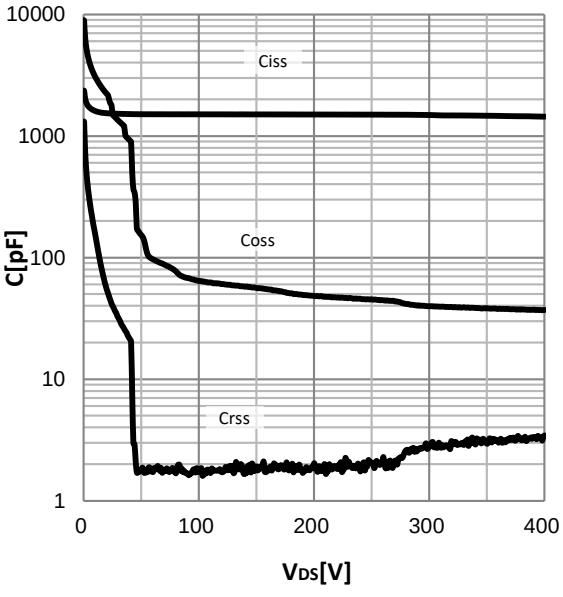
Typical Performance Characteristics



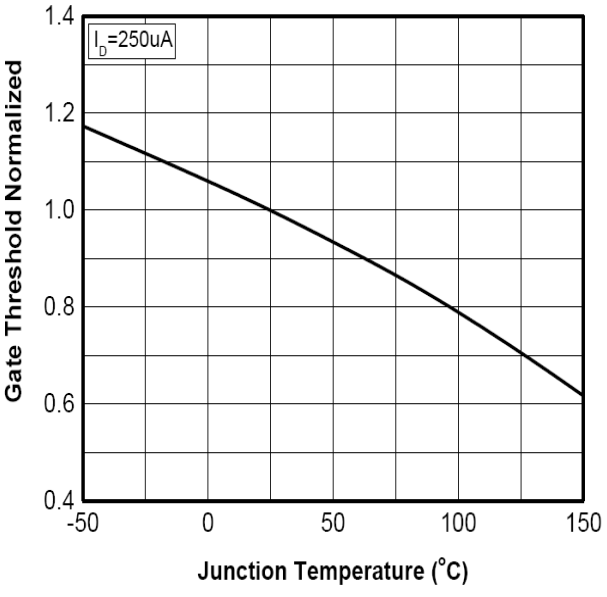
Typ. drain-source on-state resistance
parameter：VGS



Typ. gate charge characteristics

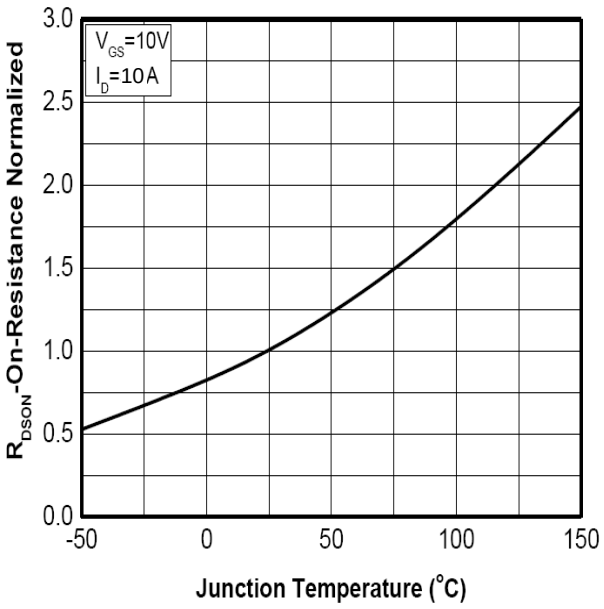


Typ. capacitances

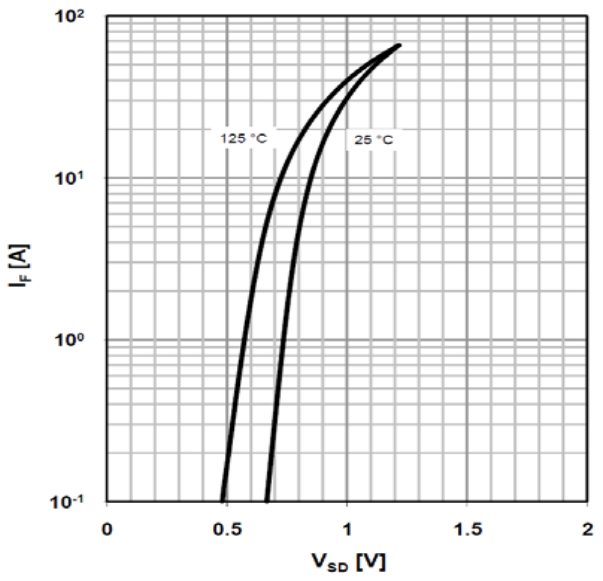


Normalized VGS(th) characteristics

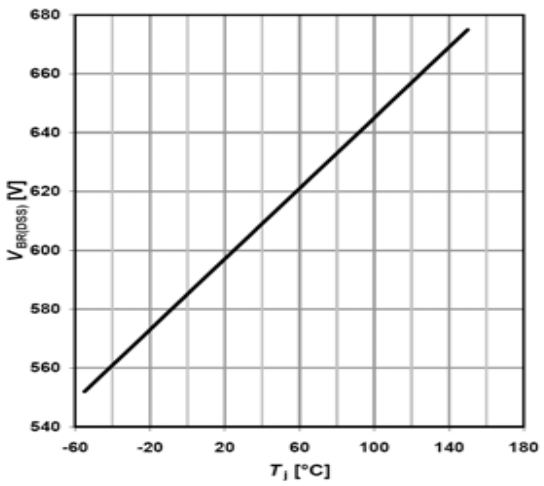
Typical Performance Characteristics



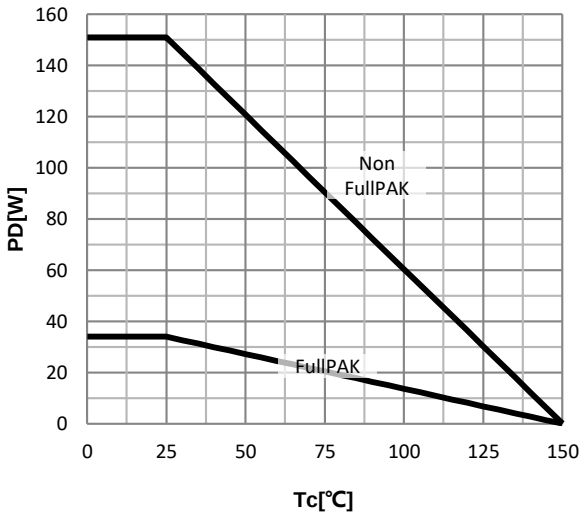
Normalized on resistance vs temperature



Forward characteristics of reverse diode

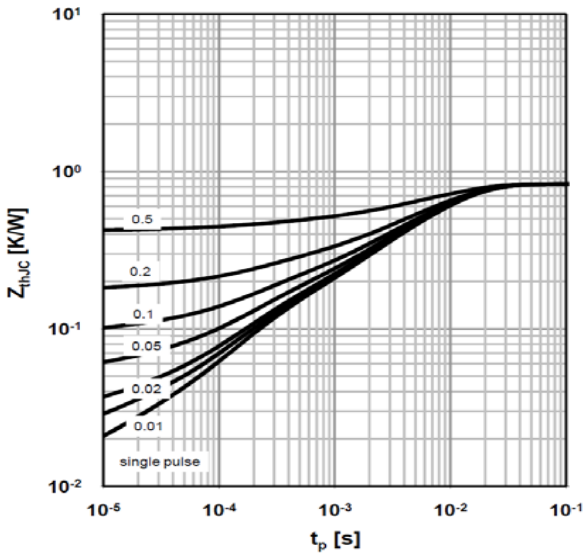


Drain-source breakdown voltage

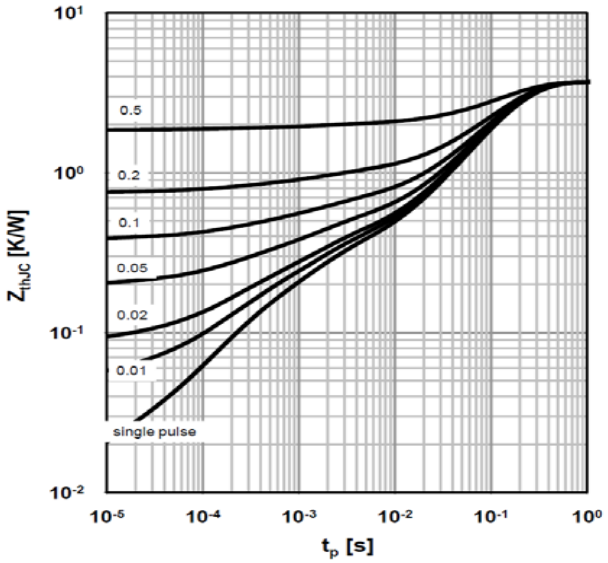


Power dissipation

Typical Performance Characteristics



Max. transient thermal impedance parameter: D=tp/T; SLP60R190S2D



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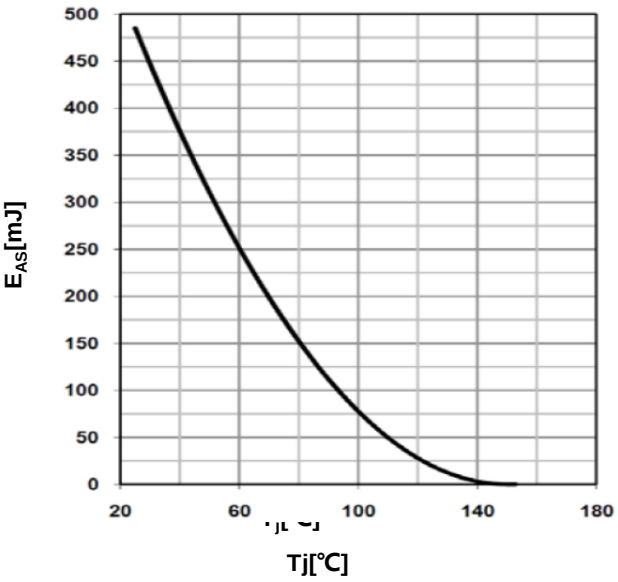
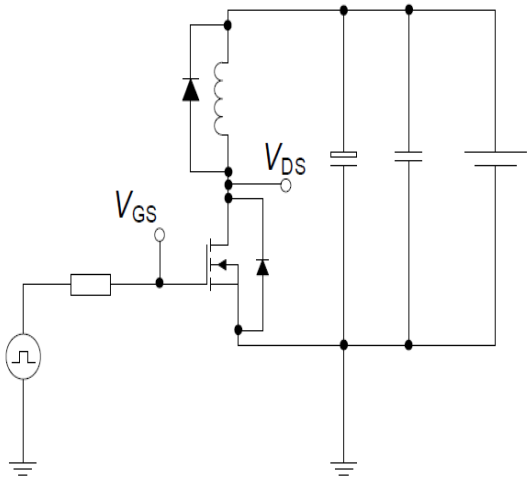


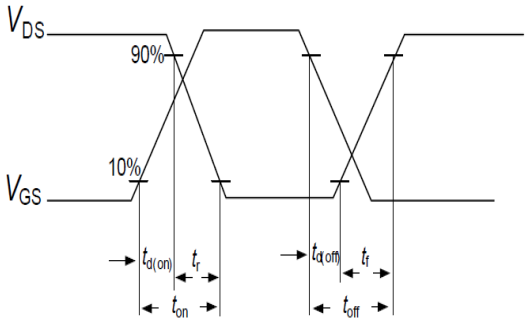
Avalanche energy

Test circuits

Switching times test circuit and waveform for inductive load

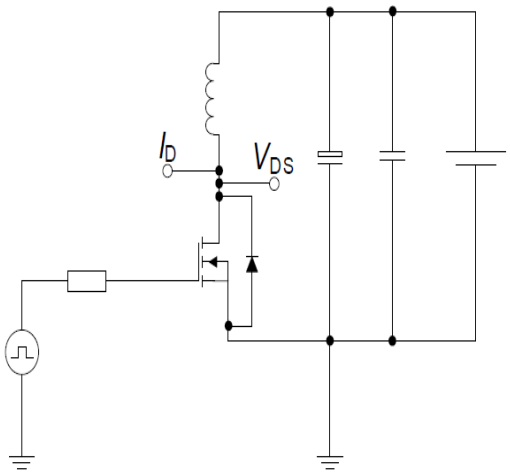


Switching times test circuit for inductive load

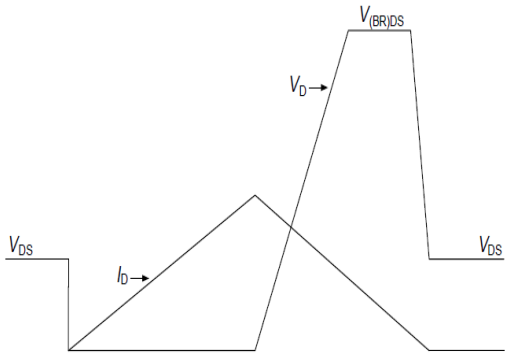


Switching time waveform

Unclamped inductive load test circuit and waveform



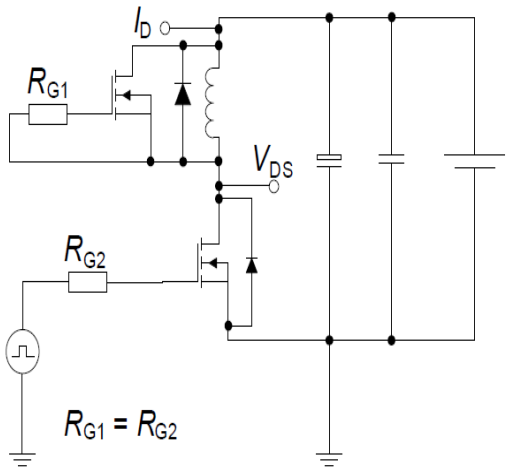
Unclamped inductive load test circuit



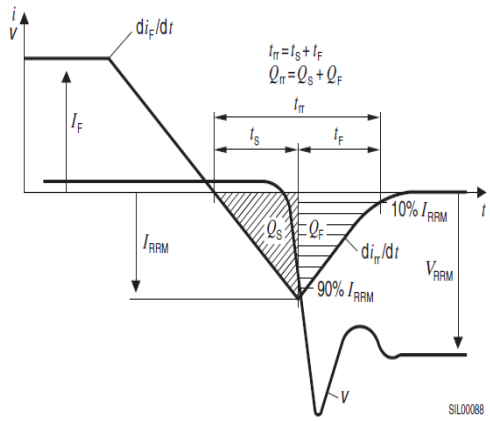
Unclamped inductive waveform

Test circuits

Test circuit and waveform for diode characteristics



Test circuit for diode characteristics



Diode recovery waveform