1. Description

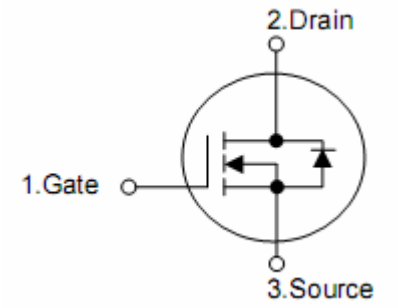
The HS70N06 is three-terminal silicon device with current conduction capability of about 70A, fast switching speed. Low on-state resistance, breakdown voltage rating of 60V, and max threshold voltages of 4 volt. It is mainly suitable electronic ballast, and low power switching

2. Features

- $R_{DS(ON)}$=15mΩ@V_{GS}=10V.
- Ultra low gate charge (typical 90nC)
- Low reverse transfer capacitance
- Fast switching capability
- 100％ avalanche energy specified
- Improved dv/dt capability

3. Pin configuration

TO-220



Pin	Function
1	Gate
2	Drain
3	Source

4. Absolute maximum ratings

Parameter		Symbol	Value	Unit
Drain to source voltage		V_{DSS}	60	V
Gate to source voltage		V_{GSS}	±20	V
Continuous drain current	T_J=25 ºC	I_D	70	A
	T_J=100 ºC	I_D	56	A
Drain current pulsed (note1)		I_{DM}	280	A
Single pulsed avalanche energy (note2)		E_{AS}	600	mJ
Repetitive avalanche energy (note1)		E_{AR}	20	mJ
Peak diode recovery dv/dt (note3)		dv/dt	10	V/ns
Total power dissipation(T_J=25 ºC)		P_D	200	W
Derating factor above 25 ºC		P_D	0.9	W/ ºC
Operating junction temperature		T_J	-55 ~ +150	ºC
Storage temperature		T_{STG}	-55 ~ +150	ºC

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

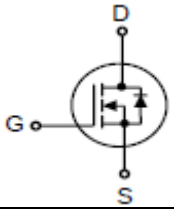
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

5. Thermal resistance

Parameter	Symbol	Typ	Max	Units
Thermal resistance, junction-to-case	θ_{JC}		1.15	ºC/W
Thermal resistance,case-to-sink	θ_{CS}	0.5		ºC/W
Thermal resistance,junction-to-ambient	θ_{JA}		62.5	ºC/W

6. Electrical characteristics

(T_J=25°C,unless otherwise notes)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA	60			V
Breakdown voltage temperature coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, referenced to 25 ºC		0.07		V/ºC
Drain-source leakage current	I_{DSS}	V_{DS}=60V,V_{GS}=0V			1	μA
		V_{DS}=48V,T_C=125 ºC			1	μA
Gate-source leakage current	I_{GSS}	V_{GS}=20V,V_{DS}=0V			100	nA
Gate-source leakage Reverse		V_{GS}=-20V,V_{DS}=0V			-100	nA
On characteristics						
Gate threshold voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.0		4.0	V
Static drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=25A		12	15	mΩ
Dynamic characteristics						
Input capacitance	C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1MHz		3300		pF
Output capacitance	C_{OSS}			530		pF
Reverse transfer capacitance	C_{RSS}			80		pF
Switching characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DD}=30V,I_D=25A,R_G=50Ω (note4,5)		12		ns
Rise time	t_R			80		ns
Turn-off delay time	$t_{D(OFF)}$			80		ns
Fall time	t_F			50		ns
Total gate charge	Q_G	V_{DS}=48V,V_{GS}=10V,I_D=50A (note4,5)		90		nC
Gate-source charge	Q_{GS}			20		nC
Gate-drain charge (miller charge)	Q_{GD}			30		nC
Source-drain diode ratings and characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0V,I_S=50A			1.5	V
Continuous source current	I_S	Integral reverse p-n junction diode in the MOSFET 			70	A
Pulsed source current	I_{SM}				280	A
Reverse recovery time	t_{RR}	V_{GS}=0V,I_S=50A dI_F/dt=100A/μs(note4)		90		ns
Reverse recovery charge	Q_{RR}			300		μC

Note:1. repetitive rating:pulse width limited by junction temperature
2.L=5.6mH,I_{AS}=50A,V_{DD}=25V,R_G=0Ω,staring T_J=25ºC
3.I_{SD}≤50A,di/dt≤300A/μs,V_{DD}≤BV_{DSS},staring T_J=25 ºC
4.Pulse test:pulse width≤300μs,duty cycle≤2%
5.Essentially independent of operating temperature

7. Test circuits and waveforms

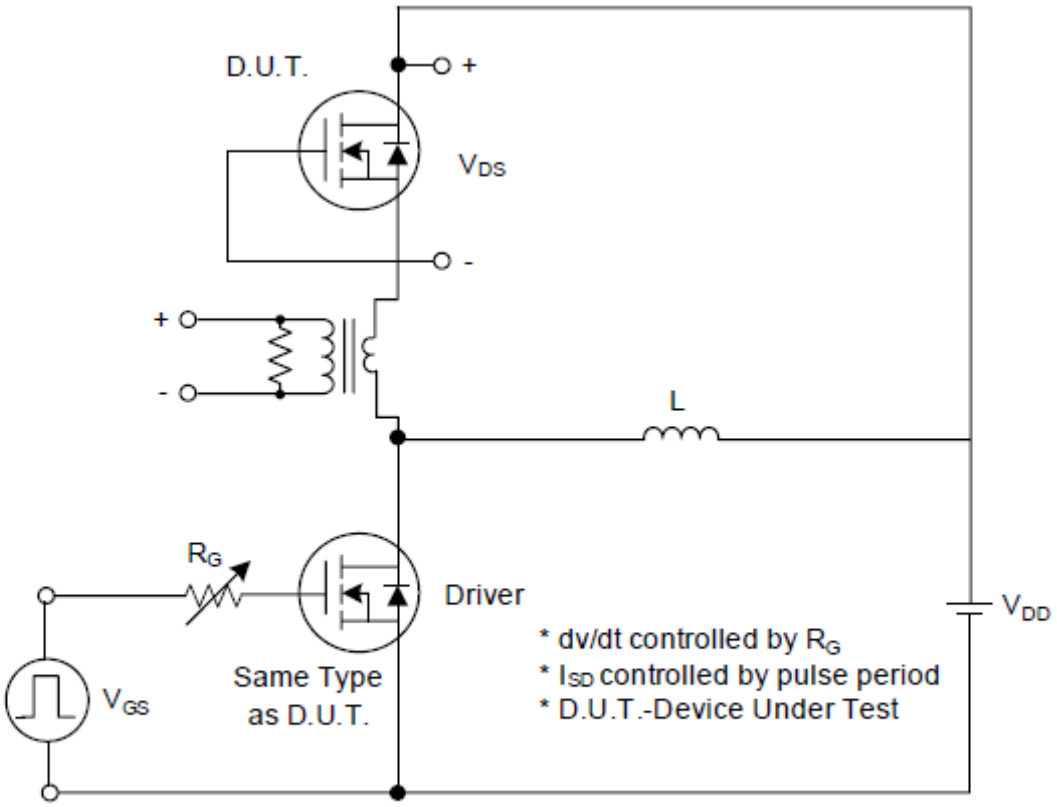


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

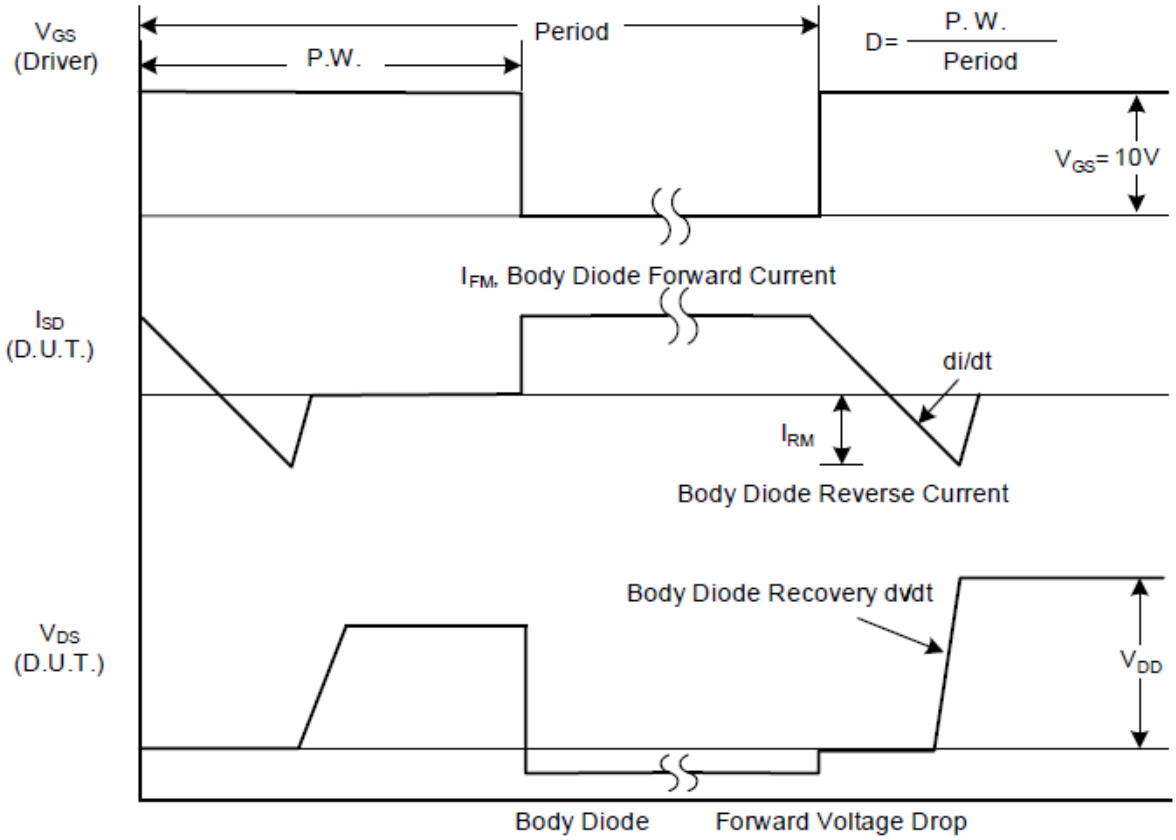


Fig. 1B Peak Diode Recovery dv/dt Waveforms

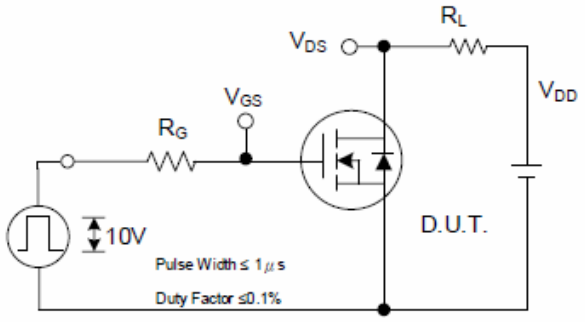


Fig. 2A Switching Test Circuit

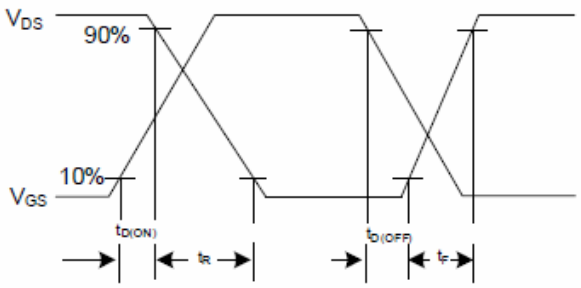


Fig. 2B Switching Waveforms

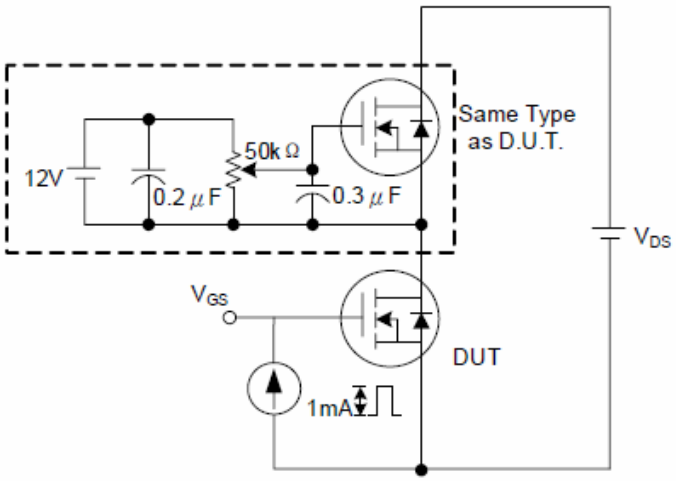


Fig. 3A Gate Charge Test Circuit

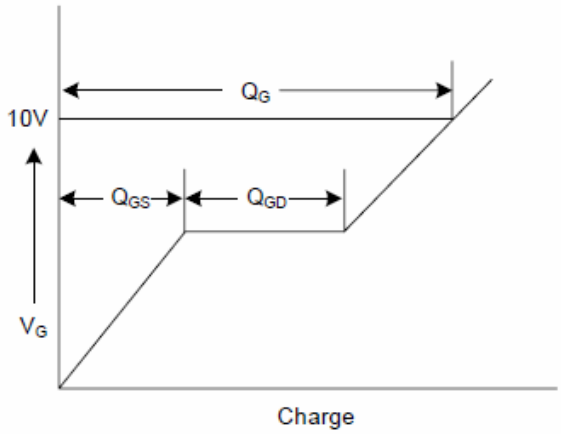


Fig. 3B Gate Charge Waveform

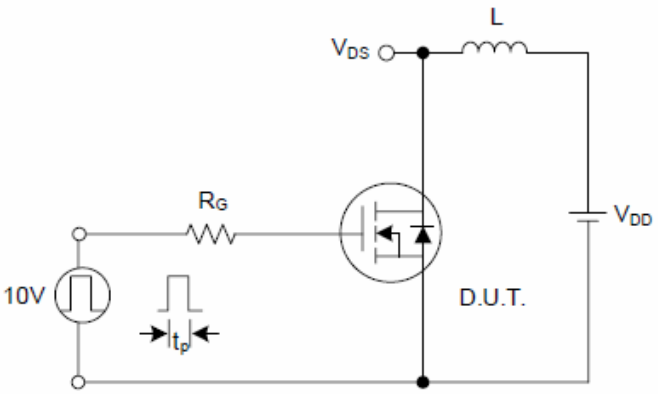


Fig. 4A Unclamped Inductive Switching Test Circuit

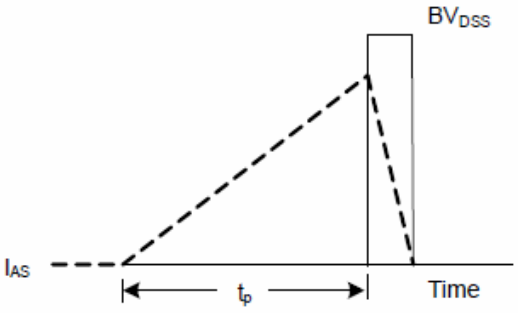


Fig. 4B Unclamped Inductive Switching Waveforms