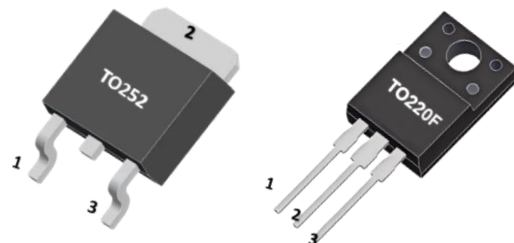


30A, 60V N-CHANNEL ENHANCEMENT MODE POWER MOSFET

DESCRIPTION

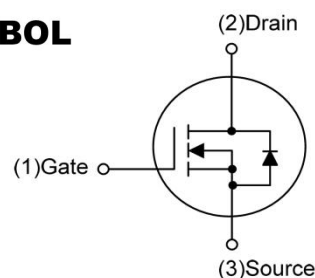
The 30N06 is a low voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and excellent avalanche characteristics. This power MOSFET is usually used at automotive applications in power supplies, high efficient DC to DC converters and battery operated products.



FEATURE

- * $R_{DS(ON)} = 30\text{ m}\Omega @ V_{GS} = 10\text{ V}, I_D = 15\text{ A}$
- * Ultra low gate charge (typical 20nC)
- * Low reverse transfer Capacitance ($CR_{SS} = \text{typical } 80\text{ pF}$)
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability

SYMBOL



ABSOLUTE MAXIMUM RATINGS($T_A = 25^\circ\text{C}$, unless otherwise specified.)

SYMBOL	PARAMETER		VALUE	UNIT
V_{DS}	Drain-Source Voltage		60	V
V_{GS}	Gate Source Voltage		± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	30	A
		$T_C = 125^\circ\text{C}$	21.3	
I_{DM}	Pulsed Drain Current (Note 2)		120	A
E_{AS}	Avalanche Energy	Single Pulsed (Note 3)	300	mJ
E_{AR}		Repetitive (Note 2)	8	mJ
P_D	Maximum Power Dissipation	TO-220F	45	W
		TO-252	46	
T_J	Storage Temperature		150	$^\circ\text{C}$
T_{STG}	Storage Temperature		-55~150	$^\circ\text{C}$
T_{OPR}	Operation Temperature		-55~150	$^\circ\text{C}$

Notes: 1. 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.

2. Repeatability rating: pulse width limited by junction temperature

3. $L = 0.66\text{ mH}$, $I_{AS} = 30\text{ A}$, $V_{DD} = 25\text{ V}$, $R_G = 20\Omega$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction-to-Ambient	TO-220F	R θ JA	62.5	°C/W
	TO-252		110	
Junction-to-Case	TO-220F	R θ JC	2.7	°C/W
	TO-252		2.85	

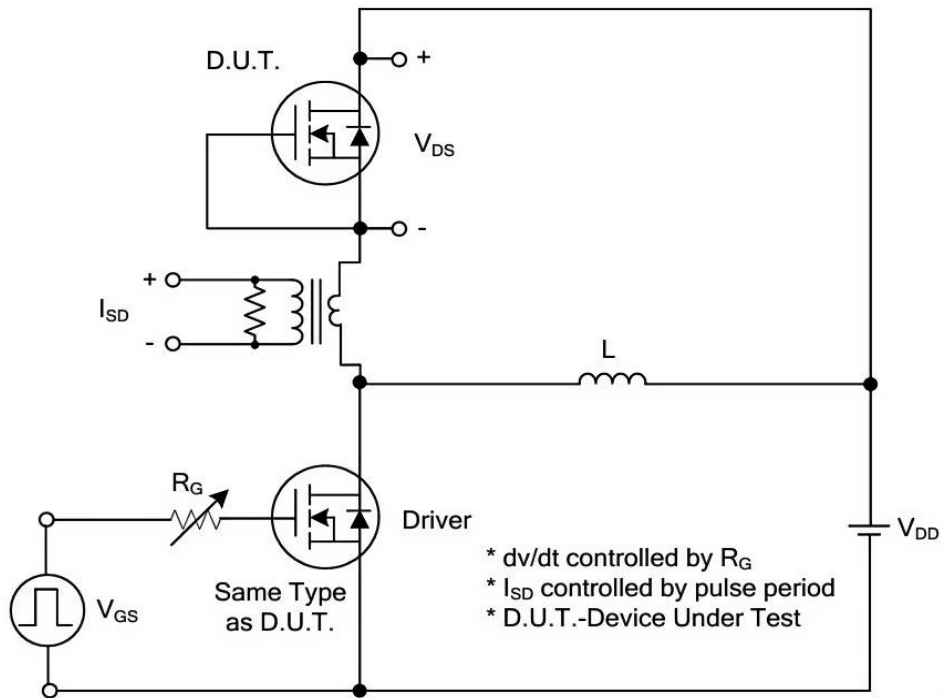
■ ELECTRICAL CHARACTERISTICS (TA=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	v _{GS} =0V, I _D =250μA	60			V
Zero gate voltage drain current	I _{DSS}	v _{DS} =60V, V _{GS} =0V			10	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
Breakdown Voltage Temperature Coefficient	ΔV _{(BR) DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.06		V/°C
ON CHARACTERISTICS						
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =15A		24	30	mΩ
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} ,I _D =250μA	2.0		4.0	V
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V,V _{DS} =25V f=1.0MHz		800		pF
Output Capacitance	C _{OSS}			300		
Reverse Transfer Capacitance	C _{RSS}			50		
SWITCHING PARAMETERS						
Total gate charge	Q _g	V _{DS} =60V,V _{GS} =10V I _D =24A(Note 1, 2)		20	30	nC
Gate-source charge	Q _{gs}			6		
Gate-drain charge	Q _{gd}			9		
Turn-On Delay Time	td(on)	V _{DD} =30V, I _D = 24A V _{GS} =10V(Note 1, 2)		52		nS
Turn-On Rise time	tr			96		
Turn-Off Delay Time	td(off)			124		
Turn-Off Fall time	tf			84		
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Continuous drain-source diode forward current	I _S				30	A
Pulsed drain-source diode forward current	I _{SM}				120	A
Drain-source diode forward voltage	V _{SD}	I _F =30A, V _{GS} =0V			1.4	V

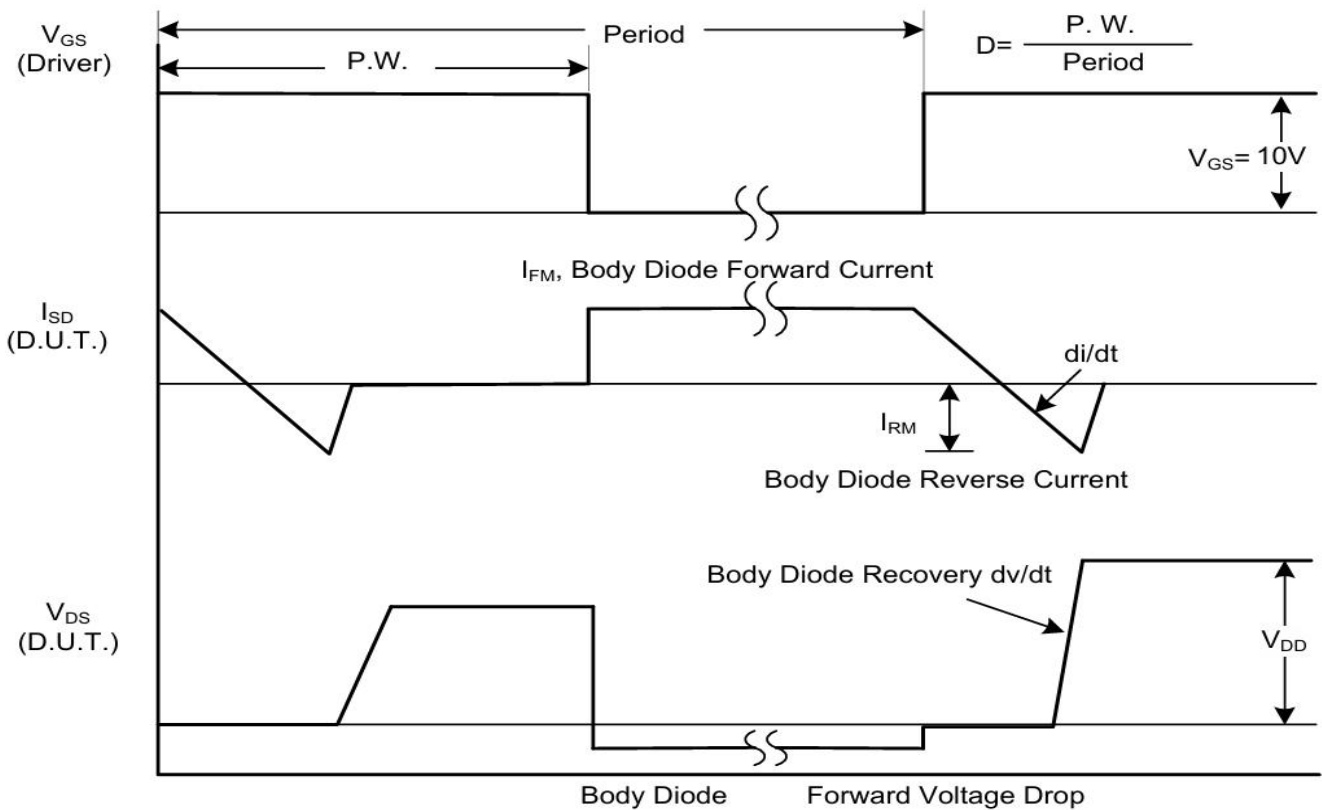
Notes:

1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2% .
2. Essentially independent of operating temperature .

■ TEST CIRCUITS AND WAVEFORMS

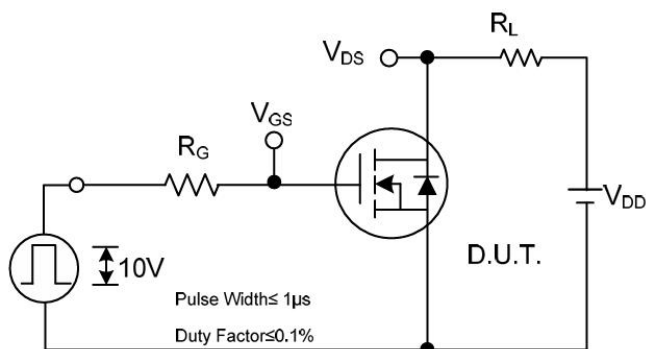


Peak Diode Recovery dv/dt Test Circuit

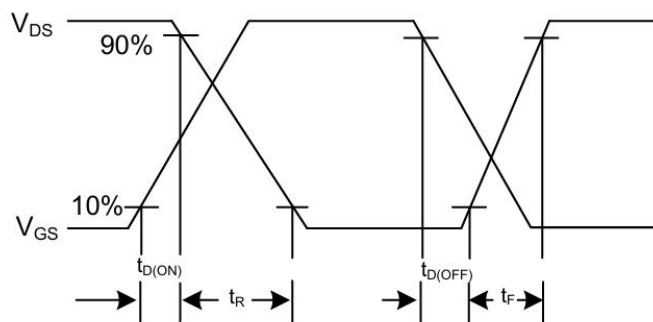


Peak Diode Recovery dv/dt Waveforms

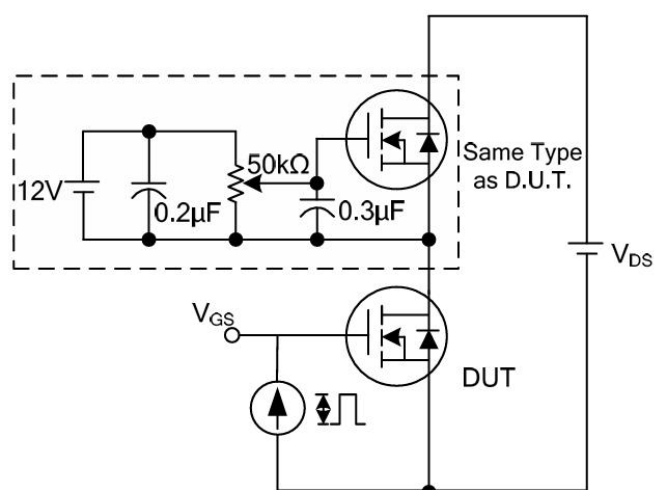
■ TEST CIRCUITS AND WAVEFORMS(Con.t)



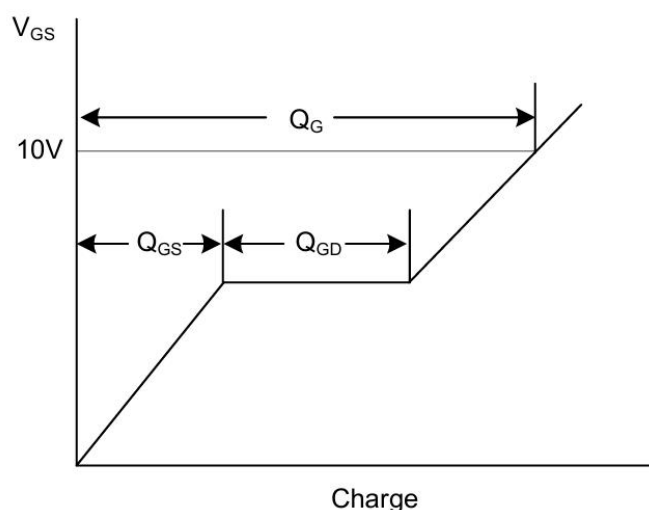
Switching Test Circuit



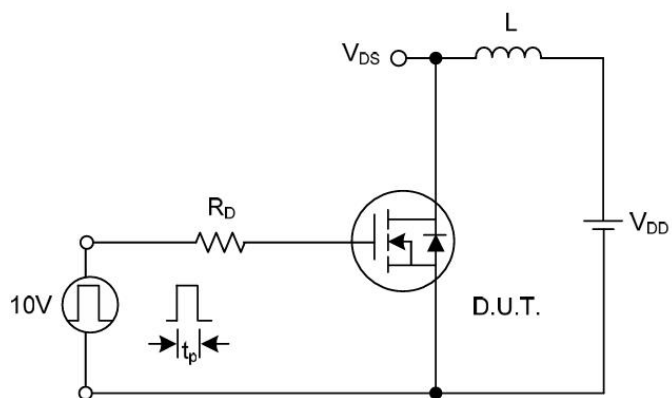
Switching Waveforms



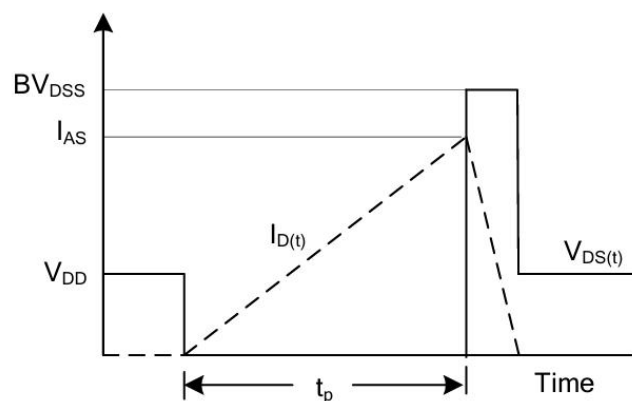
Gate Charge Test Circuit



Gate Charge Waveform



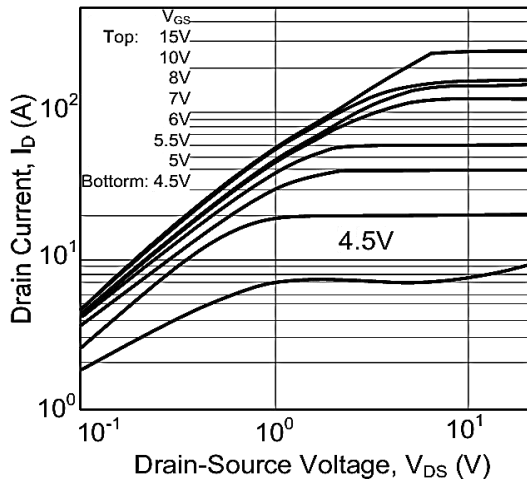
Unclamped Inductive Switching Test Circuit



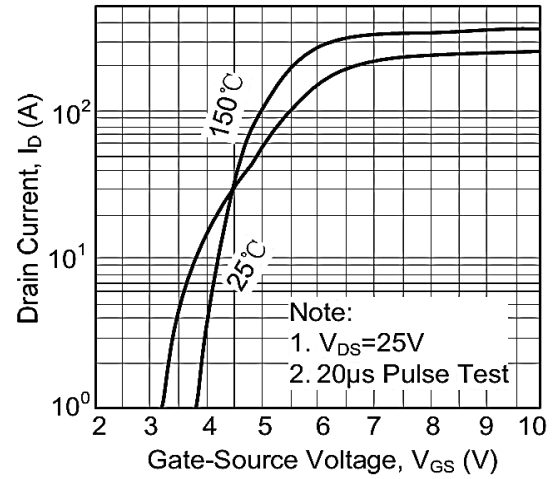
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

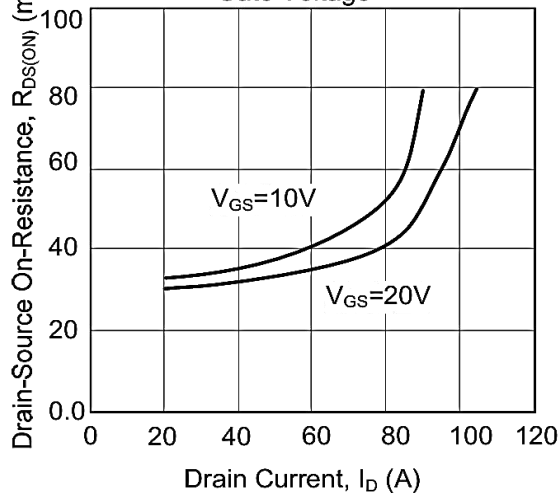
On-State Characteristics



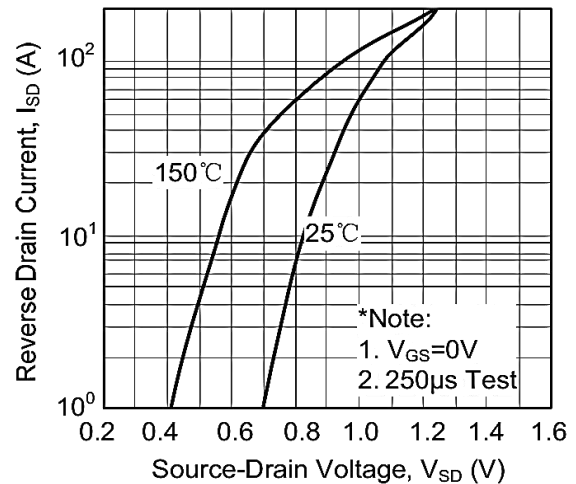
Transfer Characteristics



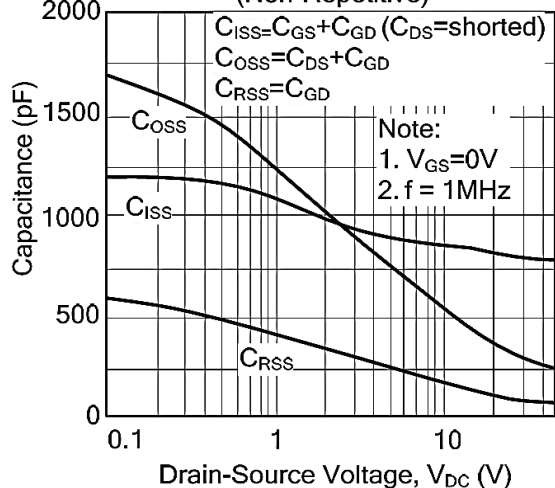
On-Resistance Variation vs. Drain Current and Gate Voltage



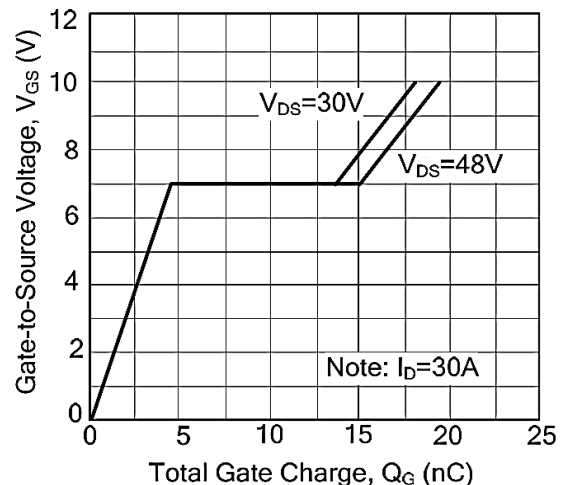
Reverse Drain Current vs. Allowable Case Temperature



Capacitance Characteristics (Non-Repetitive)



Gate Charge Characteristics



■ TYPICAL CHARACTERISTICS(Con.t)

