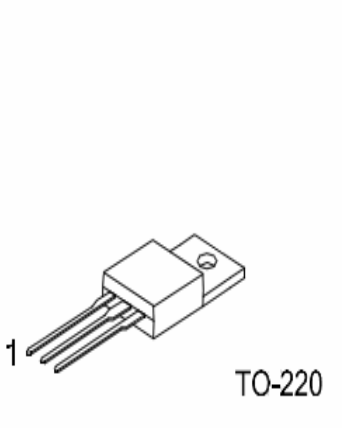
SiPower

Power Semiconductor Technology

HX70N6

Power MOSFET

70 Amps，60Volts
N-Channel MOSFET



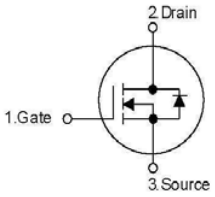
■ Description

The HX70N06 is a N-Channel enhancement MOSFET and is designed to have better characteristics, such as superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for low voltage applications such as such as switching regulators, switching converters, motor drivers and relay drivers. These transistors can be operated directly from integrated circuits.

■ Features

- $R_{DS(ON)}$=0.015Ω@VGS=10V
- Low gate charge(typical 70nC)
- Low reverse transfer capacitance(C_{RSS}=typical 160pF)
- Fast switching capability
- Avalanche energy specified
- Improved dv/dt capability,high ruggedness

■ Symbol



■ Ordering Information

Order Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
HX70N06-TA3-T	HX70N06L-TA3-T	TO-220	G	D	S	Tube

Note:Pin Assignment: G:Gate D:Drain S:Source

HX70N06L-TA3-T （1）Packing Type （2）Package Type （3）Lead Plating	(1)T:Tube,R:Tape Reel (2)TA3:TO-220 (3)L:Lead Free Plating Blank：Pb/Sn

■ Absolute Maximum Ratings(T_c=25℃,unless otherwise specified)

Parameter		Symbol	Ratings	Units
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Currenet Continuous	T_c=25℃	I_D	70	A
	T_c=100℃		55	A
Drain Current Pulsed (Note 1)		I_{DP}	280	A
Avalanche Energy	Repetitive (Note 1)	E_{AR}	20	mJ
	Single Pulse(Note 2)	E_{AS}	600	mJ
Peak Diode Recovery dv/dt(Note 3)		dv/dt	7.0	v/ns
Total Power Dissipation	T_c=25℃	P_D	158	W
	Derate above 25℃		1.05	w/℃
Operation Junction Temperature		T_J	-55 to+150	℃

Storage temperature	T_{STG}	-55~+150	℃

■ Thermal Characteristics

Parameter	Symbol	Ratings	Units
Thermal Resistance Junction-Ambient	R_{thJA}	62.5	℃/W
Thermal Resistance, Case-to-Sink Typ.	R_{thCS}	0.5	
Thermal Resistance Junction-Case	R_{thJC}	0.95	

■ Electrical Characteristics（T_J=25℃,unless Otherwise specified.）

Parameter		Symbol	Test Conditions	Min	Typ	Max	Units
Off Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V,I_D=250μA	60	–	–	V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=60V,V_{GS}=0V	–	–	1	μA
			V_{DS}=48V,T_C=150℃	–	–	25	μA
Gate-Body Leakage Current	Forward	V_{GS}=20V,V_{DS} =0V	V_{GS}=20V,V_{DS}=0V	–	–	100	nA
	Reverse		V_{GS}=-20V,V_{DS}=0V	–	–	-100	nA
Breakdown Voltage Temperature Coefficient		$\triangle BV_{DSS}/\triangle T_J$	I_D=250μA	–	0.08	–	V/℃
On Characteristics							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.0	–	4.0	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{DS}=10V,I_D=35A		–	0.015	Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V f=1MHz	–	2350	3050	pF
Output Capacitance		C_{OSS}		–	690	890	pF
Reverse Transfer Capacitance		C_{RSS}		–	160	200	pF
Switching Characteristics							
Turn-On Delay Time		$t_{D(ON)}$	V_{DD}=30V,I_D=35A, R_G=50Ω (Note4,5)	–	30	70	ns
Rise Time		t_R		–	60	130	ns
Turn-Off Delay Time		$t_{D(OFF)}$		–	125	260	ns
Fall Time		t_F		–	95	200	ns
Total Gate Charge		Q_G	V_{DS}=48V,V_{GS}=10V, I_D=70A (Note4,5)	–	70	90	nC
Gate-Source Charge		Q_{GS}		–	18	-	nC
Gate-Drain Charge		Q_{GD}		–	24	-	nC
Drain-Source Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_{SD}=70A	–	–	1.5	V
Continuous Drain-Source Current		I_{SD}				70	A
Pulsed Drain-Source Current		I_{SM}				280	A
Reverse Recovery Time		t_{RR}	V_{GS}=0V,I_{SD}=70A, di/dt=100A/μs (Note4)		62		ns
Reverse Recovery Charge		Q_{RR}			110		nC

Notes：

1.Repetitive Rating: Pulse width limited by maximum junction temperature
2.L=0.5mH,I_{AS}=70A,V_{DD}=25V,R_G=0Ω,Starting T_J=25℃
3.I_{SD}≤70A,di/dt≤300A/μs,V_{DD}≤BV_{DSS}, Starting T_J=25℃
4.Pulse Test: Pulse Width≤300μs,Duty Cycle≤2%
5.Essentially Independent of Operating Temperature

■ Typical Characteristics

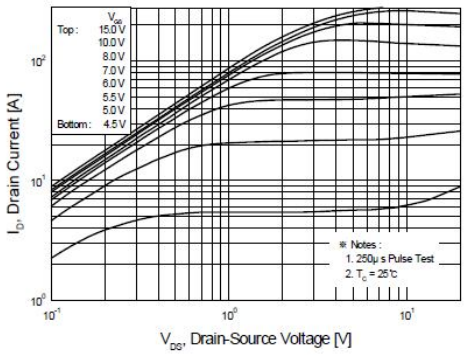


Fig 1. On-State Characteristics

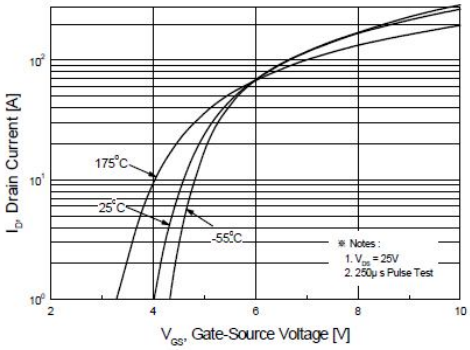


Fig 2. Transfer Characteristics

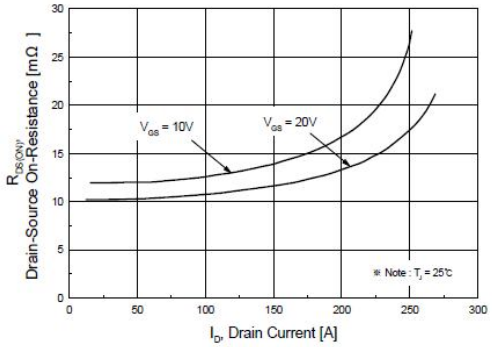


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

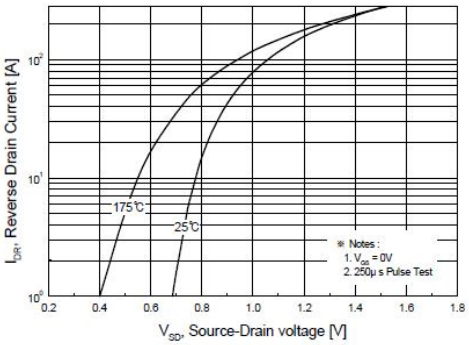


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

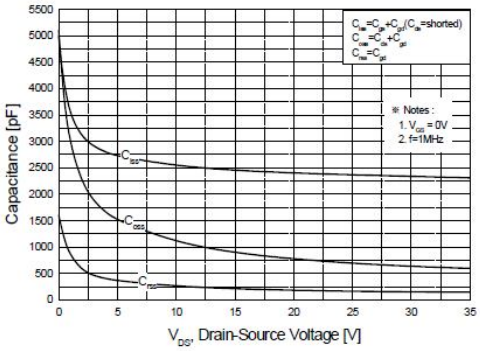


Fig 5. Capacitance Characteristics

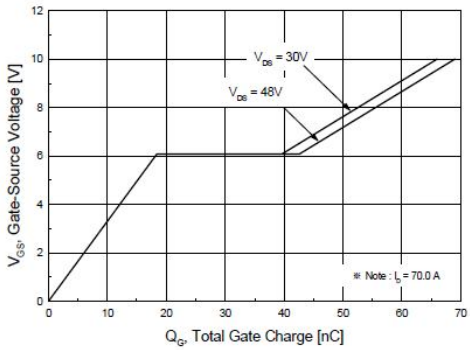


Fig 6. Gate Charge Characteristics

■ Typical Characteristics (Continued)

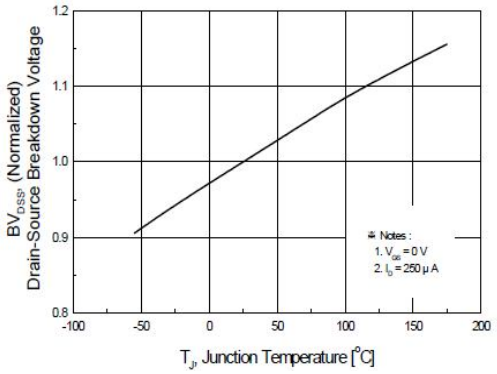


Fig 7. Breakdown Voltage Variation vs. Junction Temperature

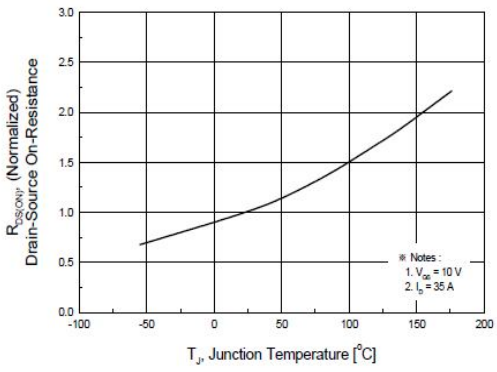


Fig 8. On-Resistance Variation vs. Junction Temperature

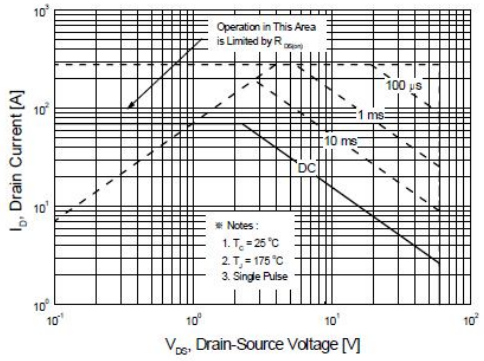


Figure 9. Maximum Safe Operating Area

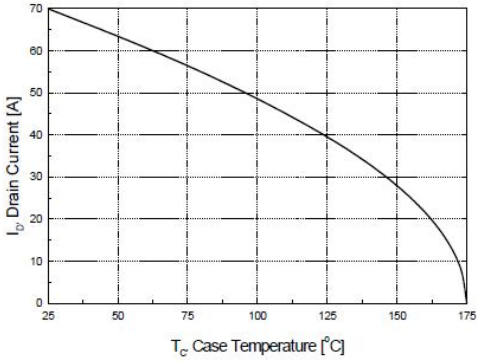


Figure 10. Maximum Drain Current vs. Case Temperature

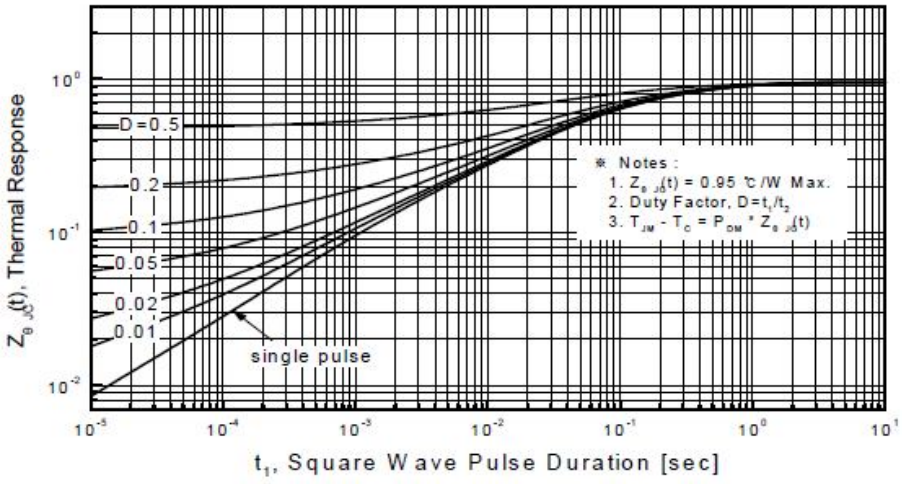


Fig 11. Transient Thermal Response Curve