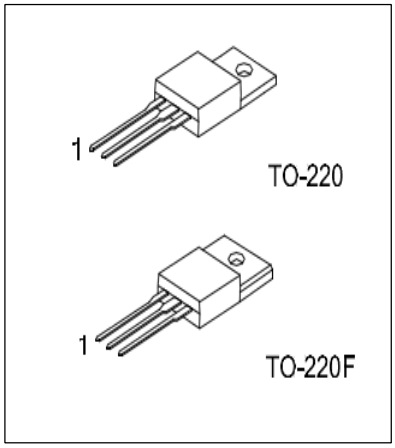
7.6 Amps，600Volts N-Channel MOSFET



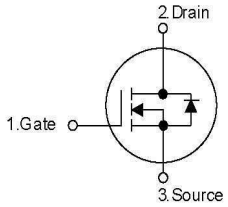
■ Description

The HX8N60 is a high voltage MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually usually used at high speed switching applications in power supplies .PWM motor controls, high efficient DC to DC converters and bridge circuits.

■ Features

- $R_{DS(ON)}$=1.2Ω@V_{GS}=10V
- Ultra Low gate charge(typical 28nC)
- Low reverse transfer capacitance(Crss=typical 12.0pF)
- Fast switching capability
- Avalanche energy tested
- Improved dv/dt capability,high ruggedness

■ Symbol



■ Ordering Information

Order Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
HX8N60-TA3-T	HX8N60L-TA3-T	TO-220	G	D	S	Tube
HX8N60-TF3-T	HX8N60L-TF3-T	TO-220F	G	D	S	Tube

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

HX8N60L-TA3-T （1）Packing Type （2）Package Type （3）Lead Plating	(1)T:Tube,R:Tape Reel (2)TA3:TO-220,TF3:TO-220F (3)L:Lead Free Plating Blank：Pb/Sn

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

Parameter		Symbol	Ratings		Units
			TO-220	TO-220F	
Drain-Source Voltage		V_{DSS}	600		V
Gate-Source Voltage		V_{GSS}	±30		V
Drain Currenet Continuous	T_c=25℃	I_D	7.6	7.6*	A
	T_c=100℃		4.7	4.7*	A
Drain Current Pulsed (Note 1)		I_{DP}	30	30*	A
Avalanche Energy	Repetitive (Note 1)	E_{AR}	14.7		mJ
	Single Pulse (Note 2)	E_{AS}	230		mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5		V/ns
Total Power Dissipation	T_c=25℃	P_D	142	48	W
	Derate above 25℃		1.14	0.40	W/℃
Junction Temperature		T_J	+150		℃
Storage Temperature		T_{STG}	-55~+150		℃

* Drain current limited by maximum junction temperature.

■ Thermal Characteristics

Parameter	Symbol	Ratings		Units
		TO-220	TO-220F	
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}	0.85	2.6	

■ 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	600	--	--	V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=600V,V_{GS}=0V	--	--	1	μA
			V_{DS}=480V,T_C=125℃	--	--	10	μA
Gate-Body Leakage Current	Forward	I_{GSS}	V_{GS}=30V,V_{DS}=0V	--	--	100	nA
	Reverse		V_{GS}=-30V,V_{DS}=0V	--	--	-100	nA
Breakdown Voltage Temperature Coefficient		△BV_{DSS}/△T_J	I_D=250μA	--	0. 7	--	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=3.8A	--	1.0	1.2	Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V, f=1MHz	--	--	1255	pF
Output Capacitance		C_{OSS}		--	--	135	pF
Reverse Transfer Capacitance		C_{RSS}		--	--	16	pF
Switching Characteristics							
Turn-On Delay Time		$t_{D(ON)}$	V_{DD}=300V,I_D=7.6A, R_G=25Ω (Note 4, 5)	--	--	45	ns
Rise Time		t_R		--	--	130	ns
Turn-Off Delay Time		$t_{D(OFF)}$		--	--	170	ns
Fall Time		t_F		--	--	140	ns
Total Gate Charge		Q_G	V_{DS}=480V, I_D=7.6A V_{GS}=10V (Note 4, 5)	--	28	36	nC
Gate-Source Charge		Q_{GS}		--	4.5	--	nC
Gate-Drain Charge		Q_{GD}		--	12	--	nC
Drain-Source Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_{SD}=7.6A	--	--	1.4	V
Continuous Drain-Source Current		I_{SD}		--	--	7.6	A
Pulsed Drain-Source Current		I_{SM}		--	--	30	A
Reverse Recovery Time		t_{RR}	I_{SD}=7.6A, dI_{SD}/dt=100A/μs (Note 4)	--	365	--	ns
Reverse Recovery Charge		Q_{RR}		--	3.4	--	μC

Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L =7.3 mH, I_{AS}=7.6 A, V_{DD}= 50V, R_G =25Ω, Starting TJ=25°C
3. I_{SD}≤7.6 A, di/dt ≤200A/μs, V_{DD}≤BV_{DSS}, Starting T =25°C
4. Pulse Test : Pulse width≤300μs, Duty cycle≤2%
5. Essentially independent of operating temperature

■ Typical Characteristics

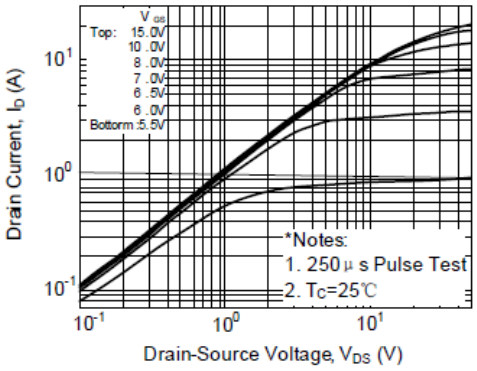


Figure 1. On-Region Characteristics

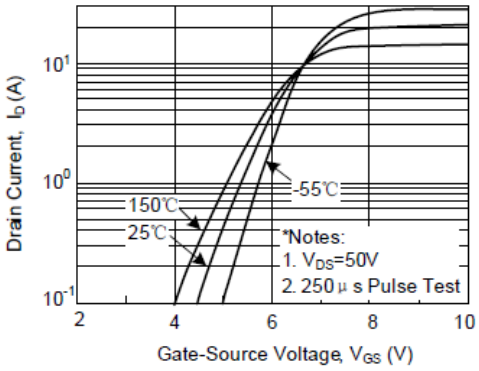


Figure 2. Transfer Characteristics

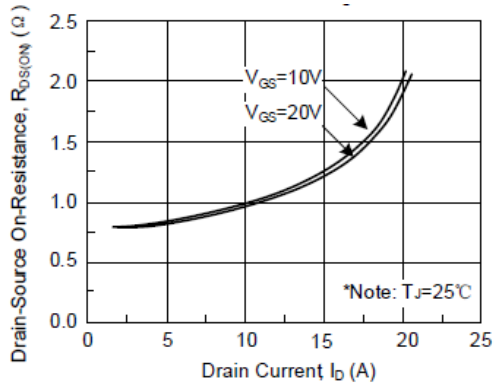


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

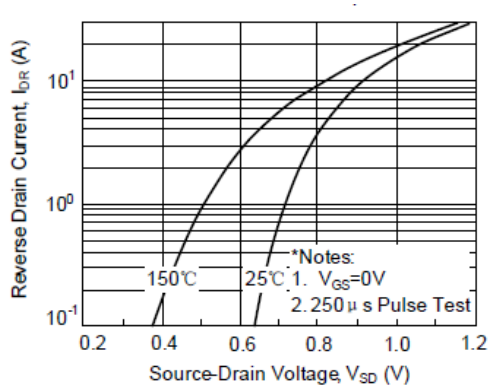


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

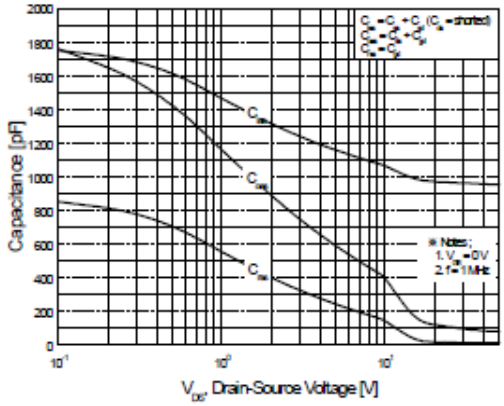


Figure 5. Capacitance Characteristics

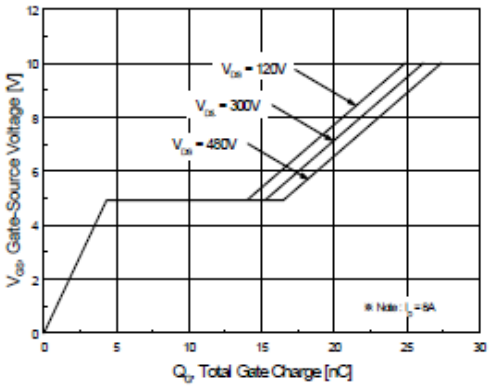


Figure 6. Gate Charge Characteristics

■ Typical Characteristics (Continued)

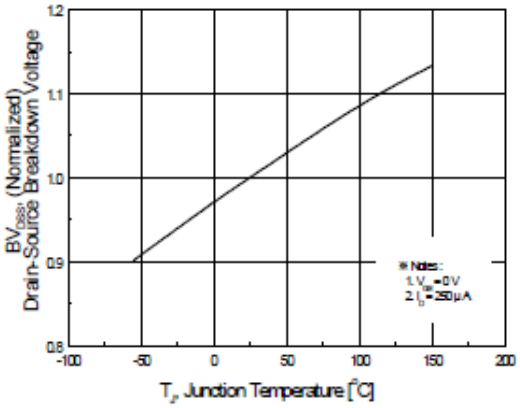


Figure 7. Breakdown Voltage Variation

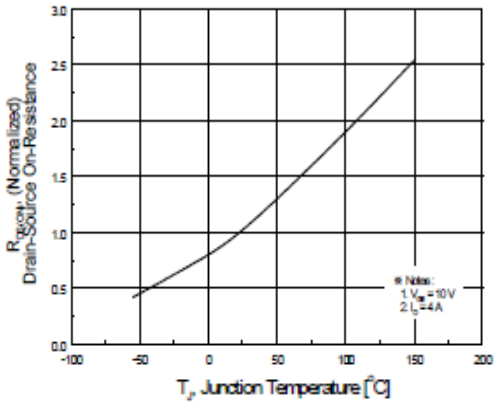


Figure8. On-Resistance Variation vs Temperature

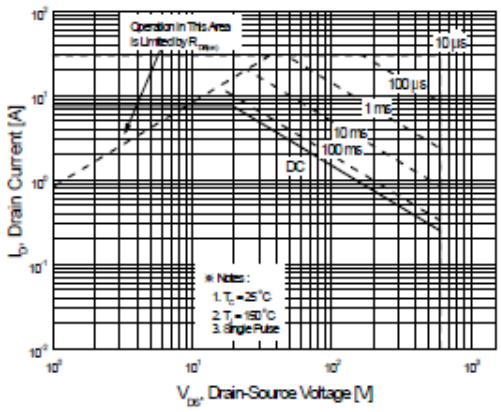


Figure 9-1. Maximum Safe Operating Area for TO220

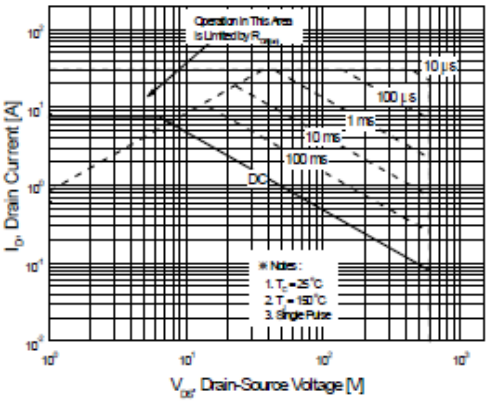


Figure 9-2. Maximum Safe Operating Area for TO220F

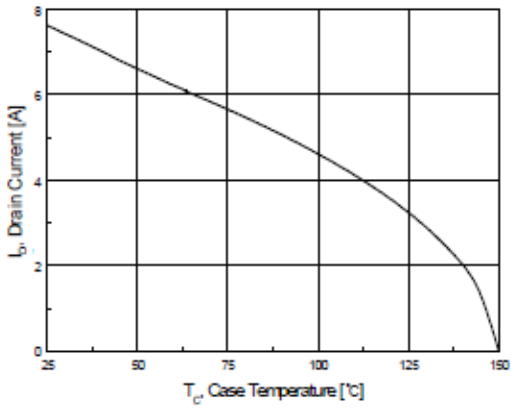


Figure 10. Maximum Drain Current vs Case Temperature

■ Typical Characteristics (Continued)

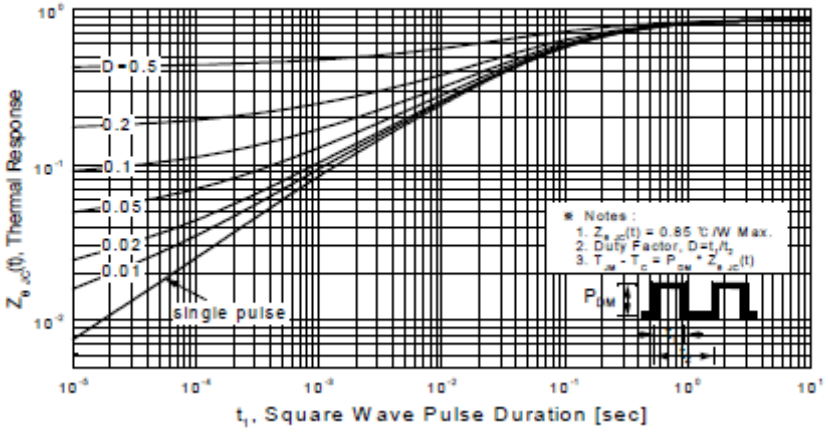


Figure 11-1. Transient Thermal Response Curve for TO220

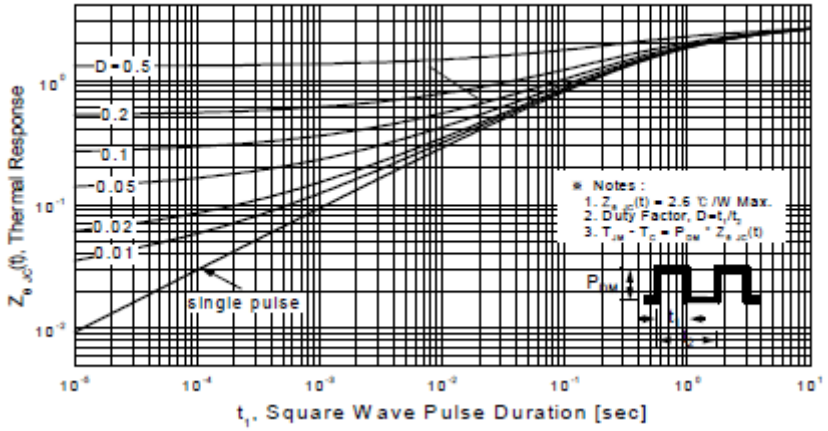


Figure 11-2. Transient Thermal Response Curve for TO220F