

Power MOSFET

**50 Amps, 60 Volts
N-CHANNEL POWER MOSFET**

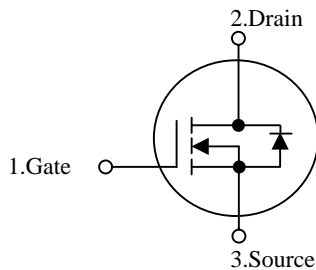
■ **DESCRIPTION**

The FTK50N06 is three-terminal silicon device with current conduction capability of about 50A, 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 mode power appliances.

■ **FEATURES**

- * $R_{DS(ON)} = 22m\Omega @ V_{GS} = 10 V$
- * Ultra low gate charge (typical 30 nC)
- * Low reverse transfer capacitance ($C_{RSS} =$ typical 70 pF)
- * Fast switching capability
- * 100% avalanche energy specified
- * Improved dv/dt capability

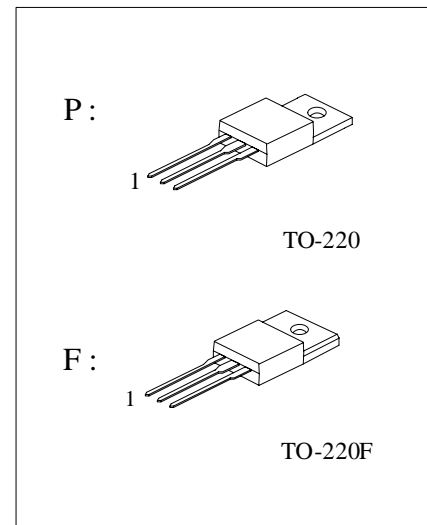
■ **SYMBOL**



■ **ORDERING INFORMATION**

Order Number	Package	Pin Assignment			Packing
		1	2	3	
FTK50N60P	TO-220	G	D	S	Tube
FTK50N60F	TO-220F	G	D	S	Tube

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





FTK50N06P / F

Power MOSFET

■ ABSOLUTE MAXIMUM RATINGS (T_C = 25°C, unless otherwise specified)

PARAMET		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	60	V
Gate-Source Voltage		V _{GSS}	±20	V
Continuous Drain Current	T _C = 25°C	I _D	50	A
	T _C = 100°C		35	A
Pulsed Drain Current (Note 1)		I _{DM}	200	A
Avalanche Energy	Single Pulse (Note 2)	E _{AS}	490	mJ
	Repetitive (Note 1)	E _{AR}	12	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	7	V/ns
Power Dissipation	T _C = 25°C	P _D	130	W
	Derate above 25°C		0.9	W / °C
Junction Temperature		T _J	+150	°C
Operating and Storage Temperature		T _{STG}	-55 ~ +150	°C

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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction-to-Ambient	TO-220	θ _{JA}	62	°C / W
	TO-220F		62	
Junction-to-Case	TO-220	θ _{JC}	1.24	
	TO-220F		1.78	

■ ELECTRICAL CHARACTERISTICS (T_C = 25°C, unless Otherwise specified.)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250μA	60			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} = 60V, V _{GS} = 0V			1	μA
			V _{DS} = 48V, T _C = 125°C			10	μA
Gate-Body Leakage Current	Forward	I _{GSSF}	V _{GS} = 20V, V _{DS} = 0V			100	nA
	Reverse	I _{GSSR}	V _{GS} = -20V, V _{DS} = 0V			-100	nA
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} / ΔT _J	I _D = 250μA, Referenced to 25°C		0.06		V / °C
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 _{GS} = 10V, I _D = 25A		18	22	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance	C _{ISS}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz			1000	1300	pF
Output Capacitance	C _{OSS}				450	590	pF
Reverse Transfer Capacitance	C _{RSS}				70	90	pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 30V, I _D = 25A, R _G = 25Ω (Note 4,5)		25	50		ns
Turn-On Rise Time	t _r			120	240		ns
Turn-Off Delay Time	t _{D(OFF)}			80	160		ns
Turn-Off Fall Time	t _f			85	170		ns
Total Gate Charge	Q _G	V _{DS} = 48V, I _D = 50A, V _{GS} = 10V (Note 4,5)		30	40		nC
Gate-Source Charge	Q _{GS}			8			nC
Gate-Drain Charge	Q _{GD}			10			nC



Power MOSFET

■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 50\text{ A}$			1.5	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				50	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				200	A
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, I_S = 50\text{ A},$		75		ns
Reverse Recovery Charge	Q_{RR}	$di_F/dt = 100\text{ A}/\mu\text{s}$		0.2		μC

Note:

1. Repetitive Rating: Pulse width limited by T_J
2. $L = 0.38\text{mH}, I_{AS} = 50\text{A}, V_{DD} = 25\text{V}, R_G = 20\ \Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 50\text{A}, di/dt \leq 300\text{A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
5. Essentially independent of operating temperature

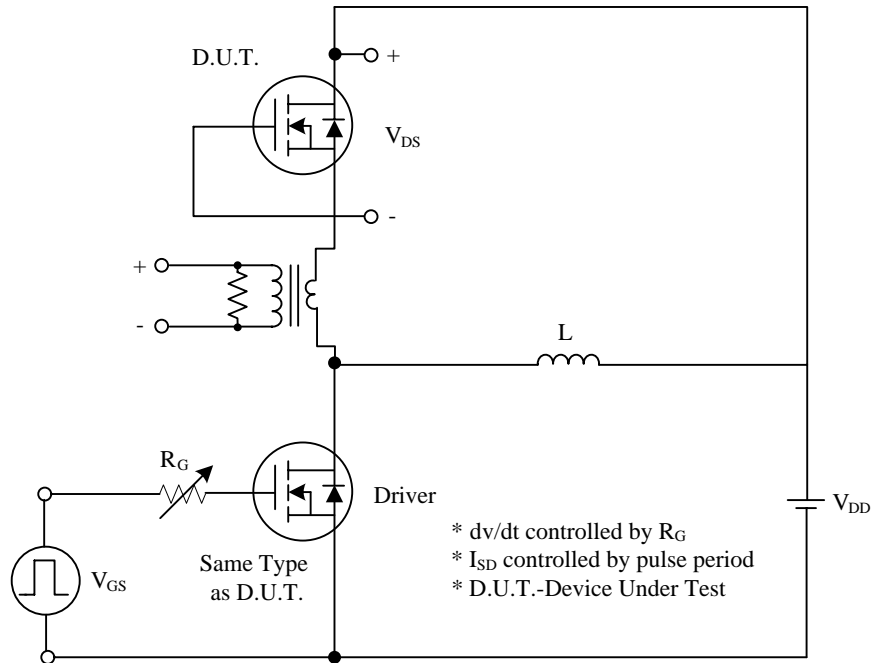


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

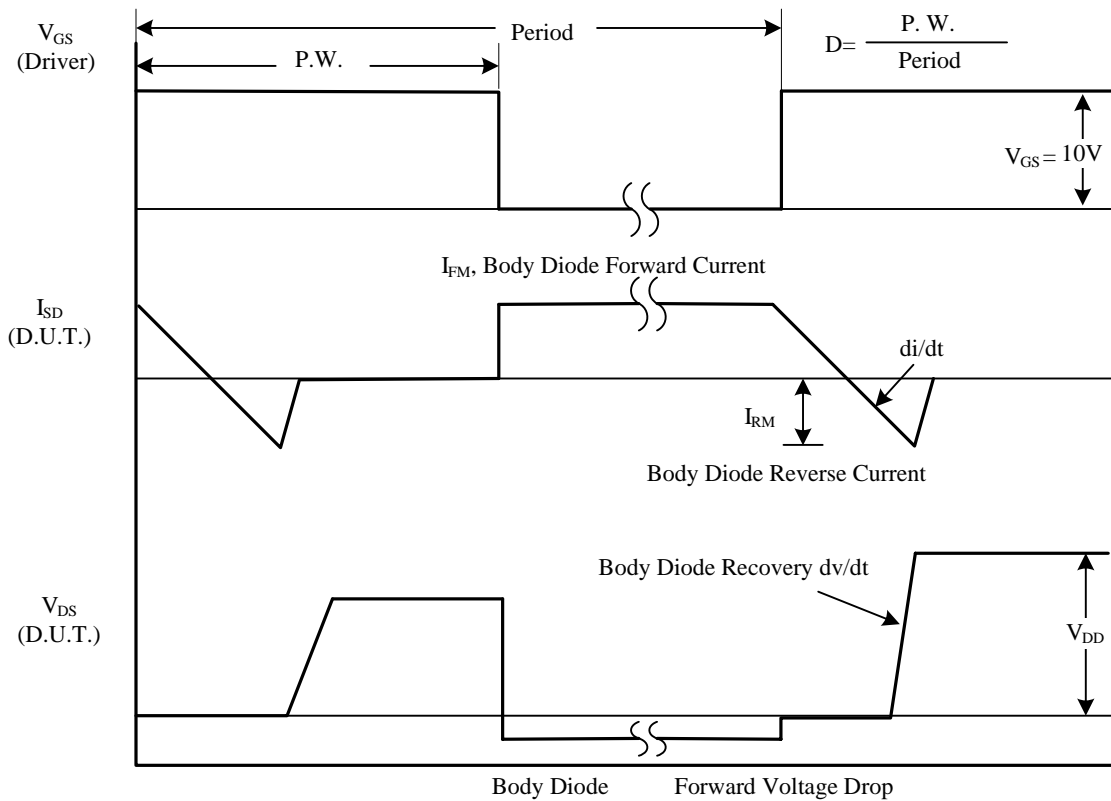


Fig. 1B Peak Diode Recovery dv/dt Waveforms

TEST CIRCUITS AND WAVEFORMS (Cont.)

Power MOSFET

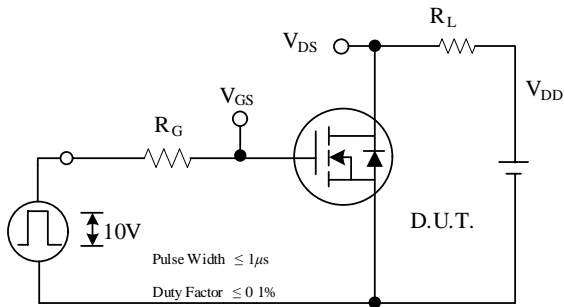


Fig. 2A Switching Test Circuit

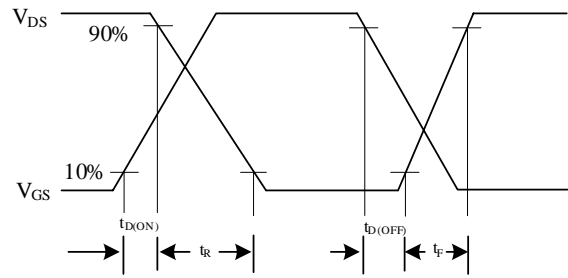


Fig. 2B Switching Waveforms

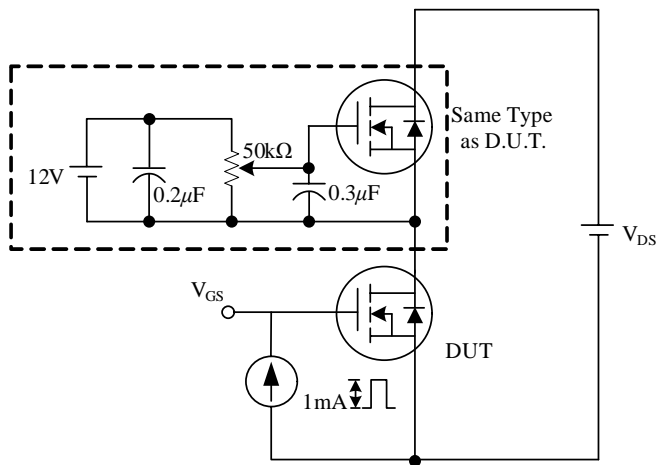


Fig. 3A Gate Charge Test Circuit

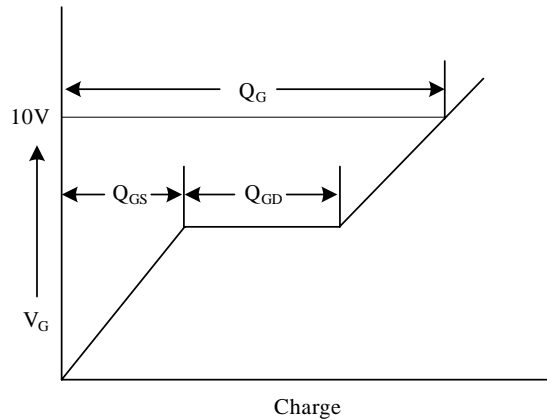


Fig. 3B Gate Charge Waveform

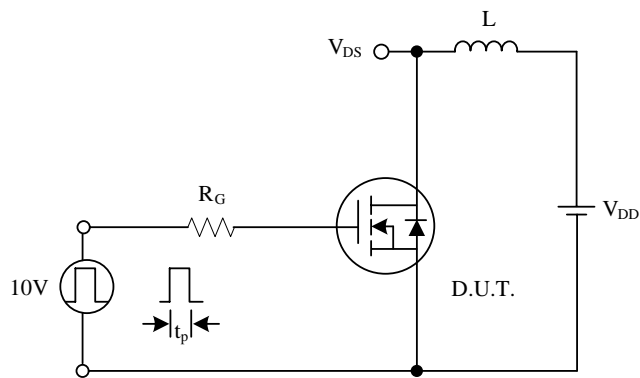


Fig. 4A Unclamped Inductive Switching Test Circuit

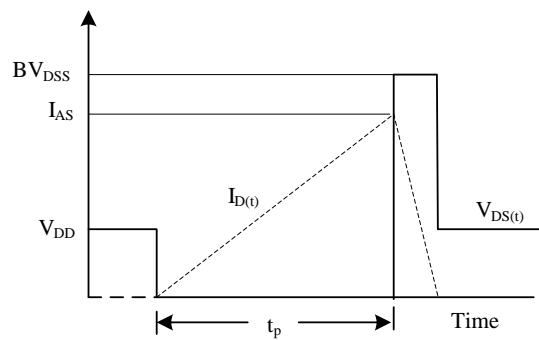
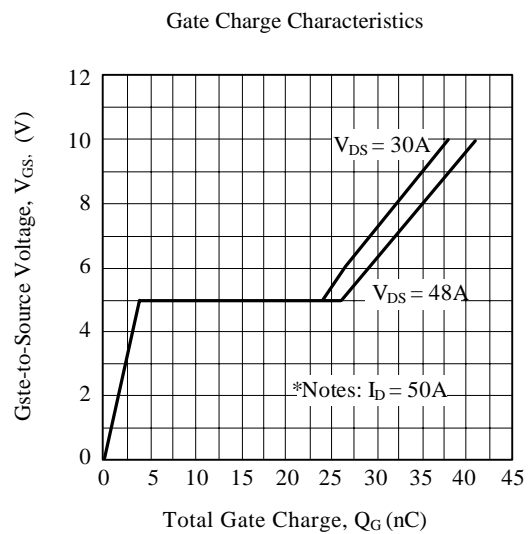
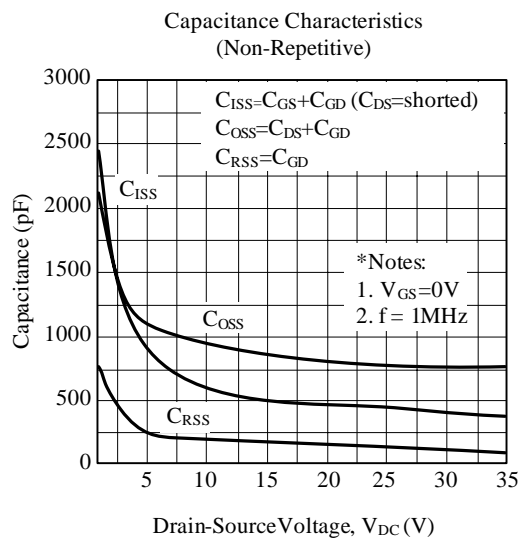
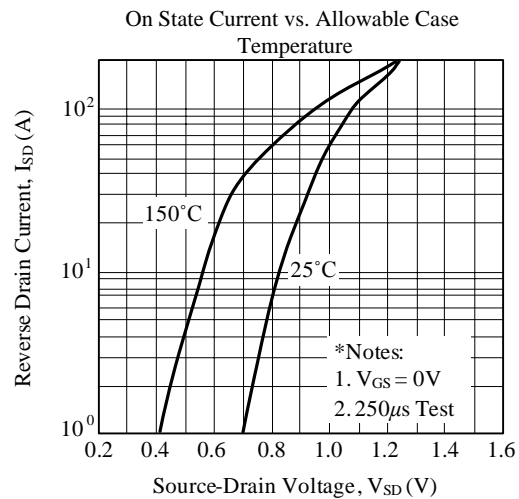
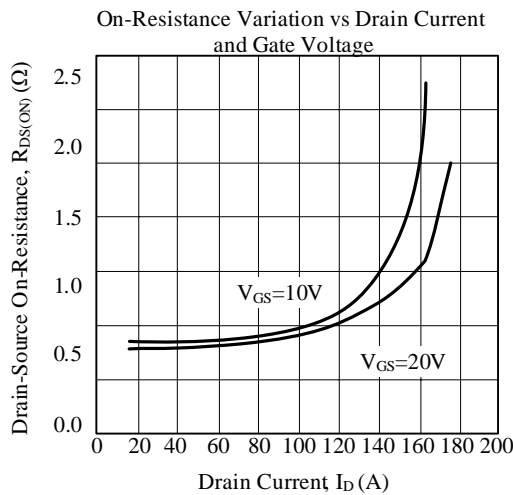
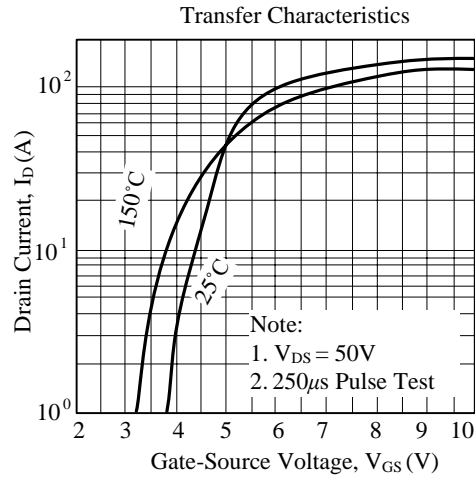
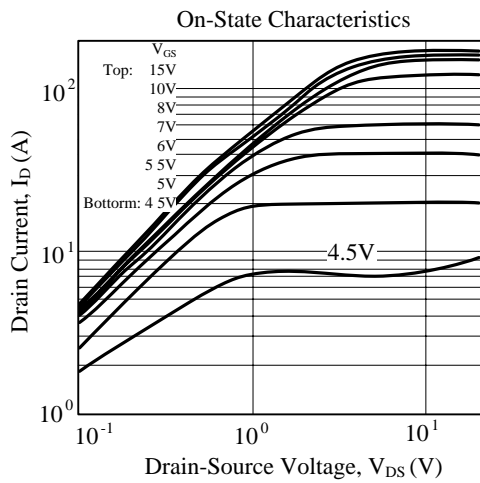


Fig. 4B Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS(Cont.)

Power MOSFET

