

1.0 Amps, 600 Volts N-CHANNEL MOSFET

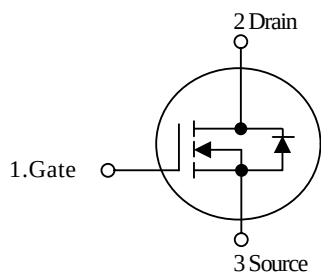
DESCRIPTION

The FTK 1N60 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 used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

FEATURES

- * $R_{DS(ON)} = 9.6\Omega @ V_{GS} = 10V$
- * Ultra Low gate charge (typical 5.0nC)
- * Low reverse transfer capacitance ($C_{RSS} =$ typical 3.5 pF)
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

SYMBOL

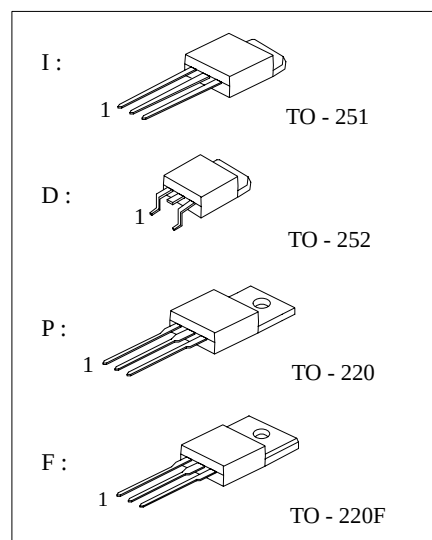


ORDERING INFORMATION

Ordering Number	Package	Pin Assignment			Packing
		1	2	3	
FTK1N60P	TO-220	G	D	S	Tube
FTK1N60F	TO-220F	G	D	S	Tube
FTK1N60I	TO-251	G	D	S	Tube
FTK1N60D	TO-252	G	D	S	Tape Reel

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

Power MOSFET





FTK1N60P / F / D / I

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

PARAMET		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	600	V
Gate-Source Voltage		V _{GSS}	±30	V
Avalanche Current (Note 2)		I _{AR}	1.0	A
Continuous Drain Current	T _C = 25°C	I _D	1.0	A
	T _C = 100°C		0.6	
Pulsed Drain Current (Note 2)		I _{DM}	4	A
Avalanche Energy	Single Pulse (Note 3)	E _{AS}	65	mJ
	Repetitive Limited by T _{J(MAX)}	E _{AR}	2.7	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	T _C = 25°C	P _D	27	W
	Derate above 25°C		0.21	W / °C
Junction Temperature		T _J	+150	°C
Operating Temperature		T _{OPR}	-55 ~ +150	°C
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	PACKAGE	SYMBOL	RATINGS	UNIT
Thermal Resistance Junction-Ambient	TO-251	θ _{JA}	112	°C / W
	TO-252		112	
	TO-220		54	
Thermal Resistance Junction-Case	TO-251	θ _{Jc}	12	
	TO-252		12	
	TO-220		4	

■ 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	600			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} = 600V, V _{GS} = 0V			1	μA
			V _{DS} = 480V, T _C = 125°C			10	μA
Gate-Source 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		ΔBV _{DSS} / ΔT _J	I _D = 250μA		0.7		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-State Resistance		R _{DS(ON)}	V _{GS} = 10V, I _D = 0.6A		9.6	12.0	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f =1MHz		160		pF
Output Capacitance		C _{OSS}			25		pF
Reverse Transfer Capacitance		C _{RSS}			3.5		pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		t _{D(ON)}	V _{DD} = 300V, I _D = 1.0A, R _G = 25Ω (Note 1,5)		20		ns
Turn-On Rise Time		t _R					
Turn-Off Delay Time		t _{D(OFF)}					
Turn-Off Fall Time		t _F					
Total Gate Charge		Q _G	V _{DS} =480V, V _{GS} =10V,		5.0		nC
Gate-Source Charge		Q _{GS}	I _D = 1.0A		1.2		nC
Gate-Drain Charge		Q _{GD}	(Note 1,5)		2.0		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}	$V_{GS} = 0\text{ V}, I_S = 1.0\text{ A}$			1.5	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				1.0	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				4.8	A
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, I_S = 1.0\text{ A},$ $dI_F/dt = 100\text{ A}/\mu\text{s}$ (Note 4)		200		ns
Reverse Recovery Charge	Q_{RR}			0.5		μC

Note:

1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
2. Repetitive Rating : Pulse width limited by maximum junction temperature
3. $L = 120\text{mH}$, $I_{AS} = 1.0\text{ A}$, $V_{DD} = 50\text{ V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$
4. $I_{SD} \leq 1.0\text{ A}$, $di/dt \leq 300\text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
5. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

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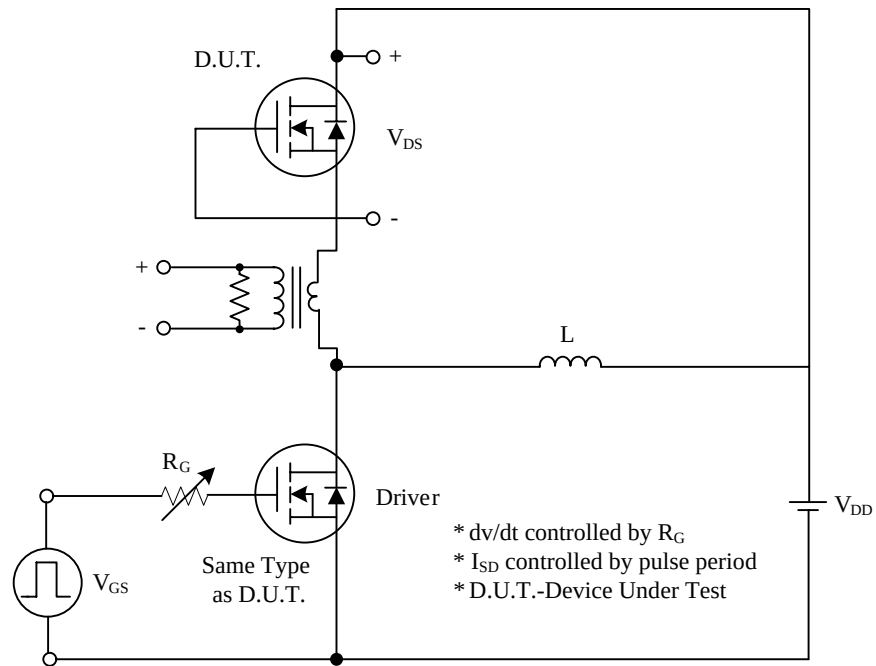


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

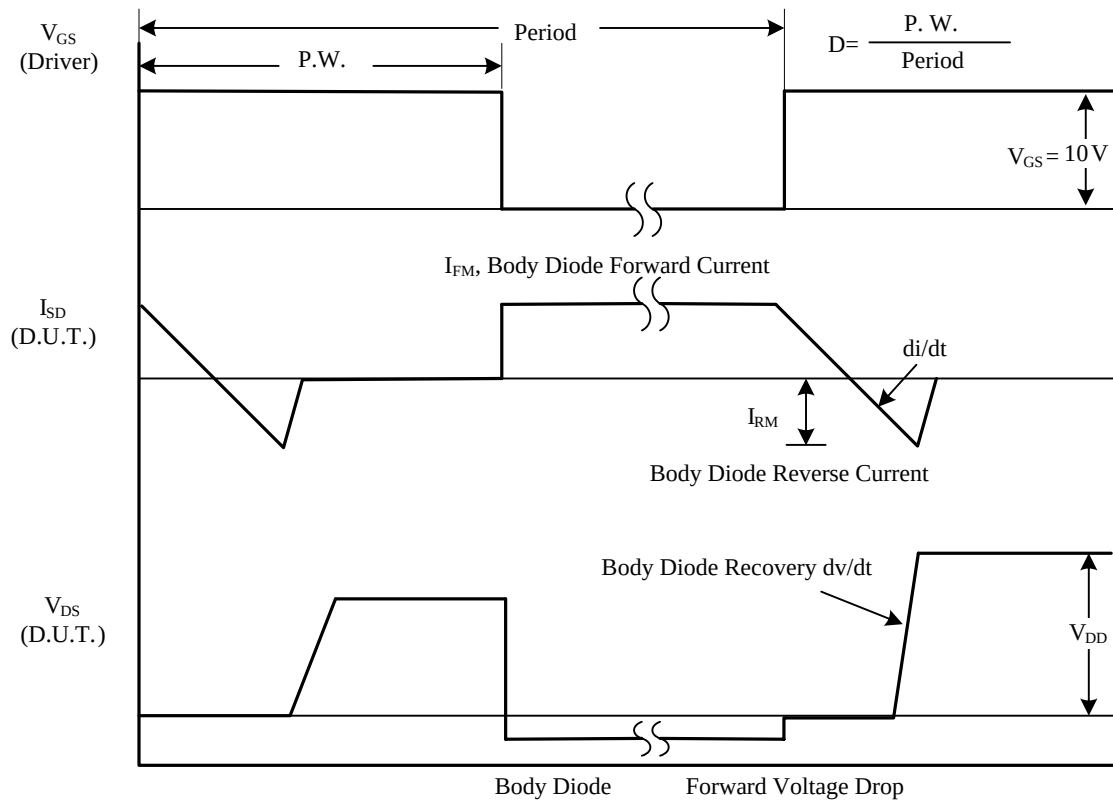


Fig. 1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

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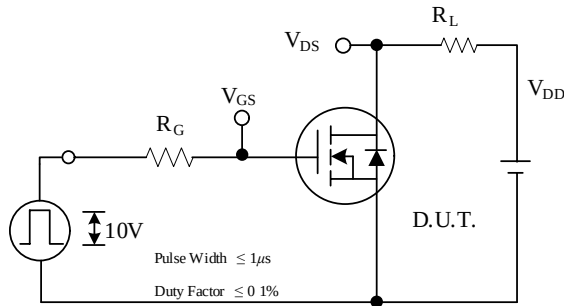


Fig. 2A Switching Test Circuit

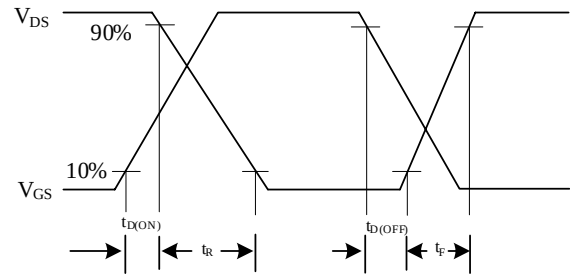


Fig. 2B Switching Waveforms

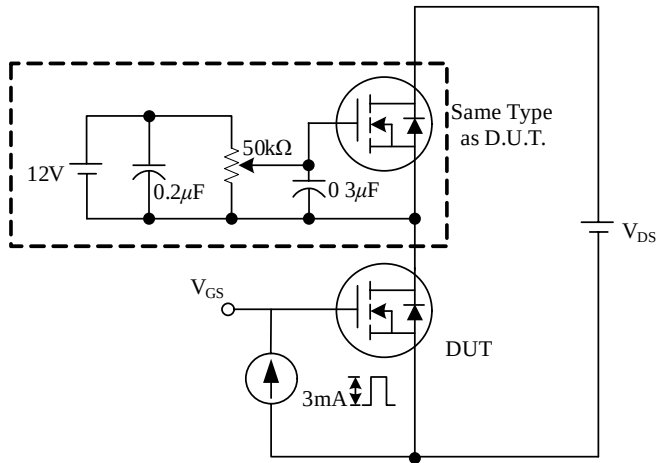


Fig. 3A Gate Charge Test Circuit

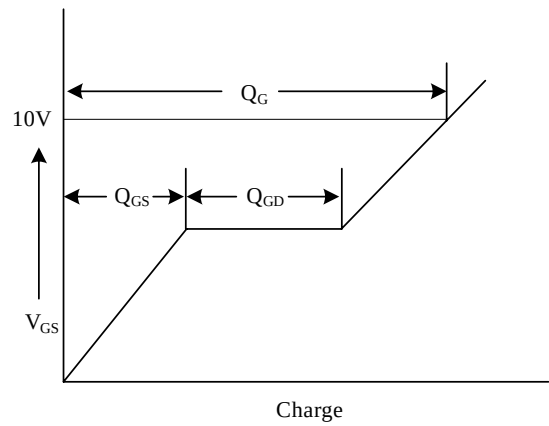


Fig. 3B Gate Charge Waveform

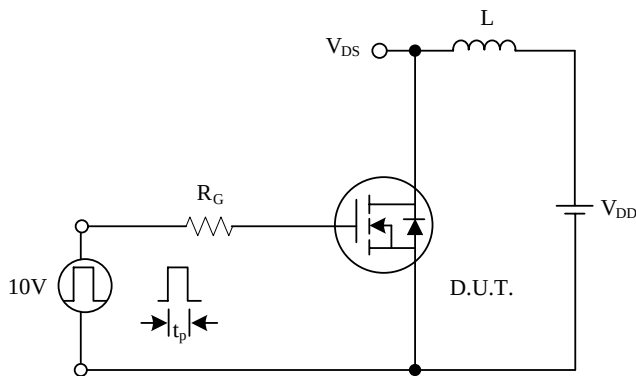


Fig. 4A Unclamped Inductive Switching Test Circuit

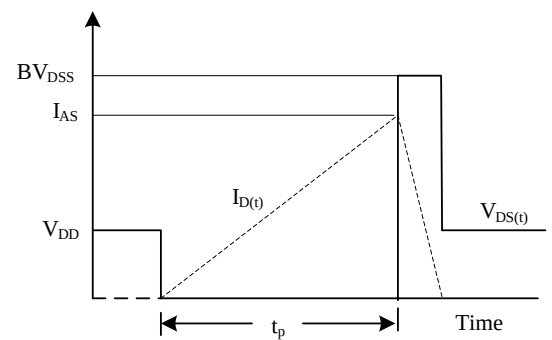
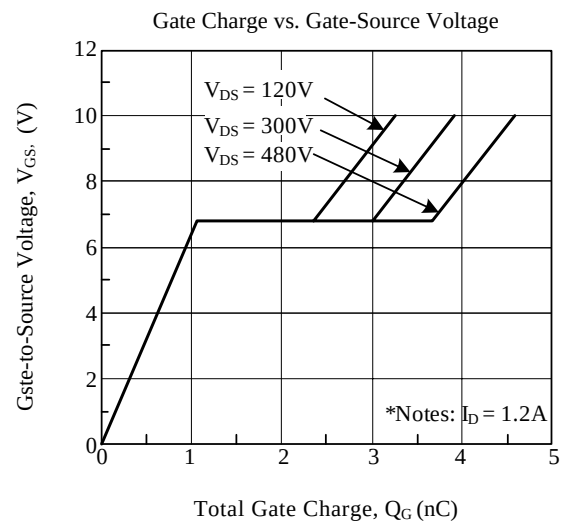
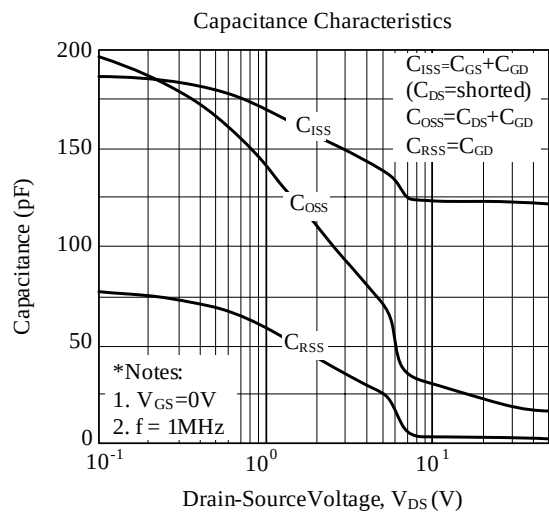
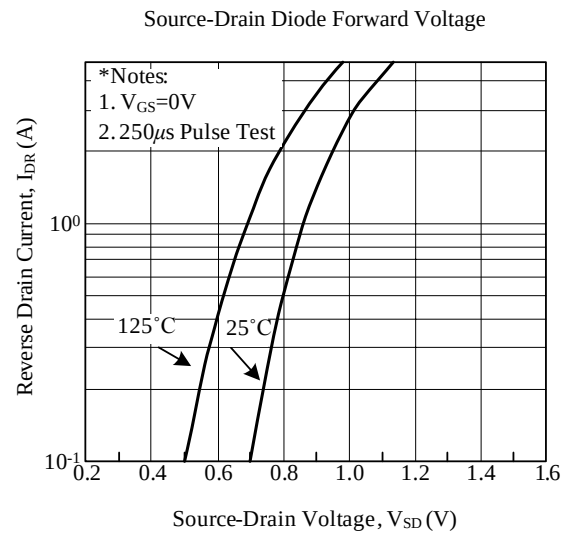
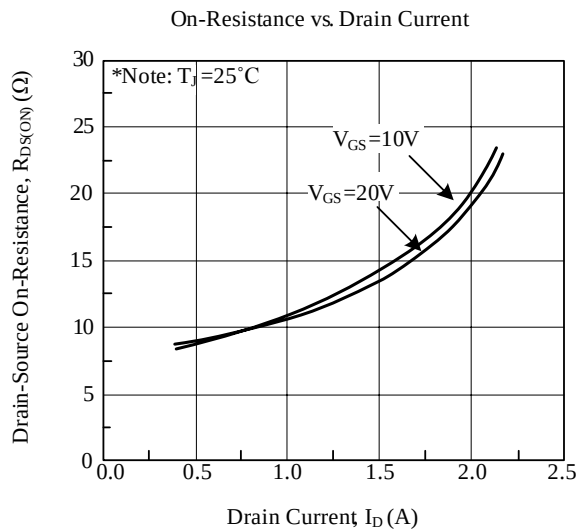
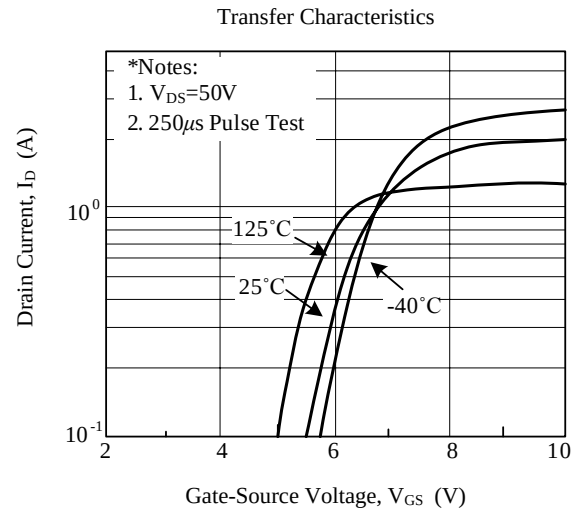
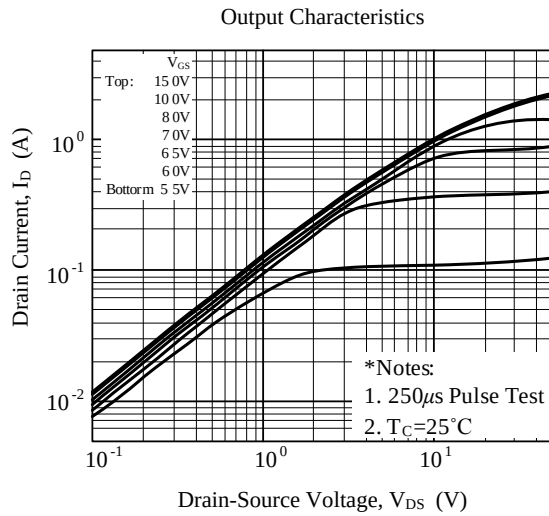


Fig. 4B Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS

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■ TYPICAL PERFORMANCE CHARACTERISTICS(cont.)

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