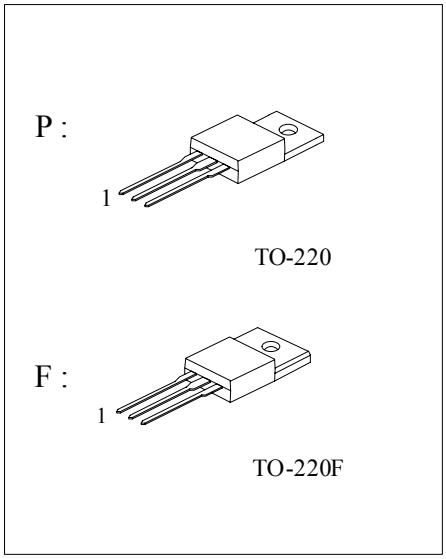
Power MOSFET

75Amps, 75Volts
N-CHANNEL POWER MOSFET



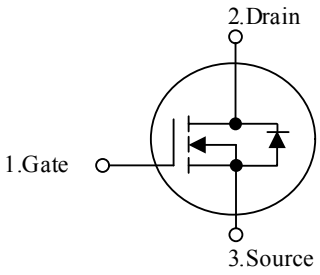
■ DESCRIPTION

The FTK75N75 is n-channel enhancement mode power field effect transistors with stable off-state characteristics, fast switching speed, low thermal resistance, usually used at telecom and computer application.

■ FEATURES

* $R_{DS(ON)}$ = 15mΩ@V_{GS} = 10V
* Ultra low gate charge (typical 80 nC)
* Fast switching capability
* Avalanche energy Specified
* Improved dv/dt capability, high ruggedness

■ SYMBOL



■ ORDERING INFORMATION

Order Number	Package	Pin Assignment			Packing
		1	2	3	
FTK75N75P	TO-220	G	D	S	Tube
FTK75N75F	TO-220F	G	D	S	Tube

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

Power MOSFET

■ ABSOLUTE MAXIMUM RATINGS

PARAMET		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	75	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	T_C = 25°C	I_D	75	A
	T_C = 100°C		52	A
Pulsed Drain Current (Note 1)		I_{DM}	300	A
Avalanche Energy	Single Pulse (Note 2)	E_{AS}	1300	mJ
	Repetitive (Note 1)	E_{AR}	17.3	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	7	V/ns
Power Dissipation	TO-220	P_D	200	W
	TO-220F		111	W
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		SYMBOL	RATING	UNIT
Junction-to-Ambient	TO-220	θ_{JA}	62	˚C / W
	TO-220F		62	
Junction-to-Case	TO-220	θ_{JC}	0.74	
	TO-220F		1.12	

■ 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	75			V
Drain-Source Leakage Current		I_{DSS}	V_{DS} = 75V, V_{GS} = 0V			20	μA
Gate-Body Leakage Current	Forward	I_{GSS}	V_{GS} = 20V, V_{DS} = 0V			100	nA
	Reverse		V_{GS} = -20V, V_{DS} = 0V			-100	nA
Breakdown Voltage Temperature Coefficient		ΔBV_{DSS} / ΔT_J	I_D = 1mA, Referenced to 25°C		0.08		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 = 48A		12.5	15	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz		2500	3300	pF
Output Capacitance		C_{OSS}			900	1200	pF
Reverse Transfer Capacitance		C_{RSS}			200	260	pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		$t_{D(ON)}$	V_{DD} = 37.5V, I_D = 37.5A, V_{GS} = 10V (Note 4,5)		30	70	ns
Turn-On Rise Time		t_R			220	418	ns
Turn-Off Delay Time		$t_{D(OFF)}$			160	320	ns
Turn-Off Fall Time		t_F			150	300	ns
Total Gate Charge		Q_G	V_{DS} = 60V, I_D = 75A, V_{GS} = 10V (Note 4,5)		80	100	nC
Gate-Source Charge		Q_{GS}			15		nC
Gate-Drain Charge		Q_{GD}			30		nC

■ **ELECTRICAL CHARACTERISTICS(Cont.)**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 75 A			75	A
Continuous Source Current	I_S				300	A
Pulsed Source Current	I_{SM}				1.5	V
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, I_S = 75A,		100		ns
Reverse Recovery Charge	Q_{RR}	dI_F/dt =100 A/μs		200		μC

Note:

1. Repeativity rating: pulse width limited by junction temperature
2. L = 0.78mH, I_{AS} = 75A, V_{DD} = 50V, R_G = 20 Ω, Starting T_J = 25°C
3. I_{SD} ≤ 75A, di/dt ≤ 300A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

Power MOSFET

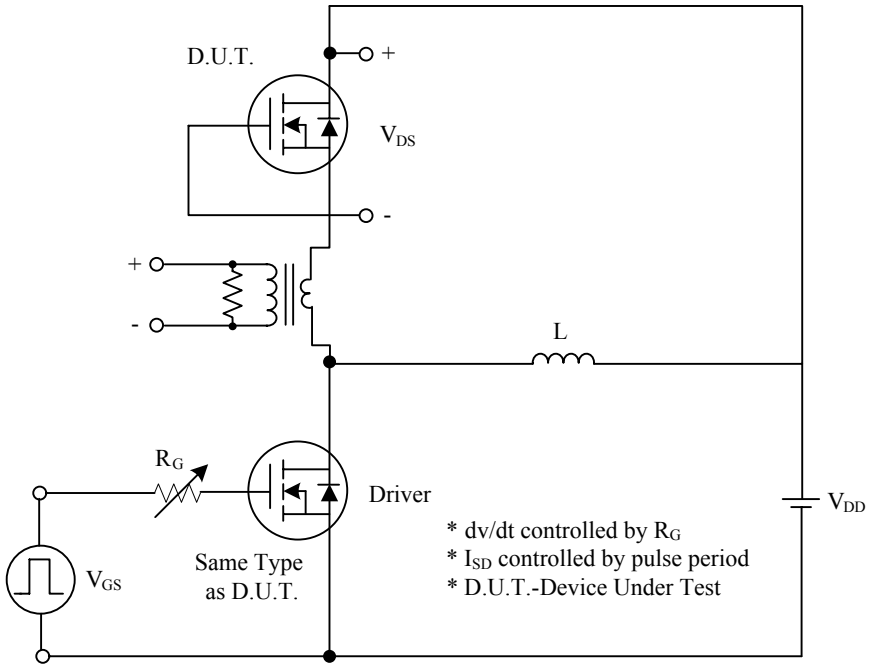


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

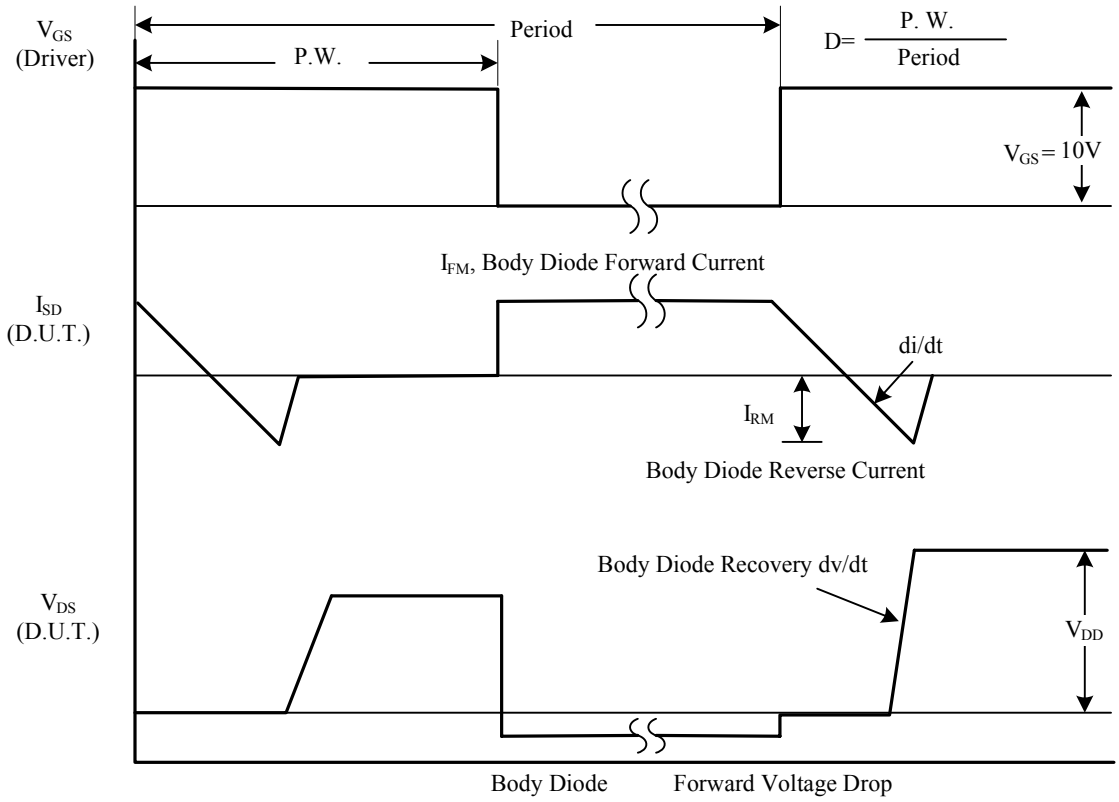


Fig. 1B Peak Diode Recovery dv/dt Waveforms

■ **TEST CIRCUITS AND WAVEFORMS (Cont.)**

Power MOSFET

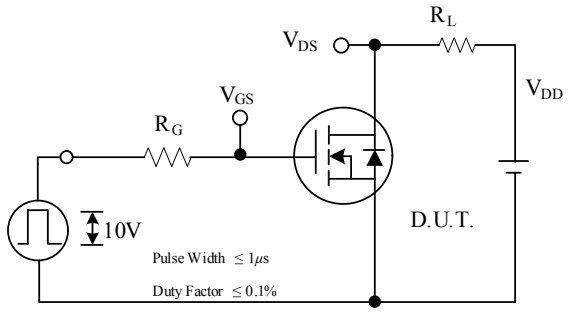


Fig. 2A Switching Test Circuit

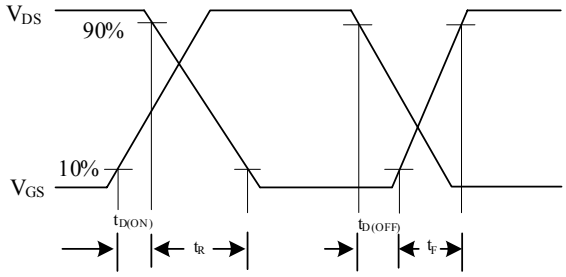


Fig. 2B Switching Waveforms

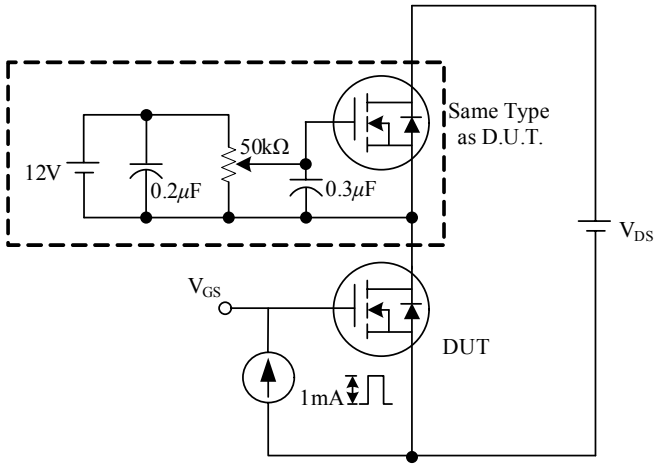


Fig. 3A Gate Charge Test Circuit

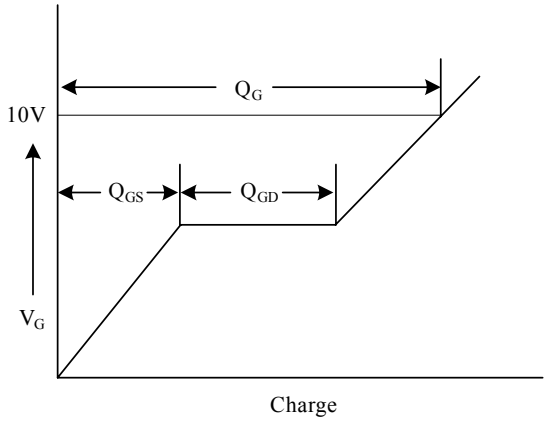


Fig. 3B Gate Charge Waveform

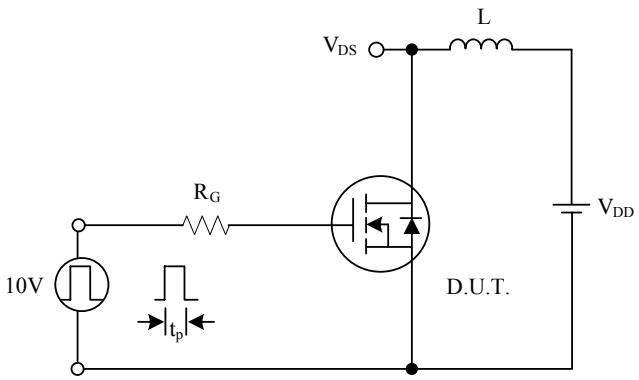


Fig. 4A Unclamped Inductive Switching Test Circuit

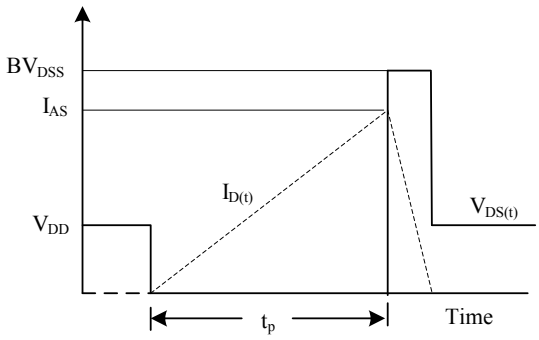
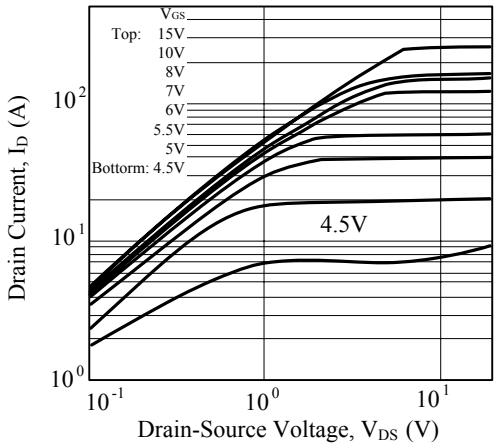


Fig. 4B Unclamped Inductive Switching Waveforms

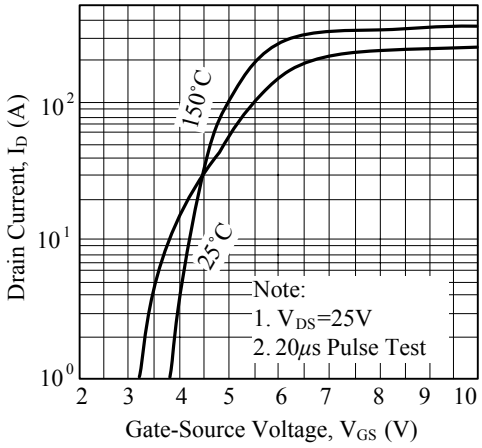
■ TYPICAL CHARACTERISTICS

Power MOSFET

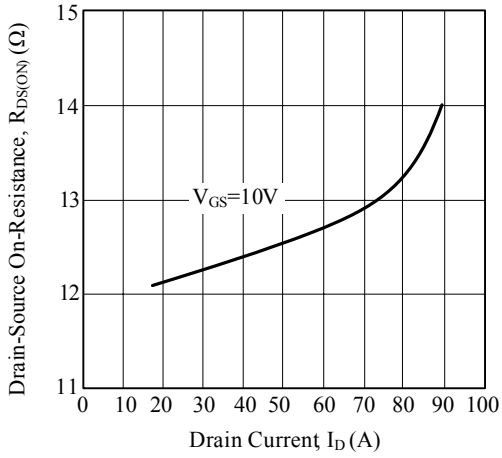
On-State Characteristics



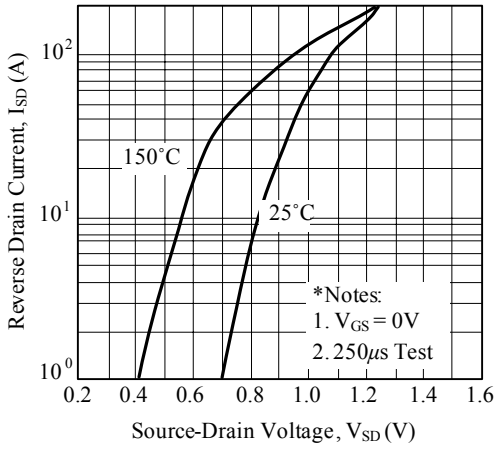
Transfer Characteristics



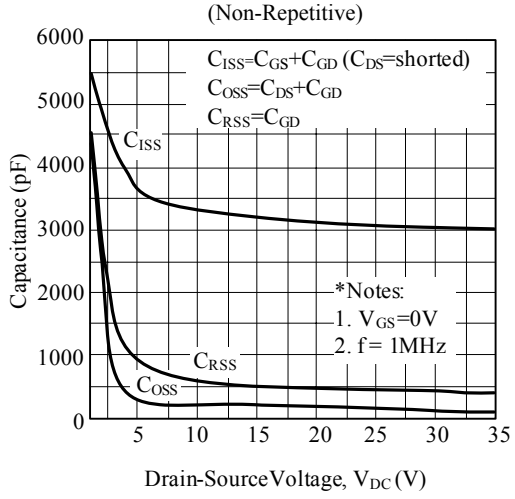
On-Resistance Variation vs Drain Current and Gate Voltage



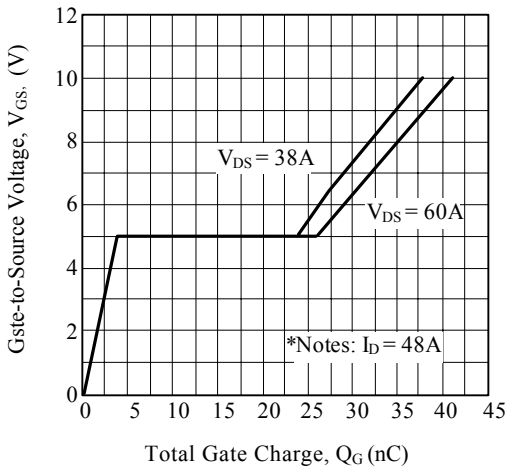
Reverse Drain Current vs. Allowable Case Temperature



Capacitance Characteristics (Non-Repetitive)



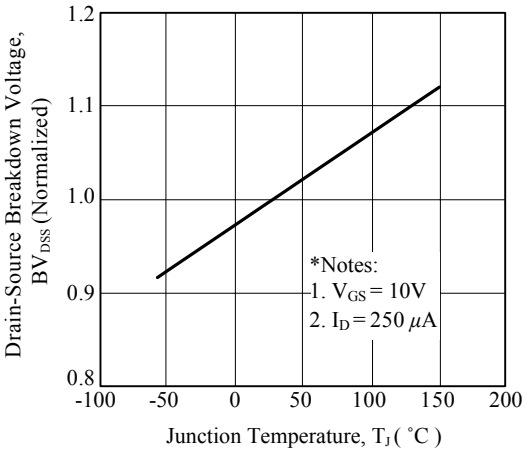
Gate Charge Characteristics



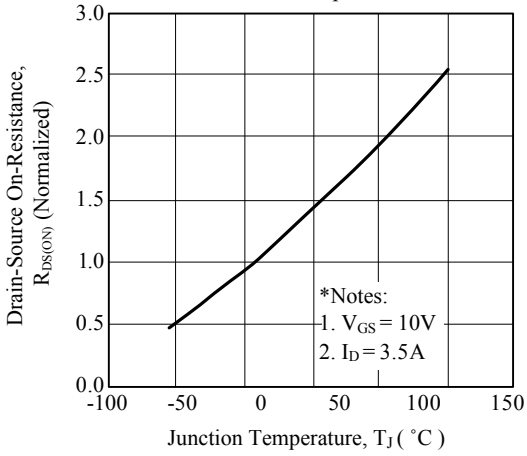
■ **TYPICAL CHARACTERISTICS(Cont.)**

Power MOSFET

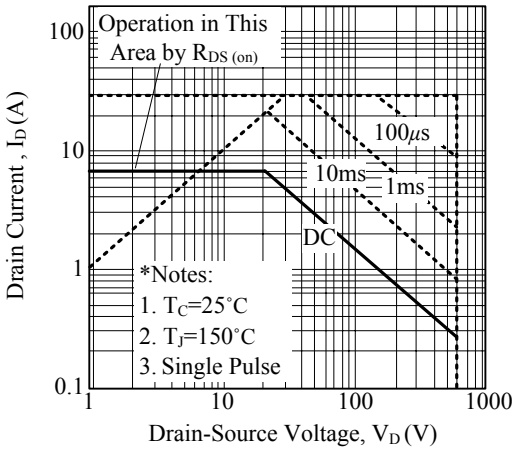
Breakdown Voltage Variation vs Junction Temperature



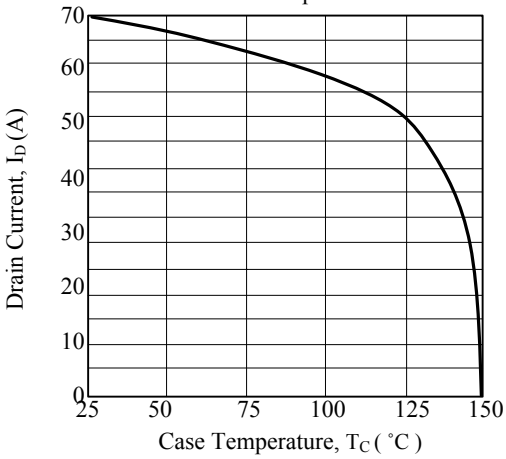
On-Resistance Variation vs Junction Temperature



Maximum Safe Operating



Maximum Drain Current vs. Case Temperature



Transient Thermal Response Curve