

12 Amps, 650 Volts N-CHANNEL MOSFET

DESCRIPTION

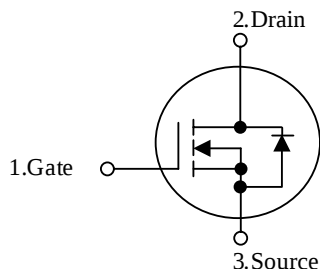
These N-Channel enhancement mode power field effect Transistors are produced using planar stripe, DMOS technology.

This advanced technology has been especially tailored to minimize on - state resistance , provide superior switching performance, and Withstand high energy pulse in the avalanche and commutation mode .These devices are well suited for high efficiency switch mode power supply, electronic lamp ballasts based on half bridge topology.

FEATURES

- * $R_{DS(ON)} = 0.8\Omega @ V_{GS} = 10V$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

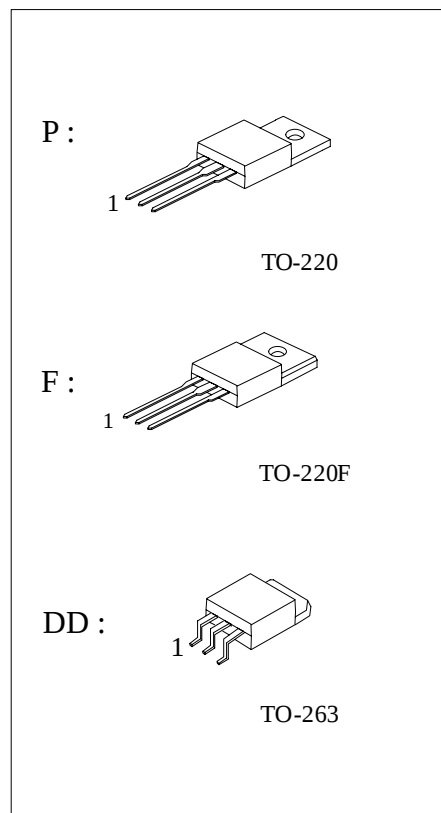
SYMBOL



ORDERING INFORMATION

Order Number	Package	Pin Assignment			Packing
		1	2	3	
FTK12N65P	TO-220	G	D	S	Tube
FTK12N65F	TO-220F	G	D	S	Tube
FTK12N65DD	TO-263	G	D	S	Reel & Taping

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





■ ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$, unless otherwise specified)

PARAMET		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	± 30	V
Avalanche Current (Note 1)		I_{AR}	12	A
Continuous Drain Current	$T_C = 25^\circ\text{C}$	I_D	12	A
	$T_C = 100^\circ\text{C}$		6.5	
Pulsed Drain Current (Note 1)		I_{DM}	48	A
Avalanche Energy	Single Pulse(Note 2)	E_{AS}	790	mJ
	Repetitive Limited by $T_{J(MAX)}$	E_{AR}	24	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Power Dissipation (TO-220,TO-263/ TO-220F)	$T_C = 25^\circ\text{C}$	P_D	225 / 51	W
	Derate above 25°C		1.25 / 0.38	W / $^\circ\text{C}$
Junction Temperature		T_J	+150	$^\circ\text{C}$
Operating and Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

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	MIN	TYP	MAX	UNIT
Junction-to-Ambient		θ_{JA}			62.5	$^\circ\text{C} / \text{W}$
Junction-to-Case	TO-220, TO-263	θ_{JC}			0.56	
	TO-220F	θ_{JC}			2.43	

■ ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$, 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	650			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} = 650V, V _{GS} = 0V			10	μA
Gate-Body Leakage Current	Forward	I _{GSSF}	V _{GS} = 30V, V _{DS} = 0V			100	nA
	Reverse	I _{GSSR}	V _{GS} = -30V, V _{DS} = 0V			-100	nA
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} / ΔT _J	I _D = 250μA, Referenced to 25°C		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-Resistance		R _{DS(ON)}	V _{GS} = 10V, I _D = 6.0A			0.8	Ω
Forward Transconductance		g _{FS}	V _{DS} = 40V, I _D = 6.0A (Note 4)		8.7		S
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz		1480		pF
Output Capacitance		C _{OSS}			200		pF
Reverse Transfer Capacitance		C _{RSS}			25		pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		t _{D(ON)}	V _{DD} =350V , I _D = 12A , R _G = 25Ω (Note 4,5)		30		ns
Turn-On Rise Time		t _R			115		ns
Turn-Off Delay Time		t _{D(OFF)}			95		ns
Turn-Off Fall Time		t _F			85		ns
Total Gate Charge		Q _G	V _{DS} = 520V,I _D = 12A		42		nC
Gate-Source Charge		Q _{GS}	V _{GS} = 10V		8.6		nC
Gate-Drain Charge		Q _{GD}	(Note 4,5)		21		nC



■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless Otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 12\text{ A}$			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				12	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				48	A
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, I_S = 12\text{ A},$ $dI_F/dt = 100\text{ A}/\mu\text{s}$ (Note 4)		380		ns
Reverse Recovery Charge	Q_{RR}			3.5		μC

Note:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L = 10.0\text{ mH}$, $I_{AS} = 12\text{ A}$, $V_{DD} = 50\text{ V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 12\text{ A}$, $dI/dt \leq 200\text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, 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

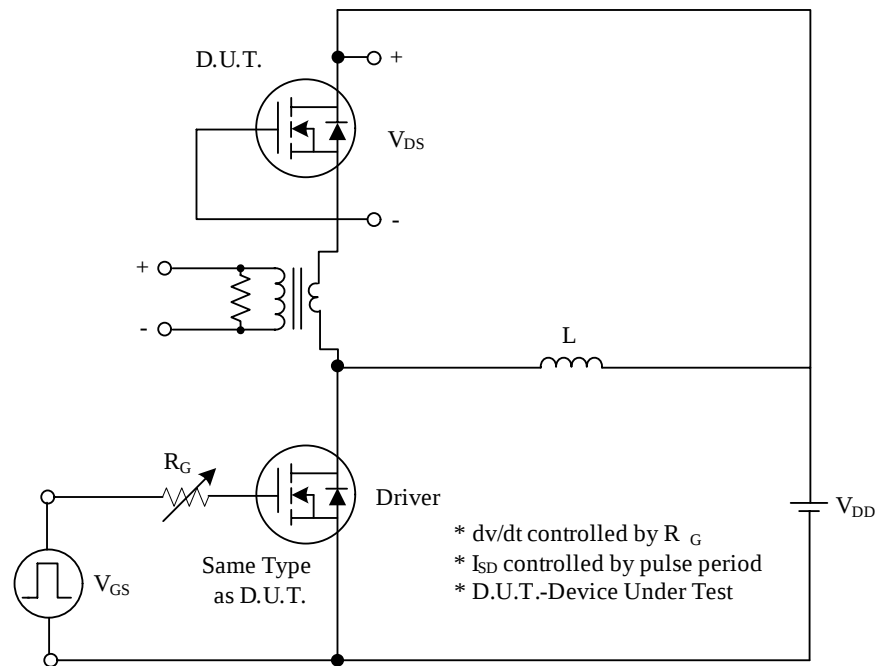


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

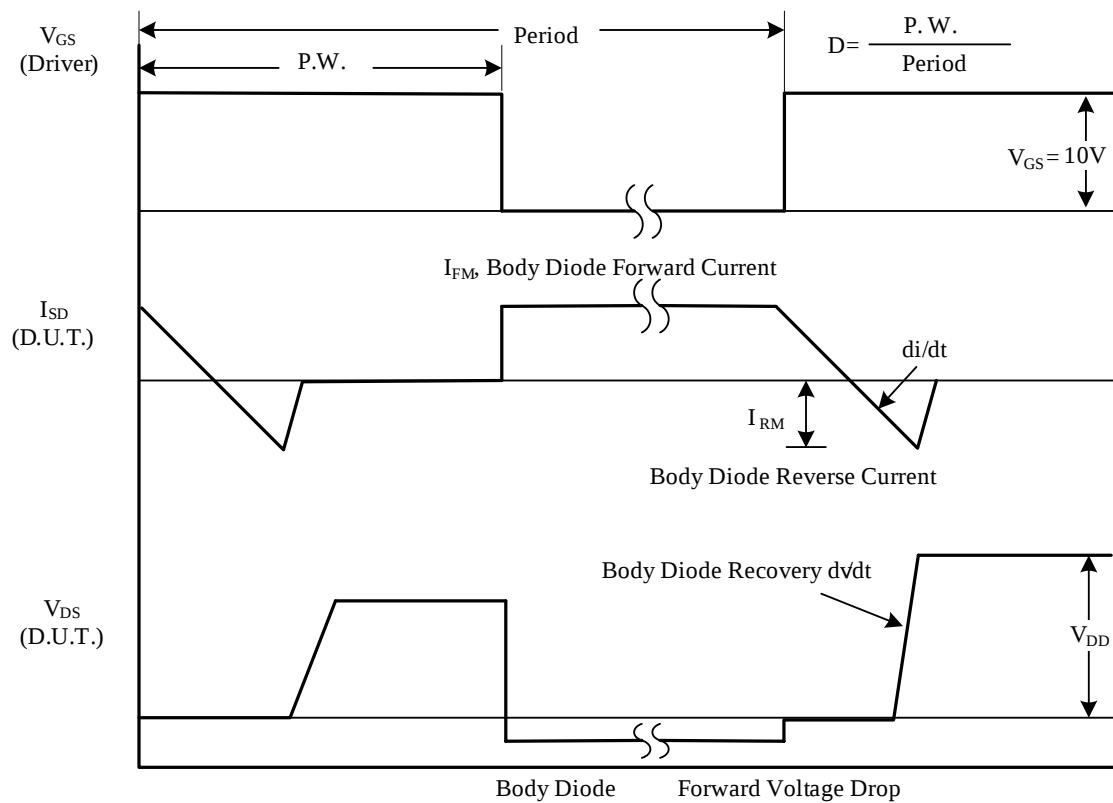


Fig. 1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

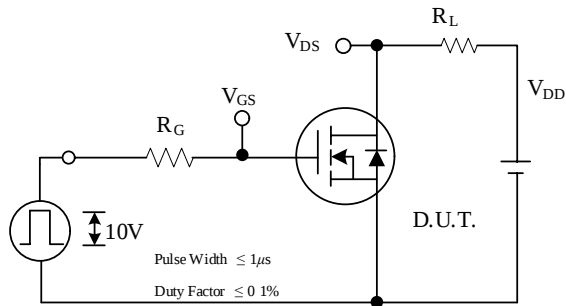


Fig. 2A Switching Test Circuit

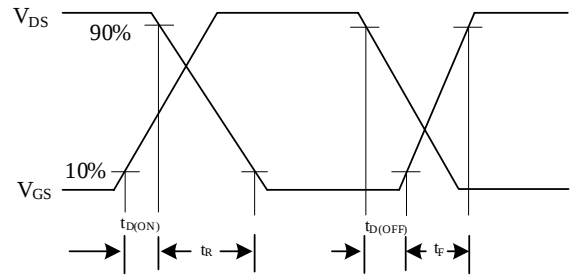


Fig. 2B Switching Waveforms

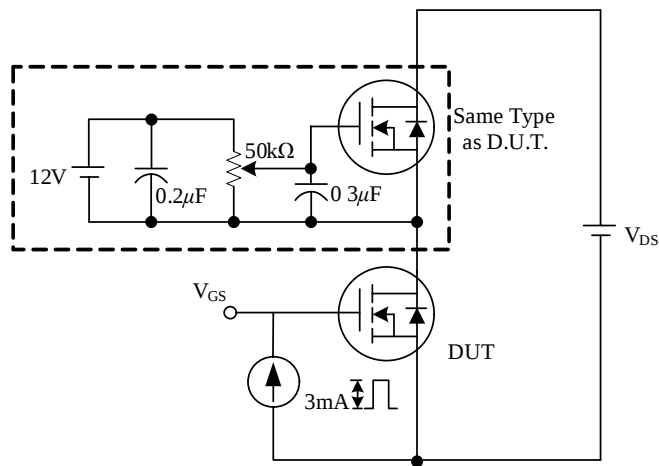


Fig. 3A Gate Charge Test Circuit

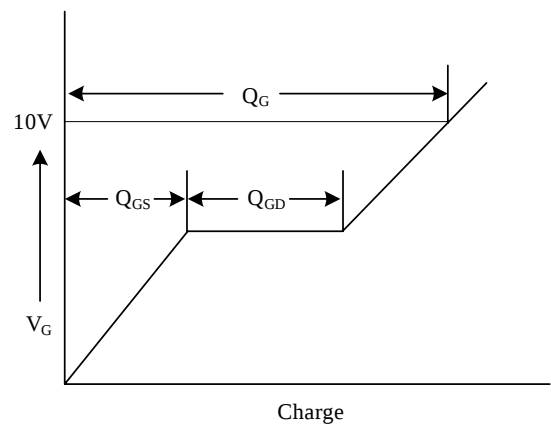


Fig. 3B Gate Charge Waveform

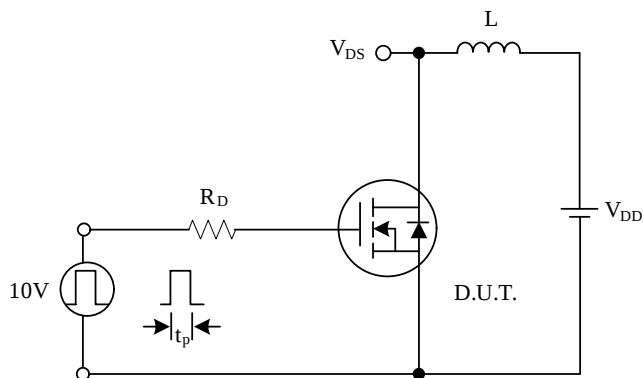


Fig. 4A Unclamped Inductive Switching Test Circuit

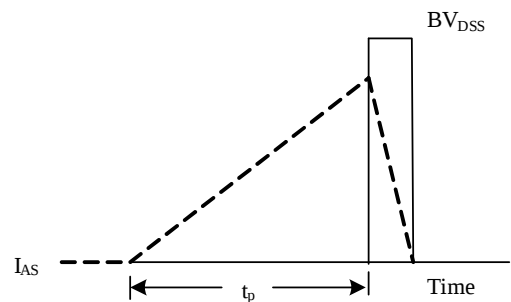


Fig. 4B Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS

