

PRODUCT CHARACTERISTICS

VDSS	500V
$R_{DS(on)max}(V_{GS}=10V)$	0.72Ω
Qg@type	35nC
ID	9A

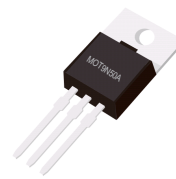
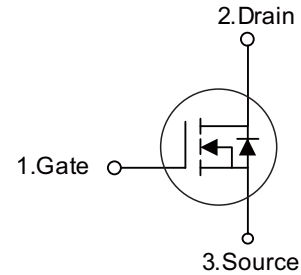
APPLICATIONS

- High frequency switching mode power supply
- Electronic ballast
- LED power supply

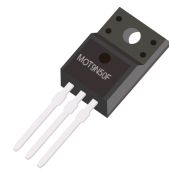
FEATURES

- * $R_{DS(ON)} < 0.72\Omega$ @ $V_{GS}=10V$
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness

Symbol



TO-220



TO-220F

ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT9N50F	TO-220F	50 pieces/Tube
N/A	MOT9N50A	TO-220	50 pieces/Tube

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	500	V
Gate-Source Voltage		V _{GSS}	±30	V
Drain Current	Continuous (T _C =25°C)	I _D	9 (Note 5)	A
	Pulsed (Note 2)	I _{DM}	36 (Note 5)	A
Avalanche Current (Note 2)		I _{AR}	9	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	360	mJ
	Repetitive (Note 4)	E _{AR}	13.5	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation		P _D	44	W
Derate above 25°C			0.35	W/°C
Junction Temperature		T _J	+150	°C
Storage Temperature		T _{STG}	-55~+150	°C

Notes: 1. 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.

2. Repetitive Rating: Pulse width limited by maximum junction temperature

3. L = 8mH, I_{AS} = 9A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

4. I_{SD} ≤ 9A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

5. Drain current limited by maximum junction temperature

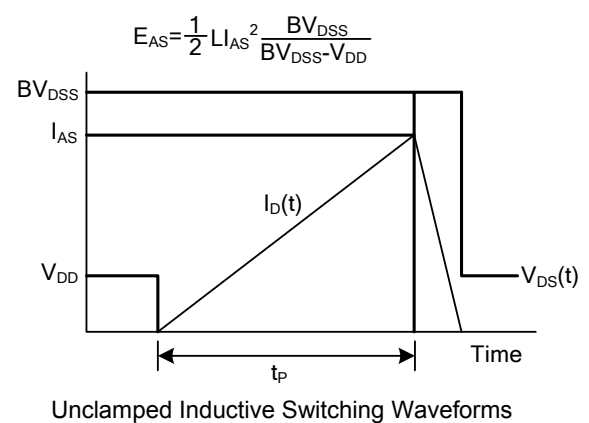
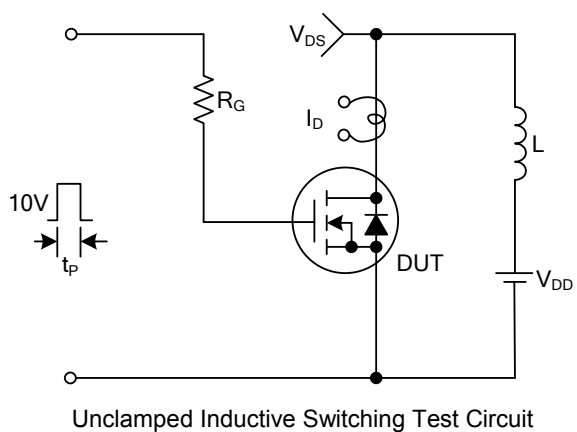
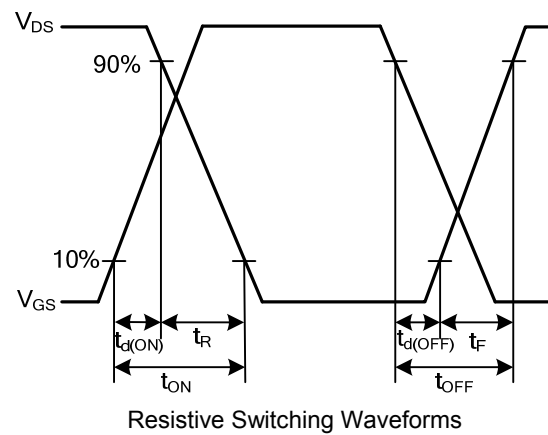
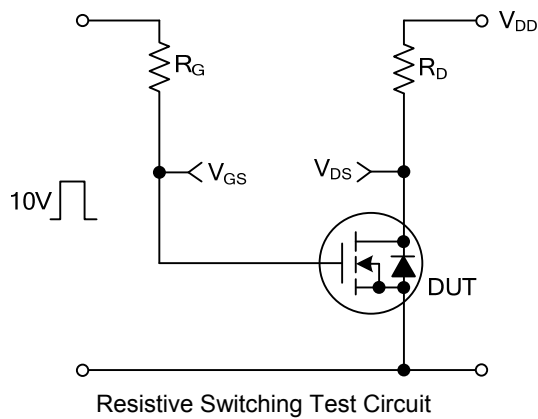
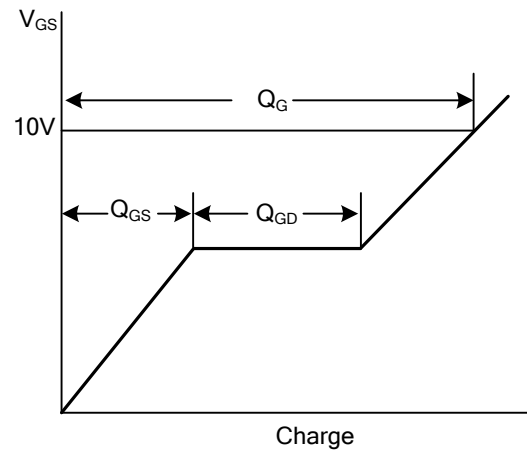
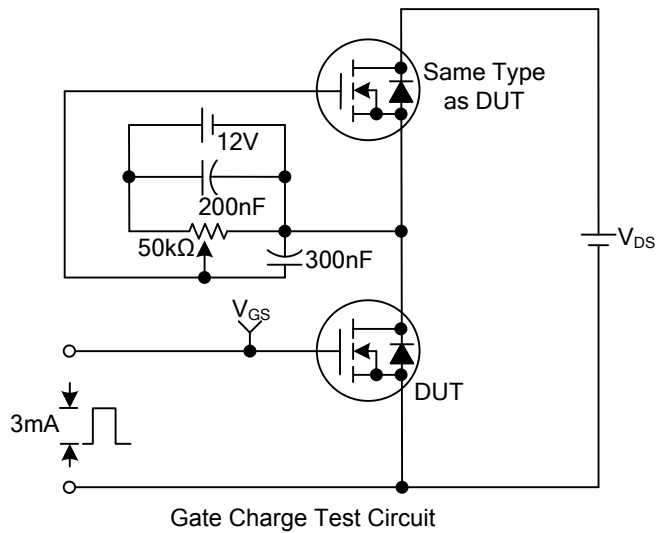


■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise noted)

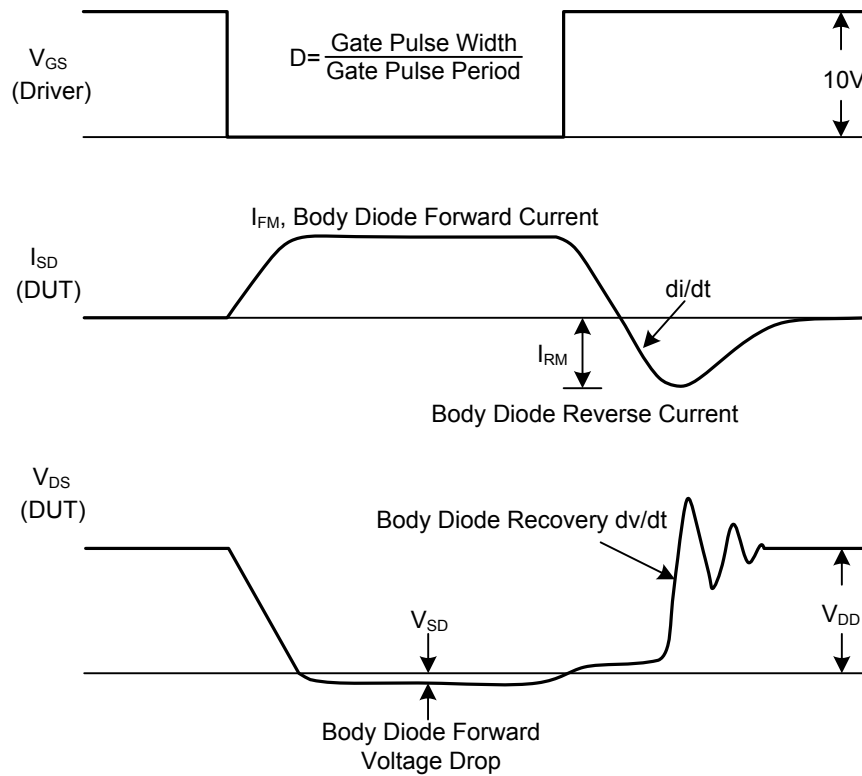
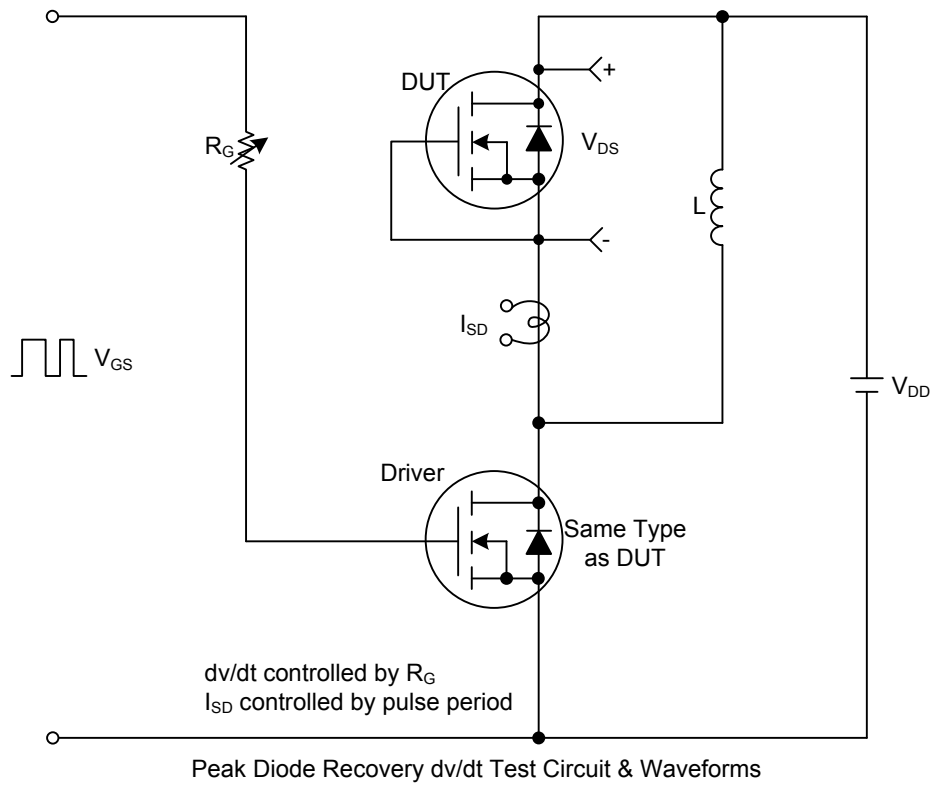
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	500			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =500V, V _{GS} =0V			1	μA
			V _{DS} =400V, T _C =125°C			10	
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
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 =4.5A		0.69	0.72	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		790	1030	pF
Output Capacitance		C _{OSS}			130	170	pF
Reverse Transfer Capacitance		C _{RSS}			24	30	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{GS} =10V, V _{DS} =400V, I _D =9A (Note 1, 2)		28	35	nC
Gate to Source Charge		Q _{GS}			4		nC
Gate to Drain Charge		Q _{GD}			15		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =250V, I _D =9A, R _G =25Ω (Note 1, 2)		18	45	ns
Rise Time		t _R			65	140	ns
Turn-OFF Delay Time		t _{D(OFF)}			93	195	ns
Fall-Time		t _F			64	125	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				9	A
Maximum Body-Diode Pulsed Current		I _{SM}				36	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =9A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =9A, V _{GS} =0V, dI _F /dt=100A/μs		335		ns
Body Diode Reverse Recovery Charge		Q _{RR}	(Note 1)		2.95		μC

Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature

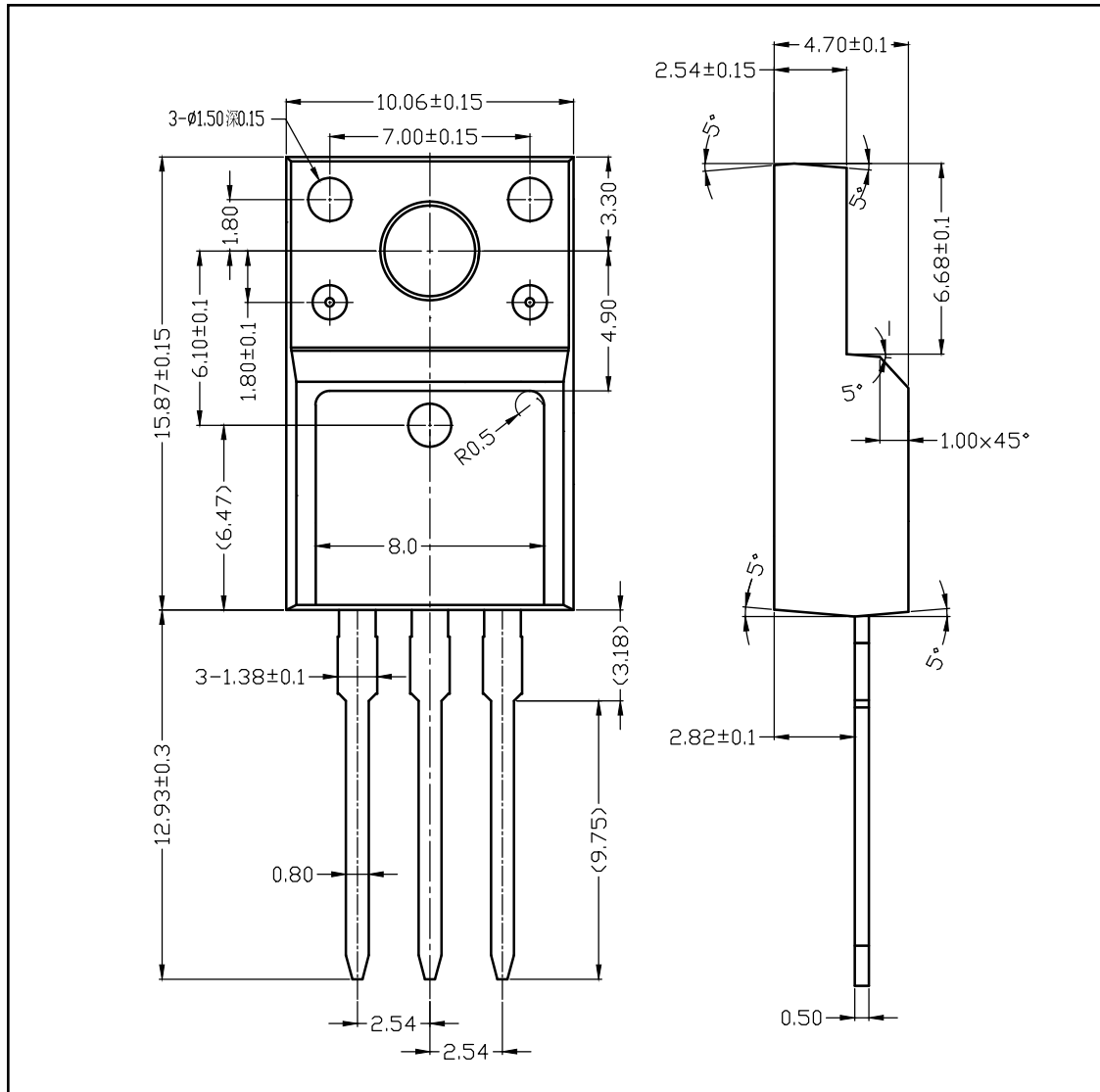
■ TEST CIRCUITS AND WAVEFORMS



TEST CIRCUITS AND WAVEFORMS(Cont.)



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS



■ TO-220-3L PACKAGE OUTLINE DIMENSIONS

