

■ PRODUCT CHARACTERISTICS

VDSS	500V
$R_{DS(on)max}(V_{GS}=10V)$	0.32Ω
Qg@type	33 nC
ID	16A

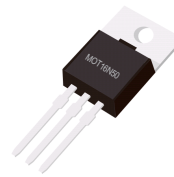
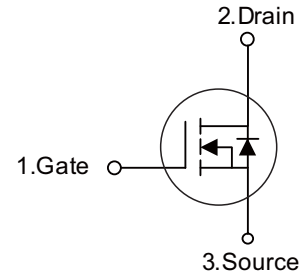
■ APPLICATIONS

- * High efficiency switch mode power supplies
- * Electronic lamp ballasts based on half bridge
- * LED power supplies

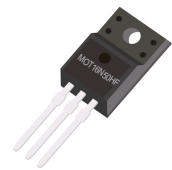
■ FEATURES

- * $R_{DS(ON)} \leq 0.34\Omega$ @ $V_{GS}=10V$
- * 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	MOT16N50HF	TO-220F	50 pieces/Tube
N/A	MOT16N50A	TO-220	50 pieces/Tube

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

Parameter		Symbol	Ratings	Unit
Drain to Source Voltage		V _{DSS}	500	V
Gate to Source Voltage		V _{GSS}	±30	V
Avalanche Current (Note 2)		I _{AR}	16	A
Continuous Drain Current	Continuous	I _D	16	A
	Pulsed (Note 2)	I _{DM}	64	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	637	mJ
	Repetitive (Note 2)	E _{AR}	25.0	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220F	P _D	38.5	W
	TO-220AB		300	
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.

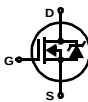
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

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

3. $L=5.23\text{mH}$, $I_{AS}=15\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

4. $I_{SD} \leq 15\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Statics						
B _{VDSS}	Drain to Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	500	-	-	V
ΔB _{VDSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	Reference to 25°C, I _D = 1mA	-	0.58	-	V/°C
r _{DS(ON)}	Drain to Source On-Resistance	V _{GS} = 10V, I _D = 8A	-	0.28	0.32	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	3.4	4.0	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 500V T _C = 25°C	-	-	25	μA
		V _{GS} = 0V T _C = 150°C	-	-	250	
I _{GSS}	Gate to Source Leakage Current	V _{GS} = ±30V	-	-	±100	nA
Dynamics						
g _{fs}	Forward Transconductance	V _{DD} = 10V, I _D = 7.5A	10	-	-	S
Q _{g(TOT)}	Total Gate Charge at 10V	V _{GS} = 10V, V _{DS} = 400V, I _D = 16A	-	33	41	nC
Q _{gs}	Gate to Source Gate Charge		-	7.2	10	nC
Q _{gd}	Gate to Drain “Miller” Charge		-	12	16	nC
t _{d(ON)}	Turn-On Delay Time	V _{DD} = 250V, I _D = 16A, R _G = 6.2Ω, R _D = 17Ω	-	9	-	ns
t _r	Rise Time		-	5.4	-	ns
t _{d(OFF)}	Turn-Off Delay Time		-	26	-	ns
t _f	Fall Time		-	5	-	ns
C _{ISS}	Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz	-	1850	-	pF
C _{OSS}	Output Capacitance		-	230	-	pF
C _{RSS}	Reverse Transfer Capacitance		-	16	-	pF
Avalanche Characteristics						
E _{AS}	Single Pulse Avalanche Energy ²		760	-	-	mJ
I _{AR}	Avalanche Current		-	-	16	A
Drain-Source Diode Characteristics						
I _S	Continuous Source Current (Body Diode)	MOSFET symbol showing the integral reverse p-n junction diode. 	-	-	15	A
I _{SM}	Pulsed Source Current ¹ (Body Diode)		-	-	64	A
V _{SD}	Source to Drain Diode Voltage	I _{SD} = 16A	-	0.86	1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} = 16A, di _{SD} /dt = 100A/μs	-	470	730	ns
Q _{RR}	Reverse Recovered Charge	I _{SD} = 16A, di _{SD} /dt = 100A/μs	-	5	6.6	μC

Notes:

1: Repetitive rating; pulse width limited by maximum junction temperature

2: Starting $T_J = 25^\circ\text{C}$, $L = 7.0\text{mH}$, $I_{AS} = 15\text{A}$

TEST CIRCUITS AND WAVEFORMS

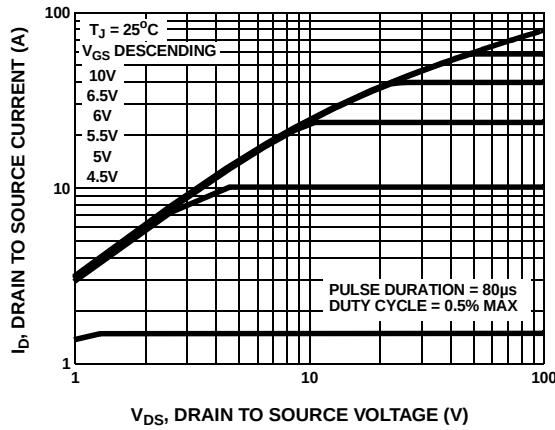


Figure 1. Output Characteristics

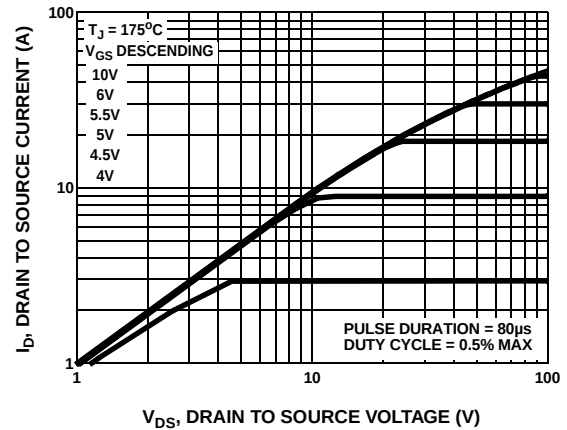


Figure 2. Output Characteristics

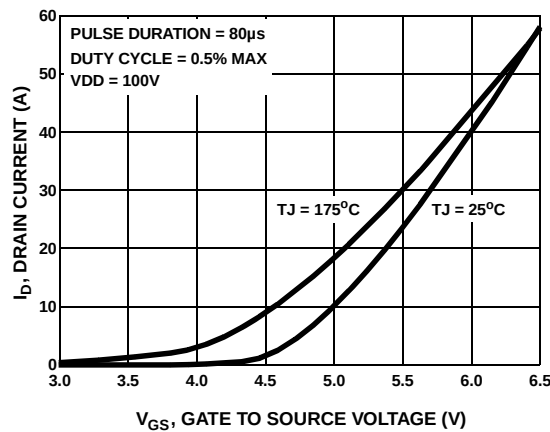


Figure 3. Transfer Characteristics

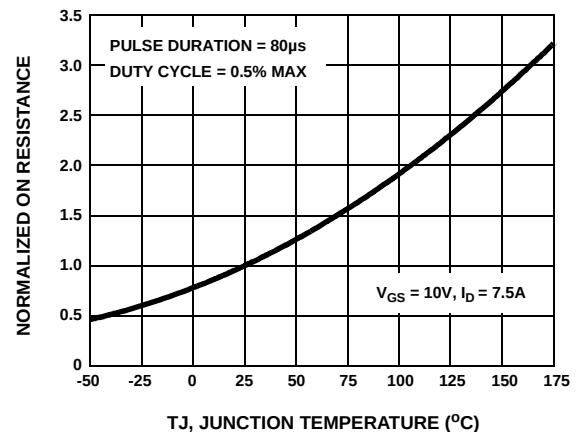


Figure 4. Normalized Drain To Source On Resistance vs Junction Temperature

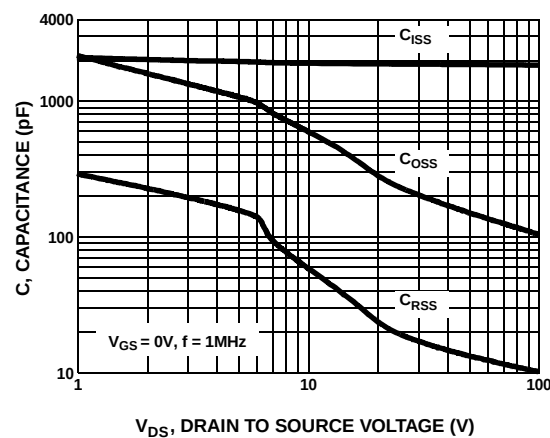


Figure 5. Capacitance vs Drain To Source Voltage

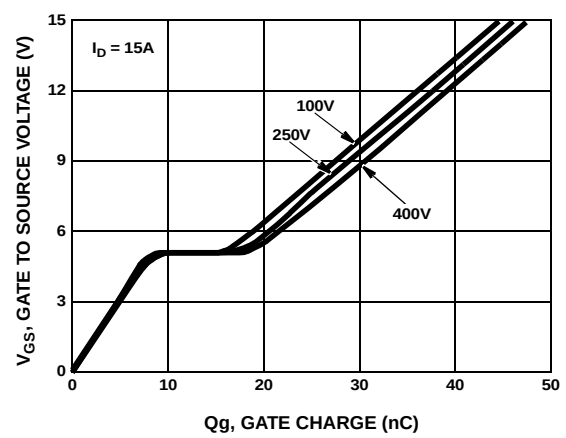


Figure 6. Gate Charge Waveforms For Constant Gate Current

TYPICAL CHARACTERISTICS

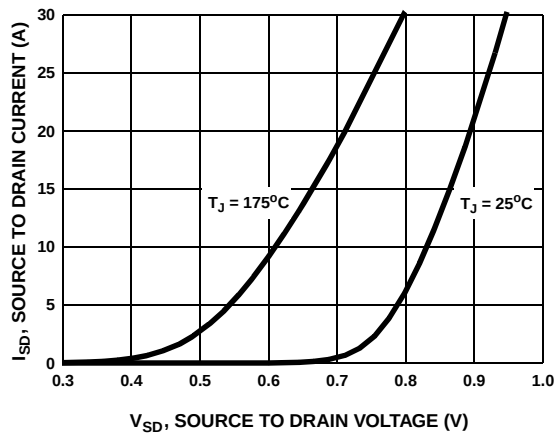


Figure 7. Body Diode Forward Voltage vs Body Diode Current

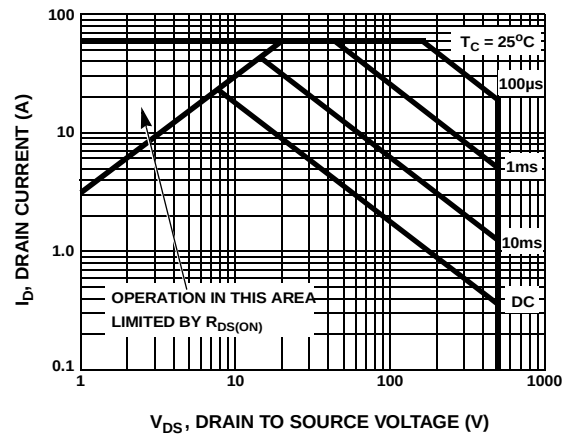


Figure 8. Maximum Safe Operating Area

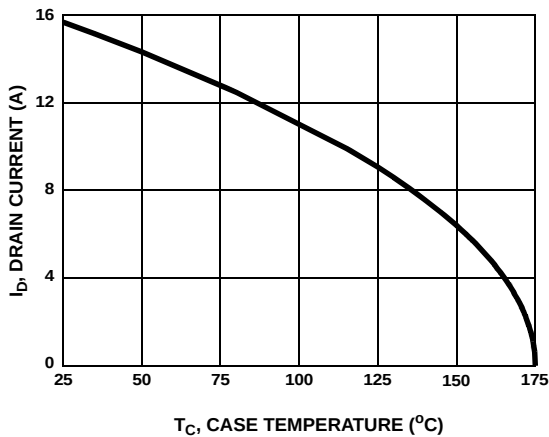


Figure 9. Maximum Drain Current vs Case Temperature

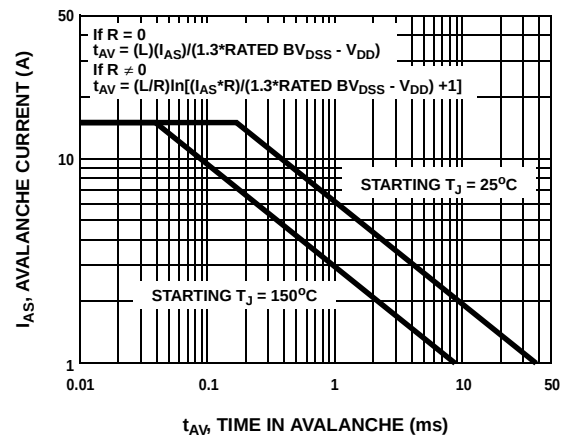
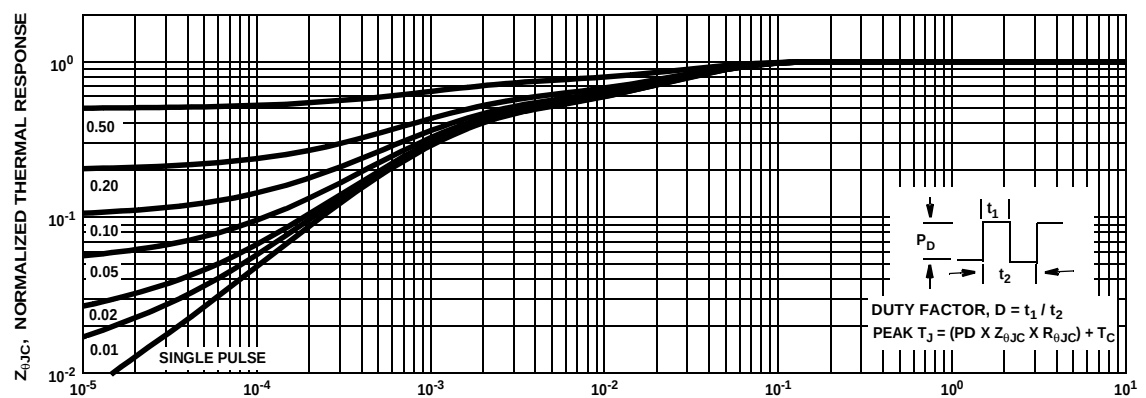
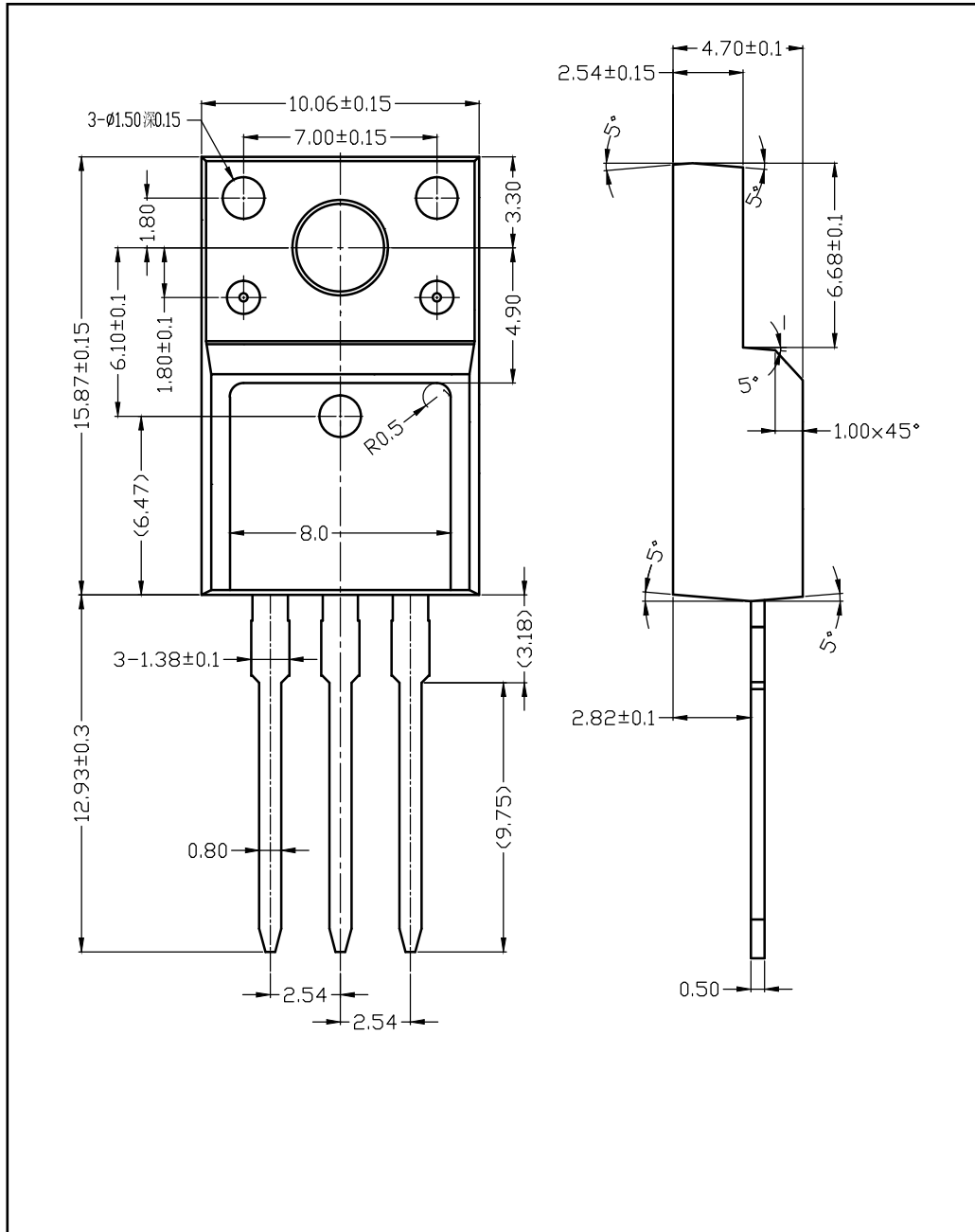


Figure 10. Unclamped Inductive Switching Capability



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS



■ TO-220-3L PACKAGE OUTLINE DIMENSIONS

