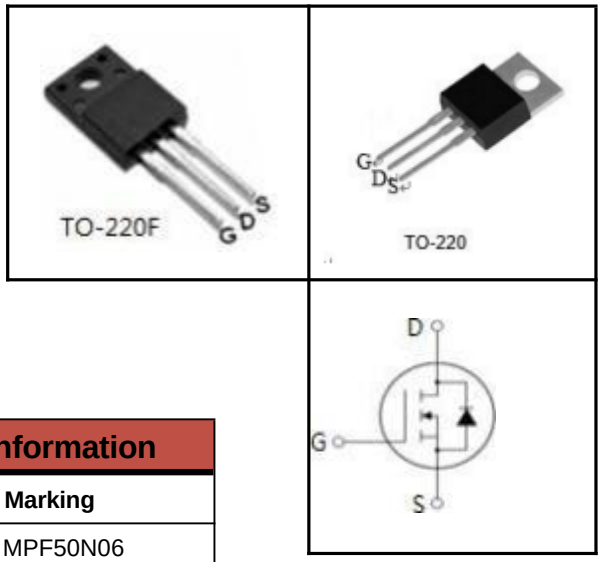
60V N-Channel MOSFET

FEATURES

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

Device Marking and Package Information

Device	Package	Marking
MPF50N06	TO-220F	MPF50N06
MP50N06	TO-220	MP50N06

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter	Symbol	Value				Unit
		TO-220F	TO-220			
Drain-Source Voltage (V_{GS} = 0V)	V_{DSS}	60				V
Continuous Drain Current	I_D	50				A
Pulsed Drain Current (note1)	I_{DM}	200				A
Gate-Source Voltage	V_{GSS}	±20				V
Single Pulse Avalanche Energy (note2)	E_{AS}	2500				mJ
Avalanche Current (note1)	I_{AR}	50				A
Repetitive Avalanche Energy (note1)	E_{AR}	36				mJ
Power Dissipation (T_C = 25ºC)	P_D	83	110			W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150				ºC

Thermal Resistance

Parameter	Symbol	Value				Unit
		TO-220F	TO-220			
Thermal Resistance, Junction-to-Case	R_{thJC}	1.5	1.14			K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	60			

Specifications T_J = 25ºC, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	60	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60V, V_{GS} = 0V, T_J = 25ºC	--	--	5	μA
		V_{DS} = 48V, V_{GS} = 0V, T_J = 125ºC	--	--	100	
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 25A	--	14	22	mΩ
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	1489	--	pF
Output Capacitance	C_{oss}		--	608	--	
Reverse Transfer Capacitance	C_{rss}		--	275	--	
Total Gate Charge	Q_g	V_{DD} =48V, I_D = 50A, V_{GS} = 10V	--	60	--	nC
Gate-Source Charge	Q_{gs}		--	6	--	
Gate-Drain Charge	Q_{gd}		--	31	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 30V, I_D =50A, R_G = 25 Ω	--	22	--	ns
Turn-on Rise Time	t_r		--	82	--	
Turn-off Delay Time	$t_{d(off)}$		--	52	--	
Turn-off Fall Time	t_f		--	93	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25 ºC	--	--	50	A
Pulsed Diode Forward Current	I_{SM}		--	--	200	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 25A, V_{GS} = 0V	--	--	2	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V,I_S = 50A, di_F/dt =100A /μs	--	68	--	ns
Reverse Recovery Charge	Q_{rr}		--	4.2	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L=1mH, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25 ºC
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics (T_J = 25ºC)

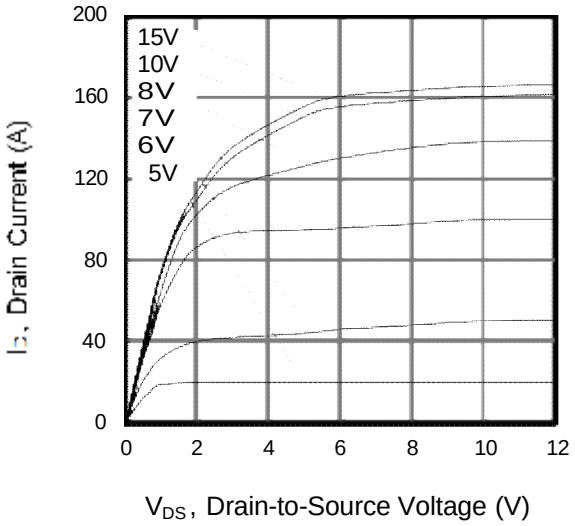


Figure 2. Body Diode Forward Voltage

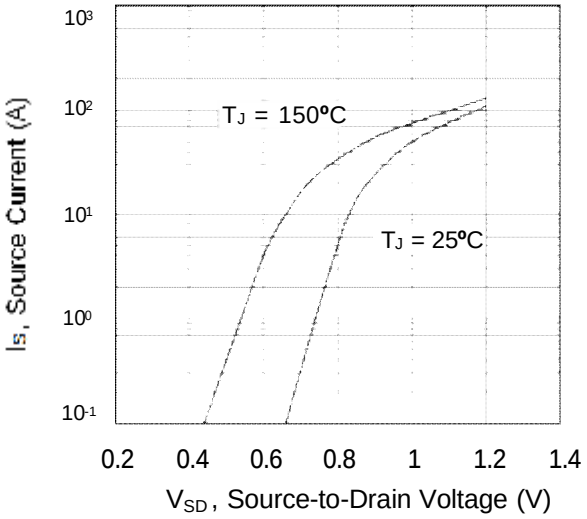


Figure 3. Drain Current vs. Temperature

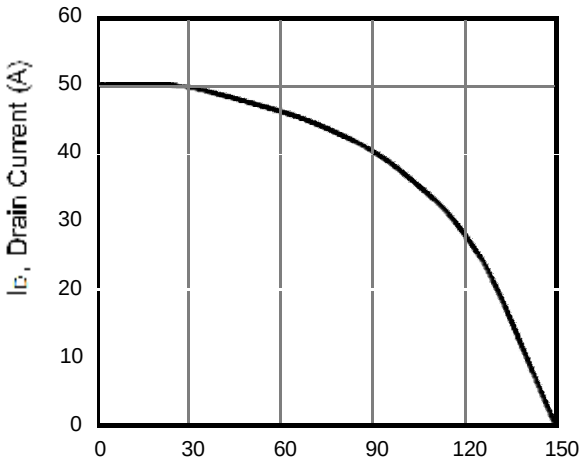


Figure 4. BV_{DSS} Variation vs. Temperature

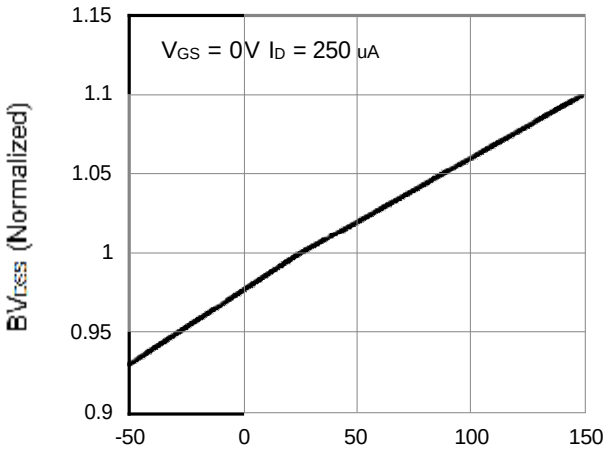


Figure 5. Transfer Characteristics

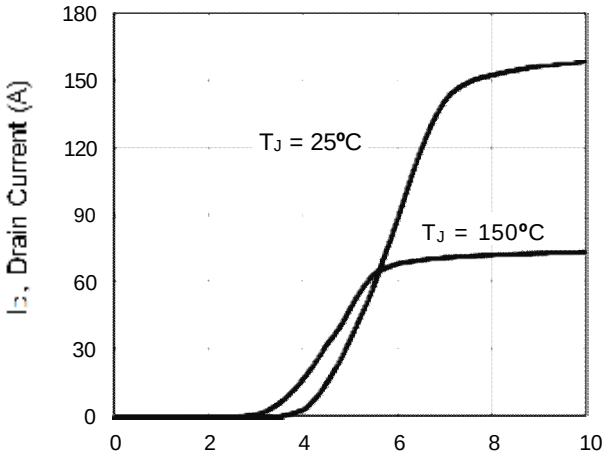
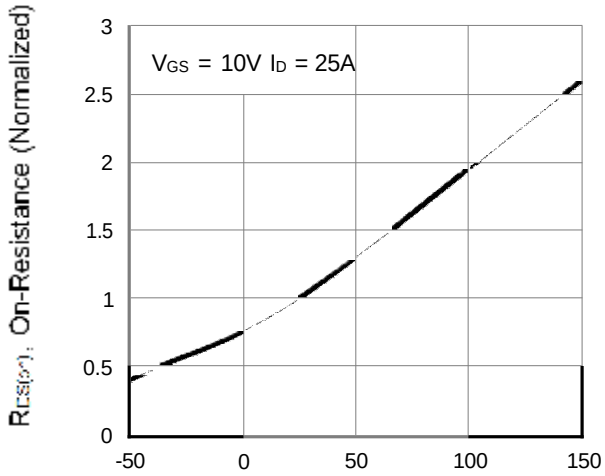


Figure 6. On-Resistance vs. Temperature



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Capacitance

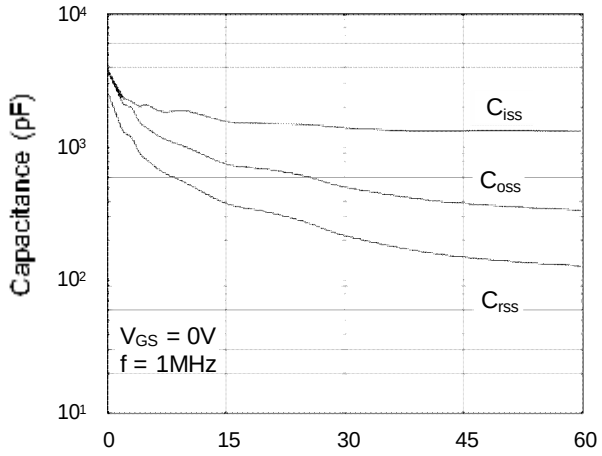


Figure 8. Gate Charge

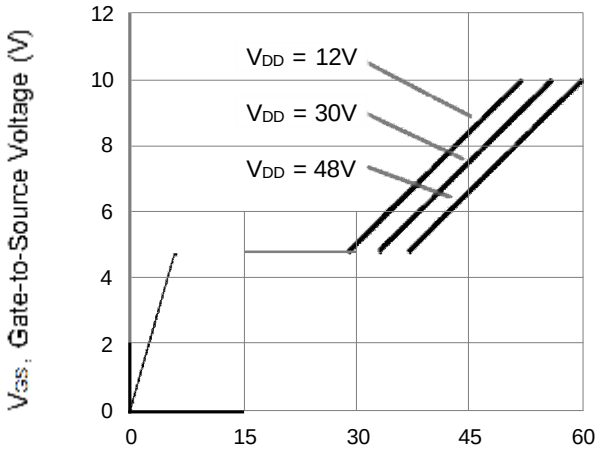


Figure 9. Transient Thermal Impedance TO-220F

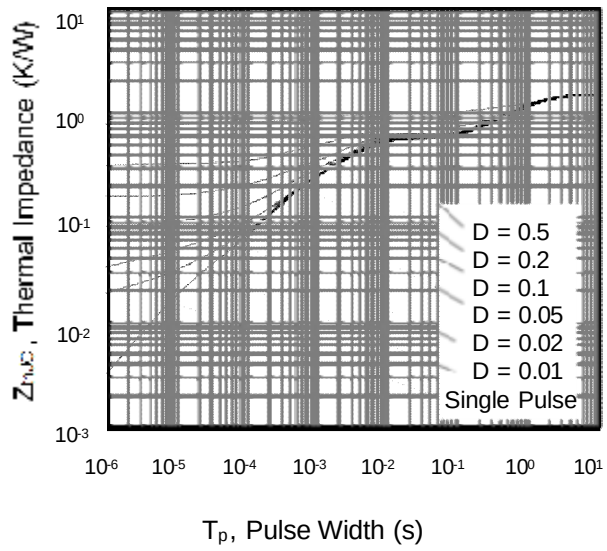


Figure 10. Transient Thermal Impedance TO-251,TO-252,TO-220

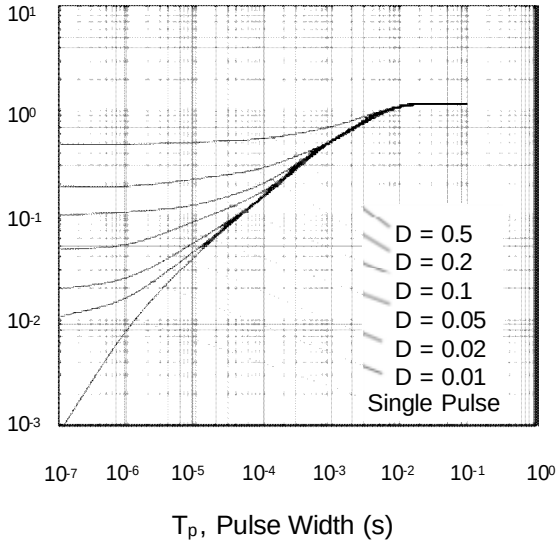


Figure A：Gate Charge Test Circuit and Waveform

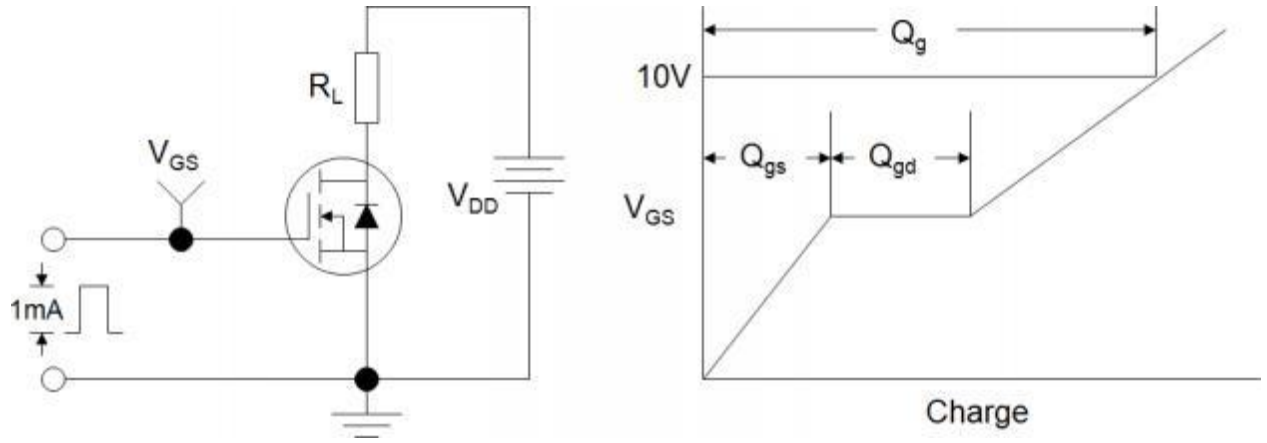


Figure B：Resistive Switching Test Circuit and Waveform

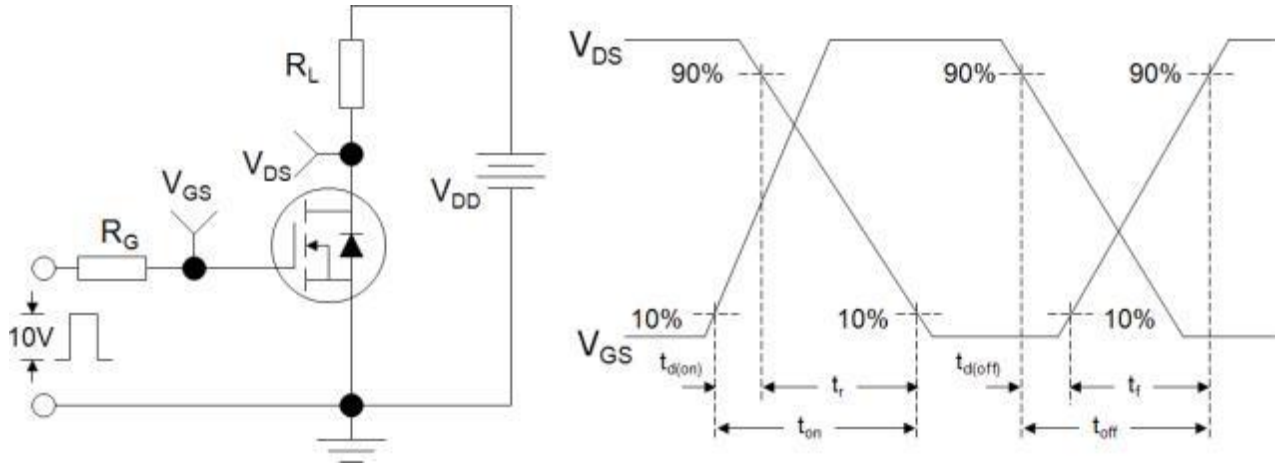


Figure C：Unclamped Inductive Switching Test Circuit and Waveform

