

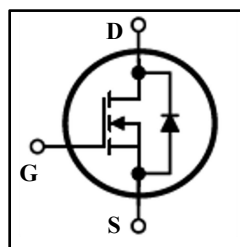
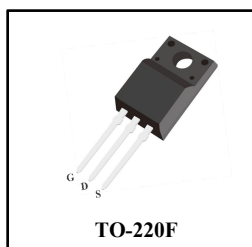


FEATURES

- BV_{DSS} : 500V, $I_D=20A$
- $R_{DS(on)}$: 0.27Ω(Max) @ $V_{GS}=10V$
- Very Low FOM ($R_{DS(on)} * Q_g$)
- Excellent stability and uniformity

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- AC to DC Converters



Ordering Information

Type NO.	Marking	Package Code
MPVA20N50F	MPVA20N50F	TO-220F

Absolute Maximum Ratings $T_C = 25^\circ C$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	500	V
Continuous Drain Current	I_D	20	A
Pulsed Drain Current (note1)	I_{DM}	72	A
Gate-Source Voltage	V_{GSS}	± 30	V
Single Pulse Avalanche Energy (note2)	E_{AS}	1000	mJ
Avalanche Current (note1)	I_{AR}	12	A
Repetitive Avalanche Energy (note1)	E_{AR}	64	mJ
Power Dissipation ($T_C = 25^\circ C$)	P_D	98	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	$^\circ C$

Thermal Resistance

Parameter	Symbol	Value		Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	1.27	0.6	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	60.0	



芯善物科技

MPVA20N50F Power MOSFET

Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	500	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 500V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 30V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	--	4.0	V
Drain-Source On-Resistance (Note4)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 10.0A$	--	0.21	0.26	Ω
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0MHz$	--	3500	--	pF
Output Capacitance	C_{oss}		--	285	--	
Reverse Transfer Capacitance	C_{rss}		--	14	--	
Total Gate Charge	Q_g	$V_{DD} = 400V, I_D = 20.0A,$ $V_{GS} = 10V$	--	60	--	nC
Gate-Source Charge	Q_{gs}		--	15	--	
Gate-Drain Charge	Q_{gd}		--	30	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 250V, I_D = 20.0A,$ $R_G = 25\Omega$	--	35	--	ns
Turn-on Rise Time	t_r		--	40	--	
Turn-off Delay Time	$t_{d(off)}$		--	160	--	
Turn-off Fall Time	t_f		--	55	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ\text{C}$	--	--	20	A
Pulsed Diode Forward Current	I_{SM}		--	--	80	
Body Diode Voltage	V_{SD}	$T_J = 25^\circ\text{C}, I_{SD} = 20.0A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Time	t_{rr}	$V_{GS} = 0V, I_F = 20.0A,$ $di_F/dt = 100A/\mu s$	--	430	--	ns
Reverse Recovery Charge	Q_{rr}		--	6.5	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS} = 12A, V_{DD} = 50V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu s, \text{Duty Cycle } \leq 1\%$
4. Essentially independent of operating temperature

Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

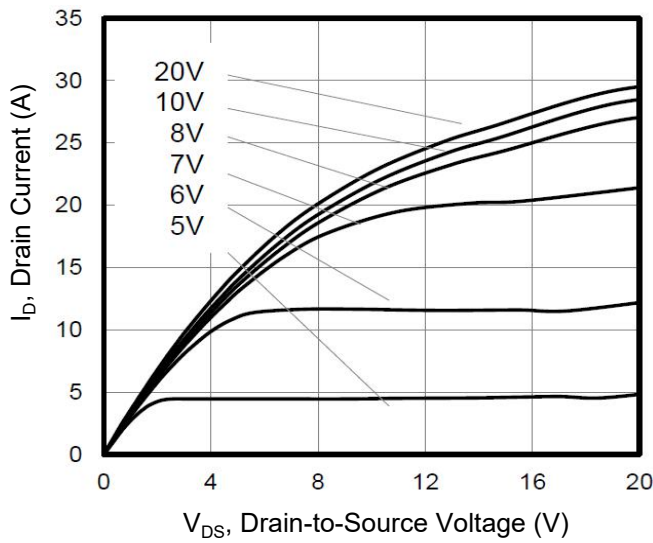


Figure 3. Drain Current vs. Temperature

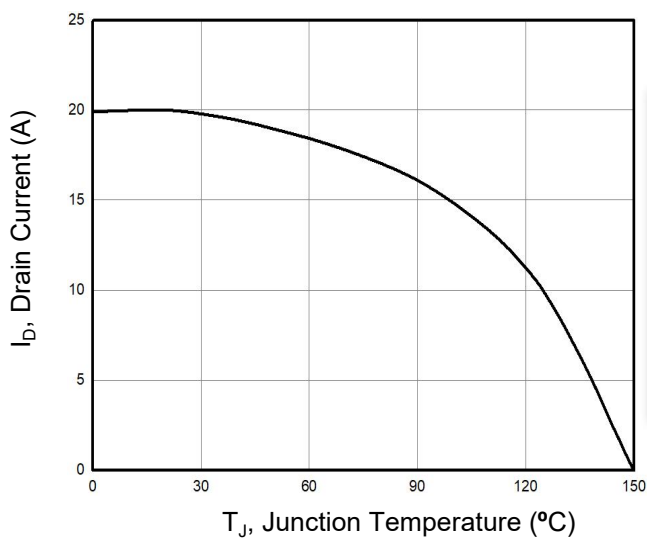


Figure 5. Gate Charge

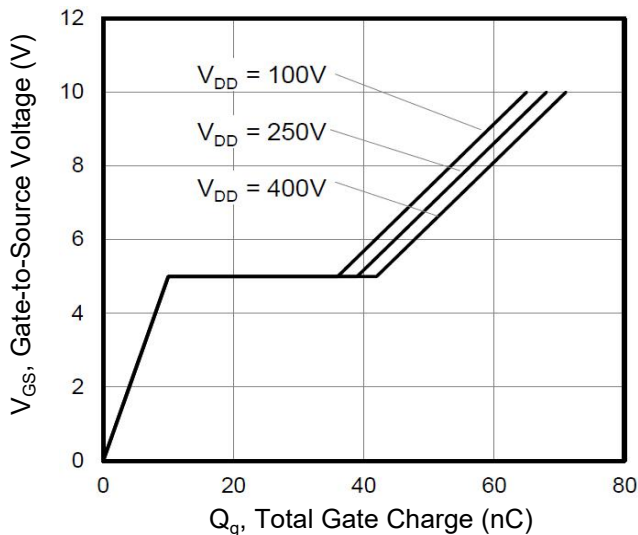


Figure 2. Transfer Characteristics

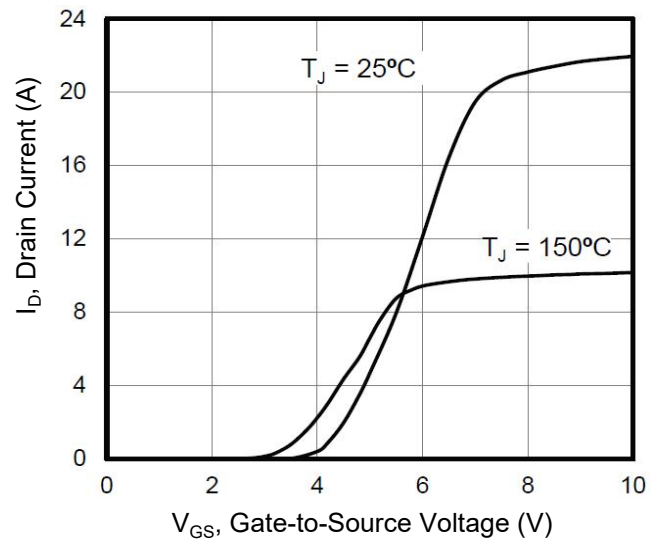


Figure 4. Capacitance

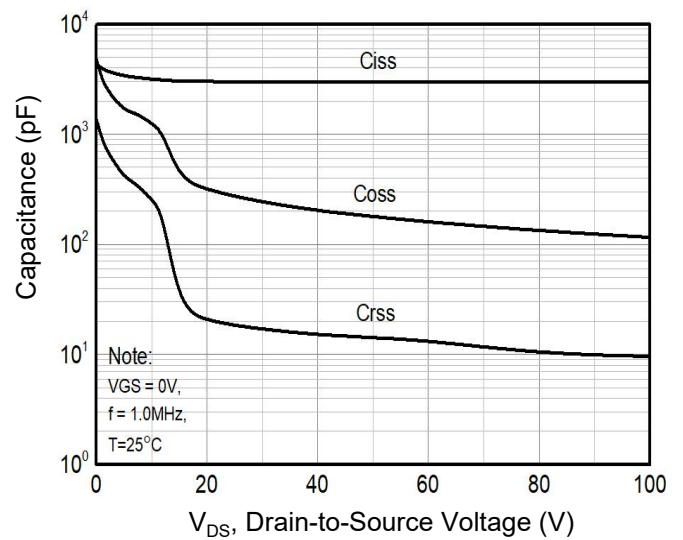
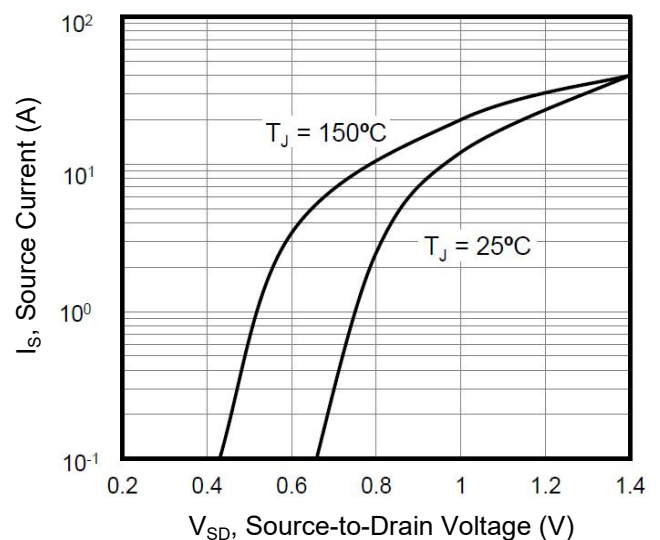


Figure 6. Body Diode Forward Voltage



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. On-Resistance vs. Temperature

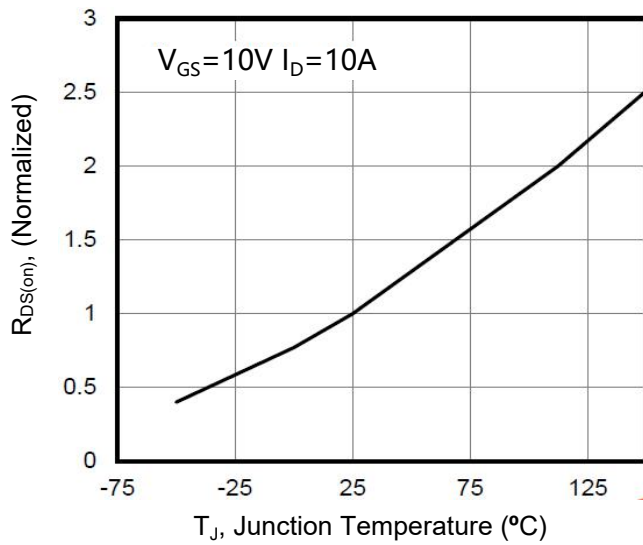


Figure 8. BV_{DSS} vs. Temperature

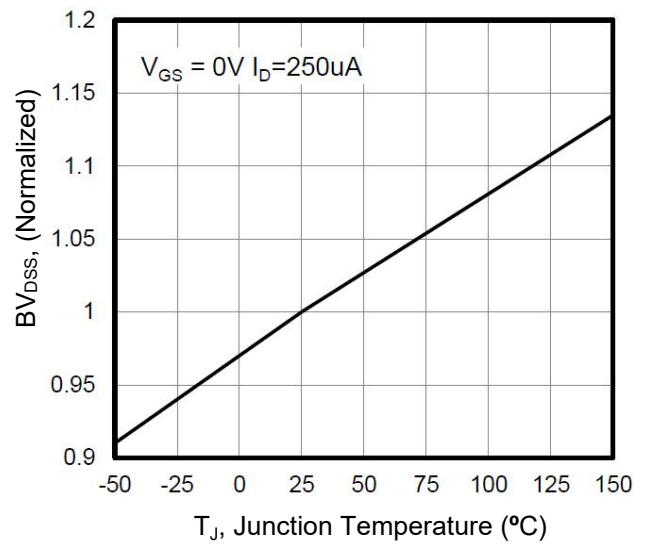


Figure 9. Transient Thermal Impedance

(TO-220F)

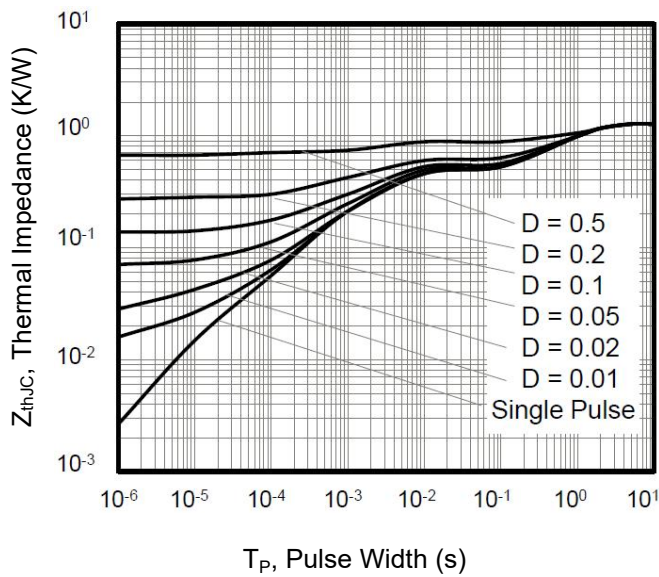


Figure A: Gate Charge Test Circuit and Waveform

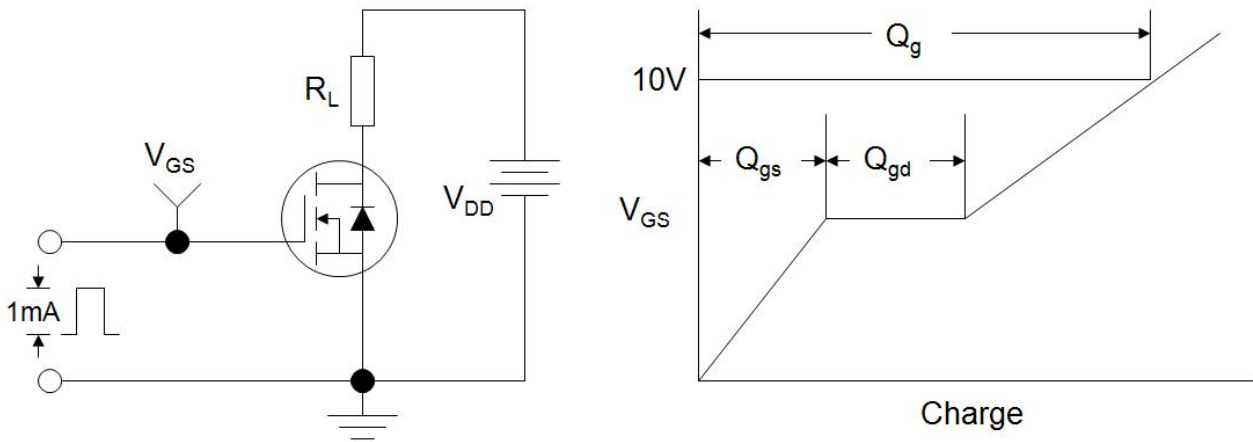


Figure B: Resistive Switching Test Circuit and Waveform

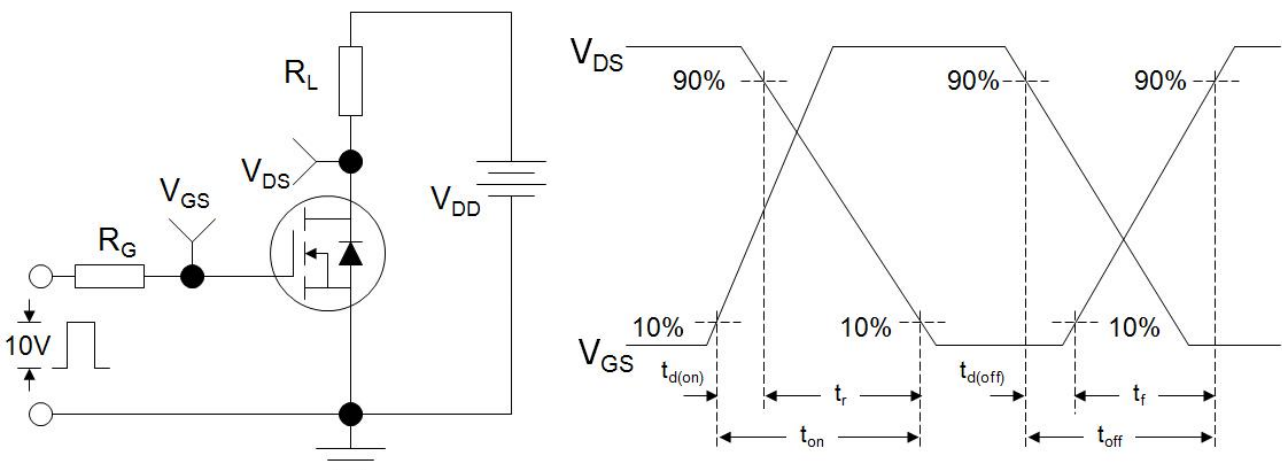
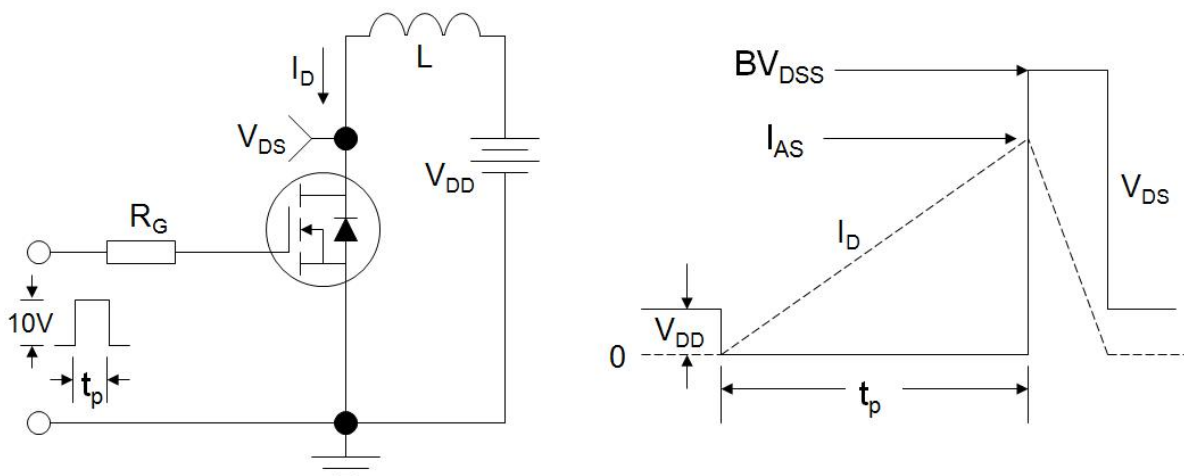


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Outline Dimension

Unit: mm

TO-220F

