

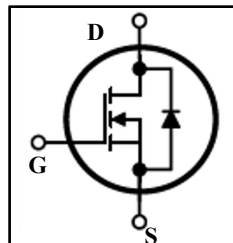
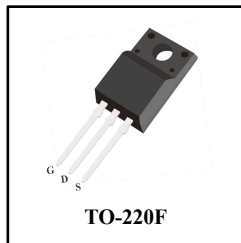


### FEATURES

- $BV_{DSS}$ : 650V,  $I_D=7A$
- $R_{DS(on)}$  : 1.4Ω(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
MPVA7N65F	MPVA7N65F	TO-220F

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage ( $V_{GS} = 0V$ )	$V_{DSS}$	650	V
Continuous Drain Current	$I_D$	7	A
Pulsed Drain Current (note1)	$I_{DM}$	28	A
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	230	mJ
Avalanche Current (note1)	$I_{AR}$	4	A
Repetitive Avalanche Energy (note1)	$E_{AR}$	21.7	mJ
Power Dissipation ( $T_C = 25^\circ C$ )	$P_D$	35	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	$R_{thJC}$	1.98	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	62.5	



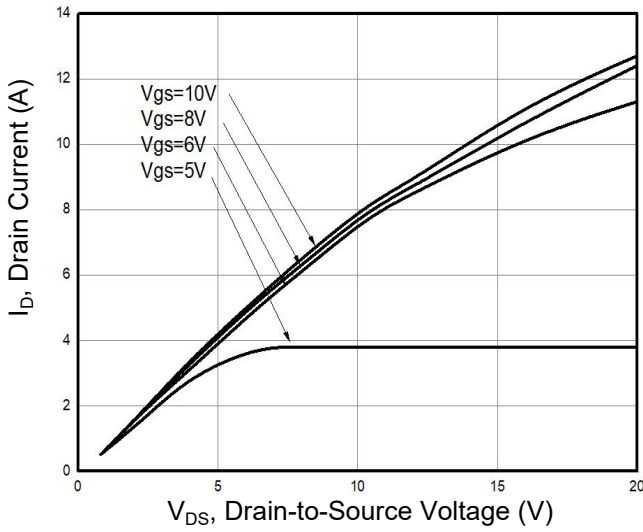
Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 650V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	$\mu A$
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 30V$	--	--	$\pm 100$	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)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 3.5A$	--	1.1	1.4	$\Omega$
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0\text{MHz}$	--	1178	--	pF
Output Capacitance	$C_{oss}$		--	89	--	
Reverse Transfer Capacitance	$C_{rss}$		--	10	--	
Total Gate Charge	$Q_g$	$V_{DD} = 400V, I_D = 7.0A,$ $V_{GS} = 10V$	--	19	--	nC
Gate-Source Charge	$Q_{gs}$		--	5	--	
Gate-Drain Charge	$Q_{gd}$		--	5	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 325V, I_D = 7.0A,$ $R_G = 25\Omega$	--	33	--	ns
Turn-on Rise Time	$t_r$		--	50	--	
Turn-off Delay Time	$t_{d(off)}$		--	42	--	
Turn-off Fall Time	$t_f$		--	35	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	7	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	28	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 7.0A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Time	$t_{rr}$	$V_R = 400V, I_F = 7.0A,$ $di_F/dt = 100A/\mu s$	--	365	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	3.4	--	$\mu C$

**Notes**

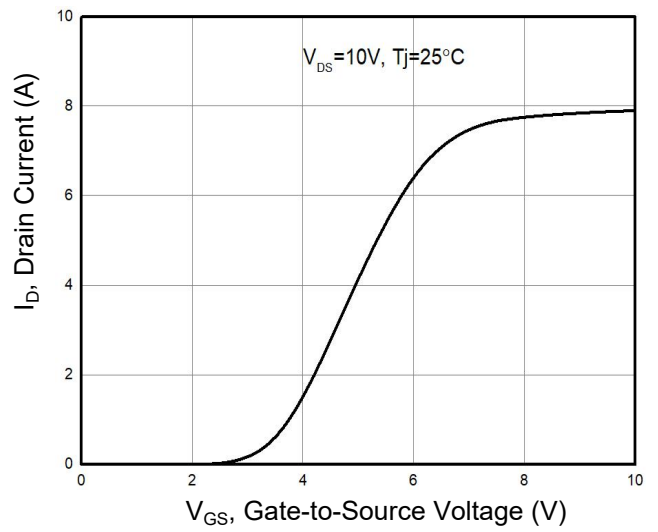
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $L = 10\text{mH}, V_{DD} = 50V, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width  $\leq 300\mu s$ , Duty Cycle  $\leq 1\%$
4. Essentially independent of operating temperature

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

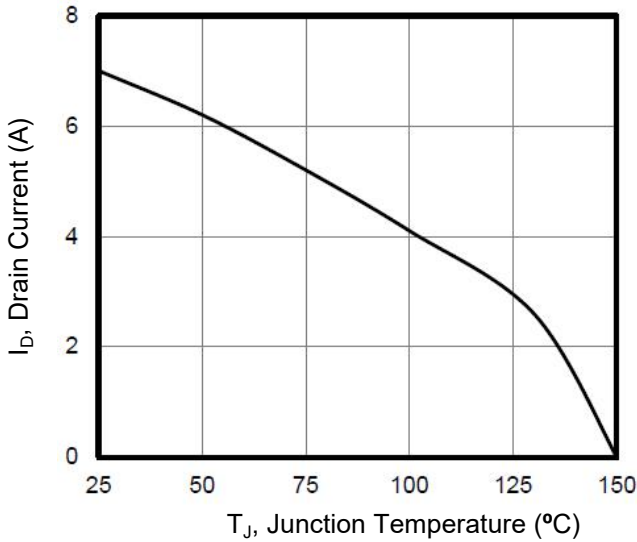
**Figure 1. Output Characteristics**



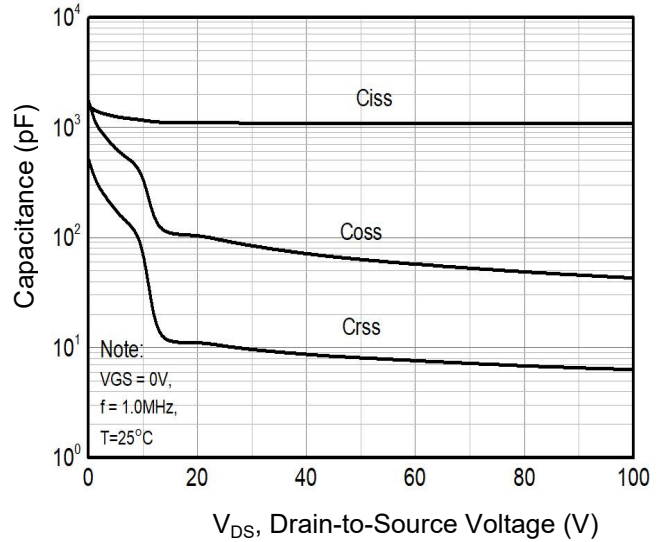
**Figure 2. Transfer Characteristics**



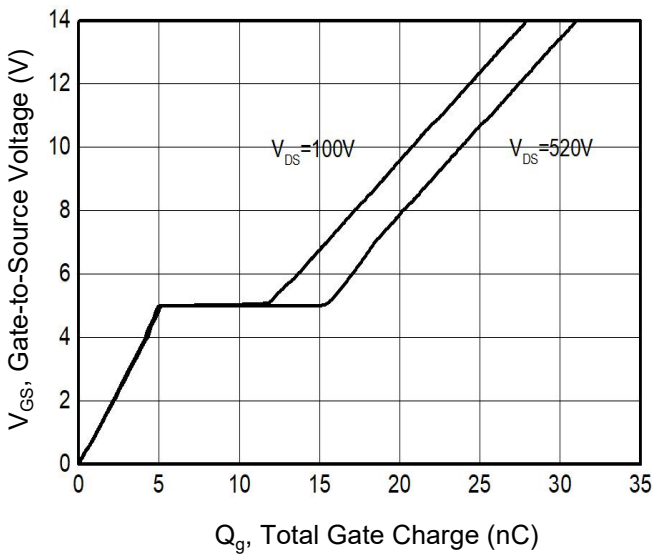
**Figure 3. Drain Current vs. Temperature**



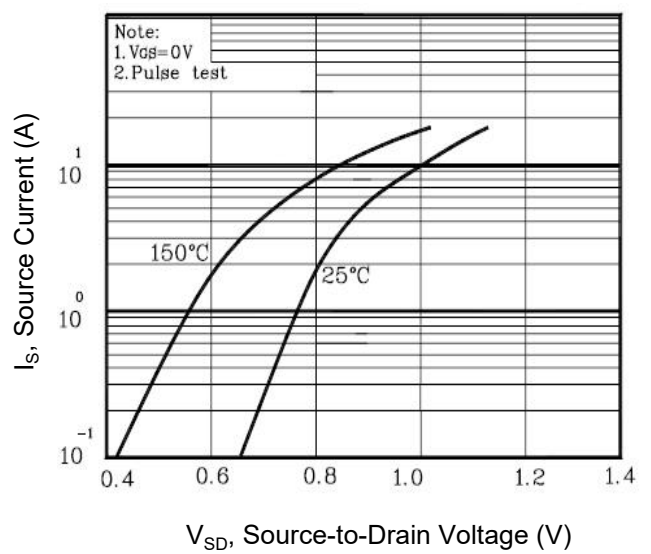
**Figure 4. Capacitance**



**Figure 5. Gate Charge**



**Figure 6. Body Diode Forward Voltage**



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

Figure 7. On-Resistance vs. Temperature

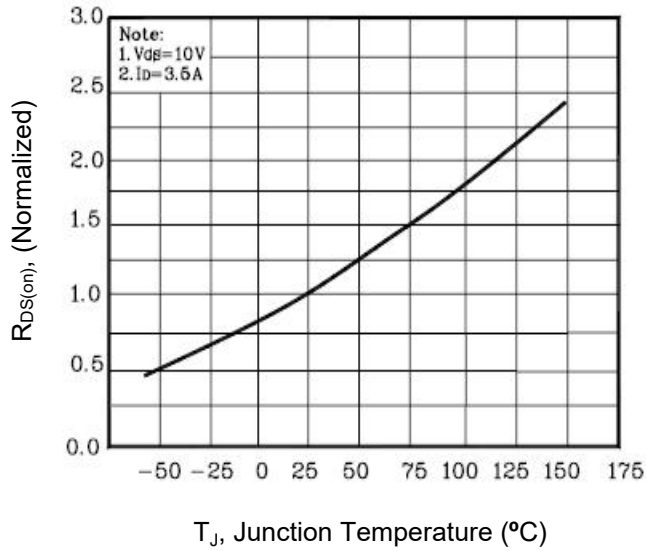


Figure 8.  $BV_{DSS}$  vs. Temperature

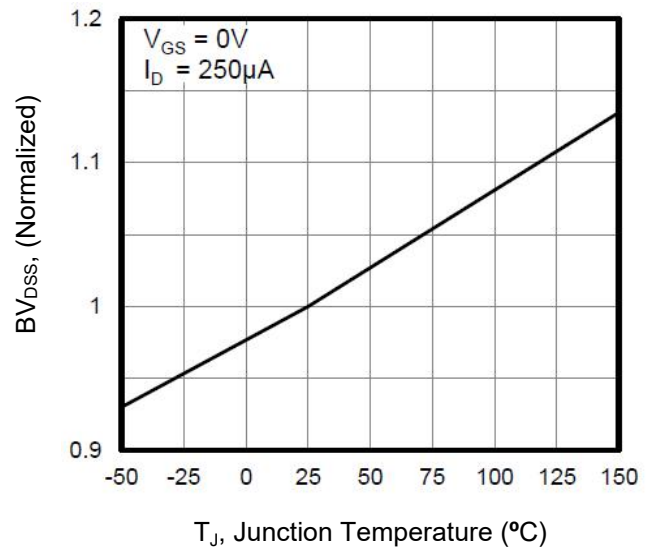
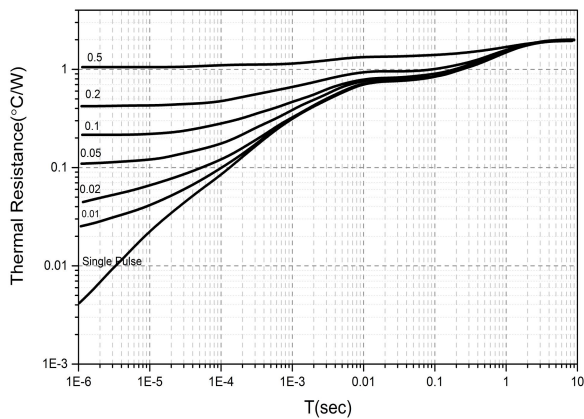
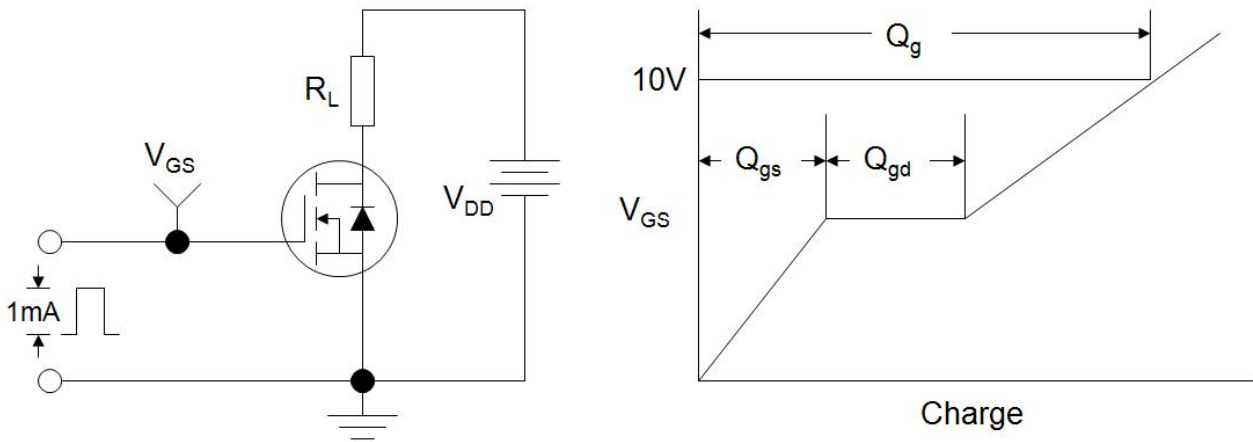


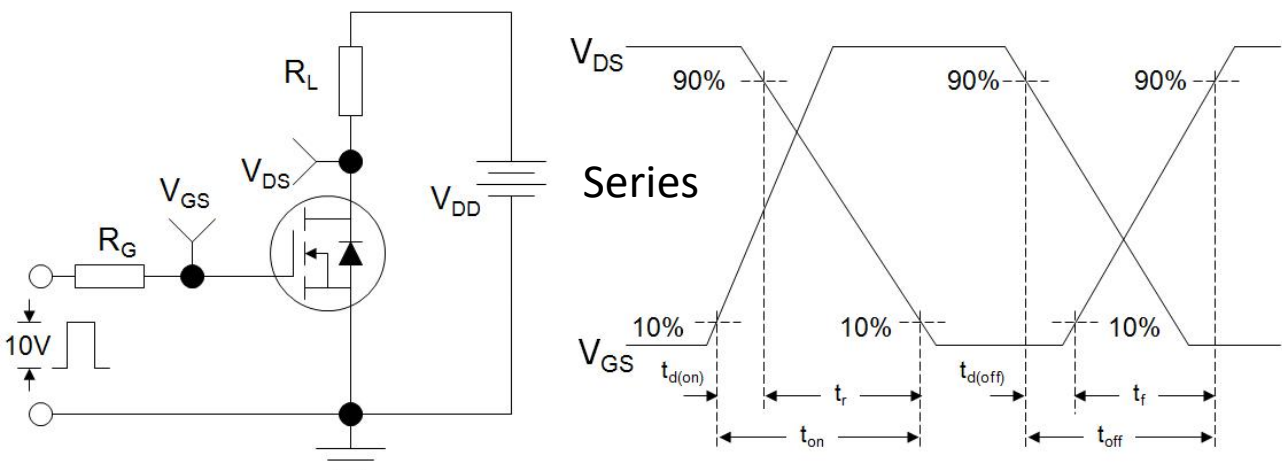
Figure 9. Transient Thermal Impedance



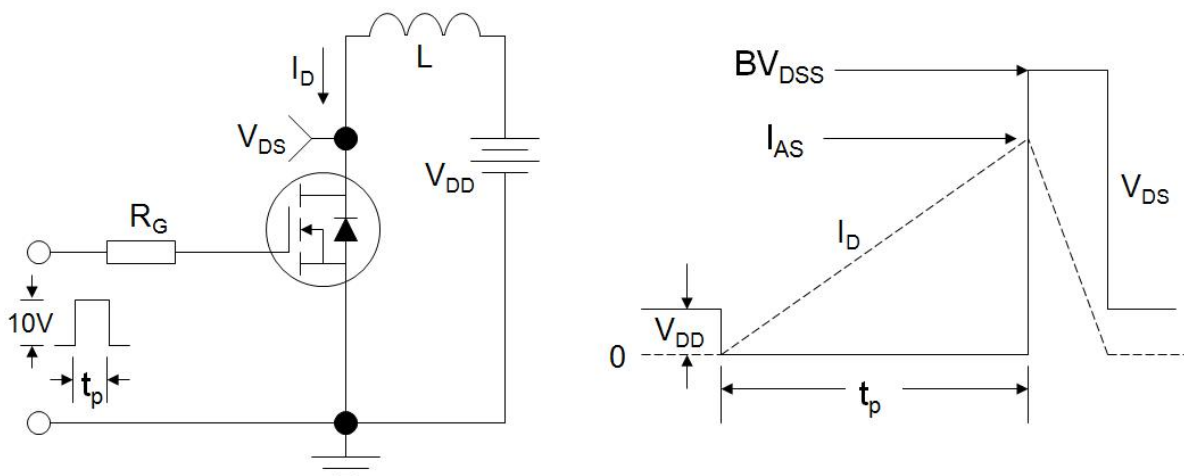
**Figure A: Gate Charge Test Circuit and Waveform**



**Figure B: Resistive Switching Test Circuit and Waveform**



**Figure C: Unclamped Inductive Switching Test Circuit and Waveform**



**Outline Dimension**

Unit: mm

**TO-220F**

