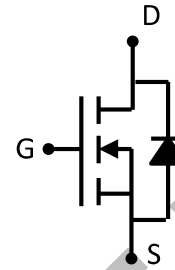


AP7N65F

N-Channel Enhancement Mosfet

Features

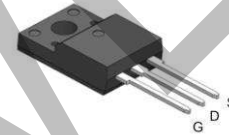
- 650V,7A
 $R_{DS(ON)} < 1.35 \Omega @ V_{GS}=10V$ TYP:1.1 Ω
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



Schematic diagram

Applications

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



TO-220F

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
7N65F	AP7N65F	TO-220F	-	-	1000

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current ($T_a=25^\circ\text{C}$)	I_D	7	A
Avalanche Current ⁽¹⁾	I_{AS}	5.76	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	28	A
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	165	mJ
Repetitive Avalanche Energy ⁽¹⁾	E_{AR}	100	mJ
Power Dissipation	P_D	63	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.29	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
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	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0	-	4.0	V
Drain-source on-resistance ⁽³⁾	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 3.5A$	-	1.1	1.35	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0\text{MHz}$	-	891	-	pF
Output Capacitance	C_{oss}		-	87	-	
Reverse Transfer Capacitance	C_{rss}		-	10	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 325V, I_D = 7A, R_G = 25\Omega$	-	39	-	ns
Turn-on rise time	t_r		-	23	-	
Turn-off delay time	$t_{d(off)}$		-	137	-	
Turn-off fall time	t_f		-	60	-	
Total Gate Charge	Q_g	$V_{DS} = 520V, I_D = 7A, V_{GS} = 10V$	-	32	-	nC
Gate-Source Charge	Q_{gs}		-	4.6	-	
Gate-Drain Charge	Q_{gd}		-	14	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	$T_J = 25^{\circ}\text{C}, V_{GS} = 0V, I_S = 3.5A$	-	-	1.4	V
Diode Forward current	I_S	$T_C = 25^{\circ}\text{C}$	-	-	7	A
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}, I_F = 7A, di/dt = 100A/\mu s$		575		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$T_J = 25^{\circ}\text{C}, I_F = 7A, di/dt = 100A/\mu s$		1.9		uc

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: $T_J = 25^{\circ}\text{C}, V_{DD} = 50V, R_G = 25\Omega, L = 10\text{mH}$
3. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 1\%$

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

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

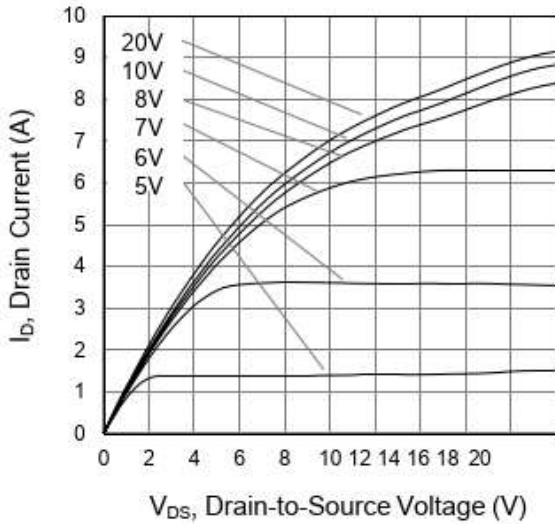


Figure 2. Body Diode Forward Voltage

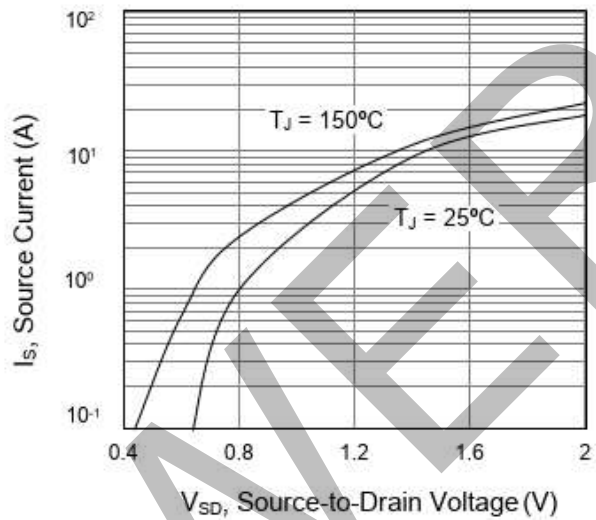


Figure 3. Drain Current vs. Temperature

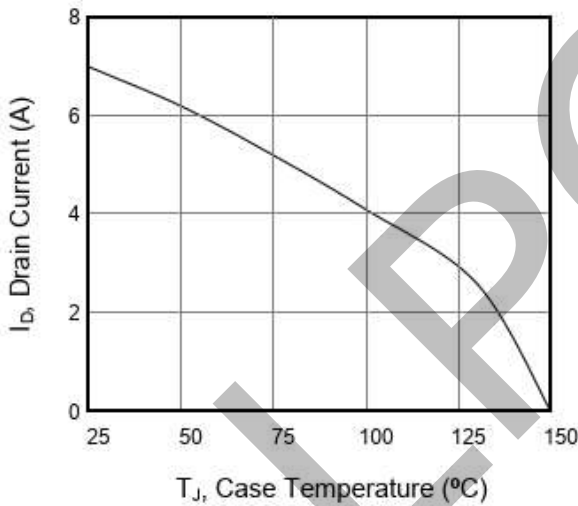


Figure 4. BV_{DSS} Variation vs. Temperature

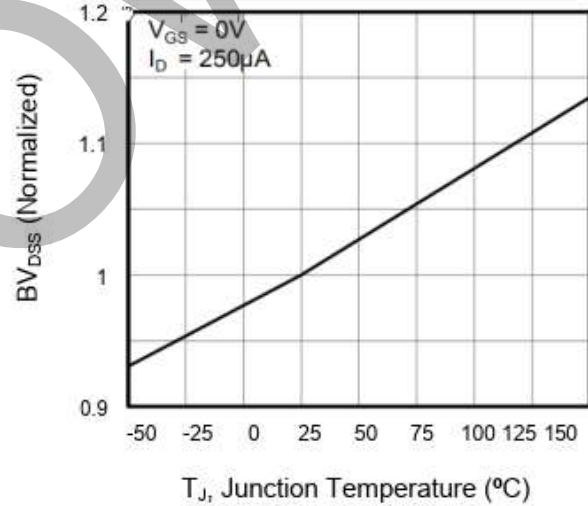


Figure 5. Transfer Characteristics

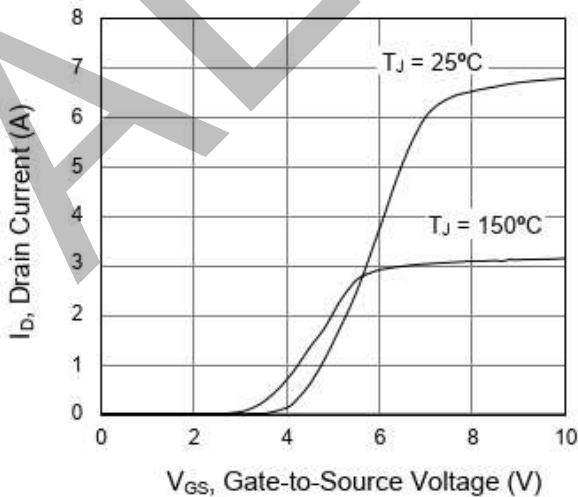
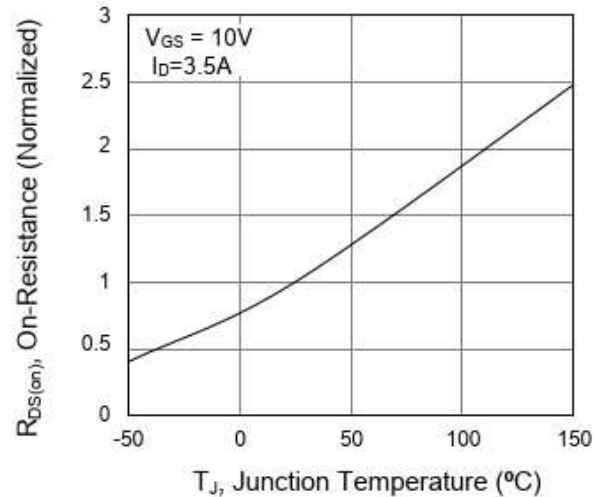


Figure 6. On-Resistance vs. Temperature



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

Figure 7. Capacitance

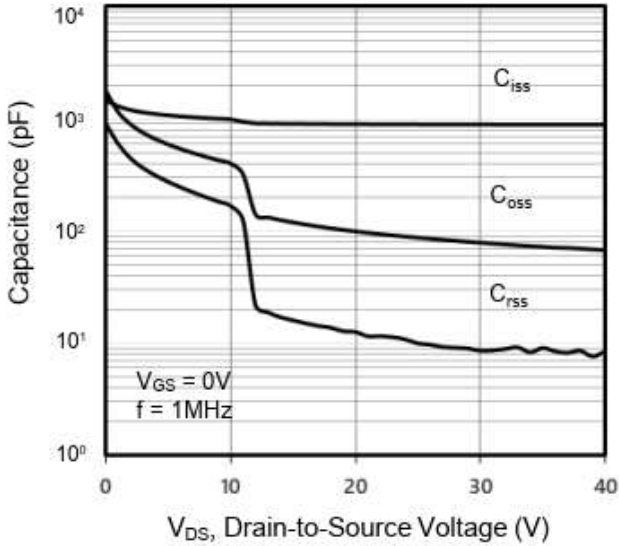


Figure 8. Gate Charge

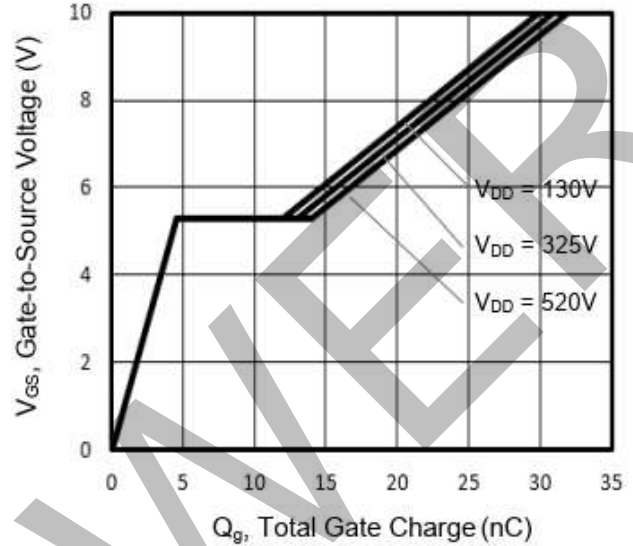


Figure 9. Transient Thermal Impedance TO-220, TO-251, TO-252

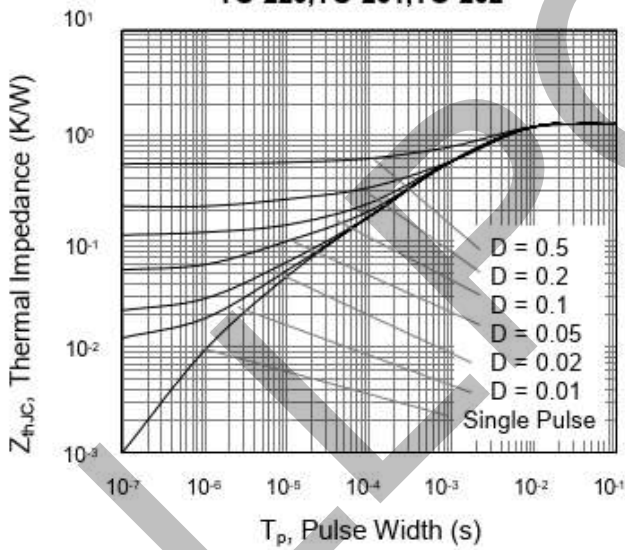
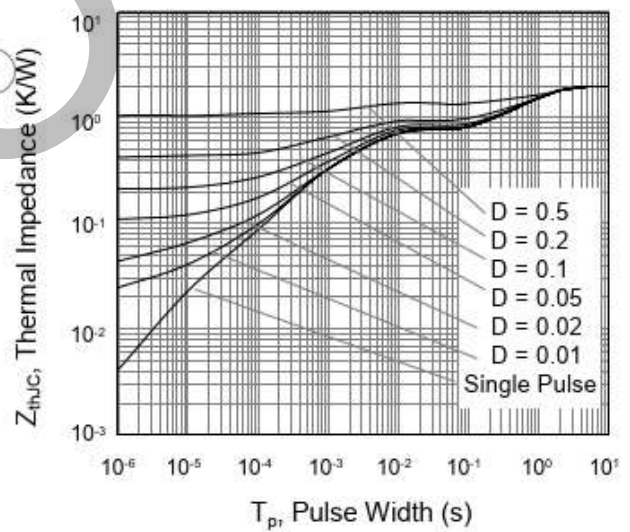
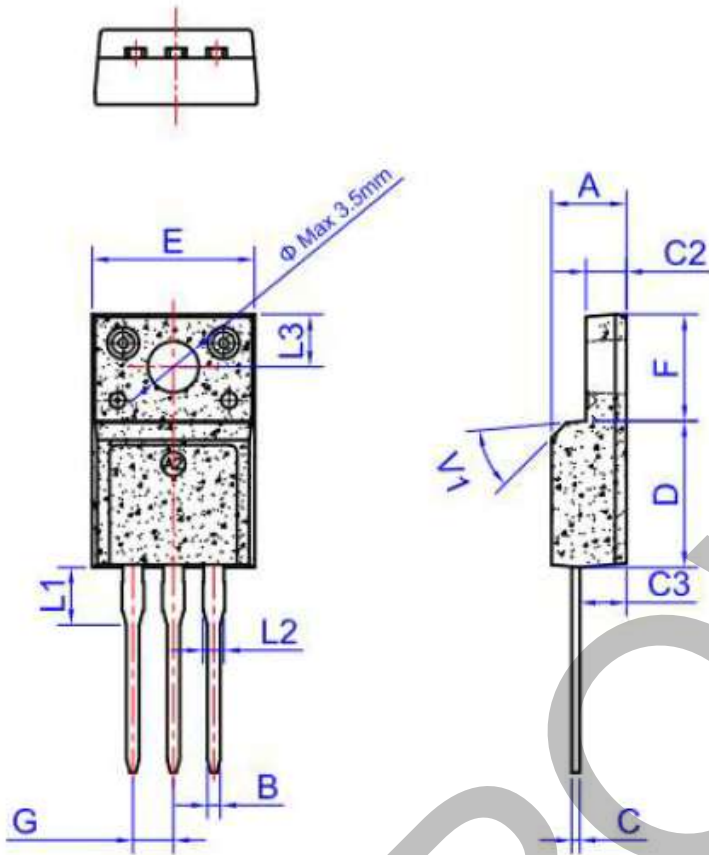


Figure 10. Transient Thermal Impedance TO-220F



Package Outlines



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.50		4.90	0.177		0.193
B	0.74	0.80	0.83	0.029	0.031	0.033
C	0.47		0.65	0.019		0.026
C2	2.45		2.75	0.096		0.108
C3	2.60		3.00	0.102		0.118
D	8.80		9.30	0.346		0.366
E	9.80		10.4	0.386		0.410
F	6.40		6.80	0.252		0.268
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.63			0.143	
L2	1.14		1.70	0.045		0.067
L3		3.30			0.130	
V1		45°			45°	