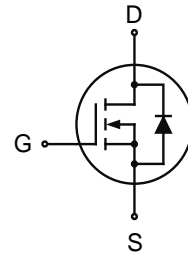


## Feature

- 700V,15 A  
RDS(ON) ≤ 0.66 Ω @ VGS=10V, TYP=0.55 Ω
- Fast Switching
- Low ON Resistance(Rdson≤0.66Ω)
- Low Gate Charge (Typical Data:65nC)
- 100% Single Pulse avalanche energy Test
- Halogen Free



Schematic Diagram



TO-220F

## Application

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

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
15N70F	AP15N70F	TO-220F	-	-	1000

## ABSOLUTE MAXIMUM RATINGS (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	700	V
Gate-Source Voltage	V <sub>GS</sub>	±30	V
Continuous Drain Current (T <sub>C</sub> =25°C)	I <sub>D</sub>	15	A
Continuous Drain Current (T <sub>C</sub> =100°C)	I <sub>D</sub>	9.5	A
Pulsed Drain Current <sup>(1)</sup>	I <sub>DM</sub>	60	A
Power Dissipation	P <sub>D</sub>	52	W
Single Pulse Avalanche Energy <sup>(2)</sup>	E <sub>AS</sub>	520	mJ
Junction to case <sup>(4)</sup>	R <sub>θJC</sub>	2.36	°C/W
Junction to Ambient <sup>(4)</sup>	R <sub>θJA</sub>	62.5	°C/W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-55~ +150	°C

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

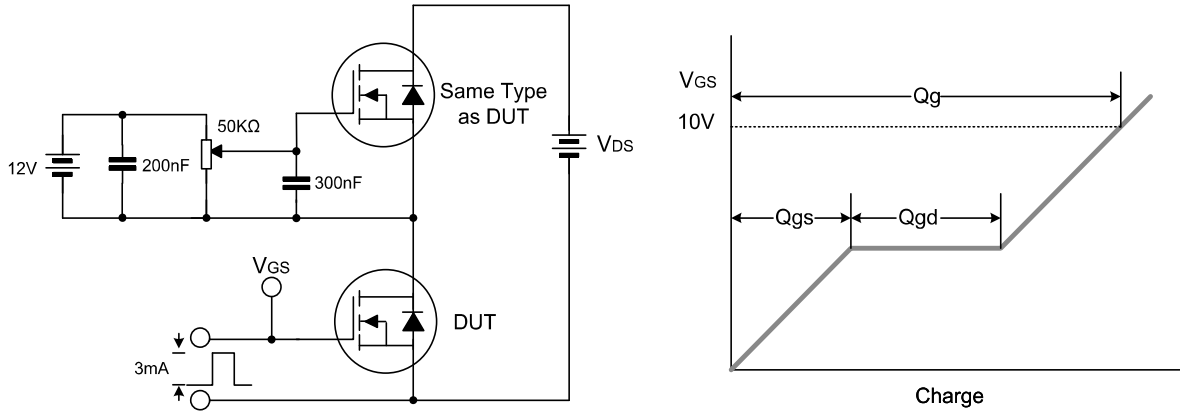
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	700	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 700V, V_{GS} = 0V, T_J = 25^{\circ}\text{C}$	-	-	1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0	-	4	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 7.5A$	-	0.56	0.66	$\Omega$
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V, f = 1\text{MHz}$	-	1990	-	pF
Output Capacitance	$C_{oss}$		-	197	-	
Reverse Transfer Capacitance	$C_{rss}$		-	25	-	
<b>Switching characteristics</b>						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 350V, I_D = 15A,$ $V_{GS} = 10V, R_G = 25\Omega$	-	48	-	ns
Turn-on rise time	$t_r$		-	39.5	-	
Turn-off delay time	$t_{d(off)}$		-	260	-	
Turn-off fall time	$t_f$		-	68	-	
Total Gate Charge	$Q_g$	$V_{DS} = 560V, I_D = 15A,$ $V_{GS} = 10V$	-	65	-	nC
Gate-Source Charge	$Q_{gs}$		-	9.5	-	
Gate-Drain Charge	$Q_{gd}$		-	34	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage	$V_{SD}$	$V_{GS} = 0V, I_S = 7.5A$	-	-	1.2	V
Diode Forward current	$I_S$		-	-	15	A
Body Diode Reverse Recovery Time	$t_{rr}$	$V_{GS} = 0V, I_F = 15A,$		777		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$dI_F/dt = 100A/\mu s$		4		$\mu C$

**Notes:**

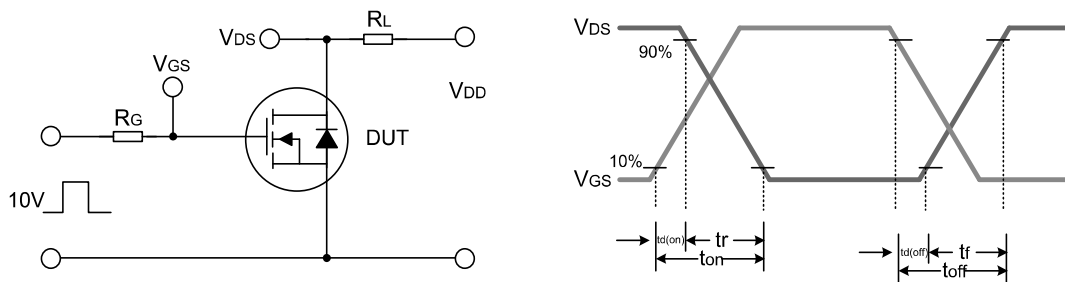
1. Repetitive Rating; pulse width limited by maximum junction temperature.
2.  $L=10\text{mH}, R_G=25\Omega, I_{AS}=10.2A$ , starting  $T_J=25^{\circ}\text{C}$ .
3.  $I_S=15A, dI/dt \leq 100A/\mu s, V_{DD} \leq BVDSS$ , starting  $T_J=25^{\circ}\text{C}$ .
4. Repetitive rating; pulse width limited by maximum junction tempera

**Test Circuit**

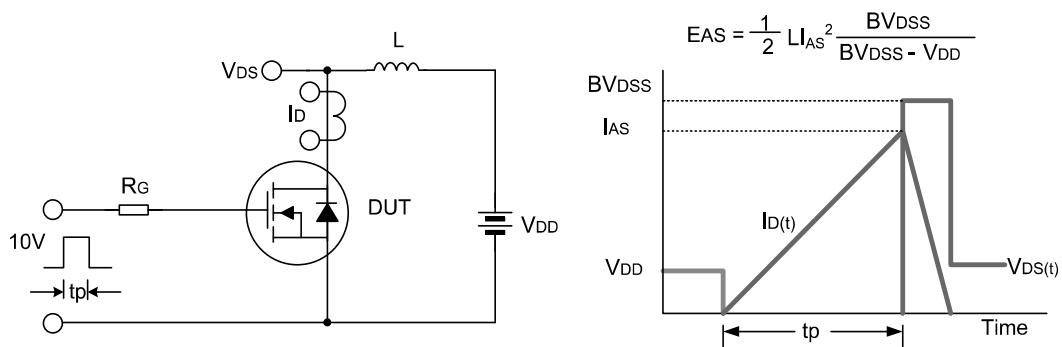
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

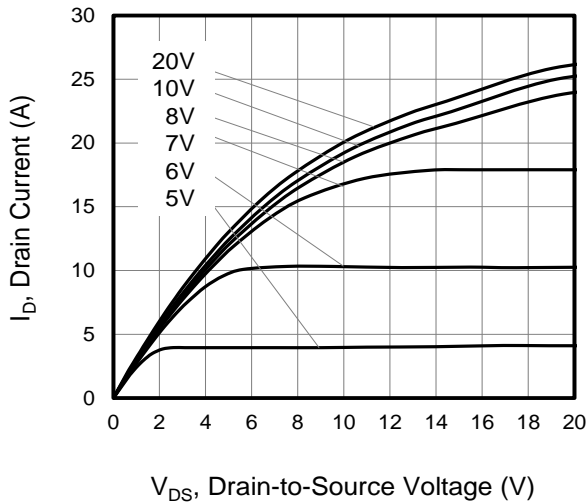


Unclamped Inductive Switching Test Circuit & Waveform

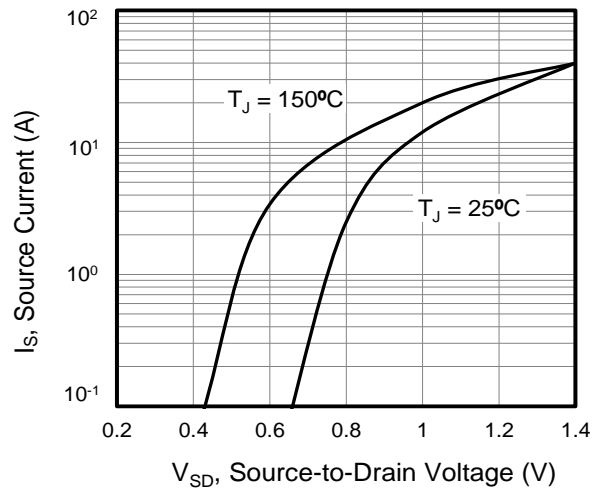


**Typical Performance Characteristics**

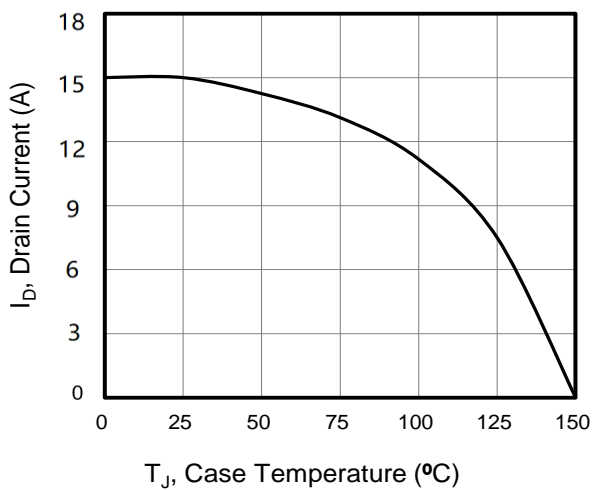
**Figure 1. Output Characteristics ( $T_J = 25^\circ\text{C}$ )**



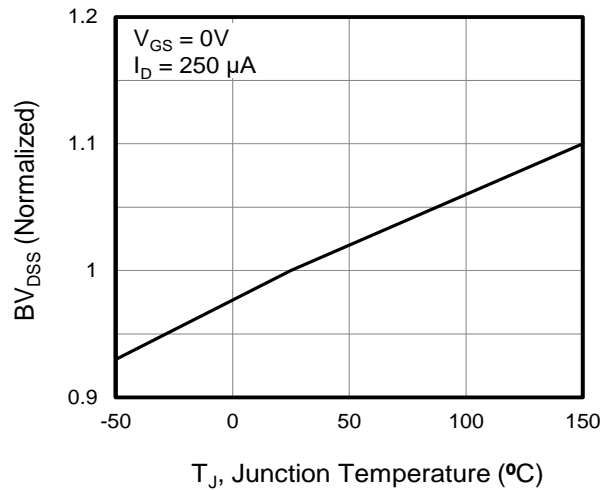
**Figure 2. Body Diode Forward Voltage**



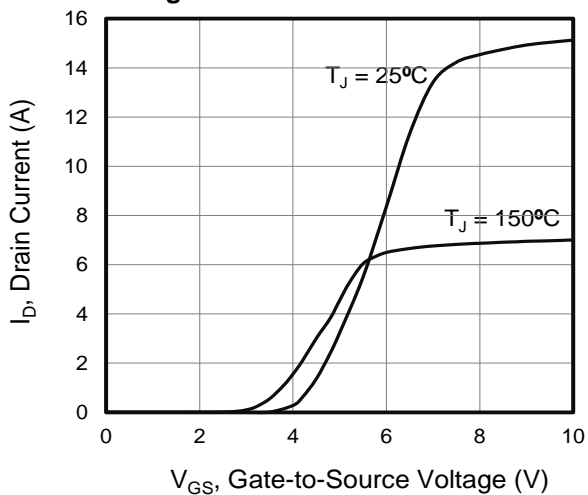
**Figure 3. Drain Current vs. Temperature**



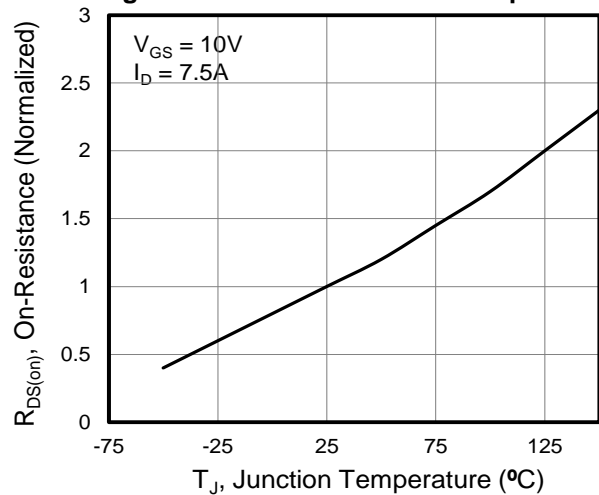
**Figure 4.  $BV_{DSS}$  Variation vs. Temperature**



**Figure 5. Transfer Characteristics**

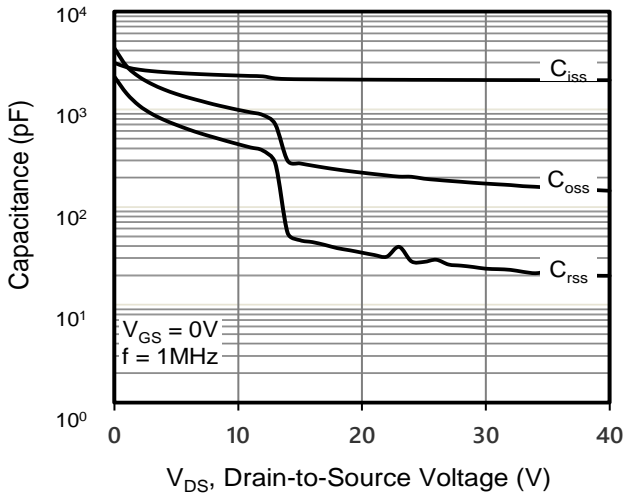


**Figure 6. On-Resistance vs. Temperature**

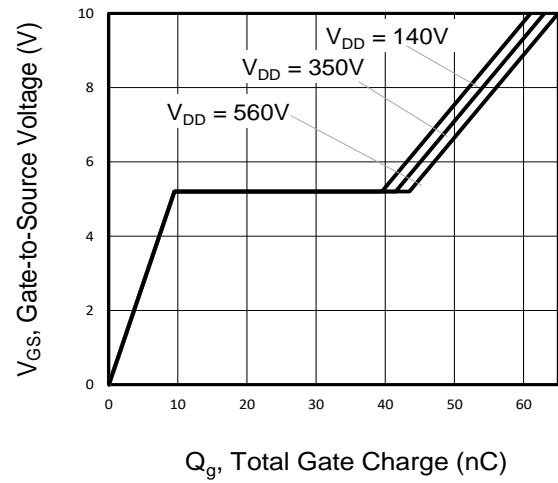


**Typical Performance Characteristics**

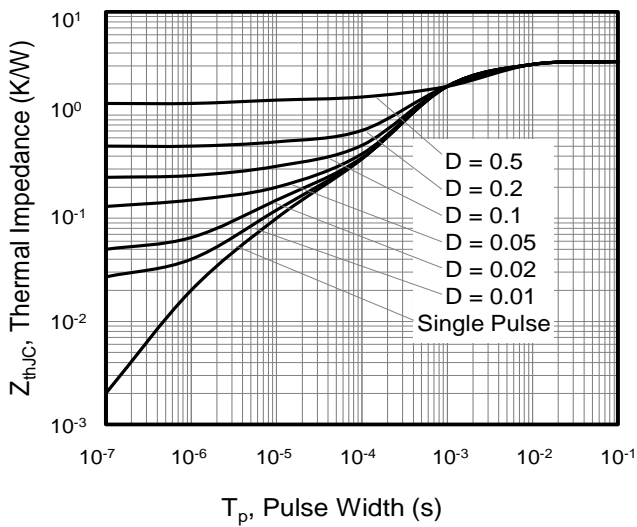
**Figure 7. Capacitance**



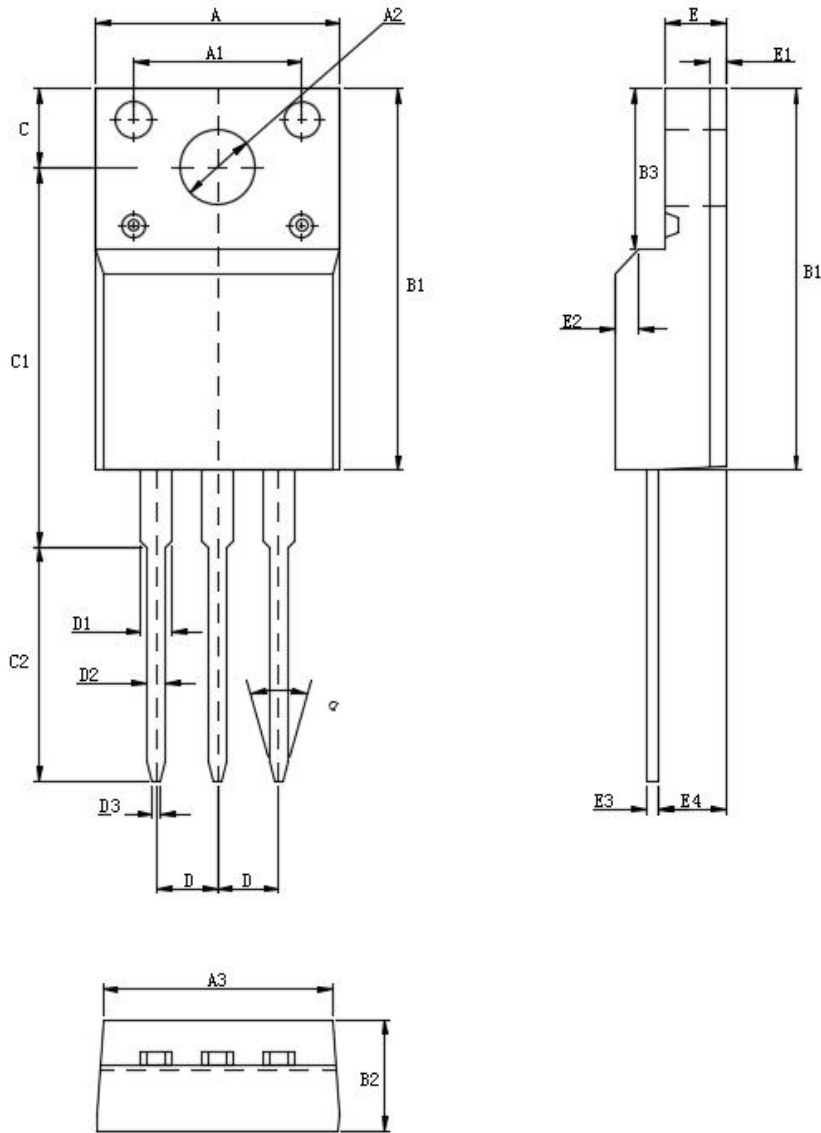
**Figure 8. Gate Charge**



**Figure 9. Transient Thermal Impedance**



**Package Dimensions of TO-220F**



UNIT: mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	9.80		10.60	D		2.54	
A1		7.00		D1	1.15		1.55
A2	2.90		3.40	D2	0.60		1.00
A3	9.10		9.90	D3	0.20		0.50
B1	15.40		16.40	E	2.24		2.84
B2	4.35		4.95	E1		0.70	
B3	6.00		7.40	E2		1.0×45°	
C	3.00		3.70	E3	0.35		0.65
C1	15.00		17.00	E4	2.30		3.30
C2	8.80		10.80	α (度)		30°	

## Revision History

Revision	Release	Remark
V1.0	2023/06/02	Initial Release

## Disclaimer

The information given in this document describes the independent performance of the product, but similar performance is not guaranteed under other working conditions, and cannot be guaranteed when installed with other products or equipment. To achieve the required performance of the product in actual scenarios, the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings, operating conditions, or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability. Customers using or selling these products for use in medical, life-saving, or life-sustaining applications do so at their own risk and agree to fully indemnify.

Due to product or technical improvements, the information described or contained herein may be changed without prior notice.