



### General Description

AFN10A60D is an N-channel enhancement mode Power MOSFET which is produced using VDMOS technology. The improved planar stripe cell and the improved guard ring terminal have been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are widely used in AC-DC power suppliers, DC-DC converters and H-bridge PWM motor drivers.

### Features

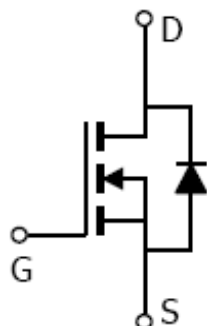
- 600V/5A,  $R_{DS(ON)}=0.58\Omega_{(typ.)}@V_{GS}=10V$
- Low gate charge
- Low  $C_{rss}$
- Fast switching
- Improved dv/dt capability

### Application

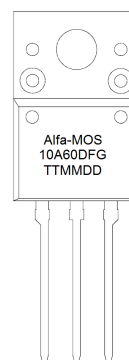
- AC-DC Switching Power Supply
- LCD / LED / PDP TV Lighting
- Solar Inverter

### Pin Description

#### SYMBOL



#### TO-220F-3L



### Absolute Maximum Ratings (T<sub>c</sub>=25°C Unless otherwise noted)

Parameter	Symbol	Value	Unit
		TO-220FB-3L	
Drain-Source Voltage	V <sub>DSS</sub>	600	V
Gate-Source Voltage	V <sub>GSS</sub>	±30	V
Drain Current	DC	10	A
	Pluse	40	A
Single Pulsed Avalanche Energy L=6.36mH, I <sub>AS</sub> =10A, V <sub>DD</sub> =90V, R <sub>G</sub> =25Ω, starting T <sub>J</sub> =25°C	E <sub>AS</sub>	363	mJ
Power Dissipation	T <sub>C</sub> =25°C	P <sub>D</sub>	45 W
Operating Junction Temperature	T <sub>J</sub>	-55/150	°C
Storage Temperature Range	T <sub>STG</sub>	-55/150	°C
Thermal Resistance-Junction to Case	R <sub>θJC</sub>	2.78	°C/W
Thermal Resistance-channel to Ambient	R <sub>θJA</sub>	62.5	°C/W



**Pin Define**

Pin	Symbol	Description
1	G	Gate
2	S	Source
3	D	Drain

**Ordering Information**

Part Ordering No.	Part Marking	Package	Material	Unit	Quantity
AFN10A60DT220FTG	Alfa-MOS 10A60DFG YYMMDD	TO-220F-3L	Halogen Free	Tube	50 EA

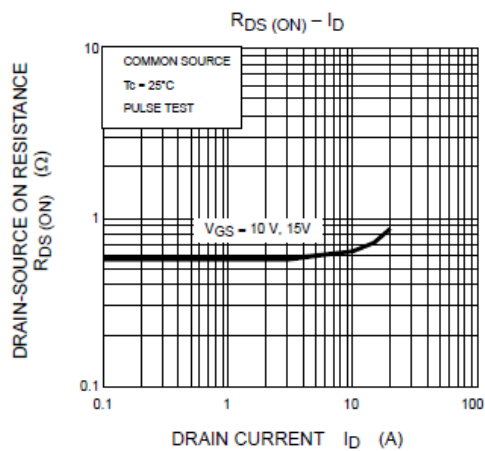
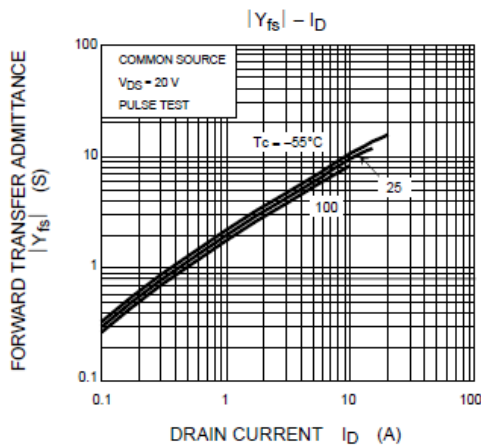
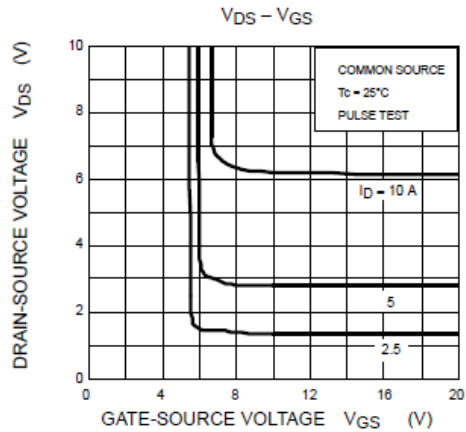
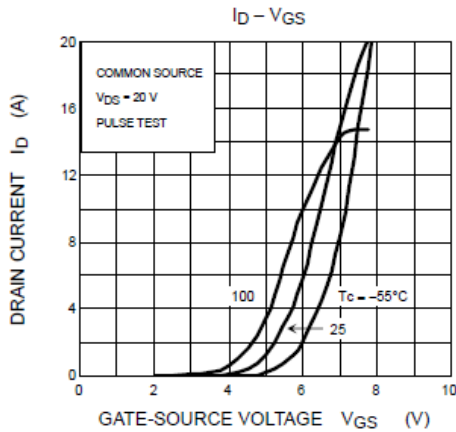
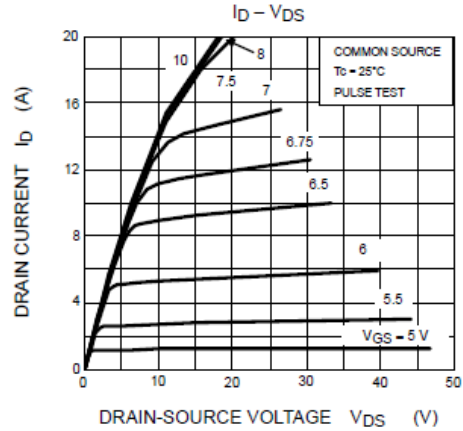
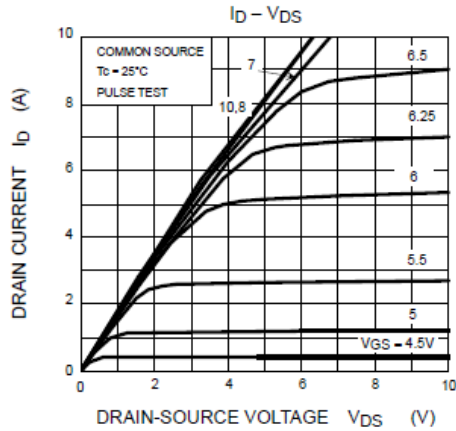
※ YYMMDD Date Code

**Electrical Characteristics** (T<sub>c</sub>25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit	
<b>Static</b>							
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =10mA	600			V	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2.0		4.0		
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±30V			±1	uA	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V			10	uA	
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =5.0A		0.58	0.75	Ω	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =5A	1.5	6		S	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =10A, V <sub>GS</sub> =0V			1.7	V	
Reverse Recovery Time	T <sub>rr</sub>	I <sub>S</sub> =10A, V <sub>GS</sub> =0V, di/dt=100A/μs		535.39		ns	
Reverse Recovery Charge	Q <sub>rr</sub>	Pulse width ≤300μs, Duty cycle≤2%		4.6		uC	
<b>Dynamic</b>							
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =400V, V <sub>GS</sub> =10V, I <sub>D</sub> ≅10A		25		nC	
Gate-Source Charge	Q <sub>gs</sub>			16			
Gate-Drain Charge	Q <sub>gd</sub>			9			
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz		1350		pF	
Output Capacitance	C <sub>oss</sub>			6			
Reverse Transfer Capacitance	C <sub>rss</sub>			135			
Turn-On Time	t <sub>d(on)</sub>	<p>10 V V<sub>GS</sub> 0 V 50 Ω I<sub>D</sub> = 5 A V<sub>OUT</sub> R<sub>L</sub> = 40 Ω V<sub>DD</sub> ≈ 200 V</p>		22		ns	
	t <sub>r</sub>				55		
Turn-Off Time	t <sub>d(off)</sub>				15		
	t <sub>f</sub>		tw = 10μs, Duty cycle≤1%		100		

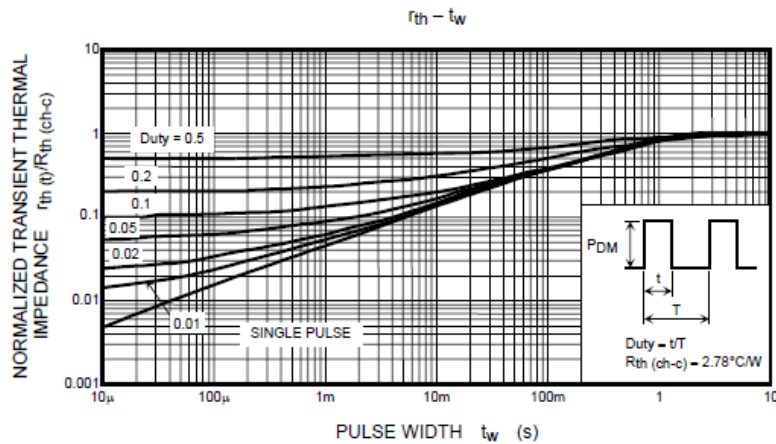
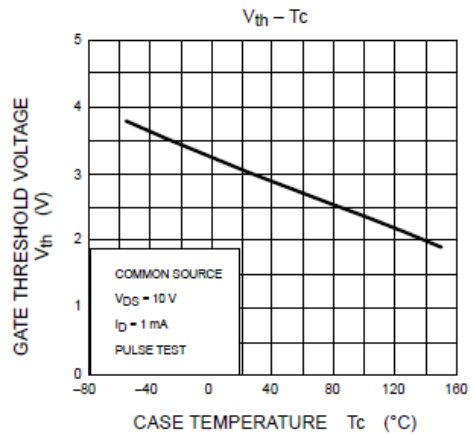
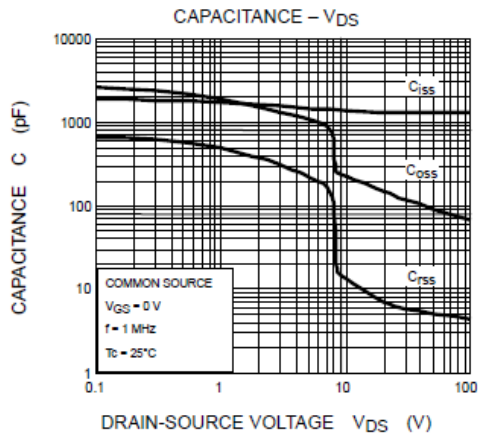
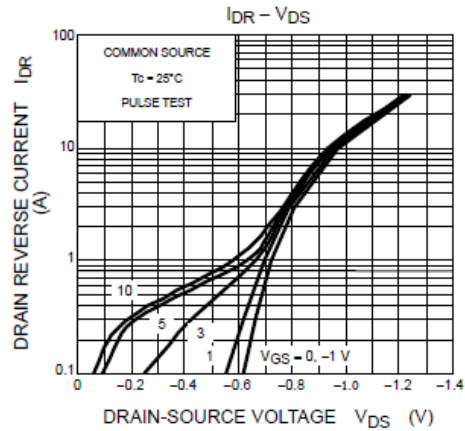
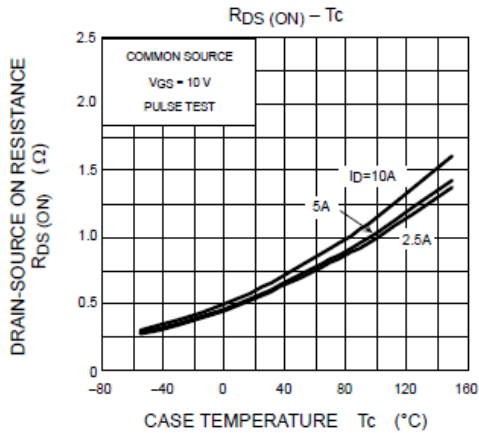


## Typical Characteristics





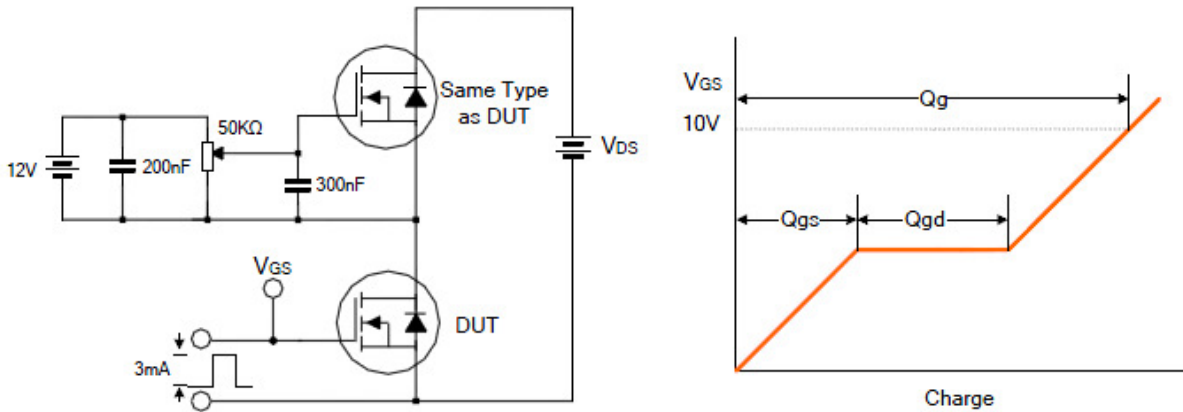
## Typical Characteristics



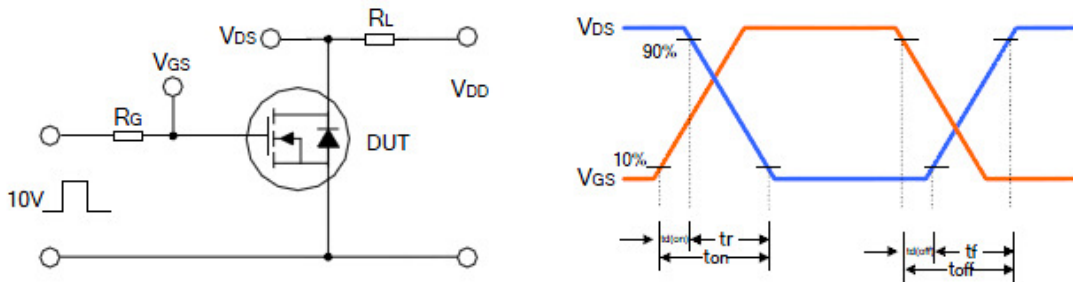


**Typical Characteristics**

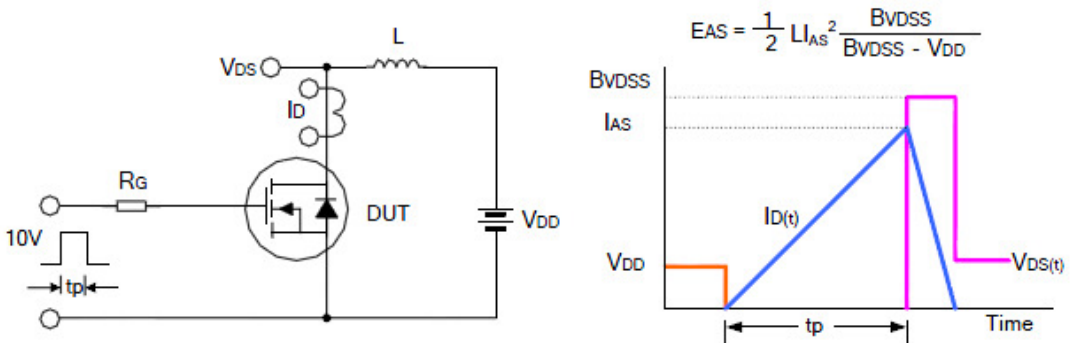
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

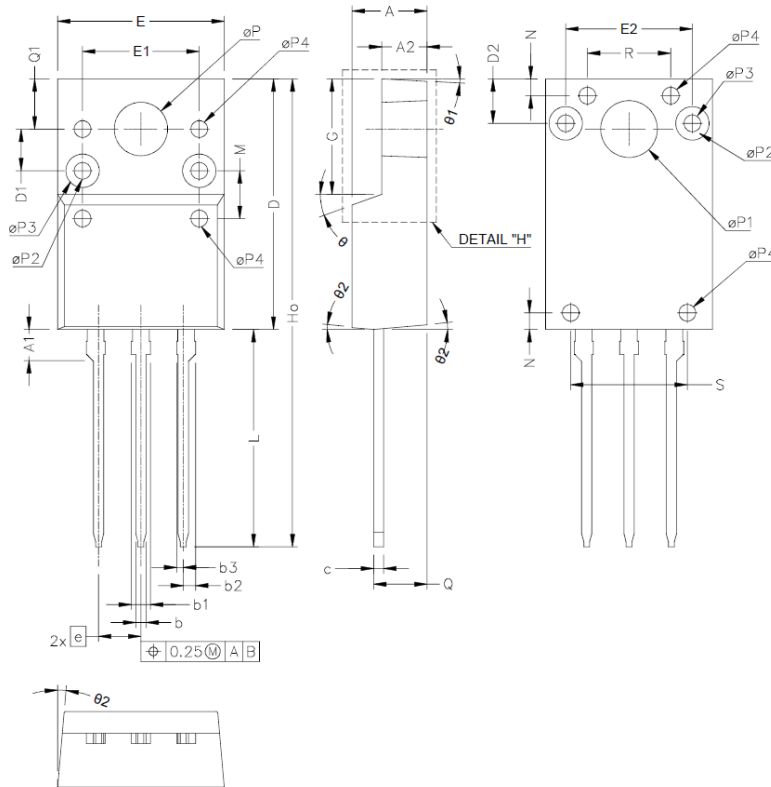


Unclamped Inductive Switching Test Circuit & Waveform





**Package Information ( TO-220F-3L )**



SYMBOL	MIN	NOM	MAX	SYMBOL	MIN	NOM	MAX
A	4.30	4.50	4.70	M		(2.86)	
A1	1.80		2.10	N		(1.00)	
A2	2.50	2.70	2.90	$\phi P$	3.05		3.40
b	0.54	0.69	0.84	$\phi P1$		(3.40)	
b1	0.99	1.14	1.29	$\phi P2$		(1.00)	
b2	0.565	0.745	0.925	$\phi P3$		(2.00)	
b3	0.245	0.395	0.545	$\phi P4$		(1.00)	
c	0.49	0.60	0.79	Q	3.10	3.20	3.30
D	14.70	15.00	15.30	Q1	2.70	3.00	3.30
D1		(2.50)		R		(5.00)	
D2		(2.66)		S		(7.00)	
e	2.29		2.79	$\theta$		(20°)	
E	9.70	10.00	10.30	$\theta 1$		(3°)	
E1		(7.00)		$\theta 2$		(5°)	
E2		(7.60)					
G	6.70	6.90	7.10				
H0		(28.00)					
L	12.50	13.00	13.50				

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