

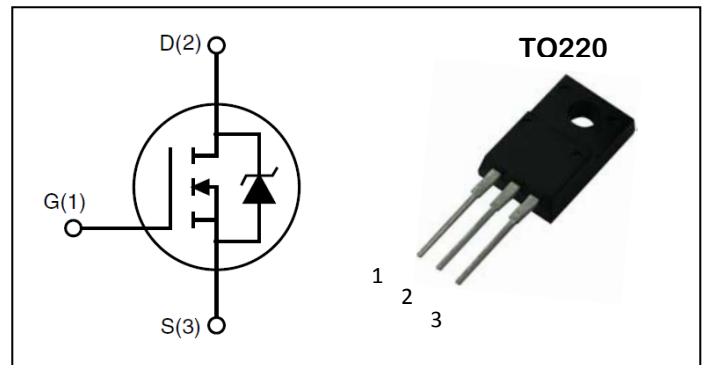
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (m Ω)
600V	20A	170m Ω

Features:

- Low gate input resistance
- High dv/dt and avalanche capabilities
- 100% avalanche tested
- Low input capacitance and gate charge
- Lead-Free, RoHS Compliant



Description:

The ADM20N60F series MOSFETs is a new technology, which combines an innovative super junction technology and advance process. This new technology achieves low R_{ds(on)}, energy saving, high reliability and uniformity, superior power density and space saving.

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Ratings	Unit
Common Ratings			
V_{DSS}	Drain-Source Voltage	600	V
V_{GSS}	Gate-Source Voltage	± 30	
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ 20	A
Mounted on Large Heat Sink			
I_{DM}	300 μs Pulse Drain Current Tested(1)	$T_C=25^\circ\text{C}$ 80	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$ 20	A
		$T_C=100^\circ\text{C}$ 13	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 34.7	W
	Derating factor	0.27	W/ $^\circ\text{C}$

1. Pulse width limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
R_{thJC}	Thermal resistance junction-case max	3.6	$^\circ\text{C}/\text{W}$
R_{thJA}	Thermal resistance junction-ambient max	80	$^\circ\text{C}/\text{W}$

Electrical Characteristics (TA=25°C Unless Otherwise Noted)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
On/off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	600	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 600V, V _{GS} =0V	--	--	1	uA
		V _{DS} =600V, V _{GS} =0V T _J =125°C	--	--	50	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	2		4	V
I _{GSS}	Gate Leakage Current	V _{GS} =±30V, V _{DS} =0V	--	--	±100	nA
R _{DS(ON)}	Drain-Source On-state Resistance(2)	V _{GS} = 10V, I _{DS} =13A	--	170	190	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} = 25V, Frequency=500KHz	--	1514	--	pF
C _{oss}	Output Capacitance		--	57.44	--	
C _{rss}	Reverse Transfer Capacitance		--	8.43	--	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time(1)	V _{DS} =380V, I _D = 18A, V _{GS} = 10V, R _{GEN} =3.38 Ω R _L =18 Ω	--	15.42	--	ns
t _r	Turn-on Rise Time(1)		--	44.8	--	
t _{d(OFF)}	Turn-off Delay Time(1)		--	30.92	--	
t _f	Turn-off Fall Time(1)		--	40.36	--	
Q _g	Total Gate Charge(1)	V _{DS} =480V, V _{GS} = 10V, I _{DS} =20A	--	50.58	--	nC
Q _{gs}	Gate-Source Charge(1)		--	11.71	--	
Q _{gd}	Gate-Drain Charge(1)		--	21.63	--	
Diode Characteristics						
V _{SD}	Diode Forward Voltage(2)	I _{SD} = 20A, V _{GS} = 0	--	0.87	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =20A, dI _{SD} /dt=100A/μs	--	370	--	ns
q _{rr}	Reverse Recovery Charge		--	5	--	uC

NOTES:

1. Independent of operating temperature.
2. Pulse Test : Pulse width ≤ 300 μs, Duty cycle ≤ 2%

Typical Performance Characteristics

Figure 1: Power dissipation

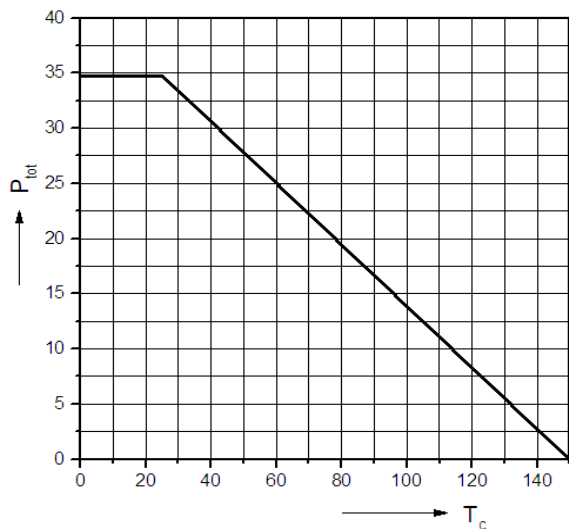


Figure 2: Typ. Gate to source cut-off voltage

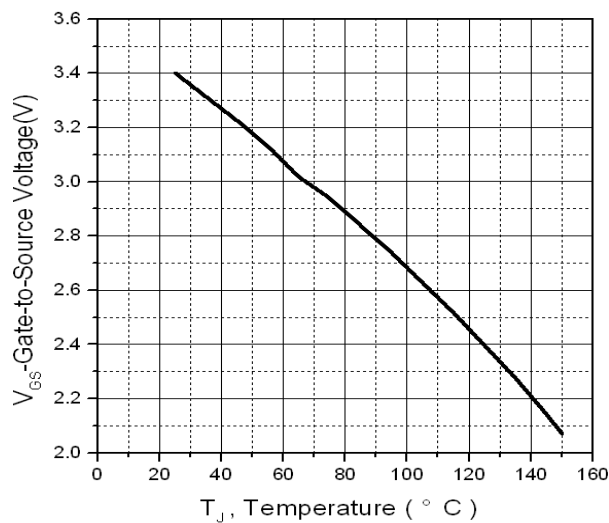


Figure 3: Typ. gate charge

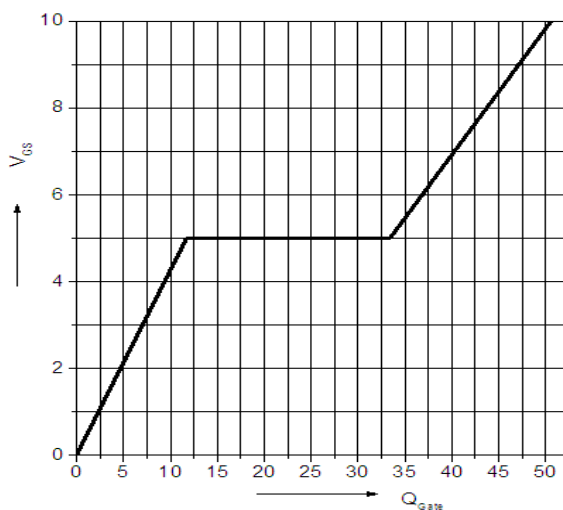


Figure 4: Typ. Capacitances

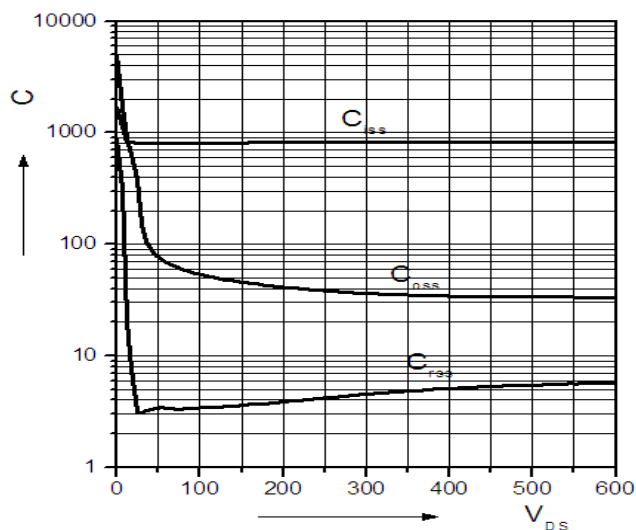


Figure 5: Drain-source breakdown voltage

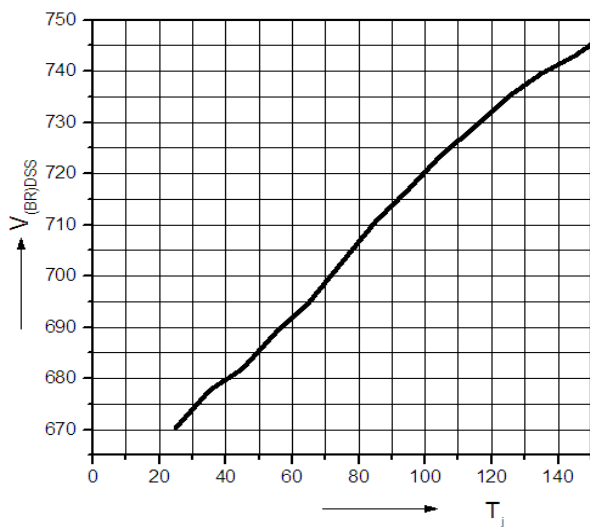
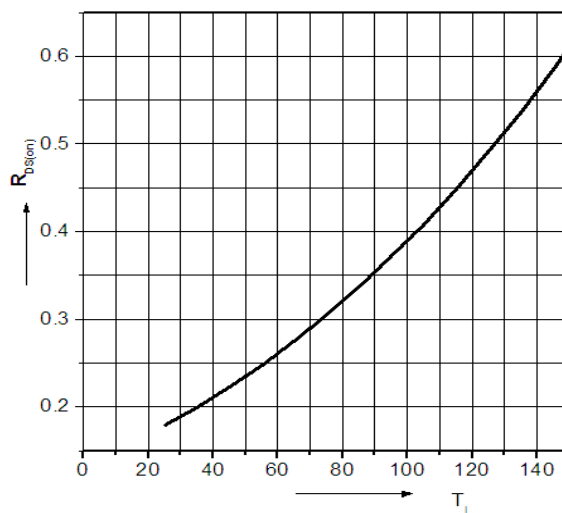
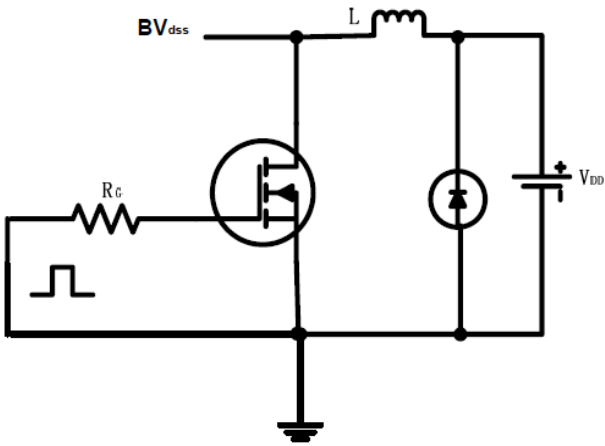


Figure 6: Drain-source on-state resistance

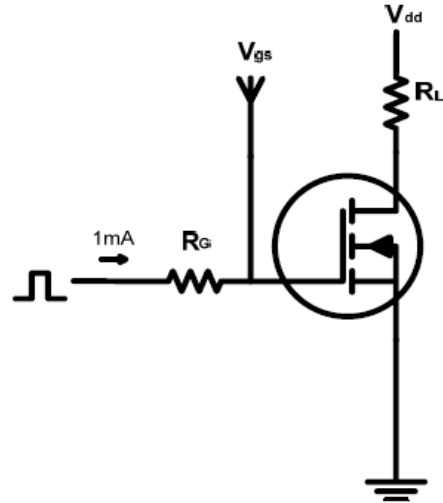


Test circuits and Waveforms

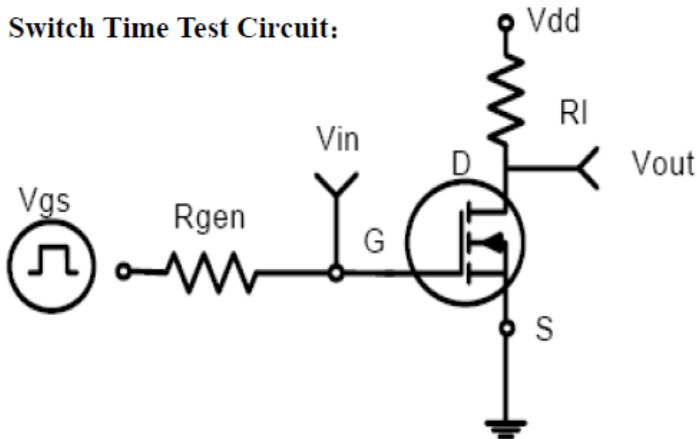
EAS test circuits:



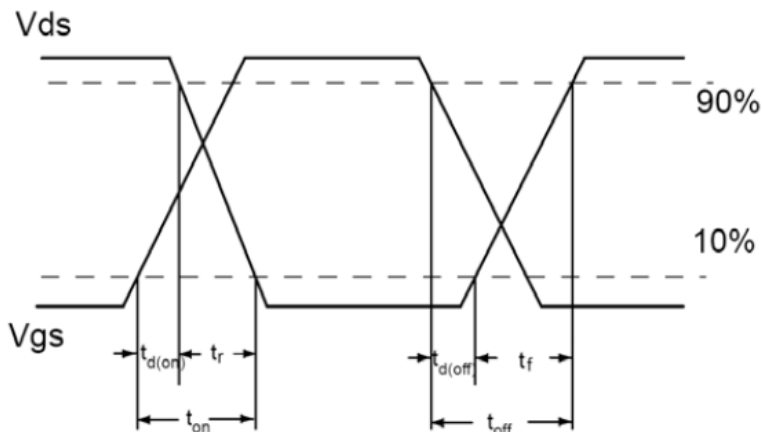
Gate charge test circuit:



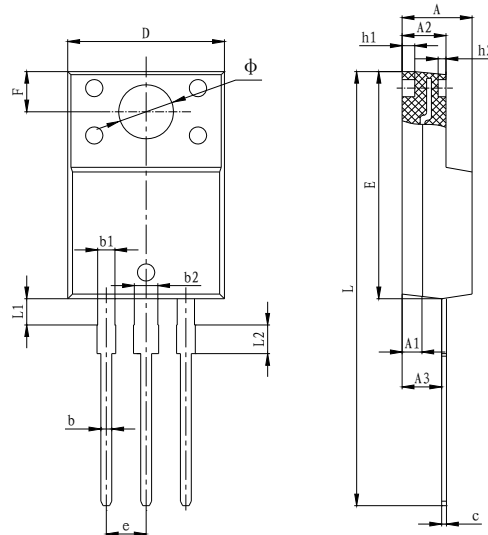
Switch Time Test Circuit:



Switch Waveforms:



PACKAGE MECHANICAL DATA
TO-220F Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.300	4.700	0.169	0.185
A1	1.300 REF		0.051 REF	
A2	2.800	3.200	0.110	0.126
A3	2.500	2.900	0.098	0.114
b	0.500	0.750	0.020	0.030
b1	1.100	1.350	0.043	0.053
b2	1.500	1.750	0.059	0.069
c	0.500	0.750	0.020	0.030
D	9.960	10.360	0.392	0.408
E	14.800	15.200	0.583	0.598
e	2.540 TYP		0.100 TYP	
F	2.700 REF		0.106 REF	
ϕ	3.500 REF		0.138 REF	
h	0.000	0.300	0.000	0.012
L	28.000	28.400	1.102	1.118
L1	1.700	1.900	0.067	0.075
L2	1.900	2.100	0.075	0.083