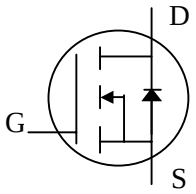
N-channel Enhancement-mode Power MOSFET

Simple Drive Requirement

100% Avalanche Tested

Fast Switching Performance

RoHS-compliant, halogen-free



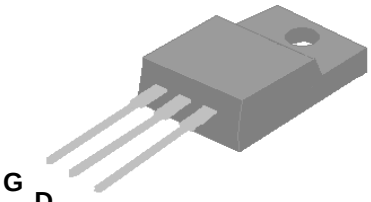
BV_{DSS}	150V
$R_{DS(ON)}$	100mΩ
I_D	20A

Description

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.

The AP20N15GI-HF-3 is in the TO-220CFM isolated through-hole package which is widely used in commercial and industrial applications where a small PCB footprint and/or isolation from an attached heatsink is required. This device is well suited for use in medium voltage applications such as DC-DC converters and motor drives.

Isolated tab



TO-220CFM (I)

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D at T_C=25°C	Continuous Drain Current	20	A
I_D at T_C=100°C	Continuous Drain Current	12	A
I_{DM}	Pulsed Drain Current[1]	80	A
P_D at T_C=25°C	Total Power Dissipation	34.7	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	3.6	°C/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	65	°C/W

Ordering Information

AP20N15GI-HF-3TB : in RoHS-compliant, halogen-free TO-220CFM, shipped in tubes (50pcs/tube)

Electrical Specifications at T_j=25°C (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=1mA	150	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=10A	-	-	100	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=10A	-	16	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=120V, V_{GS}=0V	-	-	25	uA
	Drain-Source Leakage Current (T_j=125°C)	V_{DS}=120V ,V_{GS}=0V	-	-	100	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ±20V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=14A	-	22	35	nC
Q_{gs}	Gate-Source Charge	V_{DS}=120V	-	6	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	7.7	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=75V	-	10	-	ns
t_r	Rise Time	I_D=14A	-	33	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=10Ω , V_{GS}=10V	-	27	-	ns
t_f	Fall Time	R_D=5.35Ω	-	26	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	1070	1700	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	230	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	9	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1.6	2.4	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=10A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time[2]	I_S=14A, V_{GS}=0V,	-	0.13	-	us
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	0.77	-	uC

Notes:

1. Pulse width limited by maximum junction temperature.
2. Pulse test - pulse width ≤ 300μs , duty cycle ≤ 2%

Typical Electrical Characteristics

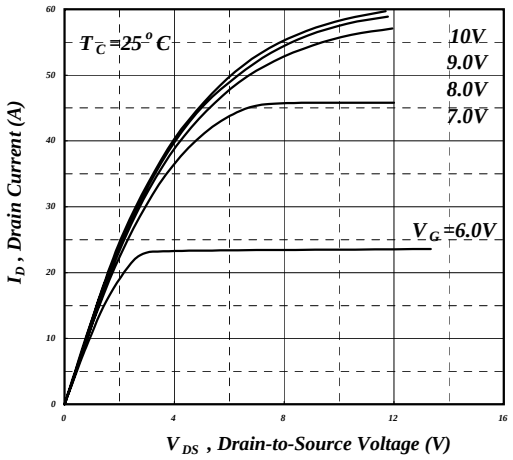


Fig 1. Typical Output Characteristics

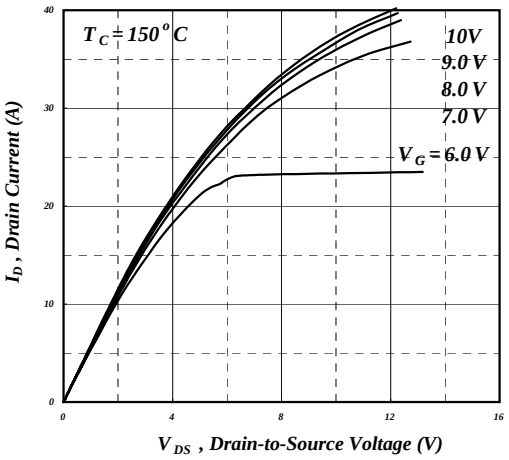


Fig 2. Typical Output Characteristics

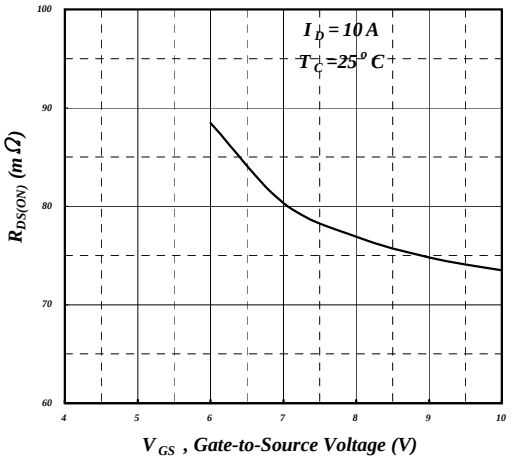


Fig 3. On-Resistance vs. Gate Voltage

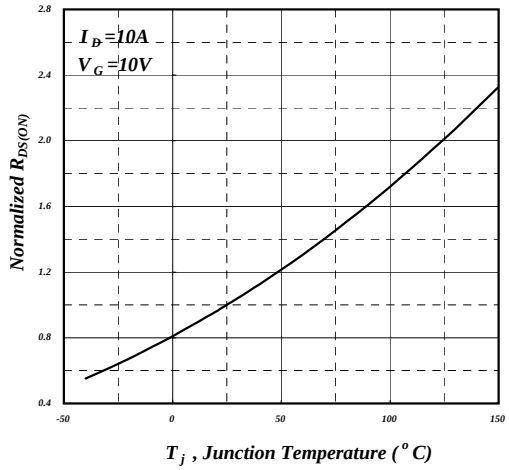


Fig 4. Normalized On-Resistance vs. Junction Temperature

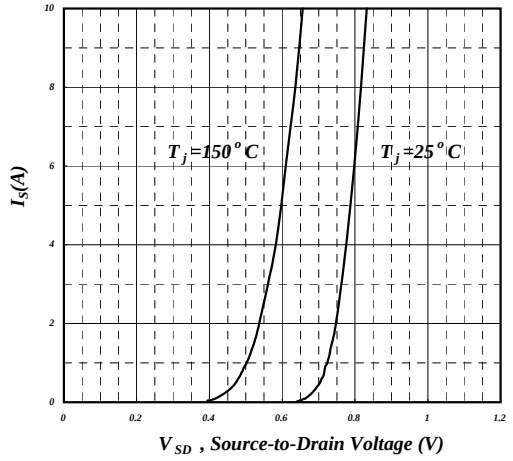


Fig 5. Forward Characteristic of Reverse Diode

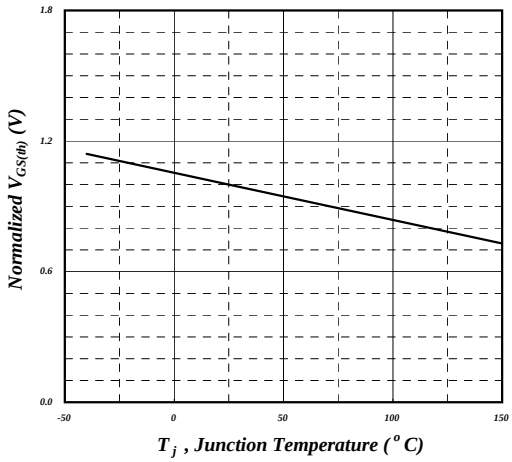


Fig 6. Gate Threshold Voltage vs. Junction Temperature

Typical Electrical Characteristics (cont.)

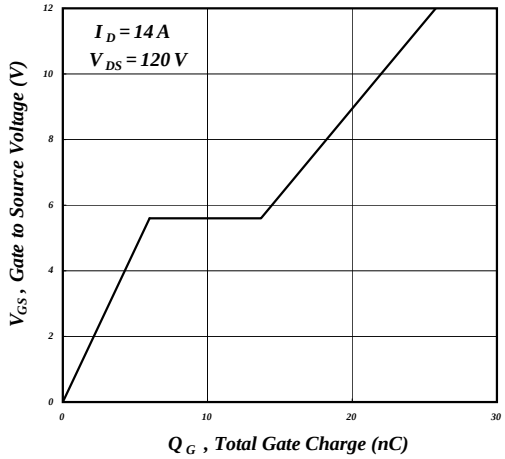


Fig 7. Gate Charge Characteristics

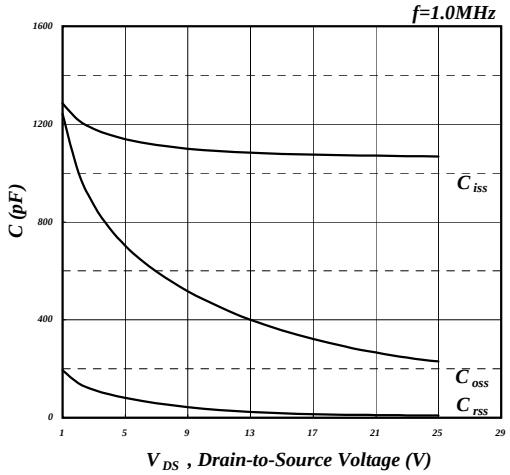


Fig 8. Typical Capacitance Characteristics

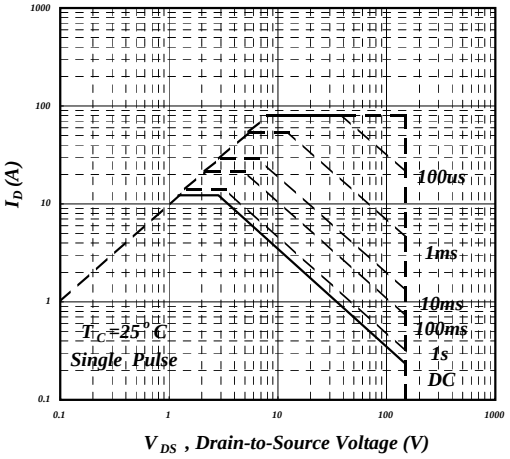


Fig 9. Maximum Safe Operating Area

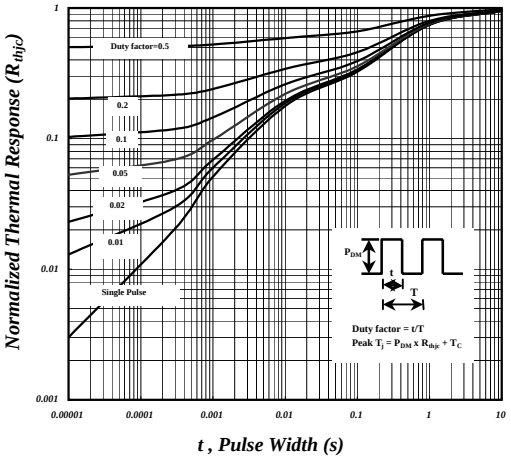


Fig 10. Effective Transient Thermal Impedance

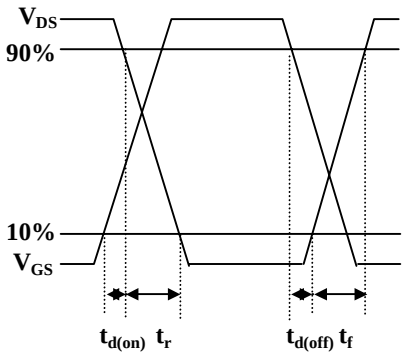


Fig 11. Switching Time Waveforms

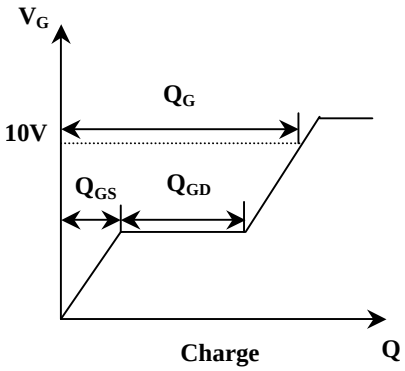
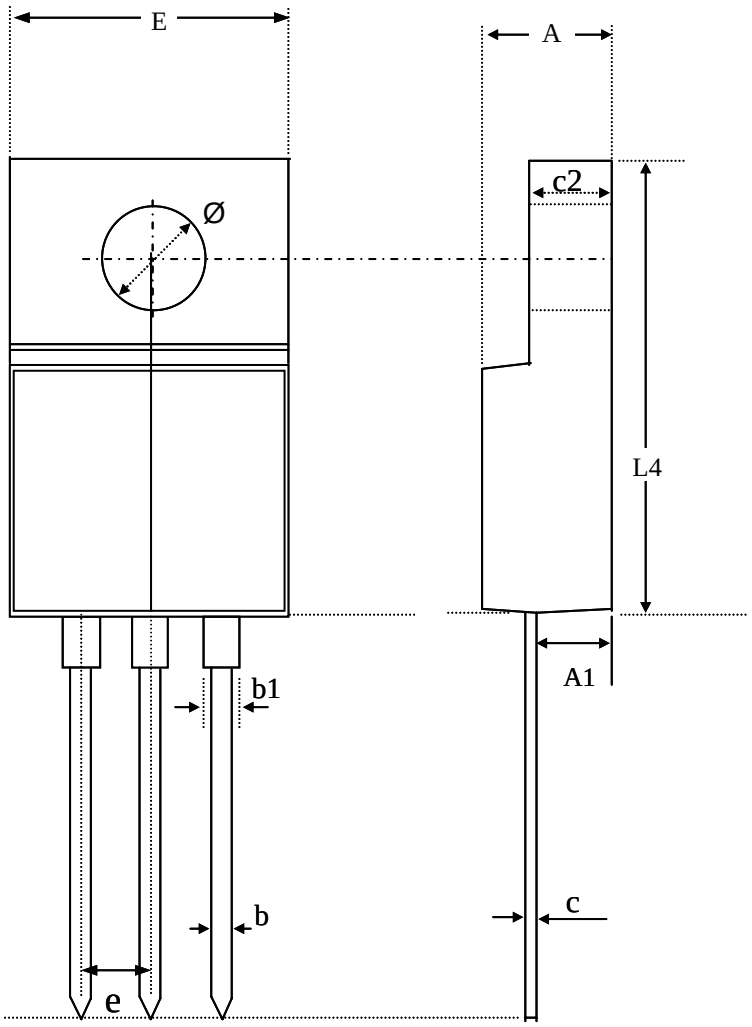


Fig 12. Gate Charge Waveform

Package Dimensions: TO-220CFM



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.30	4.60	4.90
A1	2.30	2.65	3.00
b	0.50	0.70	0.90
b1	0.95	1.20	1.50
c	0.45	0.65	0.80
c2	2.30	2.60	2.90
E	9.70	10.00	10.40
L4	14.70	15.40	16.10
Ø	----	3.20	----
e	----	2.54	----

1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.

Marking Information