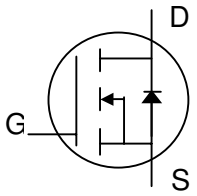
N-channel Enhancement-mode Power MOSFET

Fully isolated package

Simple Drive Requirement

Fast Switching Performance

RoHS-compliant, halogen-free

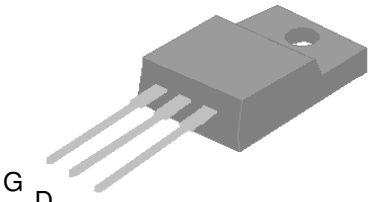


BV_{DSS}	500V
$R_{DS(ON)}$	0.27Ω
I_D	13.5A

Description

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

The AP14S50I-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 or an attached isolated heatsink is required.
This device is well suited for use in high voltage applications such as off-line AC/DC converters.



TO-220CFM (I)

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	±20	V
I_D at T_C=25℃	Continuous Drain Current	13.5	A
I_D at T_C=100℃	Continuous Drain Current	7.9	A
I_{DM}	Pulsed Drain Current[1]	27	A
P_D at T_C=25℃	Total Power Dissipation	36.7	W
P_D at T_A=25℃	Total Power Dissipation	1.92	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	3.4	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	65	℃/W

Ordering Information

AP14S50I-HF-3TB : in RoHS-compliant halogen-free TO-220CFM, shipped in tubes (50pcs/tube, 1000pcs/box)

Electrical Specifications at T_j=25℃ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	500	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=4.5A	-	-	0.27	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=7A	-	12	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=400V, V_{GS}=0V	-	-	25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge	I_D=7A	-	38	60.8	nC
Q_{gs}	Gate-Source Charge	V_{DS}=400V	-	6	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	19	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=250V	-	11	-	ns
t_r	Rise Time	I_D=7A	-	17	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	45	-	ns
t_f	Fall Time	V_{GS}=10V	-	24	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	1055	1688	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	760	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	28	-	pF
R_g	Gate Resistance	f=1.0MHz	-	4.6	9.2	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=7A, V_{GS}=0V	-	0.95	-	V
t_{rr}	Reverse Recovery Time	I_S=7A, V_{GS}=0V	-	222	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	2.4	-	μC

Notes:

1.Pulse width limited by maximum junction temperature

2.Pulse width <300us, duty cycle < 2%

Typical Electrical Characteristics

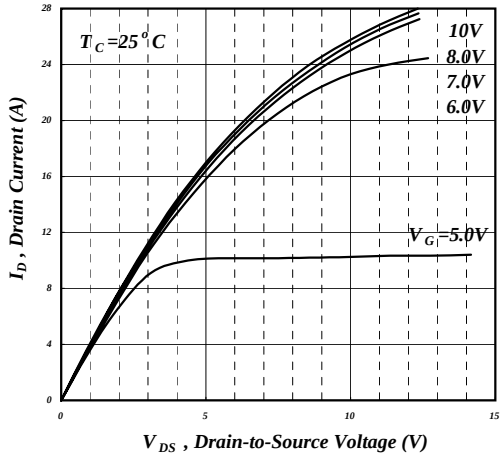


Fig 1. Typical Output Characteristics

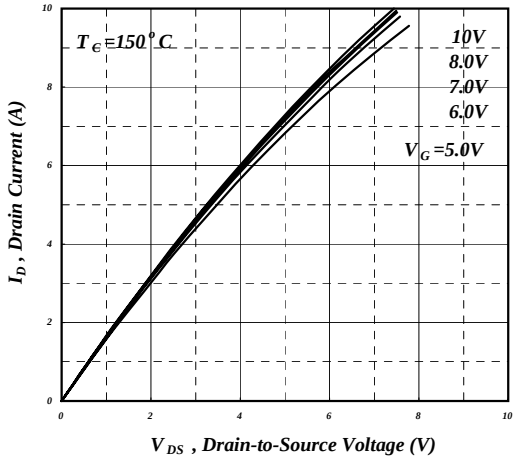


Fig 2. Typical Output Characteristics

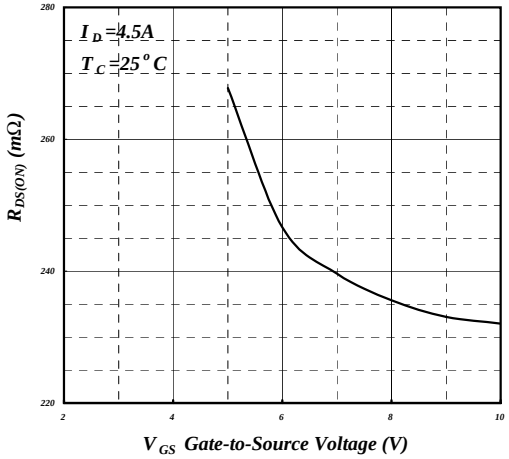


Fig 3. On-Resistance v.s. Gate Voltage

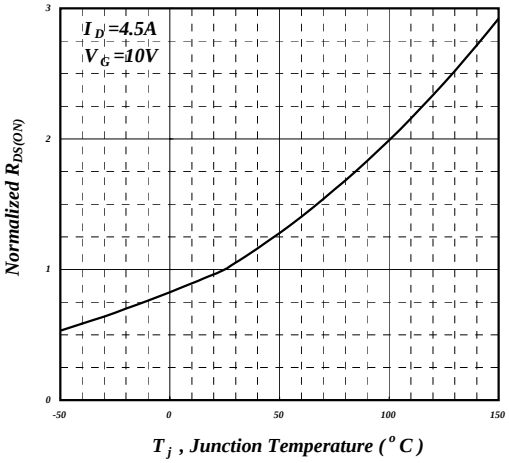


Fig 4. Normalized On-Resistance vs. Junction Temperature

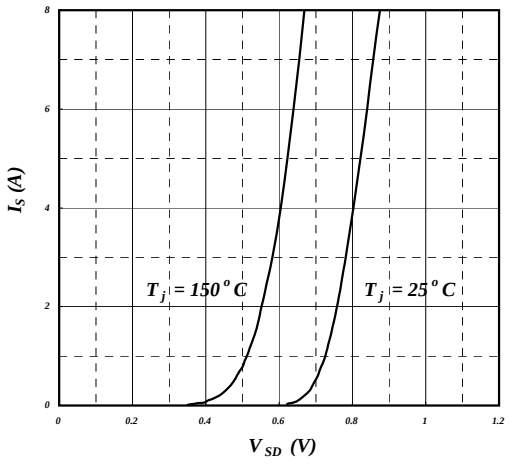


Fig 5. Forward Characteristic of Reverse Diode

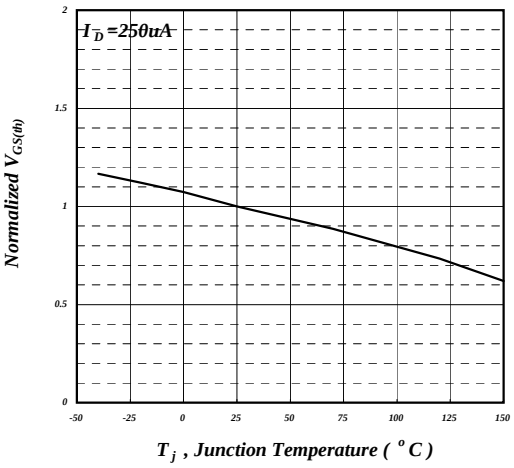


Fig 6. Gate Threshold Voltage vs. Junction Temperature

Typical Electrical Characteristics (cont.)

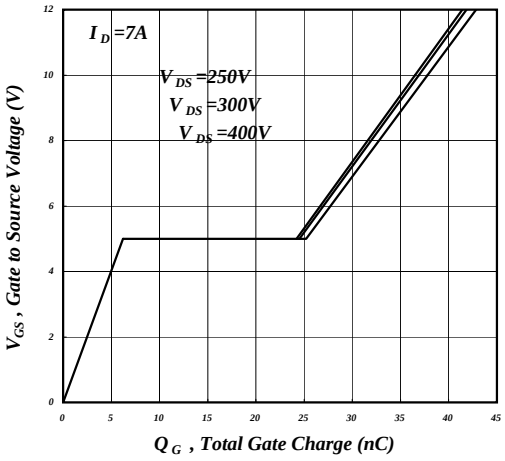


Fig 7. Gate Charge Characteristics

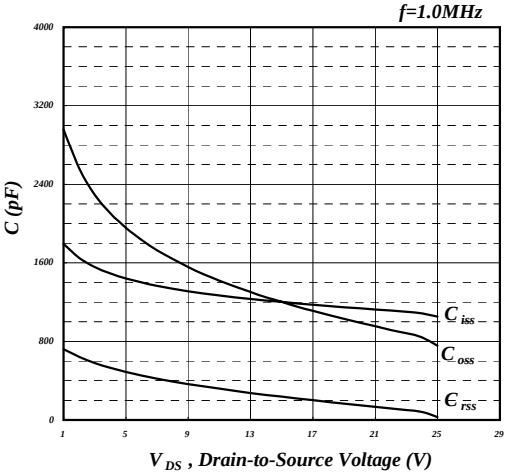


Fig 8. Typical Capacitance Characteristics

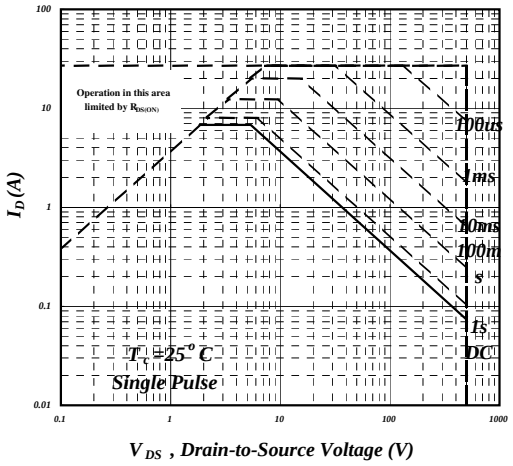


Fig 9. Maximum Safe Operating Area

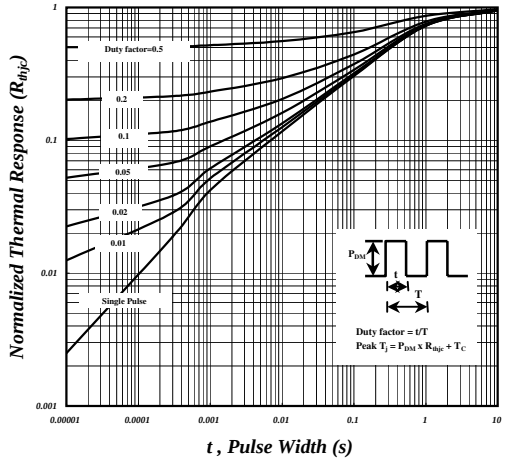


Fig 10. Effective Transient Thermal Impedance

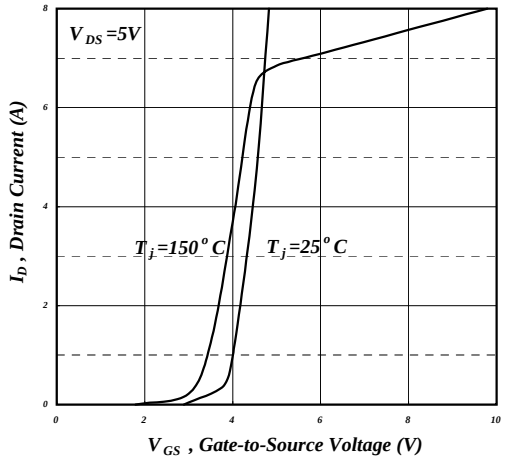


Fig 11. Transfer Characteristics

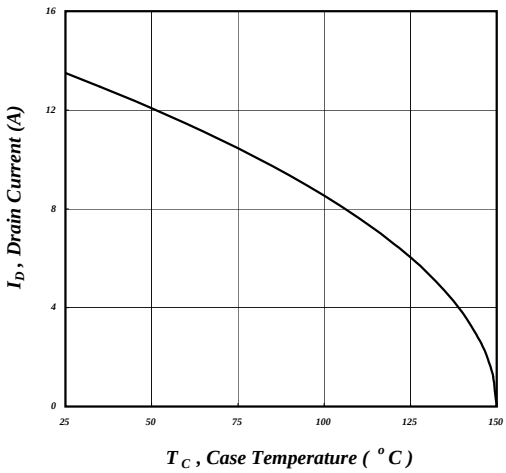
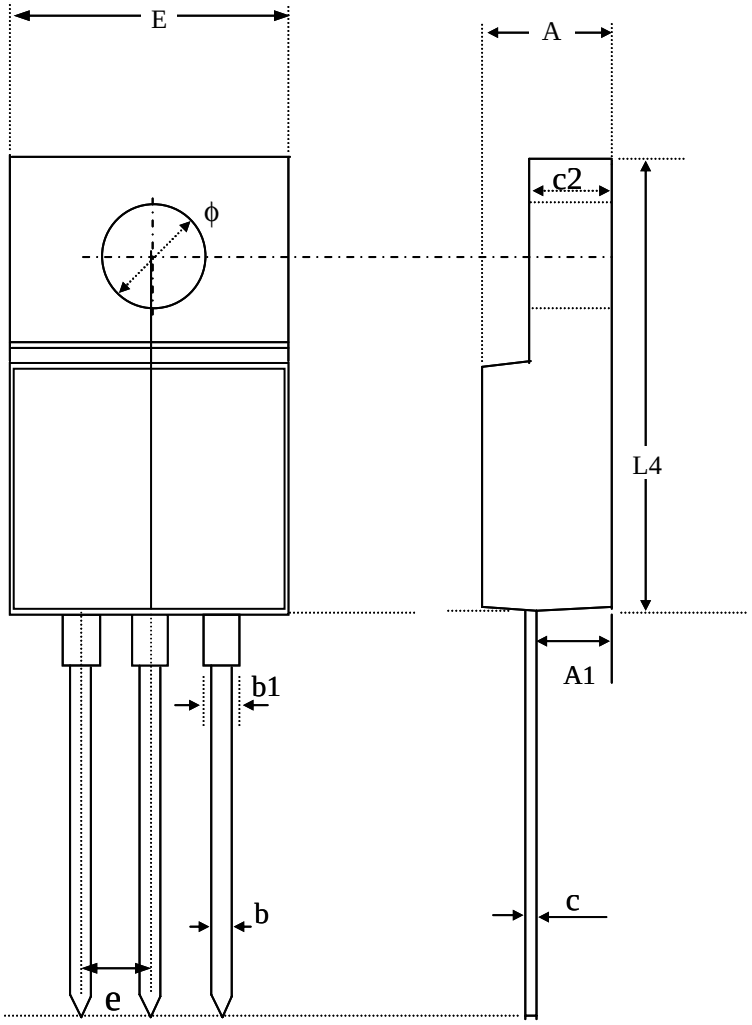


Fig 12. Maximum Continuous Drain Current v.s. Case Temperature

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
ϕ	----	3.20	----
e	----	2.54	----

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

Marking Information: