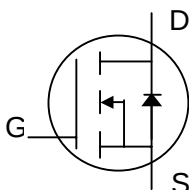




N-channel Enhancement-mode Power MOSFET

100% Avalanche-Tested
Simple Drive Requirement
Fast Switching Performance
RoHS-compliant, halogen-free



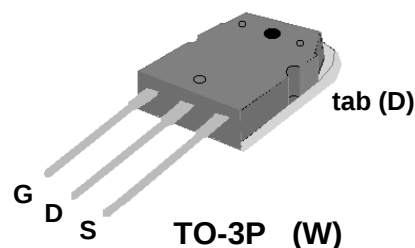
BV_{DS}	900V
$R_{DS(ON)}$	1.4 Ω
I_D	7.6A

Description

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

The AP09N90CW-HF-3 is in the TO-3P through-hole package which is widely used in higher power commercial and industrial applications where an attached heatsink is required.

This device is well suited for use in high voltage applications such as off-line AC/DC converters.



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	900	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D at $T_C=25^\circ\text{C}$	Continuous Drain Current	7.6	A
I_D at $T_C=100^\circ\text{C}$	Continuous Drain Current	4.8	A
I_{DM}	Pulsed Drain Current ¹	25	A
P_D at $T_C=25^\circ\text{C}$	Total Power Dissipation	208	W
E_{AS}	Single Pulse Avalanche Energy ²	120	mJ
I_{AR}	Avalanche Current	6	A
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	0.6	$^\circ\text{C/W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient	40	$^\circ\text{C/W}$

Ordering Information

AP09N90CW-HF-3TB : in RoHS-compliant, halogen-free TO-3P, shipped in tubes



Electrical Specifications at $T_j=25^{\circ}\text{C}$ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=1mA$	900	-	-	V
$\Delta BV_{DSS} / \Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25°C , $I_D=1mA$	-	0.74	-	$V/^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ³	$V_{GS}=10V, I_D=3.6A$	-	1.25	1.4	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=3.6A$	-	3.6	-	S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=900V, V_{GS}=0V$	-	-	10	μA
	Drain-Source Leakage Current ($T_j=125^{\circ}\text{C}$)	$V_{DS}=720V, V_{GS}=0V$	-	-	500	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	± 100	nA
Q_g	Total Gate Charge ³	$I_D=7.2A$	-	50.7	80	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=540V$	-	12	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=10V$	-	16	-	nC
$t_{d(on)}$	Turn-on Delay Time ³	$V_{DD}=450V$	-	20	-	ns
t_r	Rise Time	$I_D=7.2A$	-	16	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=6.8\Omega, V_{GS}=10V$	-	65	-	ns
t_f	Fall Time	$R_D=62.5\Omega$	-	27	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	3097	5000	pF
C_{oss}	Output Capacitance	$V_{DS}=15V$	-	516	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	19	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ³	$I_S=7.2A, V_{GS}=0V$	-	-	1.5	A
t_{rr}	Reverse Recovery Time ³	$I_S=7.2A, V_{GS}=0V,$	-	673	-	ns
Q_{rr}	Reverse Recovery Charge	$dI/dt=100A/\mu s$	-	9.6	-	μC

Notes:

1. Pulse width limited by maximum junction temperature.
2. Starting $T_j=25^{\circ}\text{C}$, $V_{DD}=50V$, $L=6.8mH$, $R_G=25\Omega$, $I_{AS}=6A$
3. Pulse test

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

APEC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

APEC RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN.



Typical Electrical Characteristics

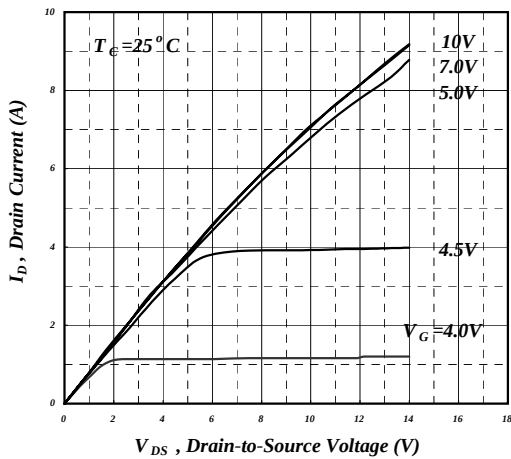


Fig 1. Typical Output Characteristics

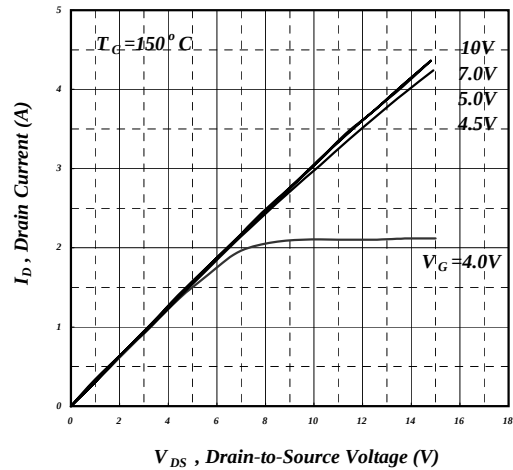


Fig 2. Typical Output Characteristics

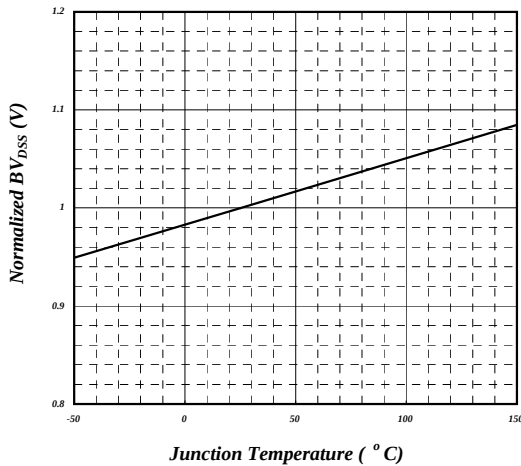


Fig 3. Normalized BV_{DSS}
vs. Junction Temperature

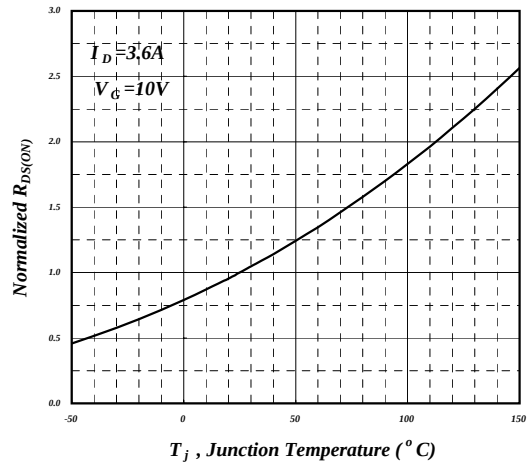


Fig 4. Normalized On-Resistance
vs. Junction Temperature

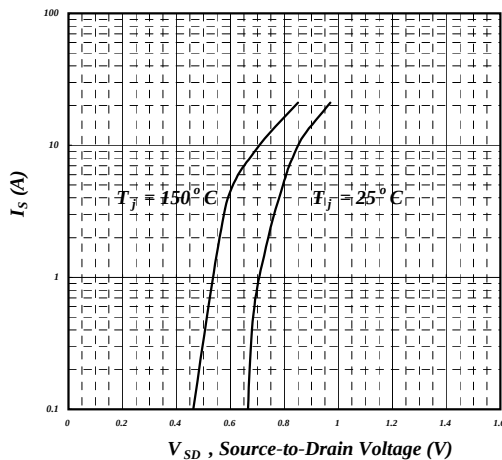


Fig 5. Forward Characteristic of
Reverse Diode

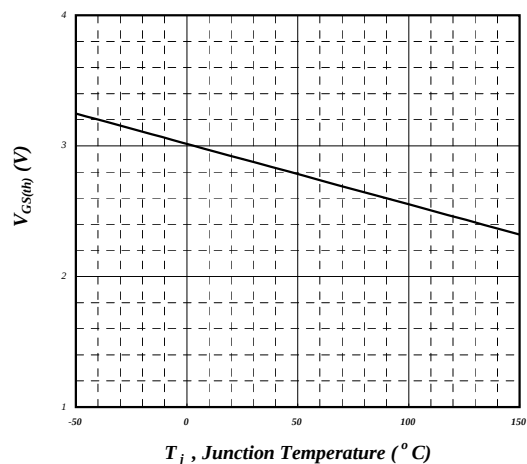
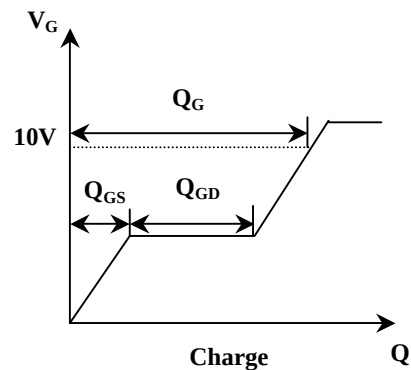
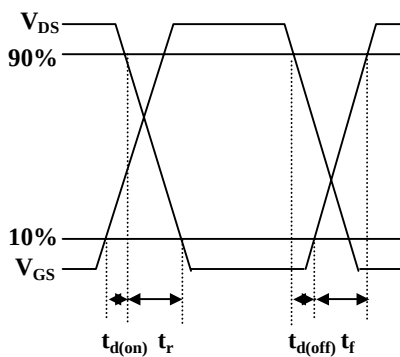
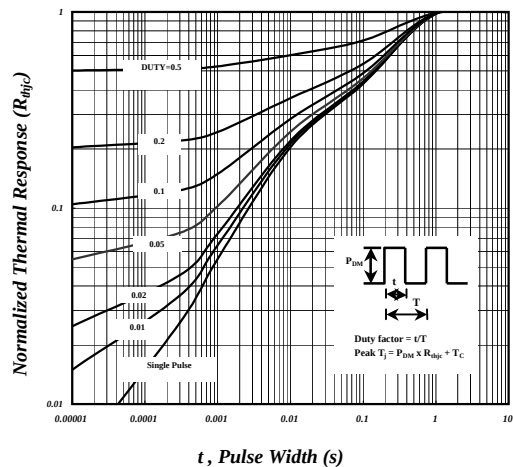
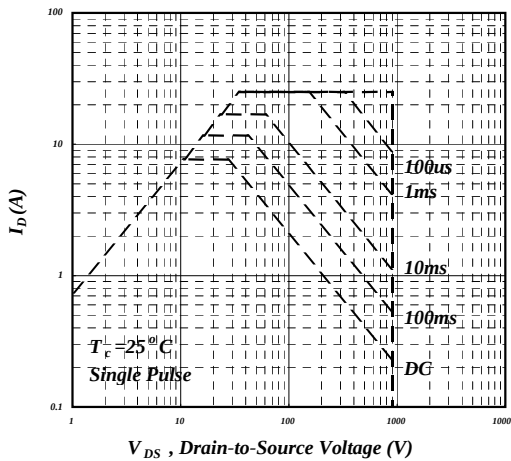
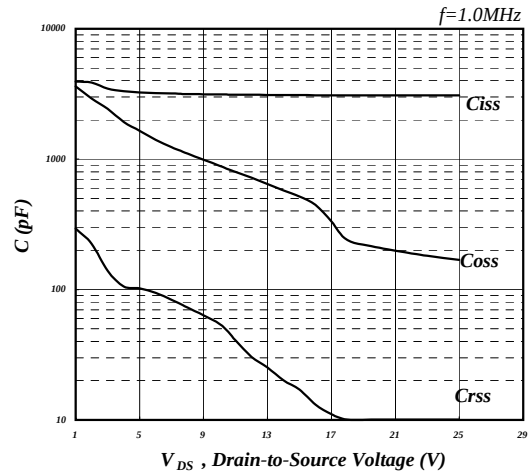
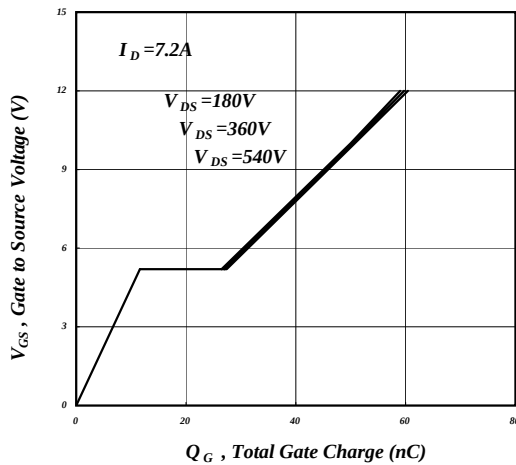


Fig 6. Gate Threshold Voltage vs.
Junction Temperature

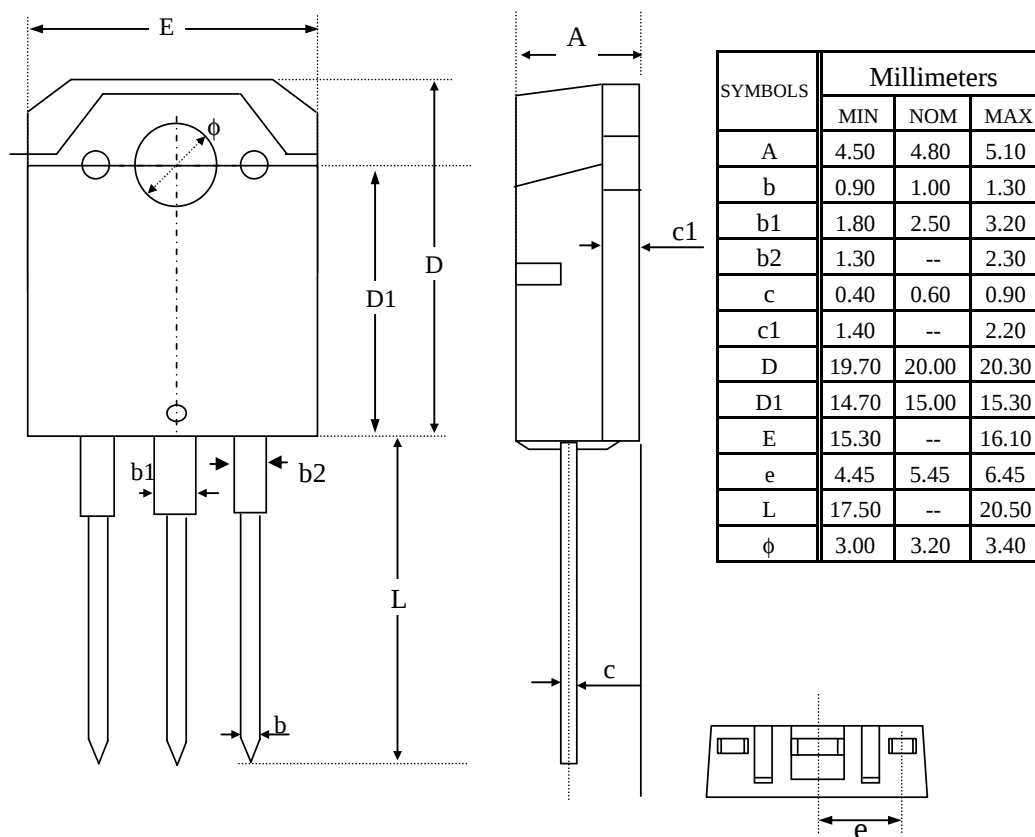


Typical Electrical Characteristics (cont.)





Package Dimensions: TO-3P



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

Marking Information:

