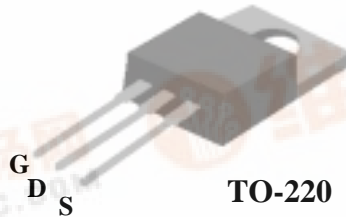# AP630P

Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE

POWER MOSFET

▼ **Dynamic dv/dt Rating**

▼ **Repetitive Avalanche Rated**
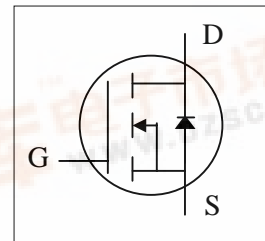
▼ **Fast Switching**

▼ **Simple Drive Requirement**

TO-220

G
D S

BV_{DSS}	200V
$R_{DS(ON)}$	400mΩ
I_D	9A

Description

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

The TO-220 package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 watts. The through-hole version (AP630P) is available for low-profile applications.

D

G

S

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	$\pm$ 30	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	9	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	5.7	A
I_{DM}	Pulsed Drain Current[1]	36	A
P_D@T_C=25℃	Total Power Dissipation	74	W
	Linear Derating Factor	0.59	W/℃
E_{AS}	Single Pulse Avalanche Energy[2]	240	mJ
I_{AR}	Avalanche Current	9	A
E_{AR}	Repetitive Avalanche Energy	7	mJ
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter		Value	Unit
Rthj-c	Thermal Resistance Junction-case	Max.	1.7	℃/W
Rthj-a	Thermal Resistance Junction-ambient	Max.	62	℃/W

Electrical Characteristics@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$_D$=250uA	200	-	-	V
$\triangle$BV$_{DSS}$/$\triangle$T$_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I$_D$=1mA	-	0.248	-	V/℃
R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=10V, I$_D$=5A	-	-	400	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$_D$=5A	-	40	-	S
I$_{DSS}$	Drain-Source Leakage Current (T$_j$=25°C)	V$_{DS}$=200V, V$_{GS}$=0V	-	-	10	uA
	Drain-Source Leakage Current (T$_j$=150°C)	V$_{DS}$=160V, V$_{GS}$=0V	-	-	100	uA
I$_{GSS}$	Gate-Source Forward Leakage	V$_{GS}$=$\pm$30V	-	-	±100	nA
Q$_g$	Total Gate Charge[3]	I$_D$= 9A	-	25	-	nC
Q$_{gs}$	Gate-Source Charge	V$_{DS}$=160V	-	3.6	-	nC
Q$_{gd}$	Gate-Drain ("Miller") Charge	V$_{GS}$=10V	-	14	-	nC
t$_{d(on)}$	Turn-on Delay Time[3]	V$_{DD}$=100V	-	8	-	ns
t$_r$	Rise Time	I$_D$= 9A	-	26	-	ns
t$_{d(off)}$	Turn-off Delay Time	R$_G$=10Ω,V$_{GS}$=10V	-	34	-	ns
t$_f$	Fall Time	R$_D$=11Ω	-	22	-	ns
C$_{iss}$	Input Capacitance	V$_{GS}$=0V	-	515	-	pF
C$_{oss}$	Output Capacitance	V$_{DS}$=25V	-	90	-	pF
C$_{rss}$	Reverse Transfer Capacitance	f=1.0MHz	-	40	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I$_S$	Continuous Source Current (Body Diode)	V$_D$=V$_G$=0V , V$_S$=1.3V	-	-	9	A
I$_{SM}$	Pulsed Source Current (Body Diode)[1]		-	-	36	A
V$_{SD}$	Forward On Voltage[3]	Tj=25℃, I$_S$=9A, V$_{GS}$=0V	-	-	1.3	V

Notes:

1.Pulse width limited by safe operating area.

2.Starting T$_j$=25°C , V$_{DD}$=50V , L=4.5mH , R$_G$=25Ω , I$_{AS}$=9A.

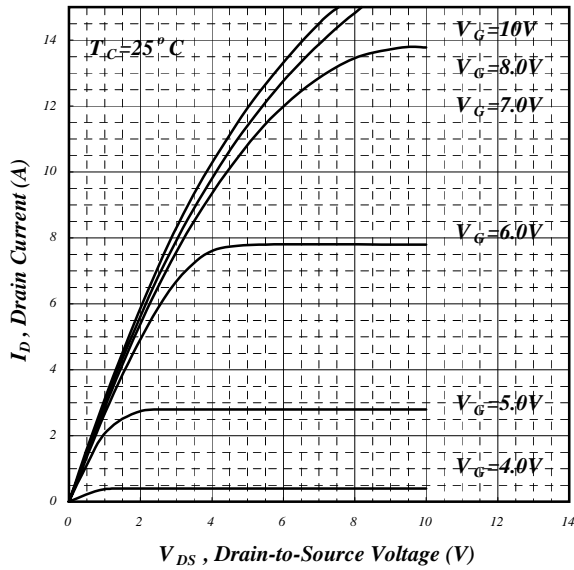3.Pulse width $\leq$300us , duty cycle $\leq$2%.
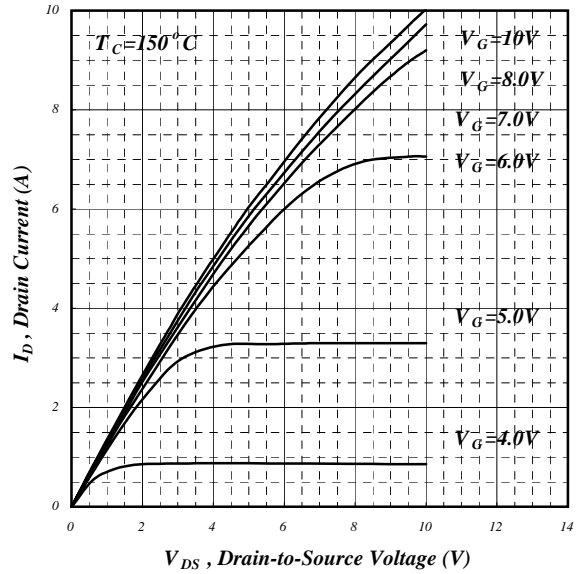
Fig 1. Typical Output Characteristics
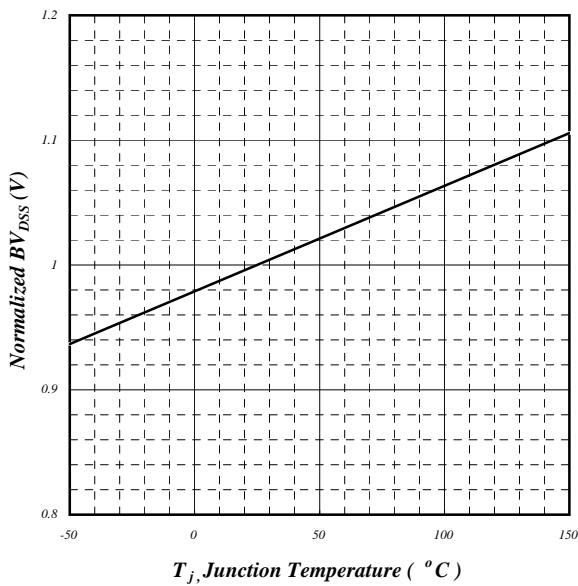

Fig 2. Typical Output Characteristics

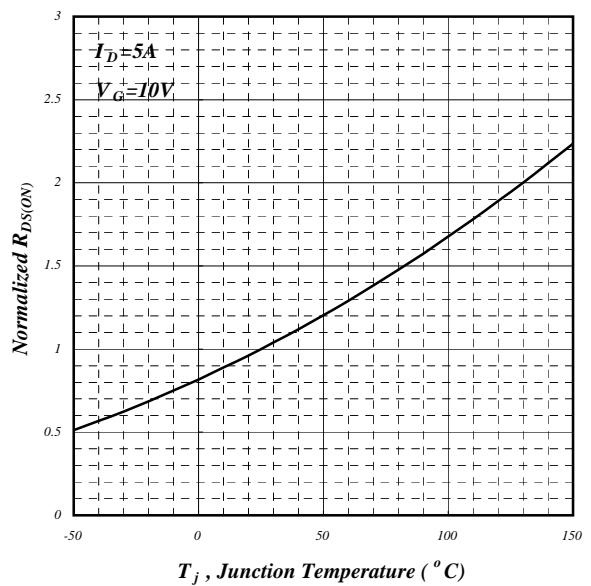Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

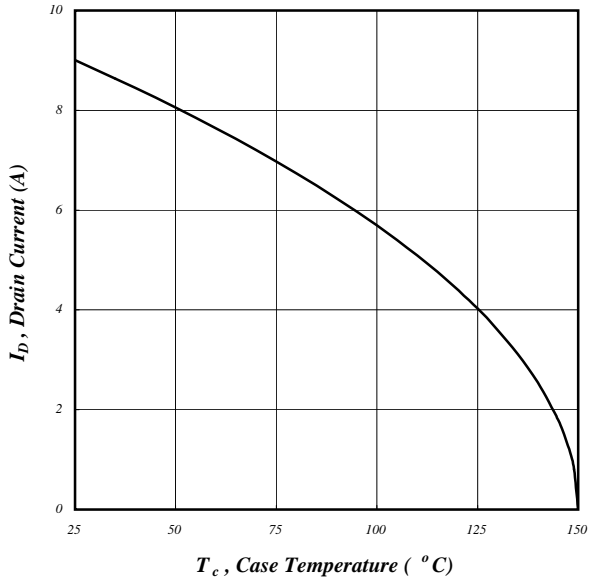Fig 4. Normalized On-Resistance v.s. Junction Temperature

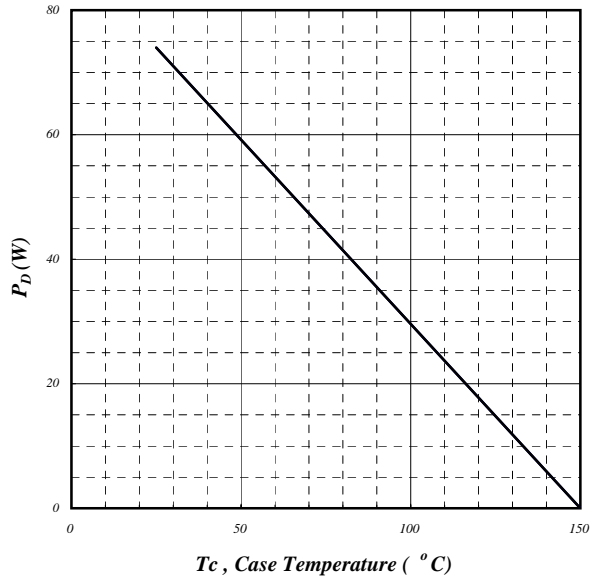Fig 5. Maximum Drain Current v.s.
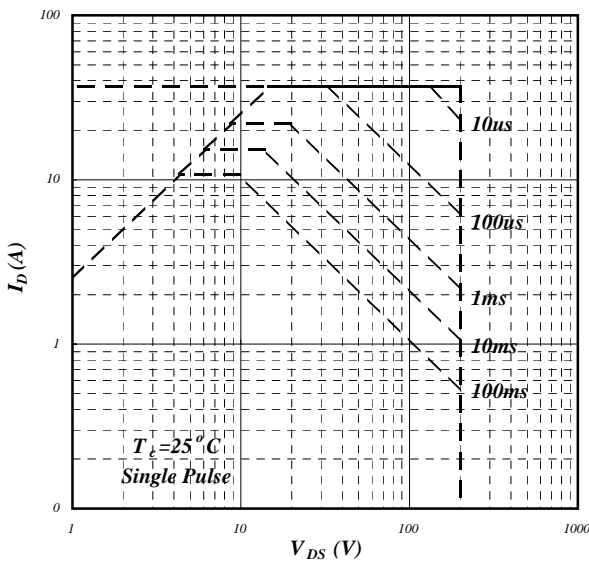Case Temperature

Fig 6. Typical Power Dissipation
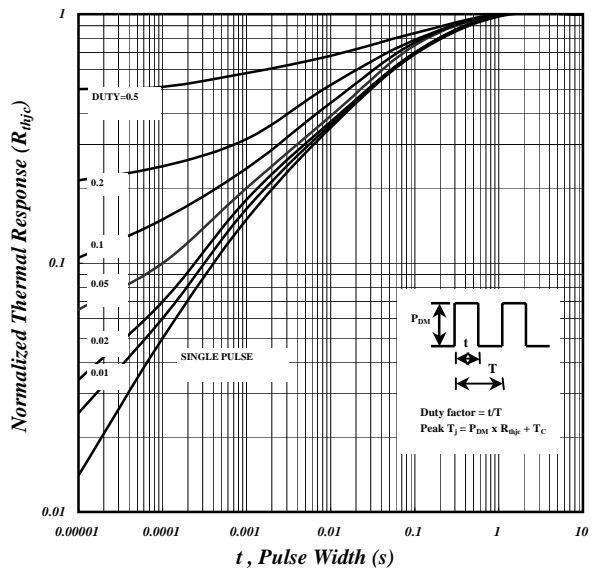

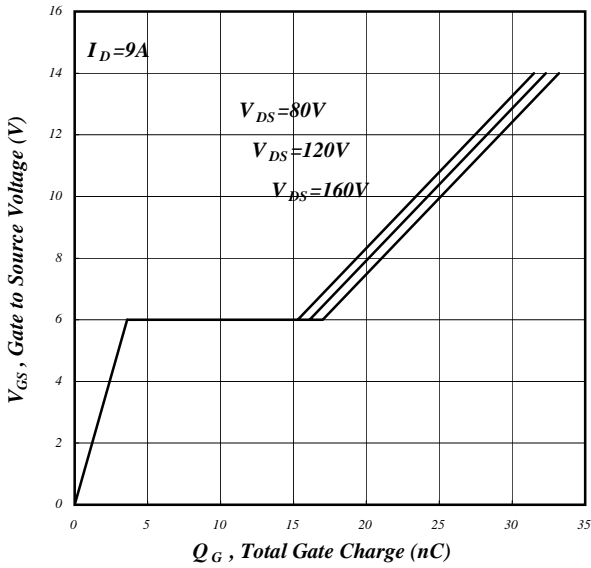Fig 7. Maximum Safe Operating Area

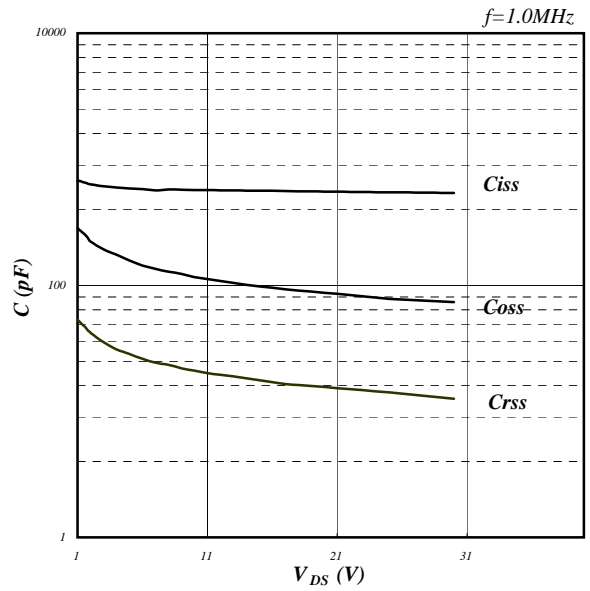Fig 8. Effective Transient Thermal Impedance

Fig 9. Gate Charge Characteristics
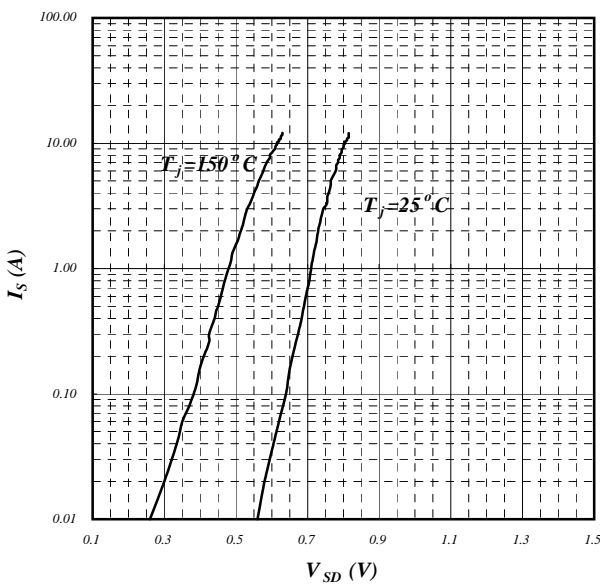

Fig 10. Typical Capacitance Characteristics

Fig 11. Forward Characteristic of
Reverse Diode
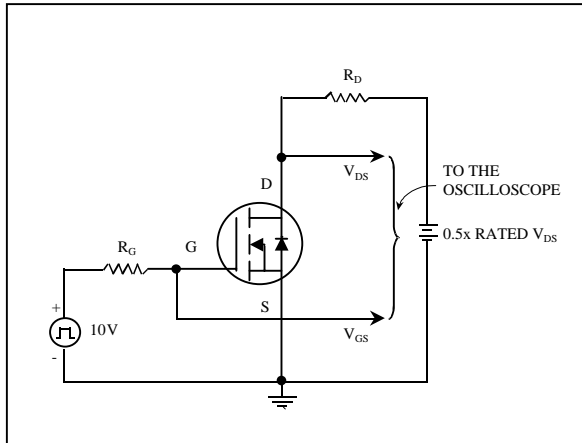

Fig 12. Gate Threshold Voltage v.s.
Junction Temperature

Fig 13. Switching Time Circuit

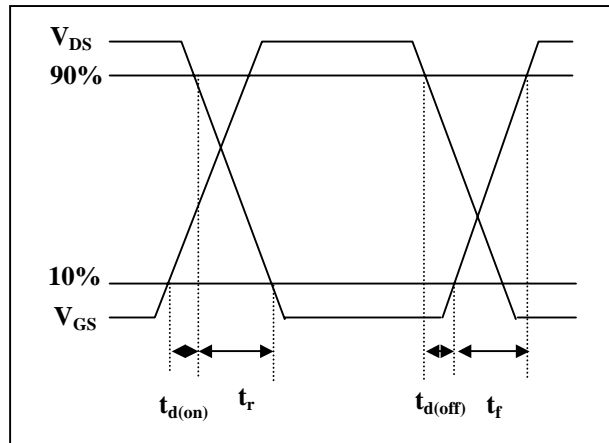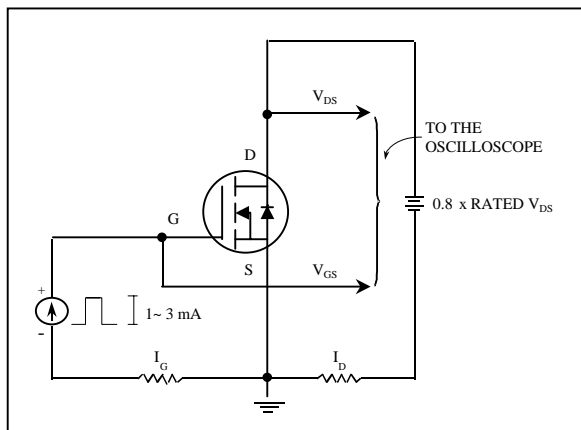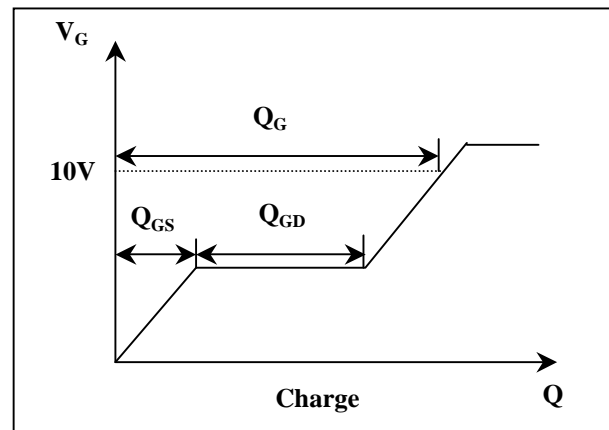
Fig 14. Switching Time Waveform

Fig 15. Gate Charge Circuit

Fig 16. Gate Charge Waveform