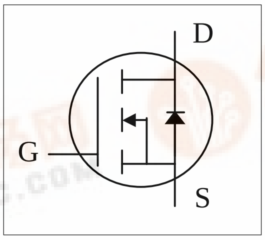
AP50L02S/P

Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

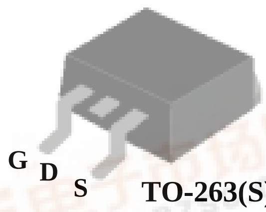
- ▼ **Low Gate Charge**
- ▼ **Simple Drive Requirement**
- ▼ **Fast Switching**



BV_{DSS}	25V
$R_{DS(ON)}$	17mΩ
I_D	40A

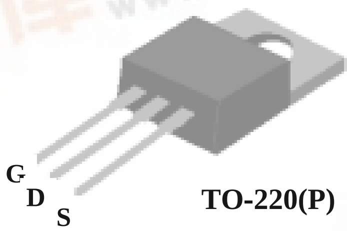
Description

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.



TO-263(S)

The TO-263 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters. The through-hole version (AP50L02P) is available for low-profile applications.



TO-220(P)

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	25	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	40	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	27	A
I_{DM}	Pulsed Drain Current[1]	140	A
P_D@T_C=25℃	Total Power Dissipation	44.6	W
	Linear Derating Factor	0.36	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter		Value	Unit
Rthj-case	Thermal Resistance Junction-case	Max.	2.8	℃/W
Rthj-amb	Thermal Resistance Junction-ambient	Max.	62	℃/W

Electrical Characteristics@T_j=25^{o}C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	25	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=1mA	-	0.037	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A	-	-	17	mΩ
		V_{GS}=4.5V, I_D=10A	-	-	35	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	-	3	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=20A	-	10	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25^{o}C)	V_{DS}=25V, V_{GS}=0V	-	-	1	uA
	Drain-Source Leakage Current (T_j=150^{o}C)	V_{DS}=20V, V_{GS}=0V	-	-	25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ± 20V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=20A	-	11.5	-	nC
Q_{gs}	Gate-Source Charge	V_{DS}=20V	-	2.1	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=5V	-	8.4	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=15V	-	7	-	ns
t_r	Rise Time	I_D=20A	-	60	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω,V_{GS}=10V	-	17	-	ns
t_f	Fall Time	R_D=0.75Ω	-	9	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	390	-	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	245	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	100	-	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=1.26V	-	-	40	A
I_{SM}	Pulsed Source Current (Body Diode)[1]		-	-	140	A
V_{SD}	Forward On Voltage[2]	T_j=25℃, I_S=40A, V_{GS}=0V	-	-	1.26	V

Notes:

1.Pulse width limited by safe operating area.

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

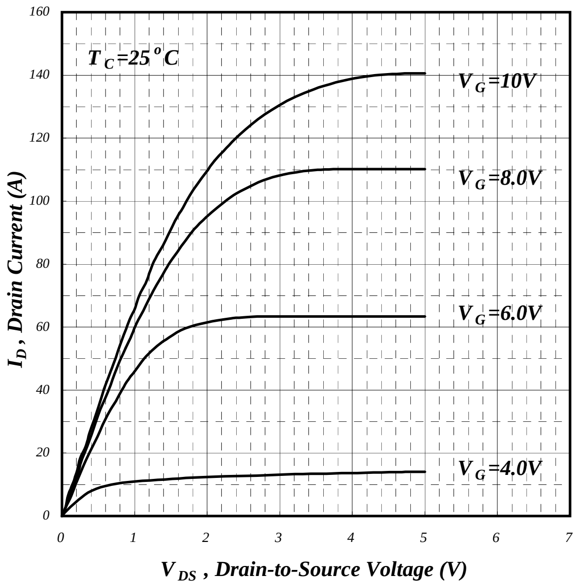


Fig 1. Typical Output Characteristics

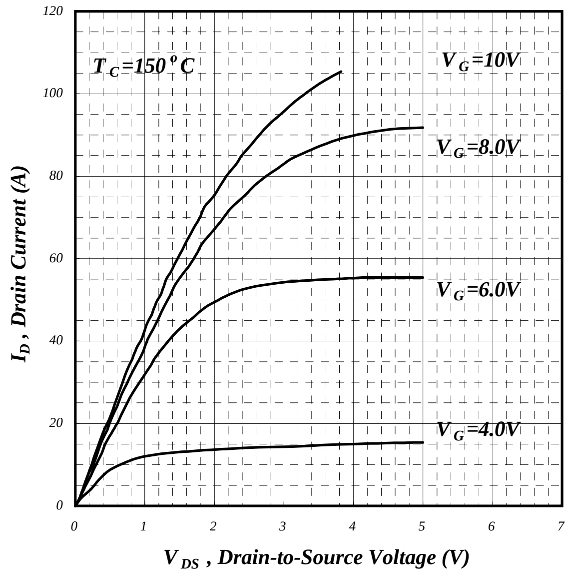


Fig 2. Typical Output Characteristics

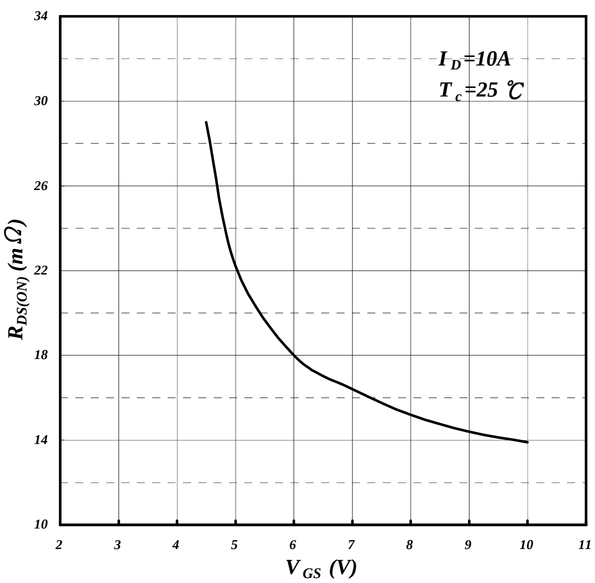


Fig 3. On-Resistance v.s. Gate Voltage

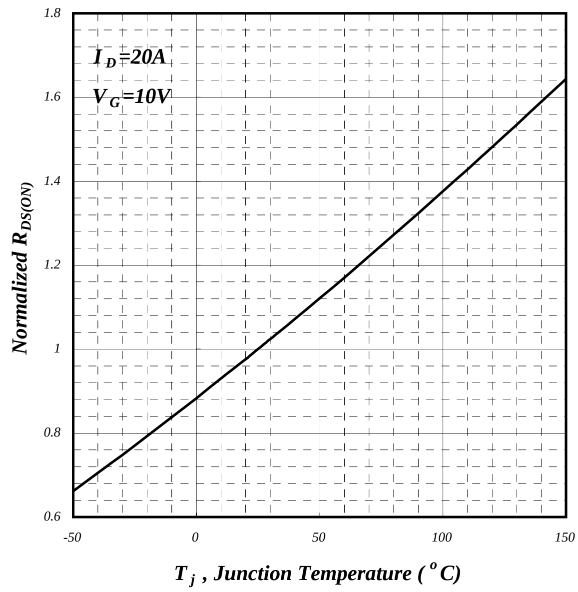


Fig 4. Normalized On-Resistance v.s. Junction Temperature

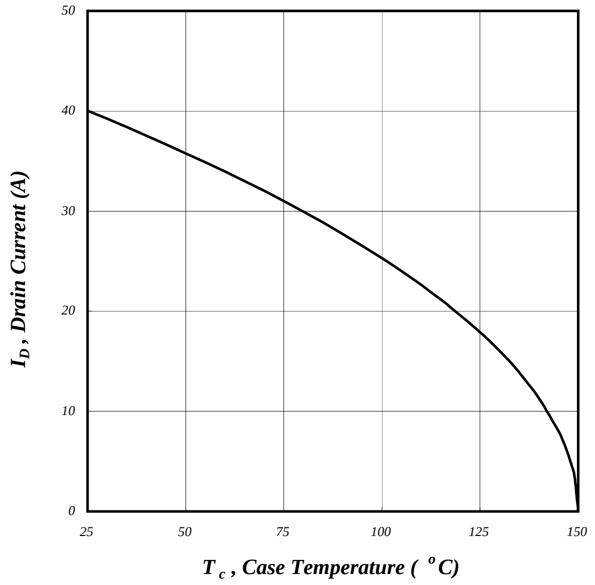


Fig 5. Maximum Drain Current v.s. Case Temperature

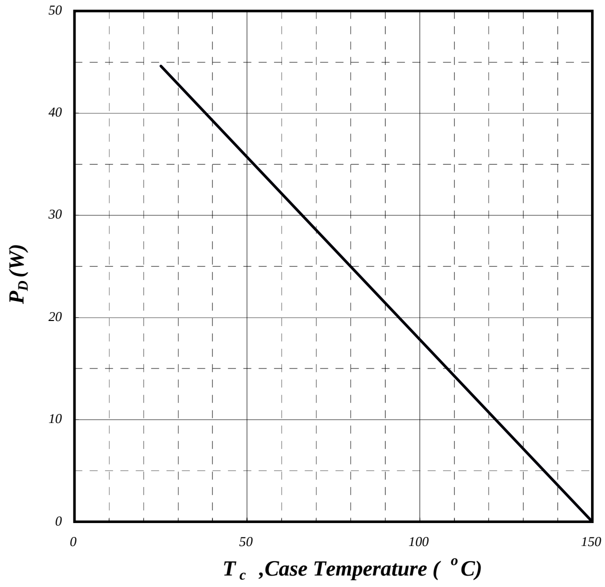


Fig 6. Typical Power Dissipation

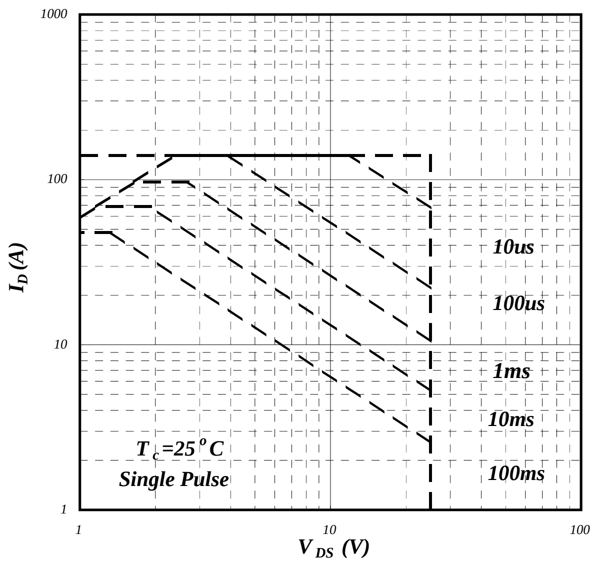


Fig 7. Maximum Safe Operating Area

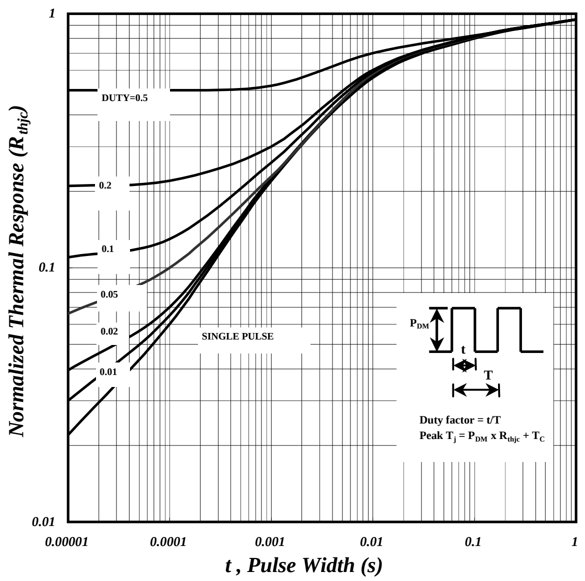


Fig 8. Effective Transient Thermal Impedance

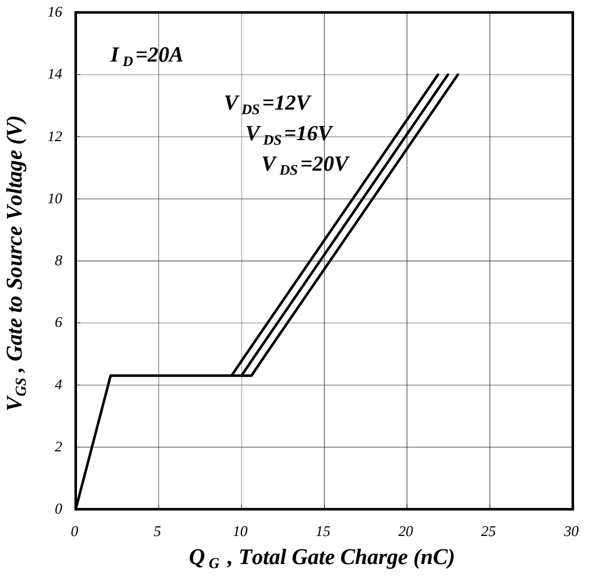


Fig 9. Gate Charge Characteristics

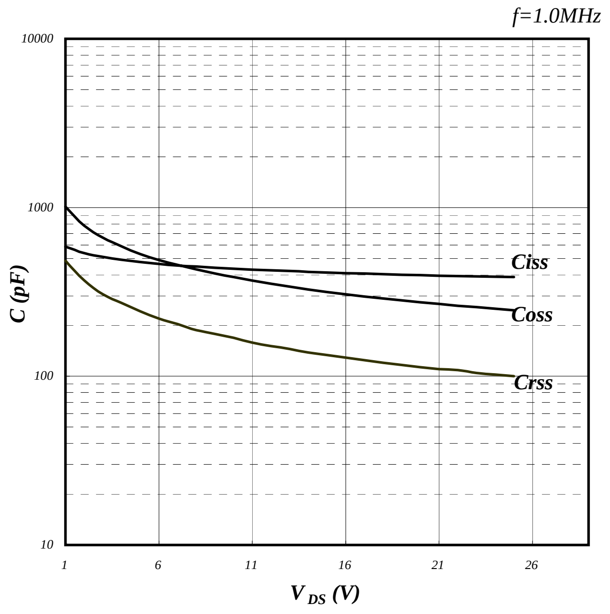


Fig 10. Typical Capacitance Characteristics

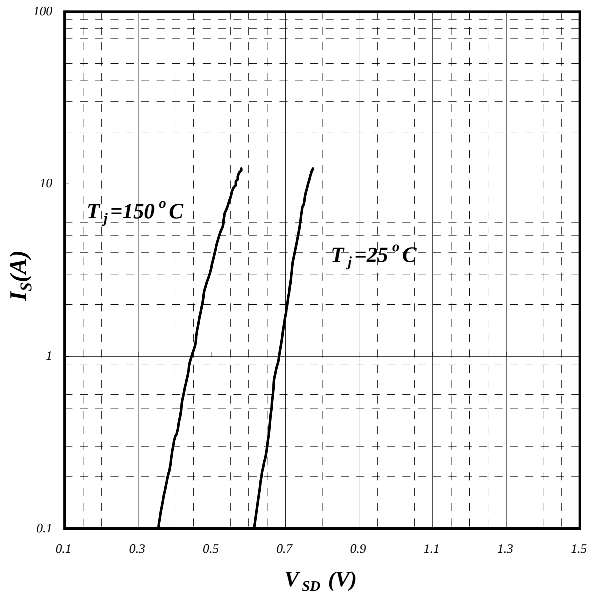


Fig 11. Forward Characteristic of Reverse Diode

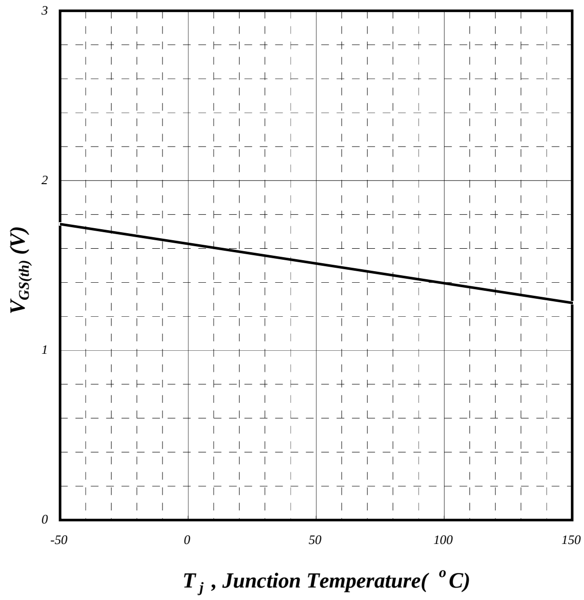
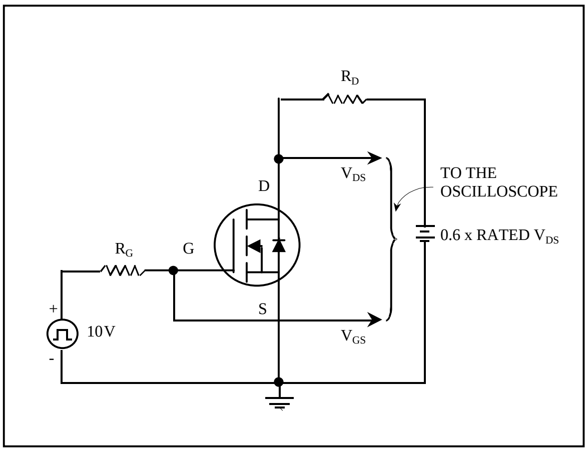


Fig 12. Gate Threshold Voltage v.s. Junction Temperature



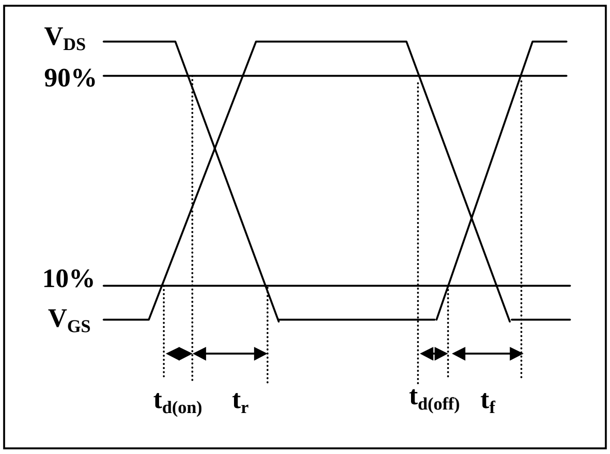
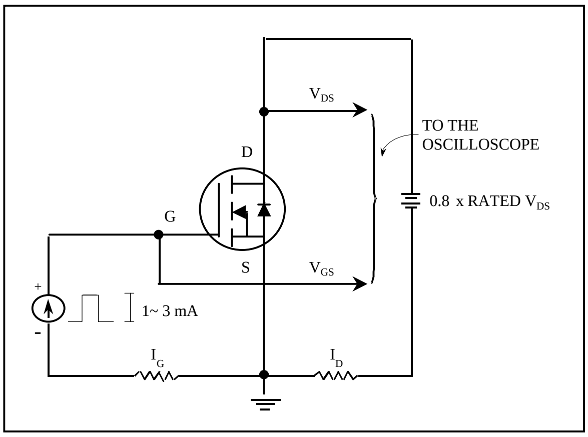


Fig 13. Switching Time Circuit

Fig 14. Switching Time Waveform



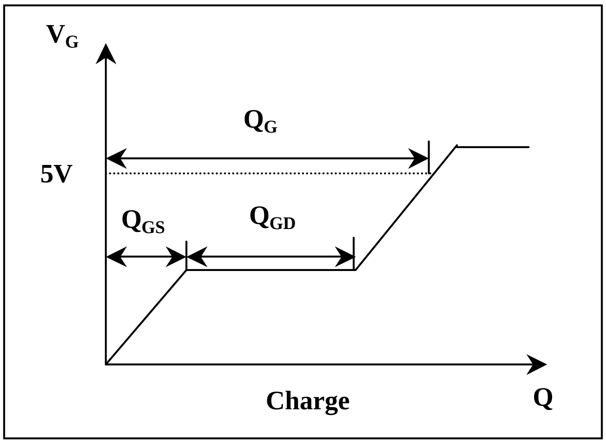


Fig 15. Gate Charge Circuit

Fig 16. Gate Charge Waveform