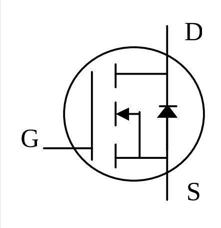
AP01N40J

RoHS-compliant Product

Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

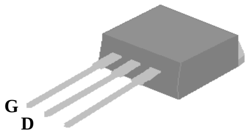
- ▼ **Lower Gate Charge**
- ▼ **100% Avalanche Rated**
- ▼ **Fast Switching Performance**
- ▼ **Simple Drive Requirement**



BV_{DSS}	400V
$R_{DS(ON)}$	16Ω
I_D	0.5A

Description

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-251(J)

The TO-251 package is widely preferred for commercial-industrial through-hole applications.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	400	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	0.5	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	0.4	A
I_{DM}	Pulsed Drain Current[1]	2	A
P_D@T_C=25℃	Total Power Dissipation	17.4	W
	Linear Derating Factor	0.14	W/℃
E_{AS}	Single Pulse Avalanche Energy[2]	0.5	mJ
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	7.2	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	110	℃/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=1mA	400	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[3]	V_{GS}=10V, I_D=0.5A	-	-	16	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	-	3	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=0.5A	-	0.5	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25^{o}C)	V_{DS}=400V, V_{GS}=0V	-	-	10	uA
	Drain-Source Leakage Current (T_j=150^{o}C)	V_{DS}=320V, V_{GS}=0V	-	-	100	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±20V	-	-	±100	nA
Q_g	Total Gate Charge[3]	I_D=1A	-	2.9	4.6	nC
Q_{gs}	Gate-Source Charge	V_{DS}=320V	-	0.6	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	0.6	-	nC
$t_{d(on)}$	Turn-on Delay Time[3]	V_{DD}=200V	-	7.7	-	ns
t_r	Rise Time	I_D=1A	-	12	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω,V_{GS}=10V	-	23	-	ns
t_f	Fall Time	R_D=200Ω	-	73	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	76	125	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	11	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	4	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[3]	I_S=2A, V_{GS}=0V	-	-	1.5	V
t_{rr}	Reverse Recovery Time	I_S=1A, V_{GS}=0V	-	260	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/µs	-	460	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Starting T_j=25^{o}C , V_{DD}=50V , L=1mH , R_G=25Ω

3.Pulse test

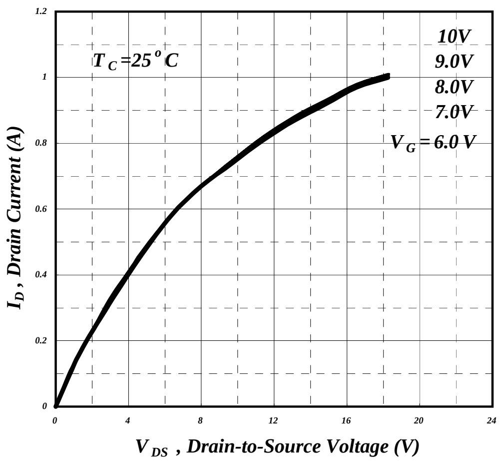


Fig 1. Typical Output Characteristics

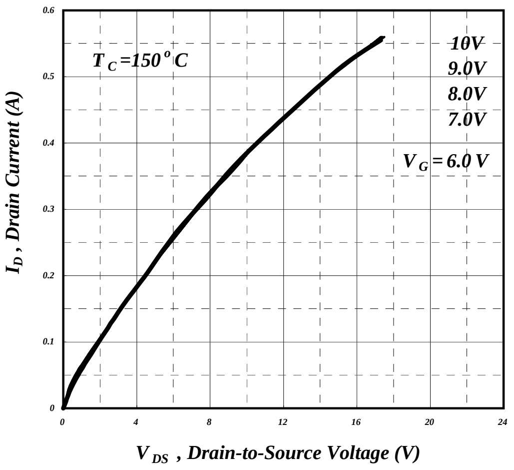


Fig 2. Typical Output Characteristics

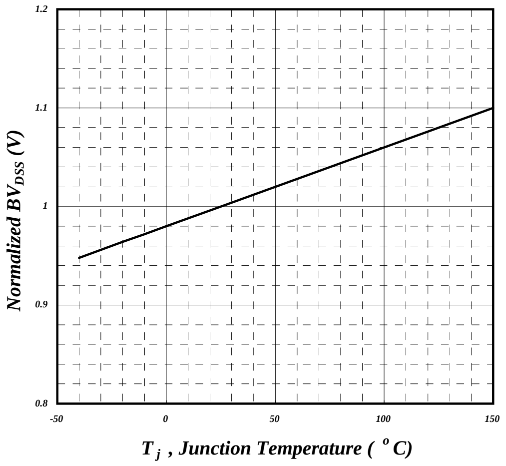


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

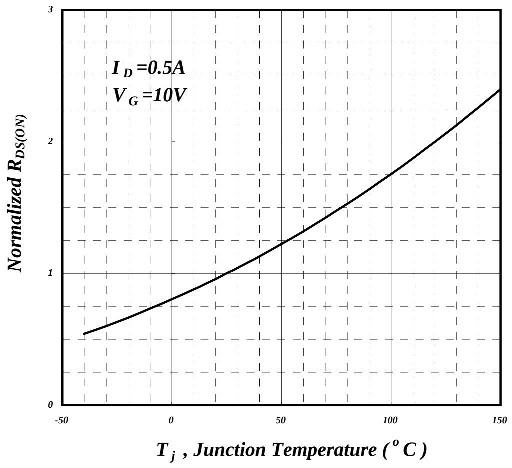


Fig 4. Normalized On-Resistance v.s. Junction Temperature

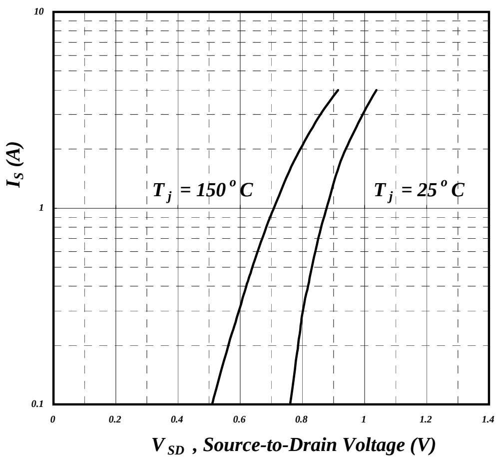


Fig 5. Forward Characteristic of Reverse Diode

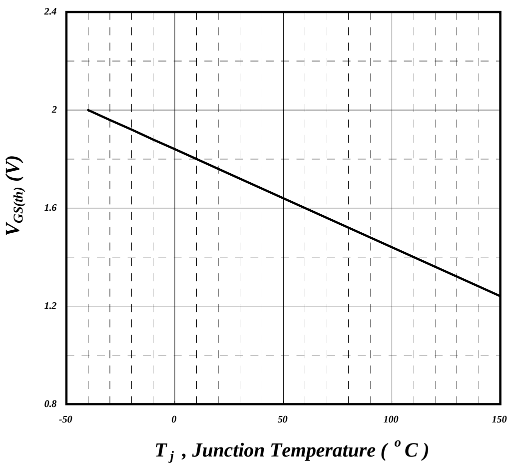


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

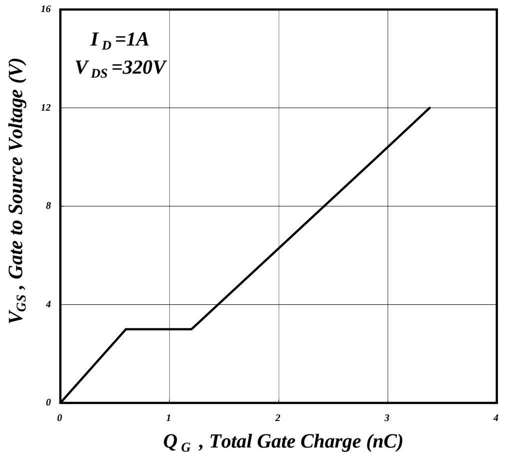


Fig 7. Gate Charge Characteristics

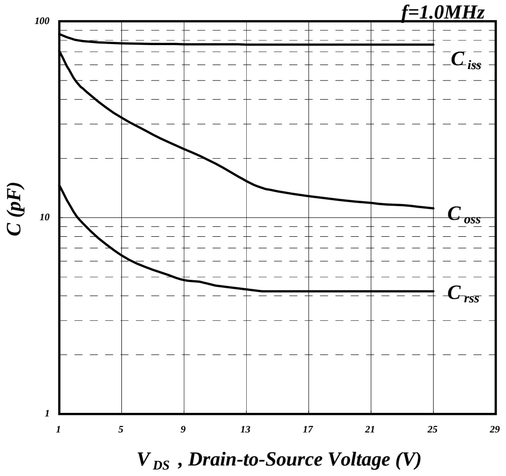


Fig 8. Typical Capacitance Characteristics

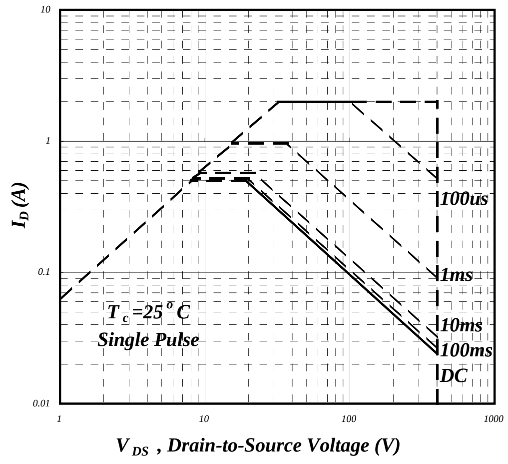


Fig 9. Maximum Safe Operating Area

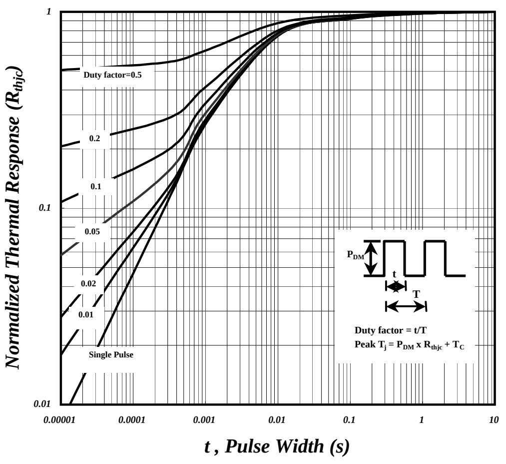


Fig 10. Effective Transient Thermal Impedance

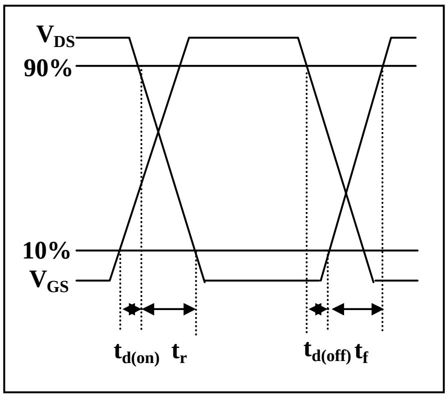


Fig 11. Switching Time Waveform

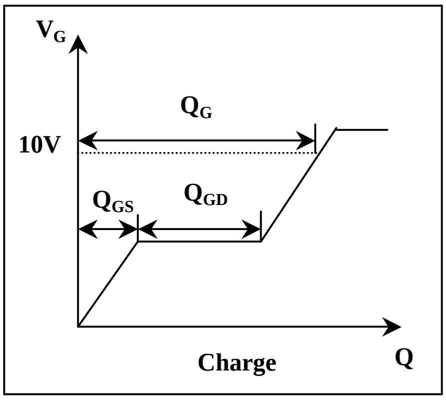


Fig 12. Gate Charge Waveform