AP01N40J

Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE

POWER MOSFET

▼ **Lower Gate Charge**

▼ **100% Avalanche Rated**

▼ **Fast Switching Performance**

▼ **Simple Drive Requirement**
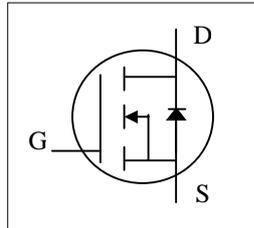
BV_{DSS}	400V
$R_{DS(ON)}$	16Ω
I_D	0.5A

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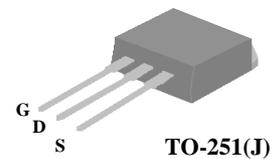
The TO-251 package is widely preferred for commercial-industrial through-hole applications.

TO-251(J)

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

Data & specifications subject to change without notice

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$_D$=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°C)	V$_{DS}$=400V, V$_{GS}$=0V	-	-	10	uA
	Drain-Source Leakage Current (T$_j$=150°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°C , V$_{DD}$=50V , L=1mH , R$_G$=25Ω

3.Pulse test
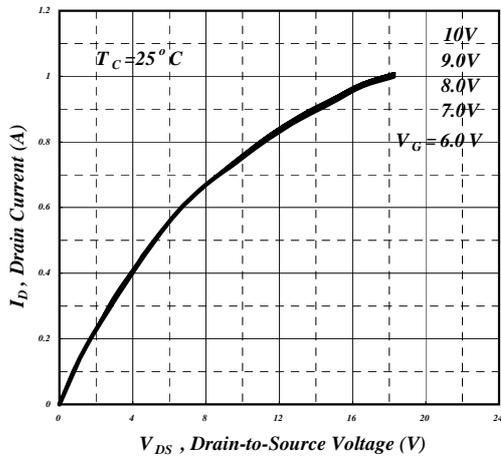
Fig 1. Typical Output Characteristics
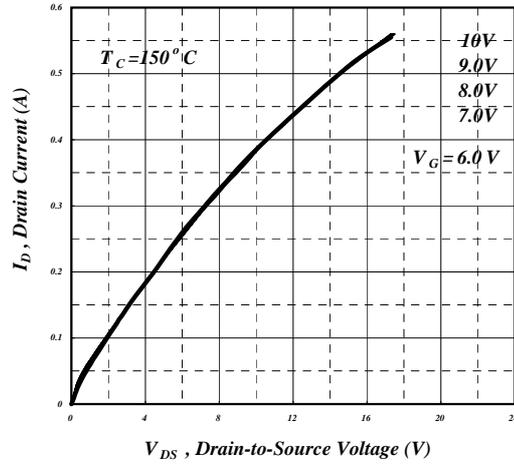

Fig 2. Typical Output Characteristics
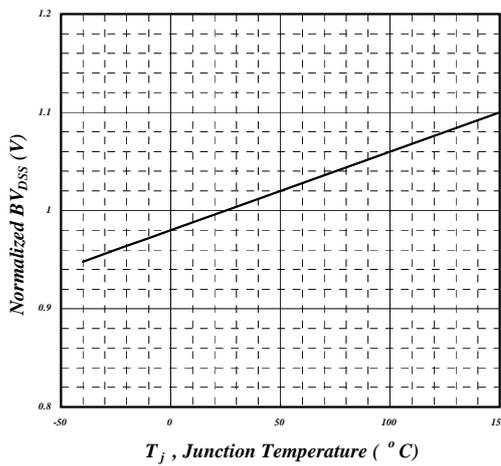
Fig 3. Normalized BV_{DSS} v.s. Junction
Temperature
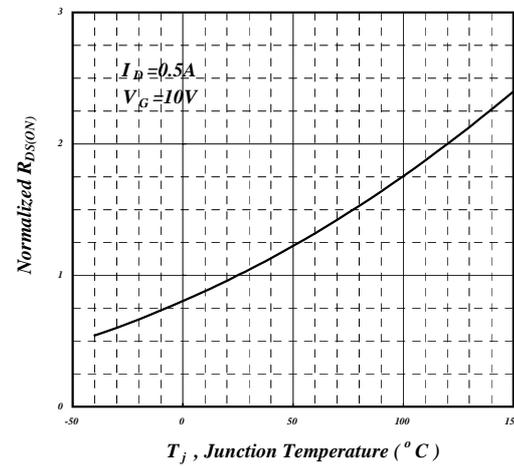
Fig 4. Normalized On-Resistance
v.s. Junction Temperature
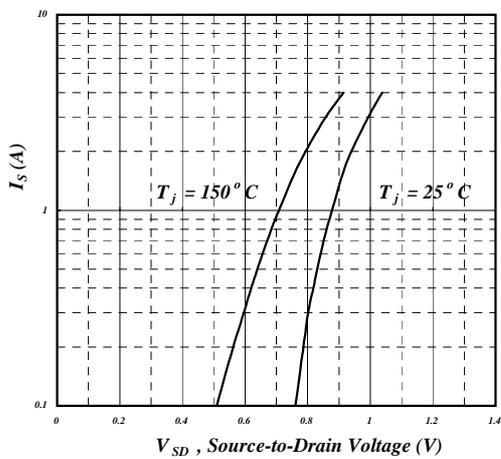
Fig 5. Forward Characteristic of
Reverse Diode
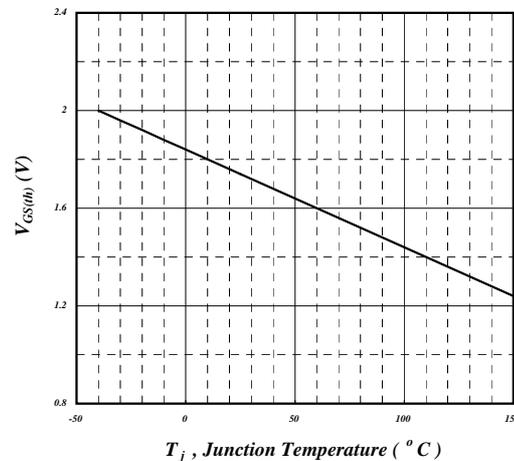
Fig 6. Gate Threshold Voltage v.s.
Junction Temperature
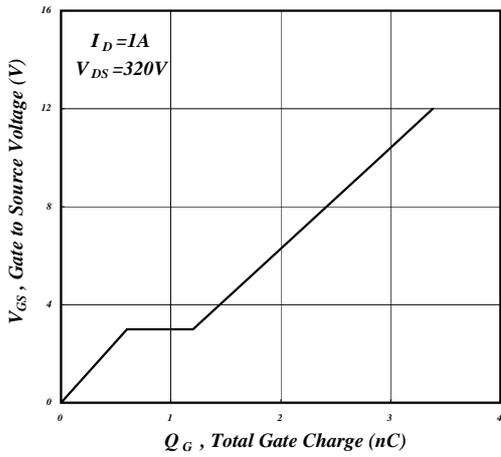
Fig 7. Gate Charge Characteristics
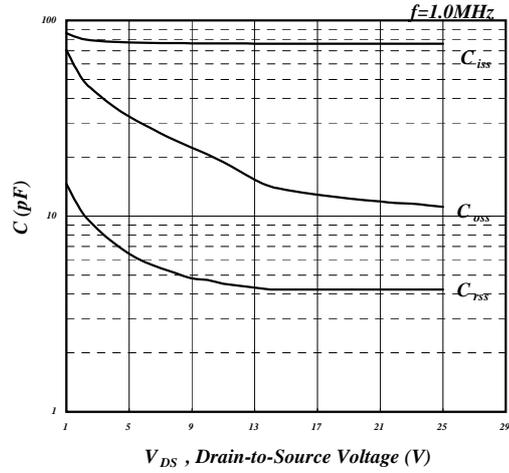

Fig 8. Typical Capacitance Characteristics
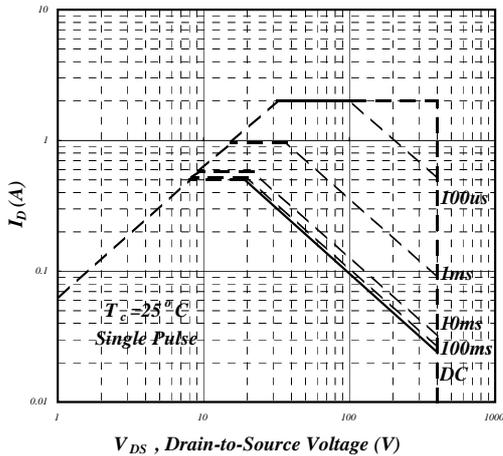
**Fig 9. Maximum Safe Operating Area**
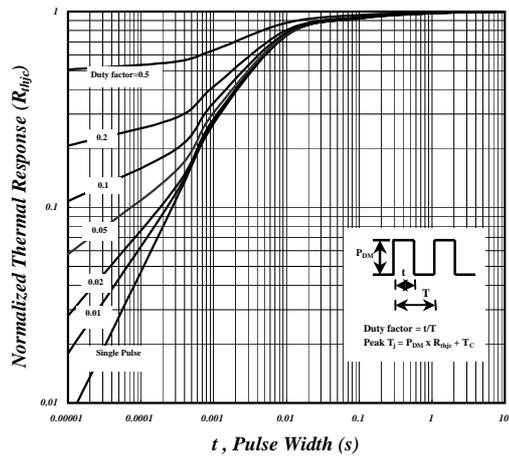
**Fig 10. Effective Transient Thermal Impedance**
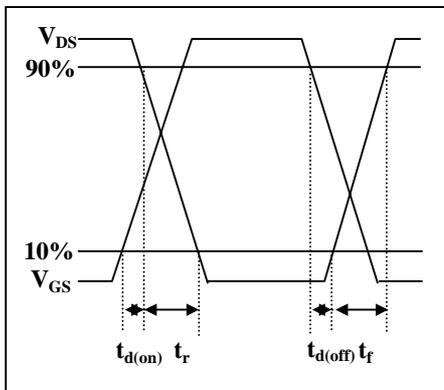
Fig 11. Switching Time Waveform
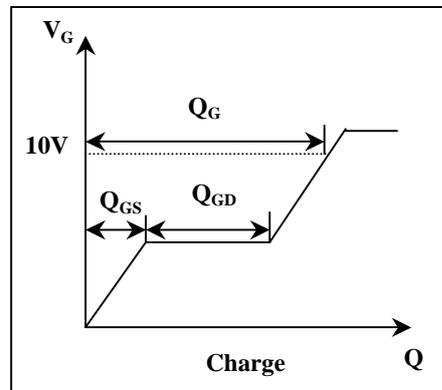
Fig 12. Gate Charge Waveform