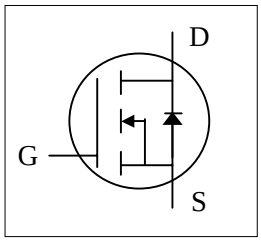
AP1504MT

Halogen-Free Product

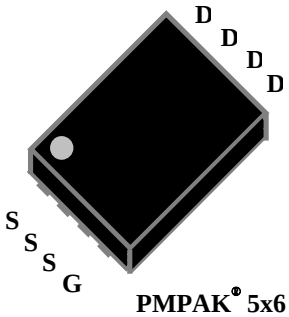
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

- ▼ **100% R_g & UIS Test**
- ▼ **Simple Drive Requirement**
- ▼ **Lower Gate Charge**
- ▼ **RoHS Compliant & Halogen-Free**



BV_{DSS}	150V
$R_{DS(ON)}$	59mΩ



PMPAK® 5x6

Description

AP1504 series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The PMPAK ® 5x6 package is special for DC-DC converters application and the foot print is compatible with SO-8 with backside heat sink and lower profile.

Absolute Maximum Ratings@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 10V	15.8	A
I_D@T_A=25℃	Drain Current, V_{GS} @ 10V[3]	6.3	A
I_D@T_A=70℃	Drain Current, V_{GS} @ 10V[3]	5	A
I_{DM}	Pulsed Drain Current[1]	40	A
P_D@T_C=25℃	Total Power Dissipation[3]	31.2	W
P_D@T_A=25℃	Total Power Dissipation	5	W
E_{AS}	Single Pulse Avalanche Energy[5]	40.5	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	Maximum Thermal Resistance, Junction-case	4	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient[3]	25	℃/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	150	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=9A	-	-	59	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=9A	-	14	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=120V, V_{GS}=0V	-	-	25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ±20V, V_{DS}=0V	-	-	±0.1	uA
Q_g	Total Gate Charge[4]	I_D=9A	-	16	25.6	nC
Q_{gs}	Gate-Source Charge[4]	V_{DS}=75V	-	4	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge[4]	V_{GS}=10V	-	6	-	nC
$t_{d(on)}$	Turn-on Delay Time[4]	V_{DS}=75V	-	8.5	-	ns
t_r	Rise Time[4]	I_D=1A	-	7.5	-	ns
$t_{d(off)}$	Turn-off Delay Time[4]	R_G=3.3Ω	-	21	-	ns
t_f	Fall Time[4]	V_{GS}=10V	-	23	-	ns
C_{iss}	Input Capacitance[4]	V_{GS}=0V	-	615	984	pF
C_{oss}	Output Capacitance[4]	V_{DS}=100V	-	57	-	pF
C_{rss}	Reverse Transfer Capacitance[4]	f=1.0MHz	-	15	-	pF
R_g	Gate Resistance	f=1.0MHz	-	0.6	1.2	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=9A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time[4]	I_S=9A, V_{GS}=0V,	-	50	-	ns
Q_{rr}	Reverse Recovery Charge[4]	dI/dt=100A/μs	-	100	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

3.Surface mounted on 1 in^2 copper pad of FR4 board, t <10sec; 60°C/W at steady state.

4.Guaranteed by design.

5.Starting T_j=25°C , V_{DD}=50V , L=1mH , R_G=25Ω , V_{GS}=10V

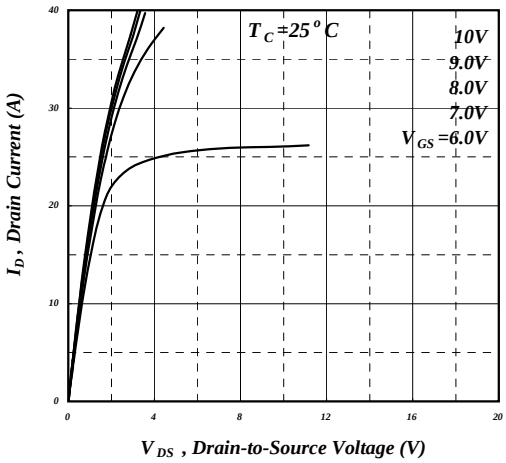


Fig 1. Typical Output Characteristics

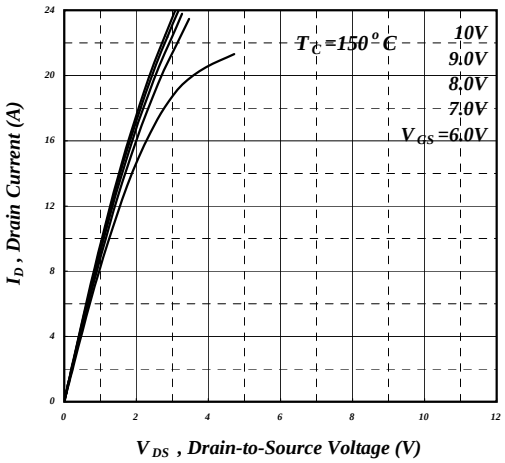


Fig 2. Typical Output Characteristics

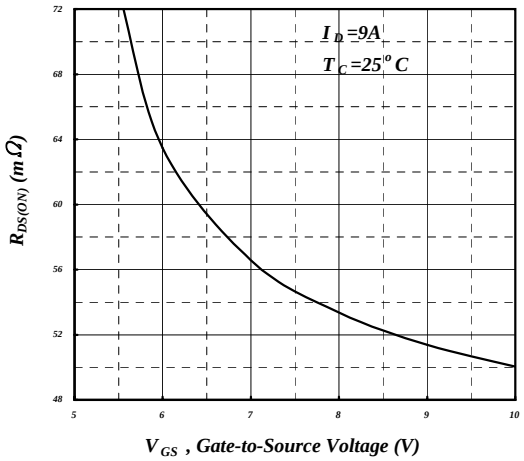


Fig 3. On-Resistance v.s. Gate Voltage

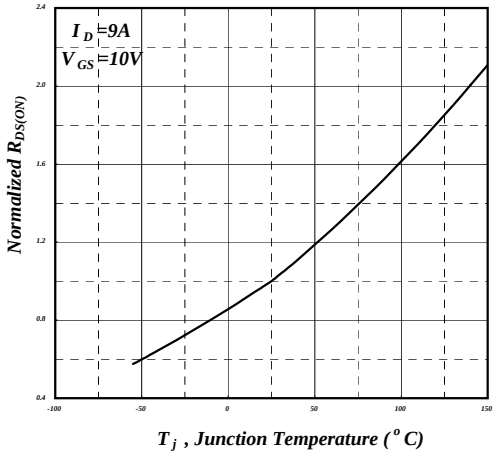


Fig 4. Normalized On-Resistance v.s. Junction Temperature

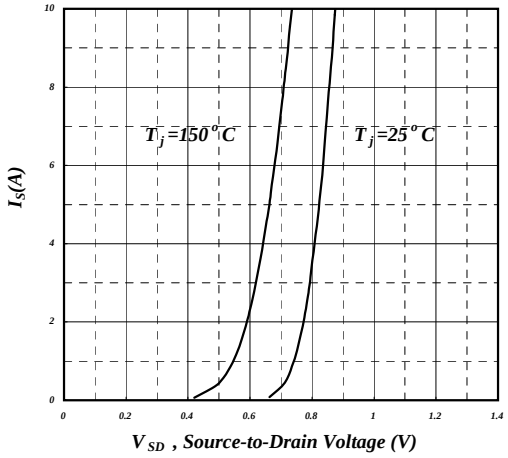


Fig 5. Forward Characteristic of Reverse Diode

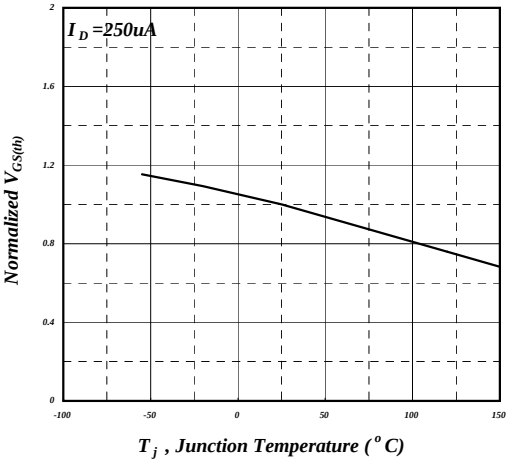


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

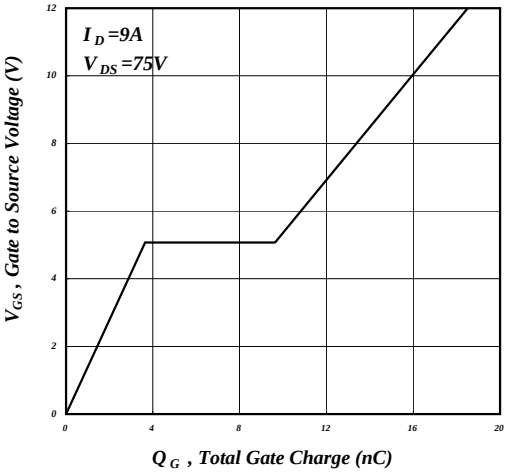


Fig 7. Gate Charge Characteristics

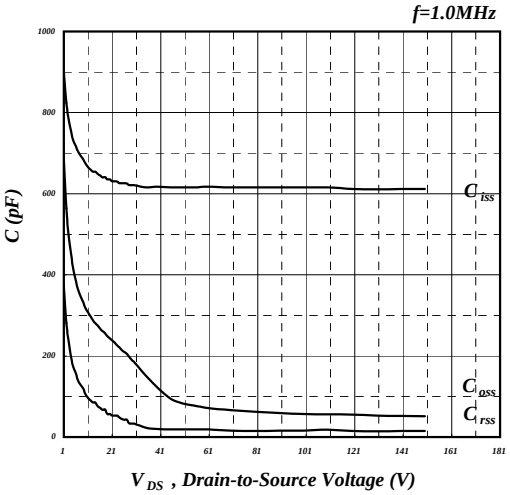


Fig 8. Typical Capacitance Characteristics

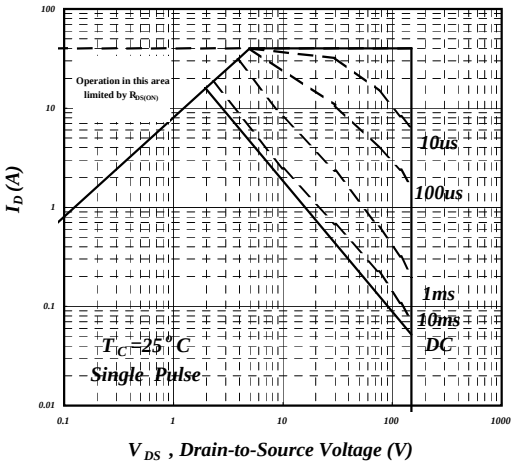


Fig 9. Maximum Safe Operating Area

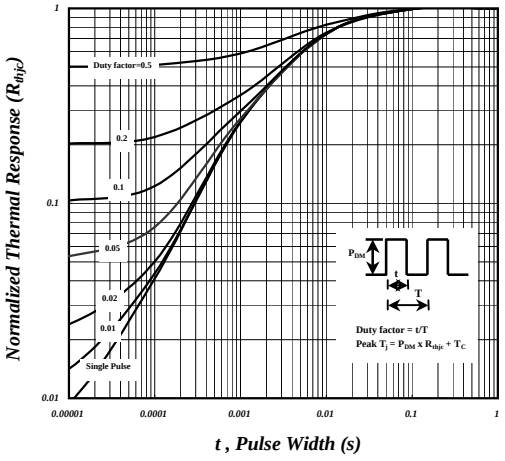


Fig 10. Effective Transient Thermal Impedance

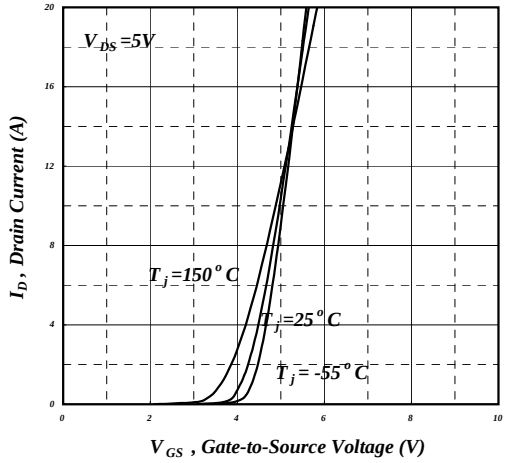


Fig 11. Transfer Characteristics

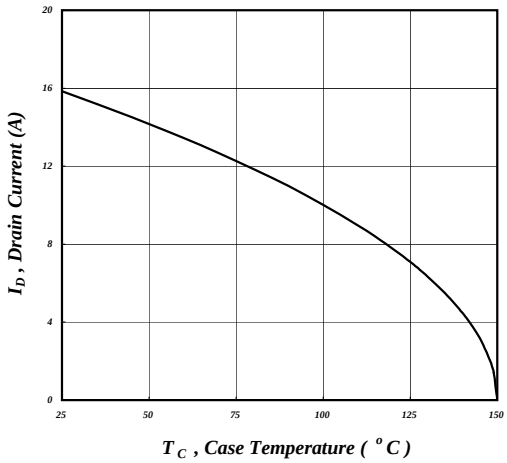


Fig 12. Drain Current v.s. Case Temperature

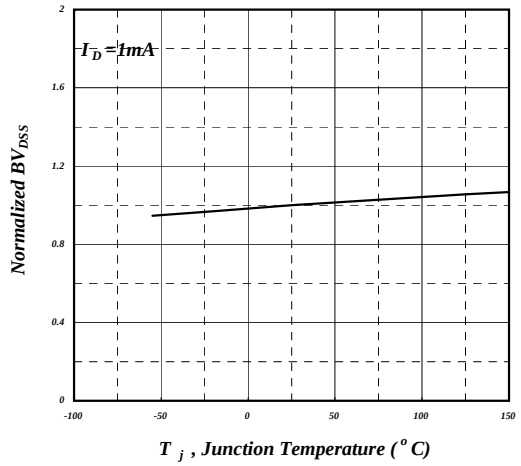


Fig 13. Normalized BV_{DSS} v.s. Junction Temperature

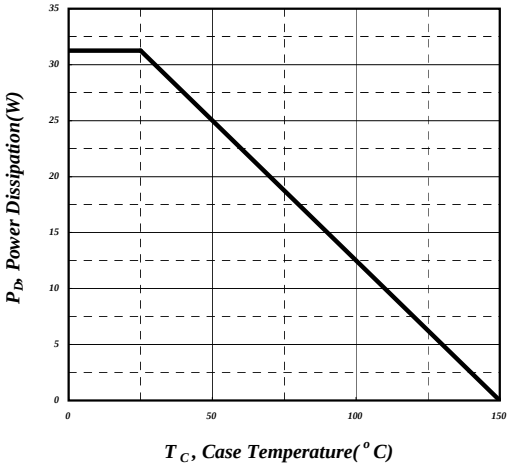


Fig 14. Total Power Dissipation

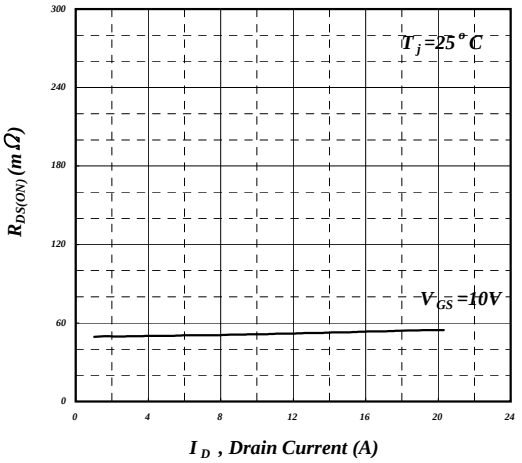


Fig 15. Typ. Drain-Source on State Resistance

MARKING INFORMATION