AP0658JP

60V P-Channel MOSFET

Features

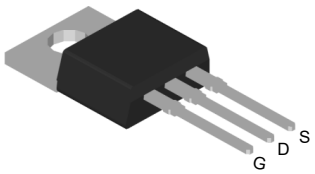
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Green Device Available

Product Summary

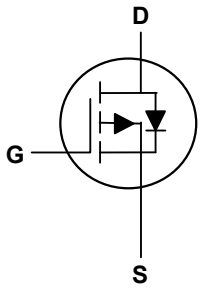
V_{DS}	-60	V
I_D	-58	A
$R_{DS(ON)}$ (at V_{GS}=-10V)	16	mΩ
$R_{DS(ON)}$ (at V_{GS}=-4.5V)	18	mΩ

Applications

- High Frequency Point-of-Load,Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch



TO-220 Top View



Absolute Maximum Ratings(T_C=25℃, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current[1]	I_D@T_C=25℃	-58	A
Continuous Drain Current[1]	I_D@T_C=100℃	-49	A
Pulsed Drain Current[2]	I_{DM}	-250	A
Single Pulse Avalanche Energy[3]	EAS	450	mJ
Avalanche Current	I_{AS}	-41	A
Total Power Dissipation[4]	P_D@T_C=25℃	114	W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient[1]	$R_{\theta JA}$	---	62	℃/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	---	1.1	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=-250uA	-60	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V , I_D=-20A	---	12	16	mΩ
		V_{GS}=-4.5V , I_D=-10A	---	15	18	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =-250uA	-1.0	---	-2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-60V, V_{GS}=0V	---	---	-1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Total Gate Charge	Q_g	V_{DS}=-30V , V_{GS}=-10V , I_D=-50A	---	94	---	nC
Gate-Source Charge	Q_{gs}		---	18	---	
Gate-Drain Charge	Q_{gd}		---	24	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DS}=-30V , V_{GS}=-10V , R_G=6Ω	---	53	---	ns
Rise Time	T_r		---	19	---	
Turn-Off Delay Time	$T_{d(off)}$		---	221	---	
Fall Time	T_f		---	61	---	
Input Capacitance	C_{iss}	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	4710	---	pF
Output Capacitance	C_{oss}		---	373	---	
Reverse Transfer Capacitance	C_{rss}		---	336	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V , I_S=-17A	---	---	-1.2	V

Note:

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is V_{DD}=-48V,V_{GS}=-10V,L=0.1mH

4.The power dissipation is limited by 150℃ junction temperature

5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

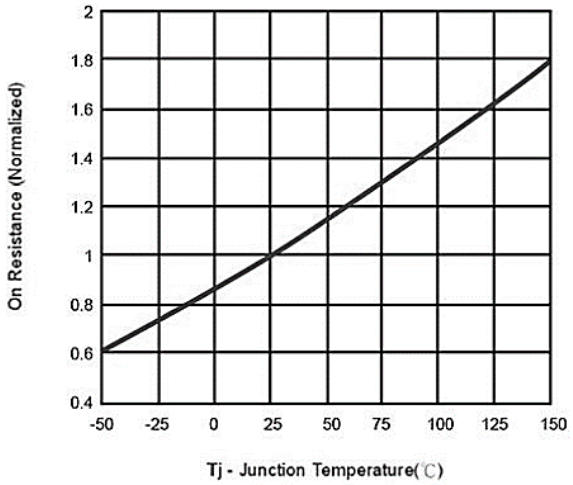


Fig.1 On Resistance Vs Junction Temperature

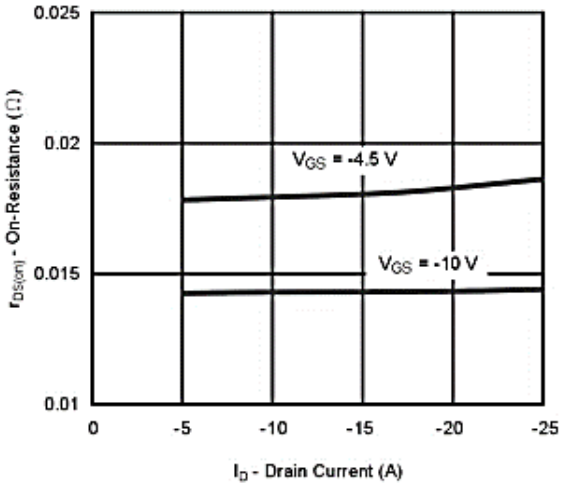


Fig.2 On-Resistance Vs.Drain Current

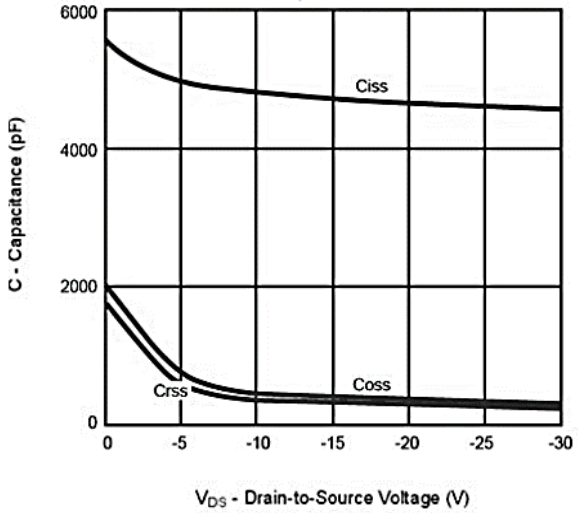


Fig.3 Capacitance

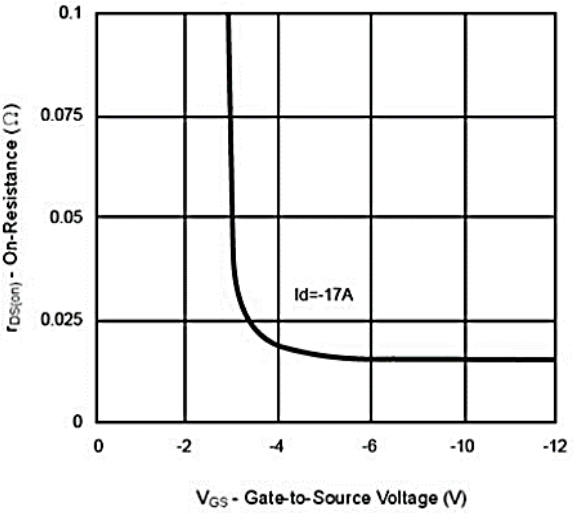


Fig.4 On-Resistance Vs. Gate-to-Sourece Voltage

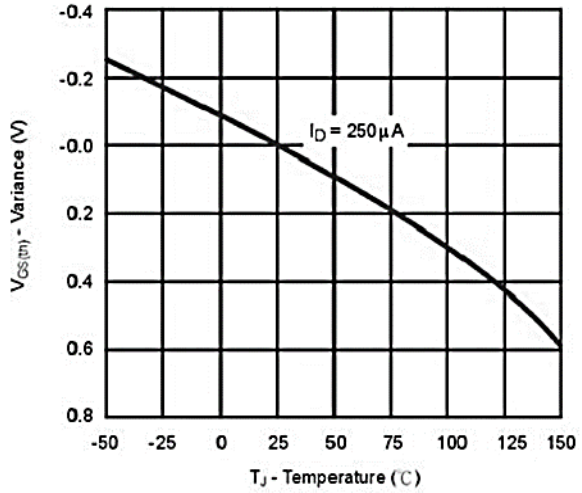


Fig.5 Threshold Voltage

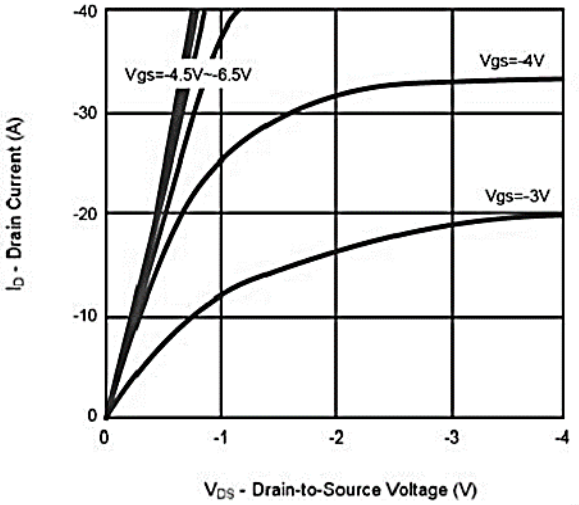


Fig.6 On-Region Characteristics

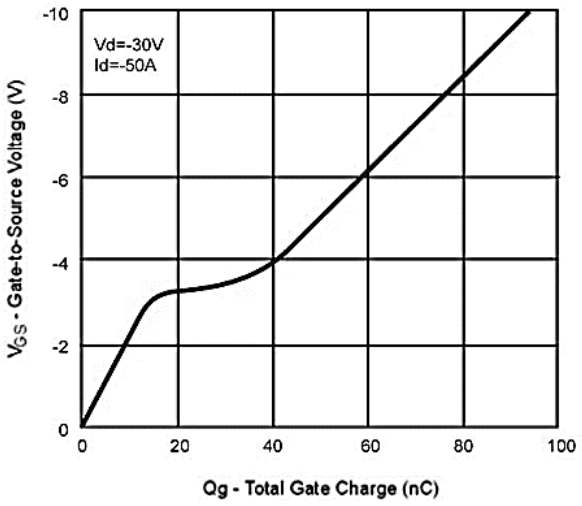


Fig.7 Gate Charge

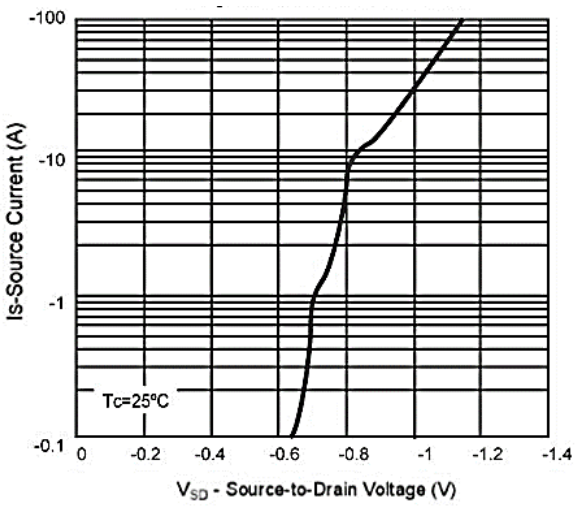


Fig.8 Body-diode Characteristice

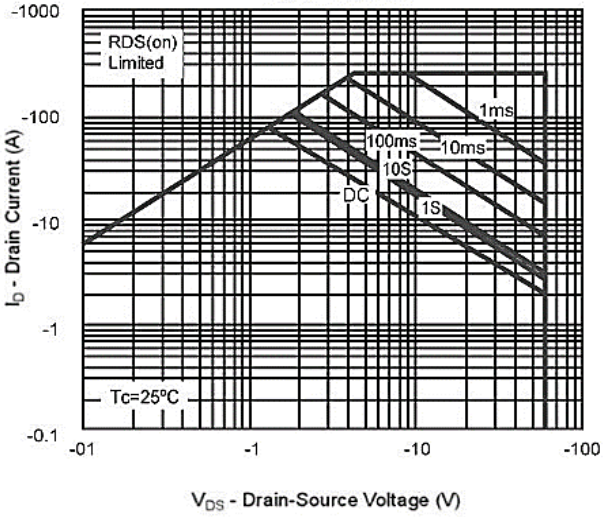


Fig.9 Safe Operating Area

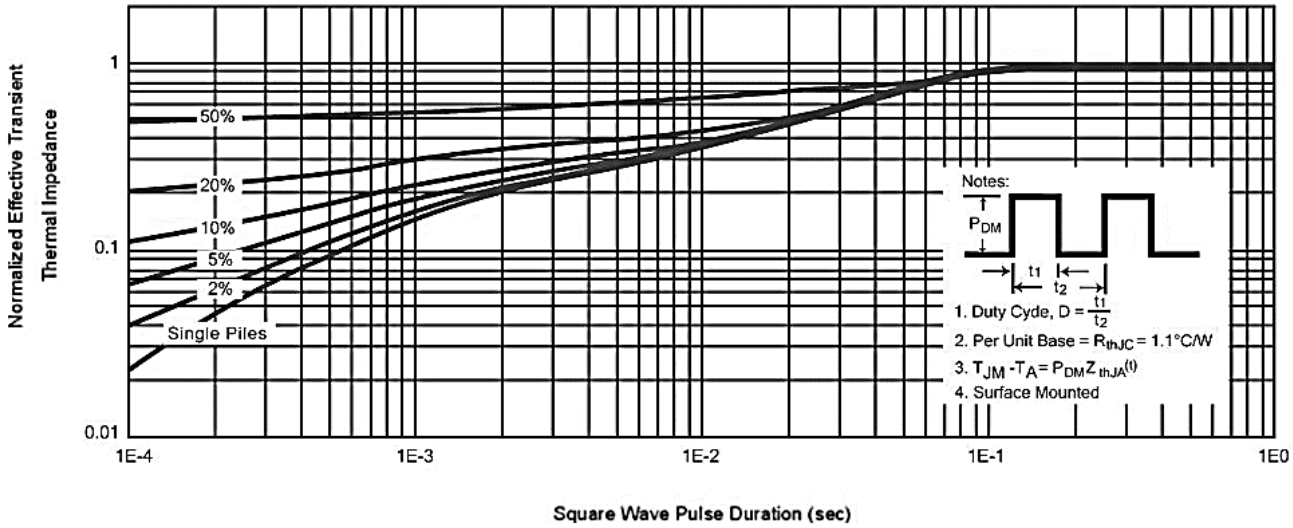
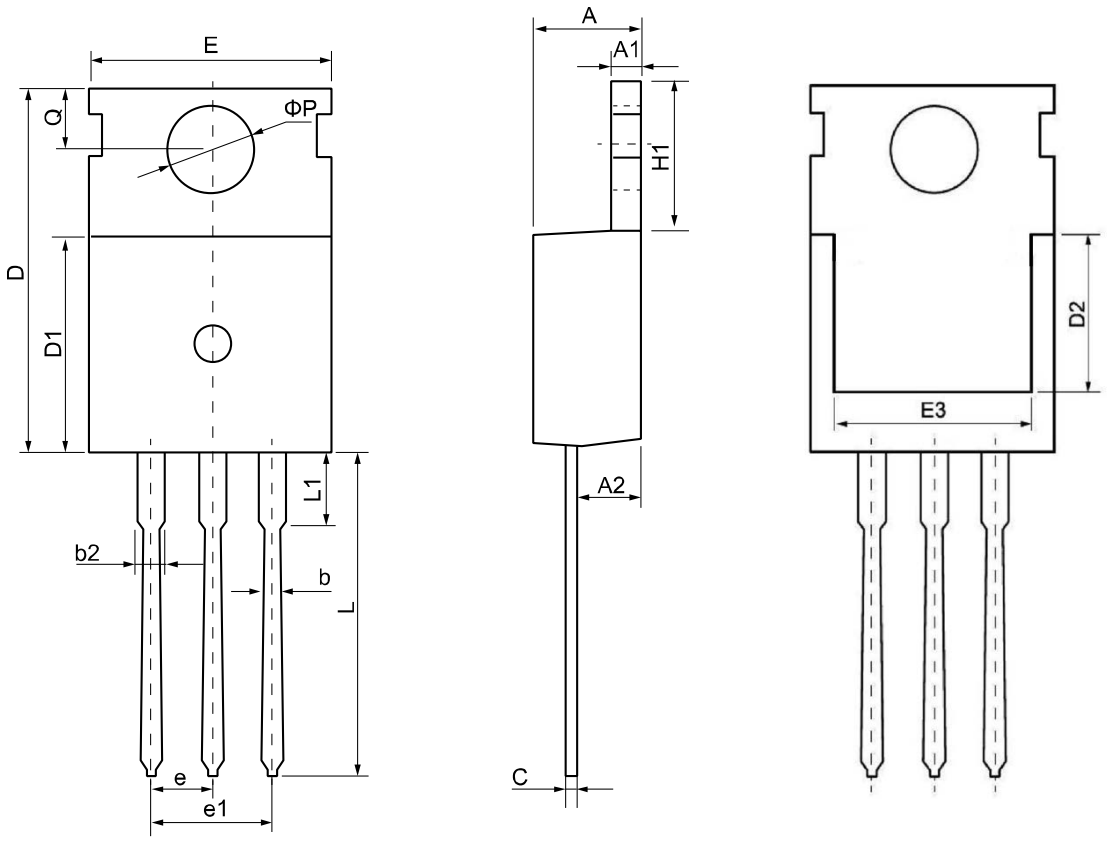


Fig.10 Normalized Maximum Transient Thermal Impedance

TO-220 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	4.30	4.55	4.75	E	9.65	10.00	10.25
A1	1.15	1.30	1.45	E3	7.00	--	--
A2	2.20	2.40	2.60	e	2.54 BSC		
b	0.70	0.80	0.95	e1	5.08 BSC		
b2	1.17	1.27	1.47	H1	6.30	6.50	6.80
c	0.40	0.50	0.65	L	12.70	13.50	14.10
D	15.30	15.60	15.90	L1	--	3.20	3.95
D1	8.90	9.10	9.35	ϕ P	3.40	3.60	3.80
D2	5.50	--	--	Q	2.60	2.80	3.00