AT06720F1

60V N-Channel MOSFET

Features

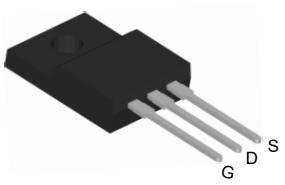
- Advanced Shield Gate Trench technology
- Super Low Gate Charge
- High-speed switching
- 100% EAS Guaranteed
- Green Device Available

Product Summary

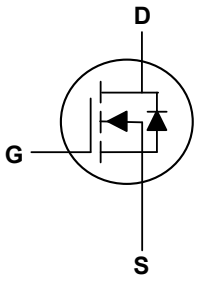
V_{DS}	60	V
I_D	72	A
$R_{DS(ON)}$(at V_{GS}=10V)	3.3	mΩ
$R_{DS(ON)}$(at V_{GS}=4.5V)	4.5	mΩ

Applications

- High Frequency Point-of-Load,Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch



TO-220F 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	72	A
Pulsed Drain Current[2]	I_{DM}	290	A
Single Pulse Avalanche Energy[3]	EAS	45	mJ
Avalanche Current	I_{AS}	35	A
Total Power Dissipation[4]	P_D	30	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]	$R_{\theta JA}$	---	62.5	℃/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	---	5	℃/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	---	2.8	3.3	mΩ
		V_{GS}=4.5V , I_D=10A	---	4.0	4.5	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1.0	---	3.0	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=60V , V_{GS}=0V , T_J=25℃	---	---	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=20A	---	40	---	nC
Gate-Source Charge	Q_{gs}		---	10	---	
Gate-Drain Charge	Q_{gd}		---	12	---	
Gate plateau voltage	$V_{plateau}$		---	1.9	---	V
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=30V,I_D=1A, V_{GS}=10V, R_G=6Ω	---	12	---	ns
Rise Time	T_r		---	35	---	
Turn-Off Delay Time	$T_{d(off)}$		---	68	---	
Fall Time	T_f		---	42	---	
Input Capacitance	C_{iss}	V_{DS}=25V , V_{GS}=0V , f=1MHz	---	4350	---	pF
Output Capacitance	C_{oss}		---	1570	---	
Reverse Transfer Capacitance	C_{rss}		---	70	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current[1]	I_S	T_C=25℃	---	---	72	A
Pulsed Source Current[2]	I_{SM}		---	---	290	A
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V , I_S=1A , T_J=25℃	---	0.7	1.3	V
Reverse Recovery Time	t_{rr}	I_F=20A , V_R=30V di/dt=100A/μs， T_J=25℃	---	30	---	nS
Reverse Recovery Charge	Q_{rr}		---	32	---	nC
Peak Reverse Recovery Current	I_{rrm}		---	28	---	A

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}=50V,V_{GS}=10V,L=0.1mH

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

Typical Characteristics

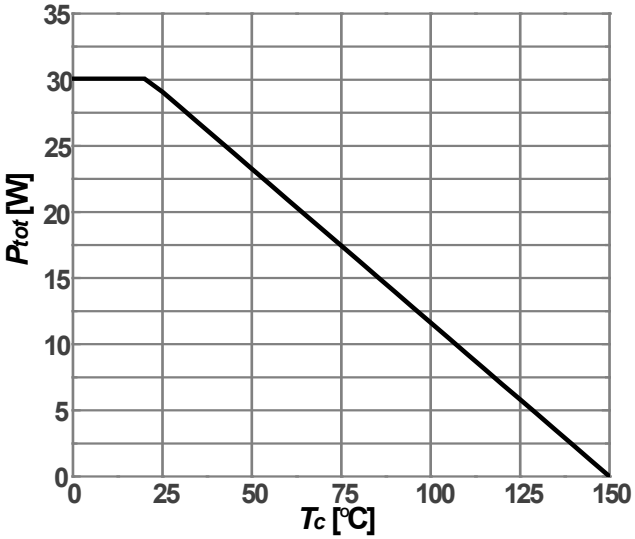


Diagram 1: Power dissipation

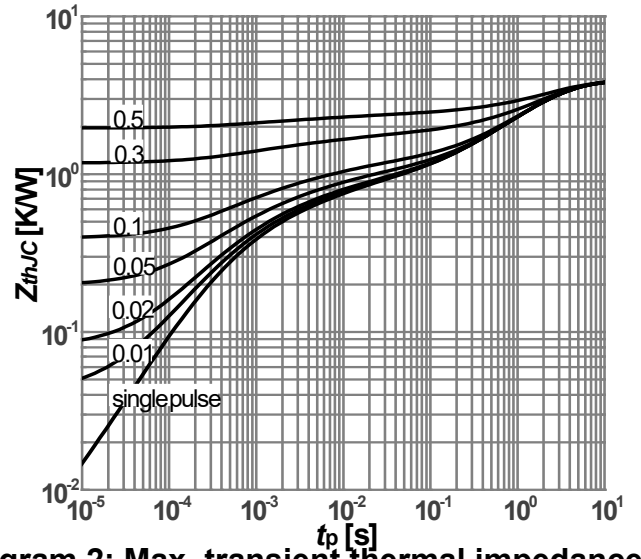


Diagram 2: Max. transient thermal impedance

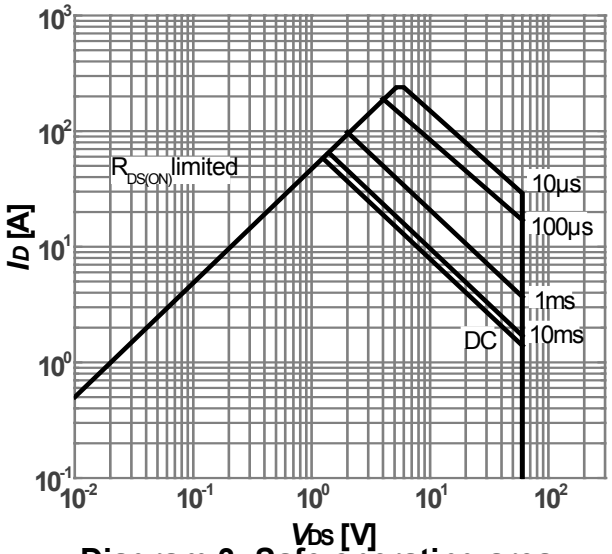


Diagram 3: Safe operating area

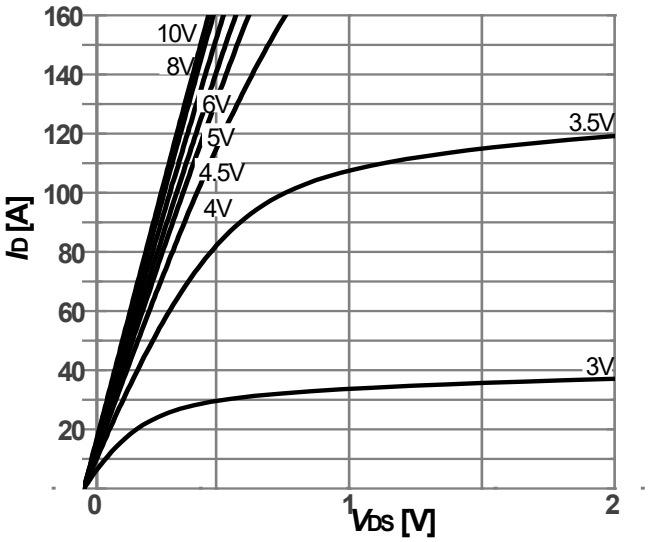


Diagram 4: Typ. output characteristics

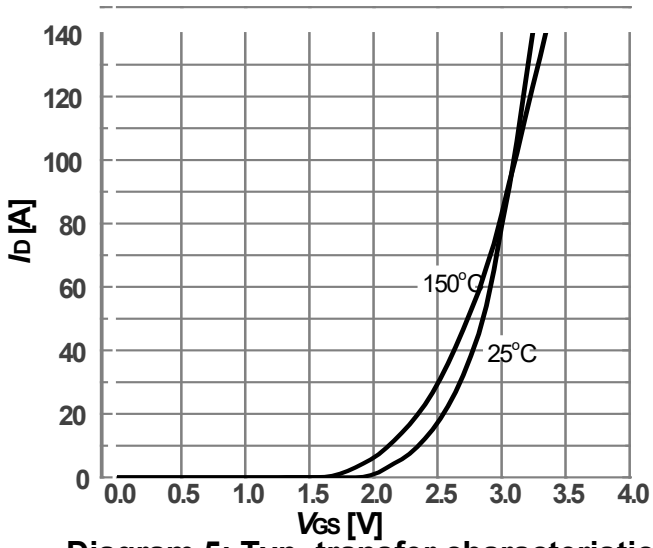


Diagram 5: Typ. transfer characteristics

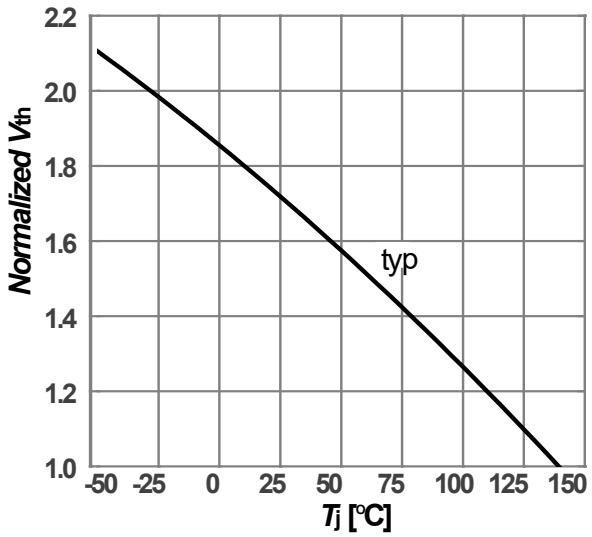


Diagram 6: Gate threshold voltage vs. Junction temperature

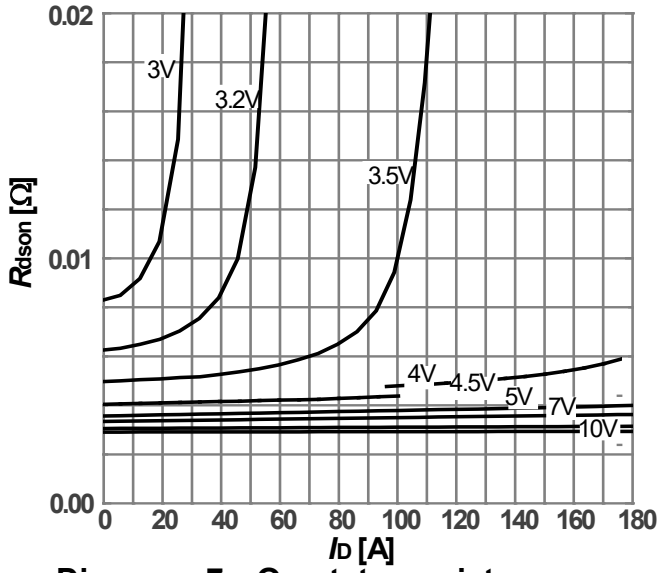


Diagram 7: On-state resistance vs. Drain current

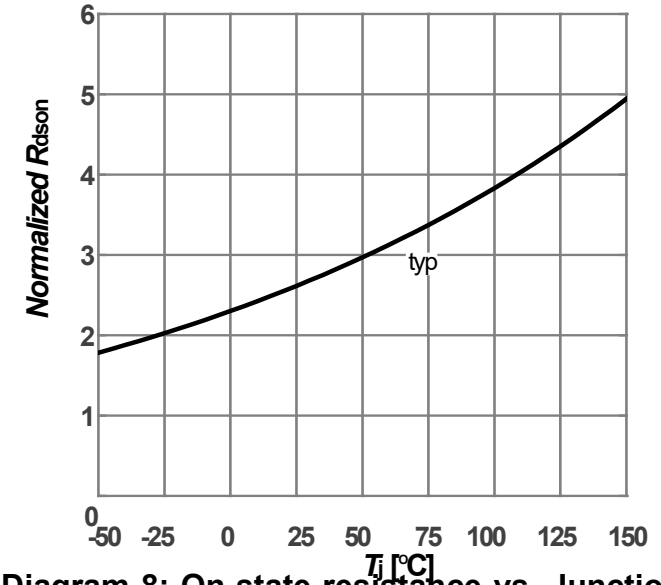


Diagram 8: On-state resistance vs. Junction temperature

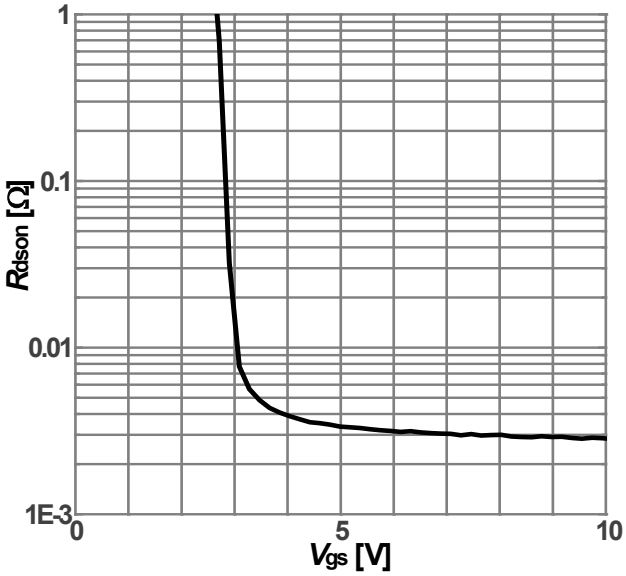


Diagram 9: On-state resistance vs. Vgs characteristics

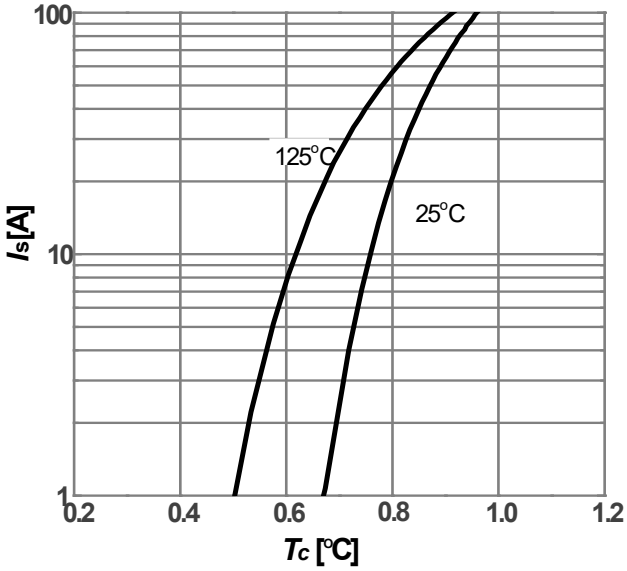


Diagram 10: Forward characteristics of reverse diode

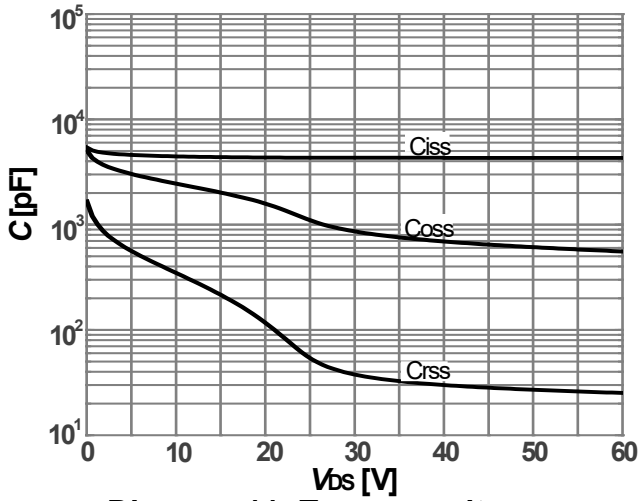


Diagram 11: Typ. capacitances

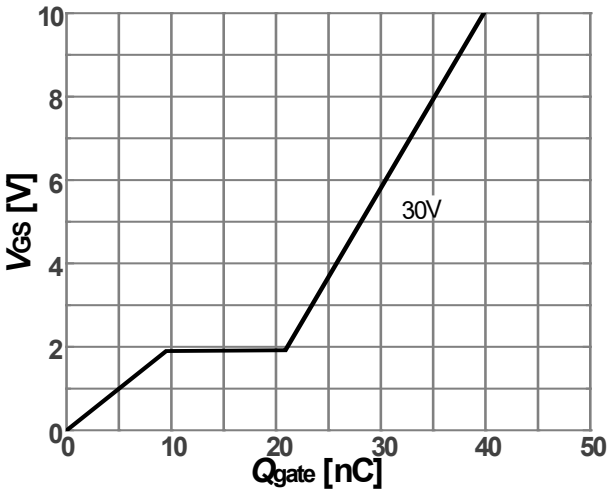
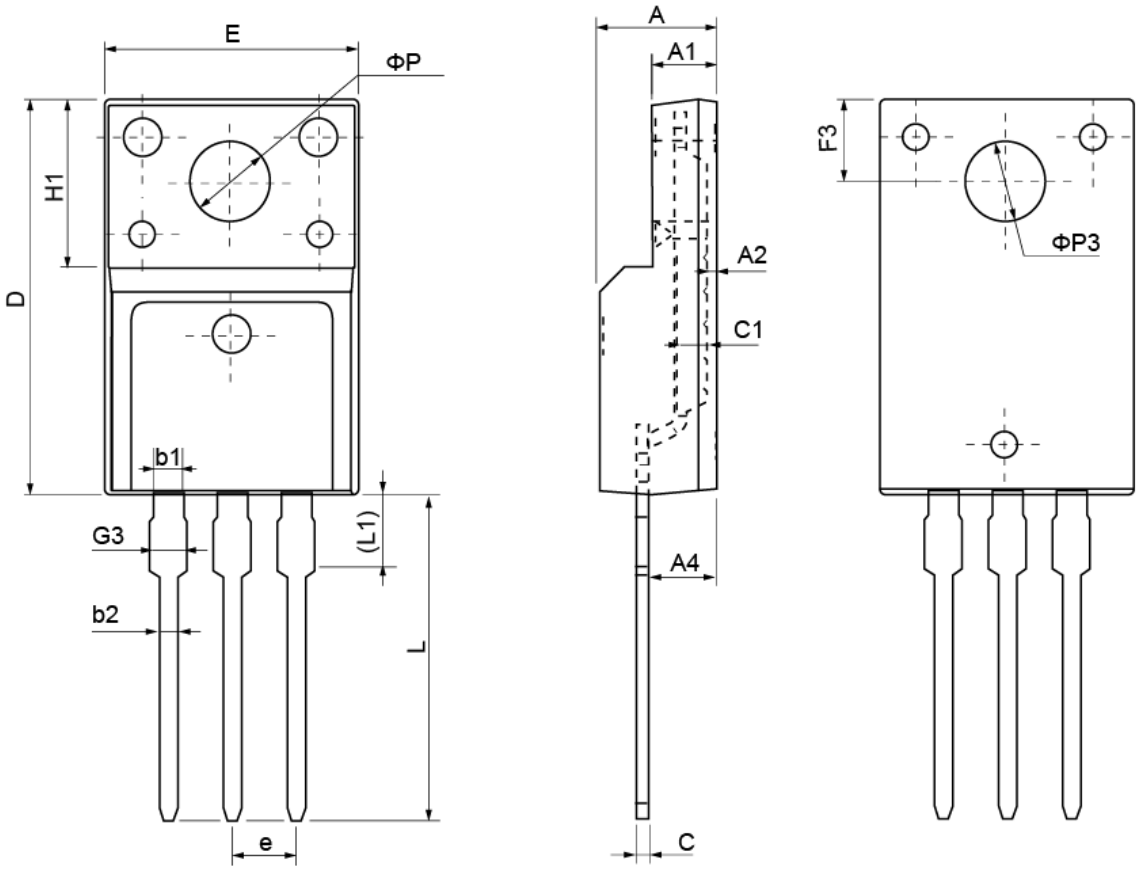


Diagram 12: Typ. gate charge

TO-220F Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	4.40	4.70	5.00	**H1**	6.70 REF		
A1	2.30	2.55	2.80	**L**	12.30	12.98	13.30
A2	0.30	0.50	0.70	**L1**	2.95	3.10	3.50
A4	2.45	2.80	3.05	**ϕP**	3.03	3.20	3.50
c	0.30	0.50	0.70	**ϕP3**	3.15	3.45	3.65
c1	1.20	1.30	1.40	**b1**	1.10	1.30	1.45
D	15.40	15.90	16.40	**b2**	0.60	0.80	1.00
E	9.86	10.16	10.46	**F3**	3.05	3.30	3.55
e	2.54 BSC			**G3**	1.15	1.35	1.55