MOSFET Silicon N-Channel MOS

1. Applications

Single-ended flyback or two-transistor forward topologies.
PC power, PD Adaptor, LCD & PDP TV and LED lighting.

2. Features

Low drain-source on-resistance: RDS(ON) = 6.5mΩ (typ.)
Easy to control Gate switching
Enhancement mode: Vth = 2.4 to 3.4 V

Table 1   Key Performance Parameters

Parameter	Value	Unit
$V_{DS} @ T_{j,max}$	100	V
$R_{DS(on),max}$	7.4	mΩ
$Q_{g,typ}$	60.7	nC
$I_{D,pulse}$	396	A

3. Packaging and Internal Circuit

Part Name	Package	Marking
AUP074N10	TO220	AUP074N10

TO220

Drain
Pin 2, Tab

Gate
Pin 1

Source
Pin 3
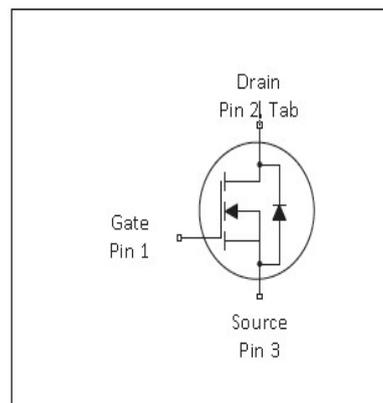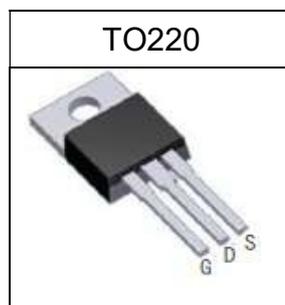
1   Maximum ratings

at T_j = 25°C, unless otherwise specified

Table 2   Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain current[1]	I_D		-	123	A	T_C=25°C
Pulsed drain current[2]	$I_{D,pulse}$	-	-	396	A	T_C=25°C
Avalanche energy, single pulse	E_{AS}	-	-	240	mJ	Tc=25°C,VDD=50V, I=31A, L = 0.5mH, RG=25Ω
Avalanche current, single pulse	I_{AR}	-	-	31	A	Tc=25°C,VDD=50V,L=0.5mH, RG=25Ω
Gate source voltage (static)	V_{GS}	-20	-	20	V	static;
Power dissipation	P_{tot}	-	-	175	W	T_C=25°C
Storage temperature	T_{stg}	-55	-	150	°C	
Operating junction temperature	T_j	-55	-	150	°C	
Transconductance	GFS	-	51	-	S	VDS=5V IDS=20A

[1] Limited by $T_{j,max}$. Maximum Duty Cycle D = 0.50
[2] Pulse width t_p limited by $T_{j,max}$
[3] Identical low side and high side switch with identical R_G

2 Thermal characteristics

Table 3 Thermal characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case	R_{thJC}	-	-	0.84	°C/W	-
Thermal resistance, junction - ambient	R_{thJA}	-	-	60	°C/W	device on PCB, minimal footprint

3 Electrical characteristics

at T_j=25°C, unless otherwise specified

Table 4 Static characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	100	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{(GS)th}$	2.4		3.4	V	V_{DS}=V_{GS}, I_D=250uA
Zero gate voltage drain current	I_{DSS}	-	-	1	uA	V_{DS}=95V, V_{GS}=0V, T_j=25°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	*VGS=±20V, VDS=0V*
Drain-source on-state resistance	$R_{DS(on)}$	-	6.5	7.4	mΩ	V_{GS}=10V, I_D=20A, T_j=25°C
Gate resistance (Intrinsic)	R_G	-	1.2	-	Ω	*f*=1MHz, open drain

Table 5 Dynamic characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	3680	-	pF	V_{GS}=0V, V_{DS}=50V, *f*=1MHz
Output capacitance	C_{oss}	-	361	-	pF	V_{GS}=0V, V_{DS}=50V, *f*=1MHz
Reverse transfer capacitance	C_{rss}	-	14.6	-	pF	V_{GS}=0V, V_{DS}=50V, *f*=1MHz
Turn-on delay time	$t_{d(on)}$	-	29	-	ns	V_{DD}=50V, V_{GS}=10V, I_D=20A, R_G=10Ω
Rise time	t_r	-	55	-	ns	V_{DD}=50V, V_{GS}=10V, I_D=20A, R_G=10Ω
Turn-off delay time	$t_{d(off)}$	-	69	-	ns	V_{DD}=50V, V_{GS}=10V, I_D=20A, R_G=10Ω
Fall time	t_f	-	43	-	ns	V_{DD}=50V, V_{GS}=10V, I_D=20A, R_G=10Ω

Table 6 Gate charge characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	15.5	-	nC	V_{DD}=50V, I_D=20A, V_{GS}=0 to 10V
Gate to drain charge	Q_{gd}	-	17.6	-	nC	V_{DD}=50V, I_D=20A, V_{GS}=0 to 10V
Gate charge total	Q_g	-	60.7	-	nC	V_{DD}=50V, I_D=20A, V_{GS}=0 to 10V

Table 7   Reverse diode characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode forward voltage	V_{SD}	-	0.7	-	V	V_{GS}=0V, I_F=1A, T_j=25°C
Reverse recovery time	t_{rr}	-	45	-	ns	V_R=30V, I_F=20A, di_F/dt=300A/μs
Reverse recovery charge	Q_{rr}	-	212	-	nC	V_R=30V, I_F=20A, di_F/dt=300A/μs
Peak reverse recovery current	I_{rrm}	-	8.4	-	A	V_R=30V, I_F=20A, di_F/dt=300A/μs

4 Test Circuits

Table 8 Diode characteristics

Test circuit for diode characteristics	Diode recovery waveform

Table 9 Switching times

Switching times test circuit for inductive load	Switching times waveform
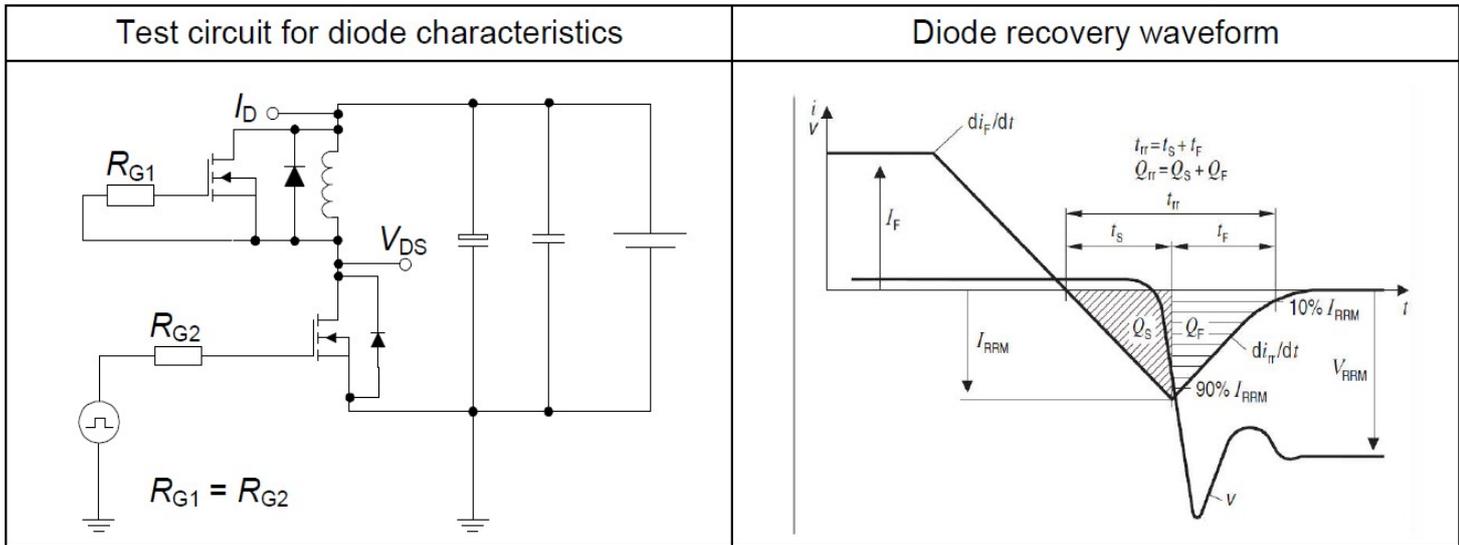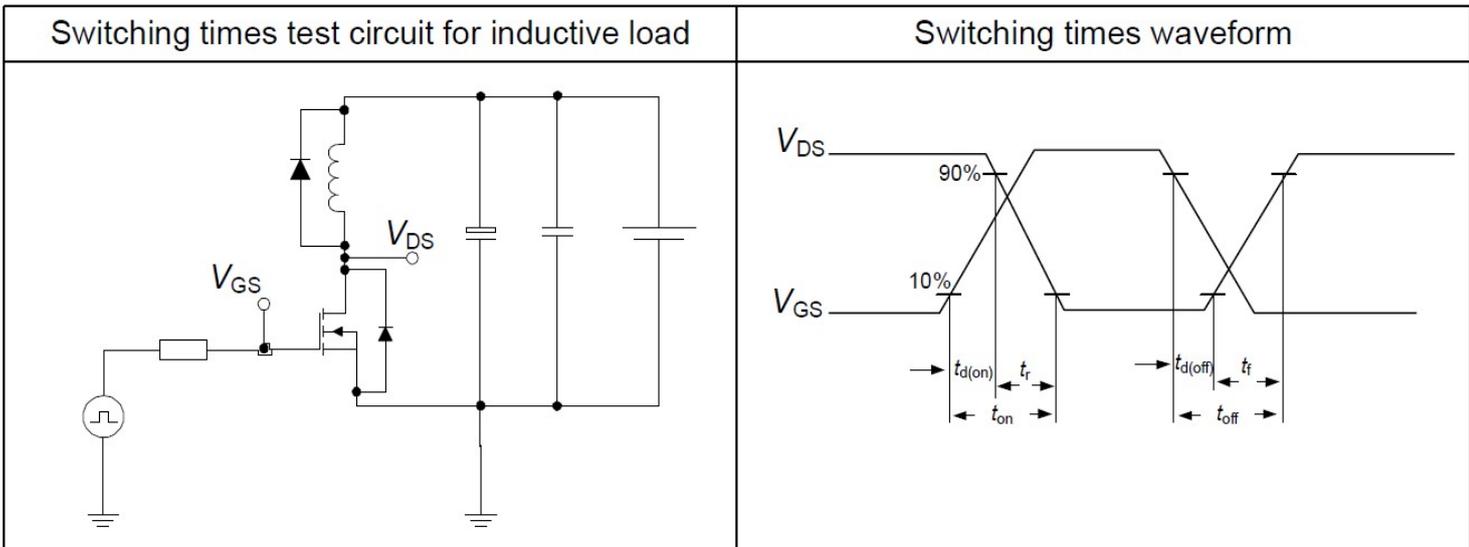
Table 10 Unclamped inductive load

Unclamped inductive load test circuit	Unclamped inductive waveform
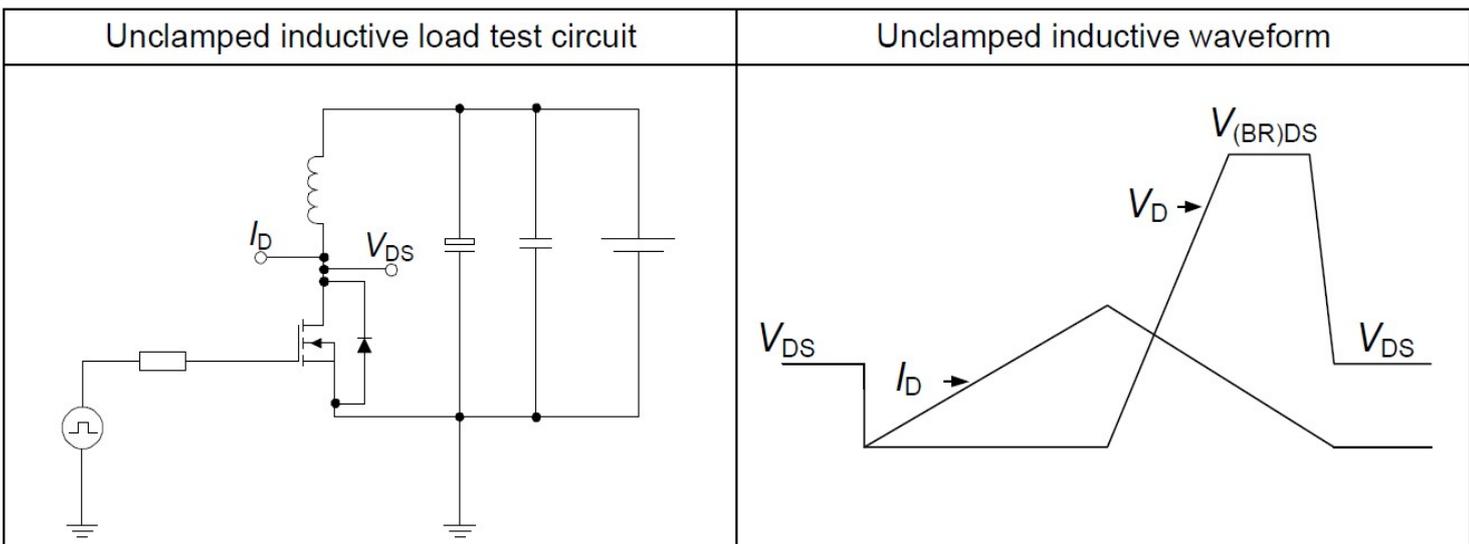
5   Package Outlines
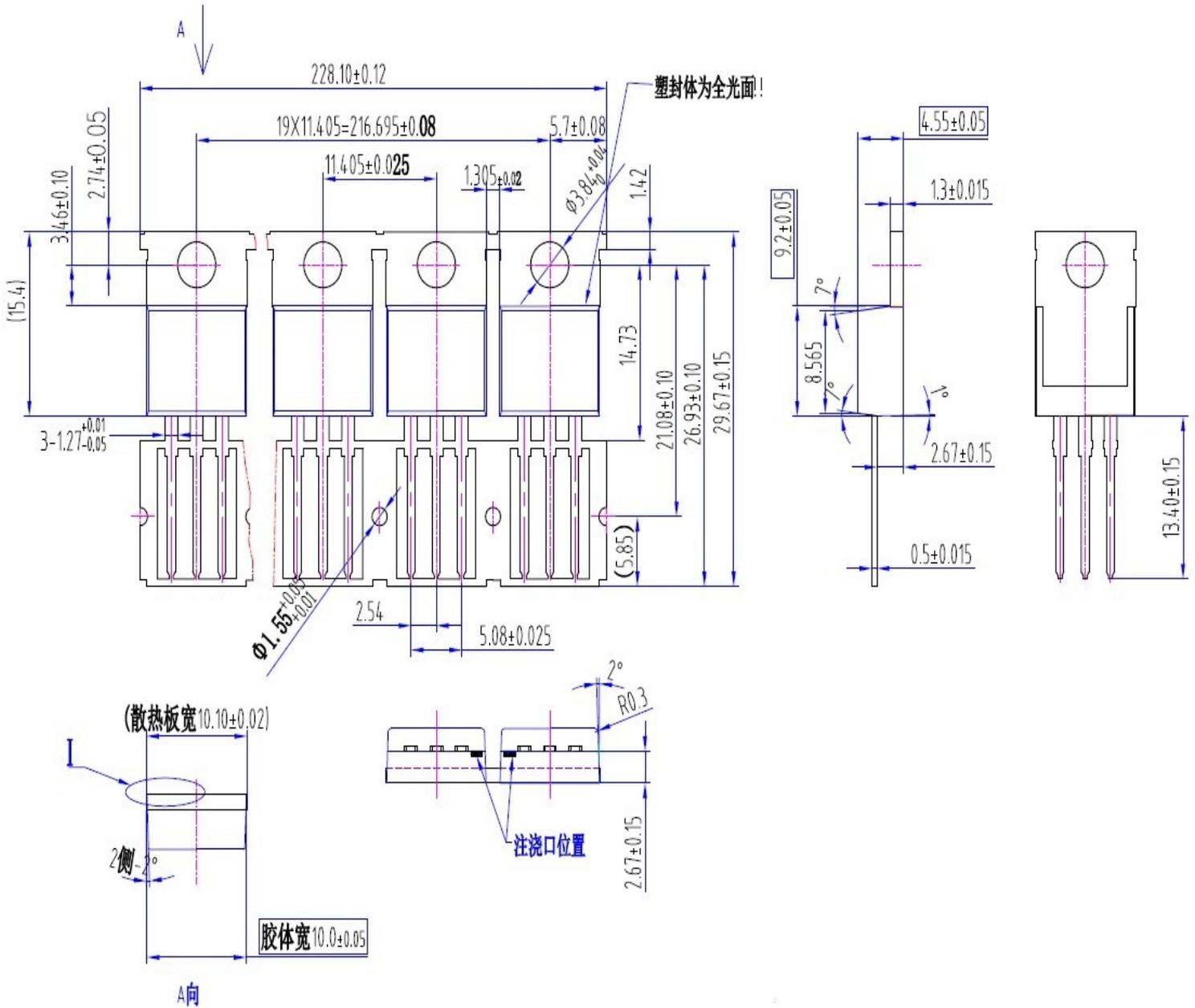
Outline PG-TO220

Revision History

Revision	Date	Subjects (major changes since last revision)
1.0	2021-10-22	Preliminary version
1.1	2021-11-30	Updated Qrr and EAS