N And P-Channel Enhancement Mode MOSFET

FEATURES

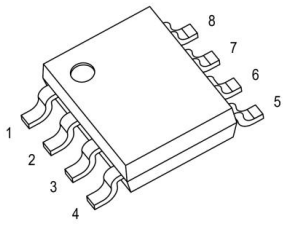
- N-Channel: 30V 6A
  - $R_{DS(ON)}$ ≤ 22mΩ(18.6mΩ Typ.) @V_{GS}=10V
  - $R_{DS(ON)}$ ≤ 37mΩ(30mΩ Typ.) @V_{GS}=4.5V
- P-Channel: -30V -6A
  - $R_{DS(ON)}$ ≤ 35mΩ(27mΩ Typ.) @V_{GS}=-10V
  - $R_{DS(ON)}$ ≤ 50mΩ(42mΩ Typ.) @V_{GS}=-4.5V
- Excellent Gate Charge x $R_{DS(ON)}$ Product(FOM)
- Very Low On-resistance $R_{DS(ON)}$
- Fast Switching Speed

APPLICATIONS

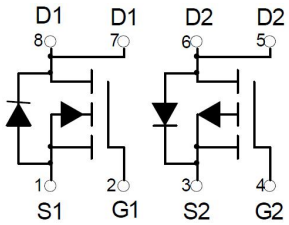
- Battery Protection
- Load Switch
- Power Management

MARKINGS: 4606A

SOP-8



CIRCUIT DIAGRAM



Absolute Maximum Ratings (T_C=25℃ unless otherwise specified)

Symbol	Parameter		Max. N-Channel	Max. P-Channel	Units
V_{DSS}	Drain-Source Voltage		30	-30	V
V_{GSS}	Gate-Source Voltage		±20	±20	V
I_D	Continuous Drain Current	T_C = 25℃	6	-6	A
		T_C = 100℃	5	-5	A
I_{DM}	Pulsed Drain Current note1		30	-30	A
P_D	Power Dissipation	T_A = 25℃	2		W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		100		℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150		℃

N-Channel Electrical Characteristics (T_C=25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =30V, V_{GS} = 0V, T_J= 25℃	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS} =0V,V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	1.0	1.55	3.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note2	V_{GS} =10V, I_D =6A	-	18.6	22	mΩ
		V_{GS} =4.5V, I_D =5A	-	30	37	mΩ
g_{FS}	Forward Transconductance	V_{DS} =5V, I_D =6A	-	15	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz	-	255	310	pF
C_{oss}	Output Capacitance		-	45	60	pF
C_{rss}	Reverse Transfer Capacitance		-	35	50	pF
Q_g	Total Gate Charge	V_{DS} =15V, I_D =6A, V_{GS} =10V	-	5.2	-	nC
Q_{gs}	Gate-Source Charge		-	2.5	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	1.0	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V, V_{DS}=15V, R_L=2.5Ω, R_{REN} =3Ω	-	4.5	-	ns
t_r	Turn-on Rise Time		-	2.5	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	14.5	-	ns
t_f	Turn-off Fall Time		-	3.5	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	6	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	30	A

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

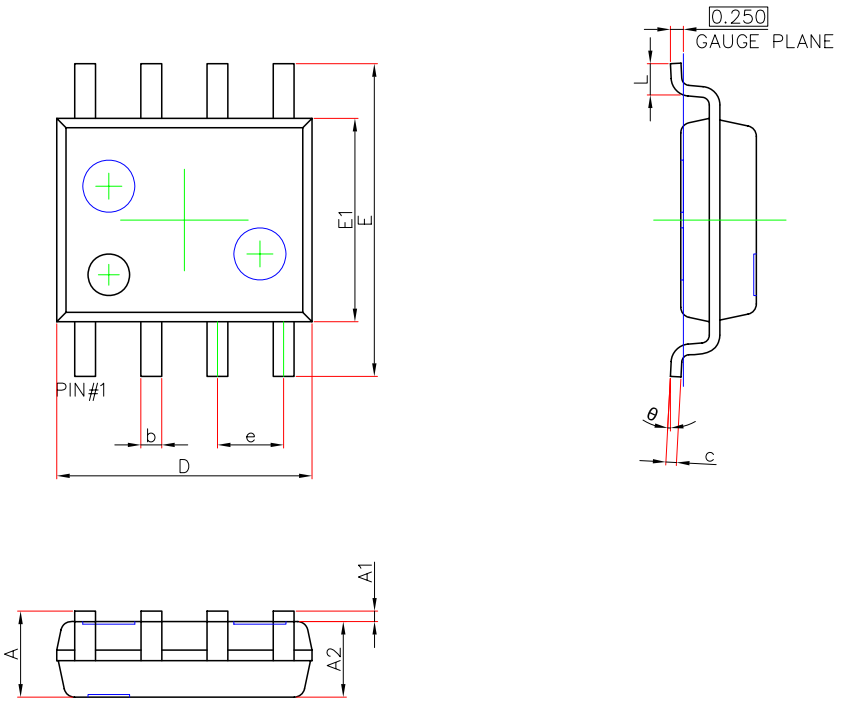
P-Channel Electrical Characteristics (T_C=25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D= -250μA	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -30V, V_{GS} = 0V,	-	-	-1	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS} =0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D= -250μA	-0.8	-1.32	-2.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note2	V_{GS} =-10V, I_D =-6A	-	27	35	mΩ
		V_{GS} =-4.5V, I_D =-5A	-	42	50	
g_{FS}	Forward Transconductance	V_{DS} =-5V, I_D = -6A	-	18	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz	-	760	-	pF
C_{oss}	Output Capacitance		-	140	-	pF
C_{rss}	Reverse Transfer Capacitance		-	95	-	pF
Q_g	Total Gate Charge	V_{DS} = -15V, I_D = -6A, V_{GS} = -10V	-	13.6	-	nC
Q_{gs}	Gate-Source Charge		-	2.5	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	3.2	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DS} = -15V, R_L=2.3Ω, R_{GEN}=3Ω,V_{GS}=-10V,	-	11	-	ns
t_r	Turn-on Rise Time		-	35	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	30	-	ns
t_f	Turn-off Fall Time		-	10	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-6	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-30	A

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

Package Mechanical Data



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.450	1.750	0.057	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

MSL:3