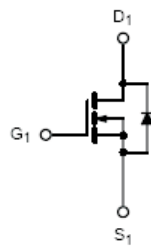
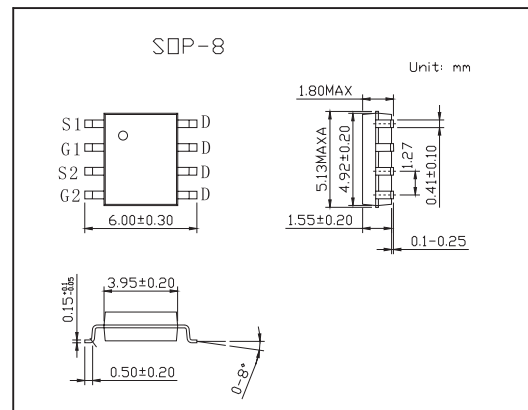
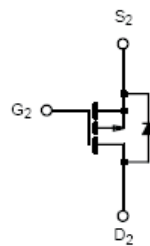


■ Features

- Ultra Low RDS(on) Provides Higher Efficiency and Extends Battery Life
- Logic Level Gate Drive ? Can Be Driven by Logic ICs
- Diode Is Characterized for Use In Bridge Circuits
- Diode Exhibits High Speed, With Soft Recovery
- Idss Specified at Elevated Temperature
- Avalanche Energy Specified



N-Channel MOSFET



P-Channel MOSFET

■ Absolute Maximum Ratings Ta = 25°C

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-source voltage	V _{DSS}	30		V
Gate-source voltage	V _{GSS}	±20		V
Drain current Continuous	I _D	4.1	3	A
Drain current Pulsed *1	I _{DM}	21	15	A
Operating and Storage Temperature Range	T _J , T _{stg}	-55 to 150		°C
Total power dissipation	P _D	2		W
Thermal Resistance ? Junction to Ambient	R _{θJA}	62.5		°C/W
Single Pulse Drain-to-Source Avalanche Energy - Starting T _J = 25°C	E _{AS}	324 *2	324 *3	mJ

*1 P_w ≤ 10 μs, Duty cycle ≤ 1%

*2 V_{DD} = 30 V, V_{GS} = 5.0 V, Peak I_L = 9.0A, L = 8.0 mH, R_G = 25 Ω

*3 V_{DD} = 30 V, V_{GS} = 5.0 V, Peak I_L = 6.0A, L = 18 mH, R_G = 25 Ω

■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit	
Gate-source leakage	IGSS	VGS=±20V, VDS=0V	N-Ch		100	nA	
			P-Ch		100		
Drain-source breakdown voltage	V(BR) DSS	ID=250 μ A, VGS=0V	N-Ch	30		V	
			P-Ch	30			
Zero gate voltage drain current	IDSS	VDS=30V, VGS=0V	N-Ch		1	μ A	
			P-Ch		1		
Gate threshold voltage *1	VGS (th)	VDS = VGS, ID = 250 μ A	N-Ch	1.0	1.7	3.0	V
			P-Ch	1.0	1.5	2.0	
Static drain-source on-state resistance *1	RDS (on)	ID=3.0A, VGS=10A	N-Ch		0.06	0.070	Ω
		ID=1.5A, VGS=4.5V			0.17	0.200	
Static drain-source on-state resistance *1	RDS (on)	ID=2.0A, VGS=10V	P-Ch		0.065	0.075	Ω
		ID=1.0A, VGS=4.5V			0.225	0.300	
Forward Transconductance	gFS	ID=1.5A, VDS=3.0V	N-Ch	2.0	3.6	S	
		ID=1.0A, VDS=3V	P-Ch	2.0	3.4		
Input capacitance	Ciss	N-Channel VDS=24V, VGS=0V, f=1MHz	N-Ch		450	630	pF
			P-Ch		397	550	
Output capacitance	Coss	P-Channel VDS=24V, VGS=0V, f=1MHz	N-Ch		160	225	pF
			P-Ch		189	250	
Reverse transfer capacitance	Crss	VDS=24V, VGS=0V, f=1MHz	N-Ch		35	70	pF
			P-Ch		64	126	
Turn-on delay time	td (on)	ID=3.0A, VDD=15V	N-Ch		12	24	ns
		ID=2.0A, VDD=-15V	P-Ch		16	32	
Rise time	tr	N-Channel VGS=4.5V, RG=9.1 Ω	N-Ch		65	130	ns
			P-Ch		18	36	
Turn-off delay time *1	td (off)	P-Channel VGS=4.5V, RG=6.0 Ω	N-Ch		16	32	ns
			P-Ch		63	126	
Fall time *1	tf	VGS=4.5V, RG=6.0 Ω	N-Ch		19	38	ns
			P-Ch		194	390	
Turn-on delay time *1	td (on)	ID=3.0A, VDD=15V	N-Ch		8.0	16	ns
		ID=2.0A, VDD=-15V	P-Ch		9.0	18	
Rise time *1	tr	N-Channel VGS=10V, RG=9.1 Ω	N-Ch		15	30	ns
			P-Ch		10	20	
Turn-off delay time *1	td (off)	P-Channel VGS=10V, RG=6.0 Ω	N-Ch		30	60	ns
			P-Ch		81	162	
Fall time *1	tf	VGS=10V, RG=6.0 Ω	N-Ch		23	46	ns
			P-Ch		192	384	
Total Gate Charge *2	QT	N-Channel VDS=10V, ID=3.0A, VGS=10 V	N-Ch		11.5	16	nC
			P-Ch		14.2	19	
Gate?Source Charge *2	Q1	P-Channel VDS = 24 V, ID = 2.0 A, VGS=10V	N-Ch		1.5		
			P-Ch		1.1		
Gate?Drain Charge *2	Q2	VDS = 24 V, ID = 2.0 A, VGS=10V	N-Ch		3.5		
			P-Ch		4.5		
	Q3		N-Ch		2.8		
			P-Ch		3.5		



■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Forward Voltage *1	VSD	Is=3.0 A, VGS=0V	N-Ch	0.82	1.2	V
		Is=2.0 A, VGS=0 V	P-Ch	1.82	2	
Reverse Recovery Time	trr	If = Is, dis/dt = 100 A/μs	N-Ch	24		ns
			P-Ch	42		
	ta		N-Ch	17		
			P-Ch	16		
	tb		N-Ch	7		
			P-Ch	26		
Reverse Recovery Storage Charge	QRR	N-Ch		0.025		μC
		P-Ch		0.043		

*1 Pulse Test: Pulse Width 3 300 μs, Duty Cycle ≤2%.

*2 Switching characteristics are independent of operating junction temperature.