

Silicon N-Channel Power MOSFET

Description

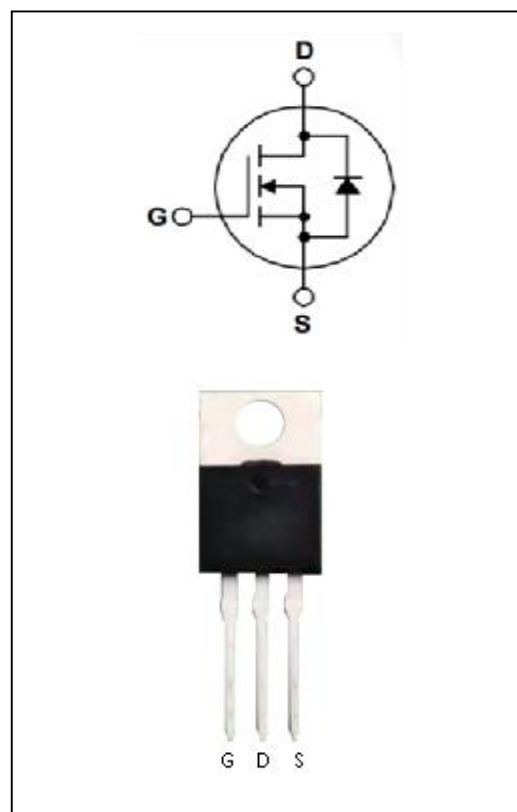
The MP13N50PF uses advanced technology and design to provide excellent $R_{DS(ON)}$. It can be used in a wide variety of applications.

General Features

- I $V_{DS}=500V, I_D=13A$
- I Low ON Resistance
- I Low Reverse transfer capacitances
- I 100% Single Pulse avalanche energy Test

Application

- I Power switching application
- I Adapter and charger



Electrical Characteristics @ $T_a=25^\circ\text{C}$ (unless otherwise specified)

a) Absolute Maximum Ratings:

Symbol	Parameter	Value	Units
V_{DSS}	Drain-to-Source Breakdown Voltage	500	V
I_D	Drain Current (continuous) at $T_c=25^\circ\text{C}$	13	A
I_{DM}	Drain Current (pulsed)	52	A
V_{GS}	Gate to Source Voltage	+/-30	V
P_{tot}	Total Dissipation at $T_c=25^\circ\text{C}$	60	W
T_j	Max. Operating Junction Temperature	175	$^\circ\text{C}$
E_{AS}	Single Pulse Avalanche Energy	1000	mJ

b) Electrical Parameters:

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{DS}	Drain-source Voltage	$V_{GS}=0V, I_D=250\mu A$	500			V
$R_{DS(on)}$	Static Drain-to-Source on-Resistance	$V_{GS}=10V, I_D=6.5A$		0.34	0.50	Ω
$V_{GS(th)}$	Gated Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	3.1	4.0	V
I_{DSS}	Drain to Source leakage Current	$V_{DS}=500V, V_{GS}=0V$			1.0	μA
$I_{GSS(F)}$	Gated Body Forward Leakage	$V_{GS}=+30V$			100	nA
$I_{GSS(R)}$	Gated Body Reverse Leakage	$V_{GS}=-30V$			-100	nA
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ $f=1.0MHz$		2315		pF
C_{oss}	Output Capacitance			190		pF
C_{rss}	Reverse Transfer Capacitance			11		pF

c) Switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=250V, I_D=13A,$ $R_G=10\Omega$		28		nS
t_r	Turn-on Rise Time			21		nS
$t_{d(off)}$	Turn-off Delay Time			62		nS
t_f	Turn-off Fall Time			32		nS
Q_g	Total Gate Charge	$V_{DS}=400V$ $I_D=13A$ $V_{GS}=10V$		40		nC
Q_{gs}	Gate-Source Charge			9.2		nC
Q_{gd}	Gate-Drain Charge			14		nC

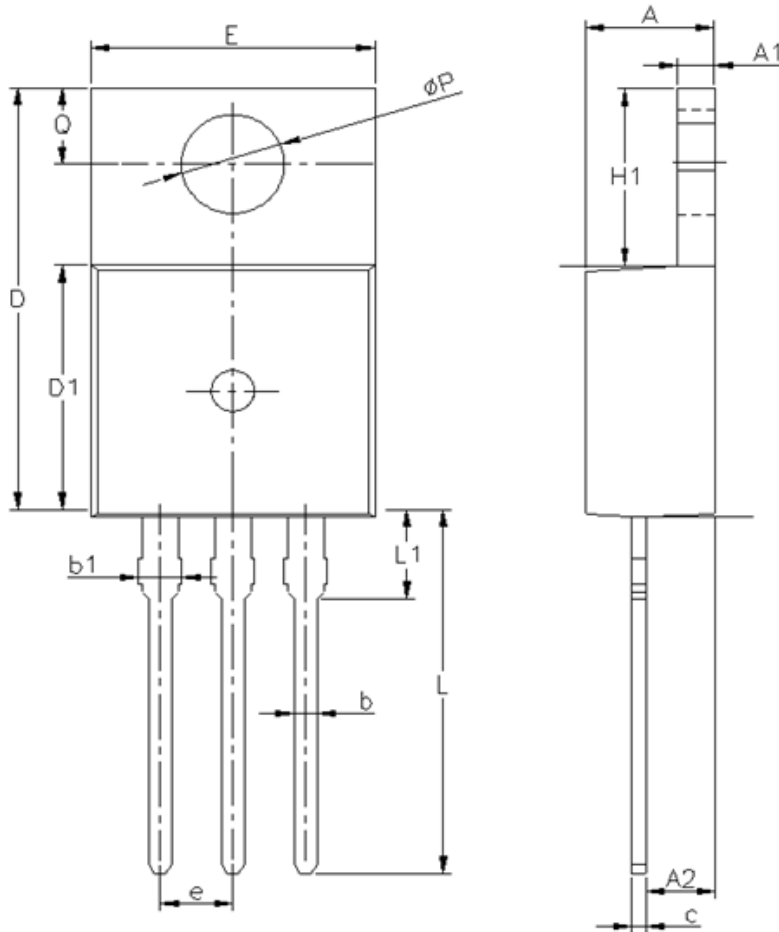
d) Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I_{SD}	S-D Current(Body Diode)				13	A
I_{SDM}	Pulsed S-D Current(Body Diode)				52	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_{DS}=13A$			1.5	V
t_{rr}	Reverse Recovery Time	$T_J=25^\circ C, I_F=13A$ $di/dt=100A/us$			555	nS
Q_{rr}	Reverse Recovery Charge				4550	μC
*Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$						

Symbol	Parameter	Typ	Units
$R_{\theta JC}$	Junction-to-Case	2.5	$^\circ C/W$

Package Information

TO-220EW PACKAGE



SYMBOL	MIN	NOM	MAX
A	4.30	4.50	4.77
A1	1.25	1.27	1.42
A2	1.80	2.50	2.89
b	0.70	0.80	0.96
b1	1.22	1.33	1.50
c	0.33	0.38	0.48
D	15.10	15.70	16.10
D1	8.80	9.15	9.40
E	9.60	10.20	10.40
e	2.54 BSC		
H1	6.10	6.50	7.00
L	12.60	13.10	14.30
L1	—	—	3.50
Q	2.54	—	2.94
ϕP	3.66	3.86	4.06