



N-channel Power MOSFET

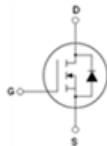
PRODUCT SUMMARY		
V_{DS} (V) at T_J max.	550	
$R_{DS(on)}$ max. at 25°C (Ω)	$V_{GS}=10V$	0.30
Q_g max. (nC)	88	
Q_{gs} (nC)	21	
Q_{gd} (nC)	28	
Configuration	single	

Features

- $I_D=18A(V_{GS}=10V)$
- Ultra Low Gate Charge
- Improved dv/dt Capability
- 100% Avalanche Tested
- ROHS compliant



TO-220F



Schematic diagram

Applications

- Switching Mode Power Supplies (SMPS)
- PWM Motor Controls
- DC to DC Converters
- LED Lighting
- Bridge Circuits

ORDERING INFORMATION	
Device	SPC18N50G
Device Package	TO-220F
Marking	18N50G

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$, unless otherwise noted)			
Parameter	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	500	V
Continuous Drain Current (@ $T_C=25^\circ\text{C}$)	I_D	18 ⁽¹⁾	A
Continuous Drain Current (@ $T_C=100^\circ\text{C}$)		13 ⁽¹⁾	A
Drain current pulsed ⁽²⁾	I_{DM}	72 ⁽¹⁾	A
Gate to Source Voltage	V_{GS}	± 30	V
Single pulsed Avalanche Energy ⁽³⁾	E_{AS}	1200	mJ
MOSFET dv/dt ruggedness (@ $V_{DS}=0\sim 400V$)	dv/dt	25	V/ns
Peak diode Recovery dv/dt ⁽⁴⁾	dv/dt	15	V/ns
Total power dissipation (@ $T_C=25^\circ\text{C}$)	P_D	40	W
Derating Factor above 25°C		0.3	W/°C
Operating Junction Temperature & Storage Temperature	T_{STG}, T_J	-55 to + 150	°C
Maximum lead temperature for soldering purpose	T_L	260	°C
Mounting torque ⁽⁵⁾		0.4~0.6	N.m

Notes

1. Drain current is limited by maximum junction temperature.
2. Repetitive rating : pulse width limited by junction temperature.
3. $L = 6mH, I_{AS} = 18A, V_{DD} = 50V, R_G=25\Omega$, Starting at $T_J = 25^\circ\text{C}$
4. $I_{SD} \leq I_D, di/dt = 100A/us, V_{DD} \leq BV_{DSS}$, Starting at $T_J = 25^\circ\text{C}$
5. Mounting consideration for TO220 Fullpack:
M3 screw plus flat washer is suggested, free of burr between devices and contact area, the devices are to be mounted to a hole not larger than 3.6mm in contact diameter (chamfer included).



THERMAL CHARACTERISTICS			
Parameter	Symbol	Value	Unit
		SPC18N50G	
Thermal resistance, Junction to case	R_{thjc}	3.0	$^{\circ}\text{C}/\text{W}$
Thermal resistance, Junction to ambient	R_{thja}	46	$^{\circ}\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}\text{C}$ unless otherwise specified)						
Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain to source breakdown voltage	BV_{DSS}	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	500			V
Breakdown voltage temperature coefficient	$\Delta BV_{DSS} / \Delta T_J$	$I_D=250\mu\text{A}$, referenced to 25°C		0.51		$\text{V}/^{\circ}\text{C}$
Drain to source leakage current	I_{DSS}	$V_{DS}=500\text{V}, V_{GS}=0\text{V}$			1	μA
		$V_{DS}=400\text{V}, T_C=125^{\circ}\text{C}$			50	μA
Gate to source leakage current, forward	I_{GSS}	$V_{GS}=30\text{V}, V_{DS}=0\text{V}$			100	nA
Gate to source leakage current, reverse		$V_{GS}=-30\text{V}, V_{DS}=0\text{V}$			-100	nA
On Characteristics						
Gate threshold voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	3		5	V
Drain to source on state resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=9\text{A}$		0.25	0.30	Ω
Forward Transconductance	G_{fs}	$V_{DS}=30\text{V}, I_D=9\text{A}$		18.5		S
Dynamic Characteristics						
Input capacitance	C_{iss}	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1\text{MHz}$		4670		pF
Output capacitance	C_{oss}			315		
Reverse transfer capacitance	C_{rss}			18.5		
Turn on delay time	$t_{d(on)}$	$V_{DS}=250\text{V}, I_D=18\text{A}, R_G=25\Omega$		49		ns
Rising time	t_r			65		
Turn off delay time	$t_{d(off)}$			232		
Fall time	t_f			81		
Total gate charge	Q_g	$V_{DS}=400\text{V}, V_{GS}=10\text{V}, I_D=18\text{A}$		88		nC
Gate-source charge	Q_{gs}			22		
Gate-drain charge	Q_{gd}			29		
Gate Resistance	R_g	$V_{DS}=0\text{V}, \text{Scan F mode}$		1		Ω

SOURCE TO DRAIN DIODE RATINGS CHARACTERISTICS						
Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous source current	I_S	Integral reverse p-n Junction diode in the MOSFET			18	A
Pulsed source current	I_{SM}				72	A
Diode forward voltage drop.	V_{SD}	$I_S=18\text{A}, V_{GS}=0\text{V}$			1.3	V
Reverse recovery time	T_{rr}	$I_S=18\text{A}, V_{GS}=0\text{V}, dl_F/dt=100\text{A}/\mu\text{s}$		461		ns
Reverse recovery Charge	Q_{rr}				5.5	μC

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