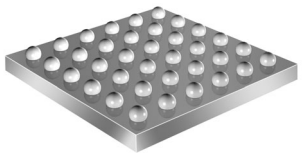
TS12N20CS

Single N-Channel 4.5V Specified MicroSurf™



Drain-Source Voltage
20 Volt
Current I_D
12 Ampere

Features

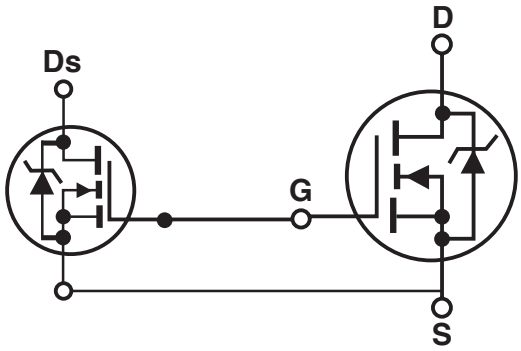
- ✧ 12A, 20V $R_{DS(ON)}$=3.9mΩ at 4.5Volts
- ✧ 12A, 20V Qg=19.8nC at 4.5Volts
- ✧ Low profile package: less than 1mm height when mounted on PCB
- ✧ Occupies only 1/3 the area of SO-8
- ✧ Excellent thermal characteristics
- ✧ High power and current handling capability
- ✧ Lead free solder balls available

Description

Taiwan Semiconductor's new low cost, state of the art MicroSurf™ lateral MOSFET process technology in chipscale bondwireless packaging minimizes PCB space and $R_{DS(ON)}$ plus provides an ultra-low Qg X $R_{DS(ON)}$ figure of merit.

Patent Pending

Internal Block Diagram



Pin Configuration

D	S	D	S	D	S
S	D	S	D	S	D
D	S	D	S	D	G
S	D	S	D	S	D_s
D	S	D	S	D	S
S	D	S	D	S	D

Bottom: Bump Side

Standard Application

MicroSurf™ for High Frequency DC-DC Converters

Rev. 1 05/2003

Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	20	V
Gate-Source Voltage	V_{GSS}	+12	V
Drain Current – Continuous – Pulsed	I_D	6 25	A A
Power Dissipation (Steady State)	P_D	2.2	W
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	°C

Thermal Characteristics

Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	56	°C/W
Thermal Resistance, Junction-to-Ball	$R_{\theta JR}$	4.5	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.6	°C/W

TS12N20CS Electrical Specifications T_A = 25°C unless otherwise specified

Characteristics	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	20	--	--	V
Gate-Body Leakage	I_{GGS}	V_{GS} = ±12V, V_{DS} = 0V	--	--	±150	nA
Zero Gate Voltage Drain Current	I_{DSS}	Tj=150°C, V_{DS} = 20V, V_{GS} = 0V	--	--	250	uA
Drain to Drain Sense Leakage	I_{DDS}	Tj=150°C, V_{DS} = 20V, V_{GS} = 0V	--	--	250	uA
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 12A	--	3.9	--	mΩ
Drain Sense On-Resistance	$R_{DSDS(on)}$	V_{GS} = 4.5V, I_D = 0.35A	--	137	--	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250uA	--	1.3	--	V
Total Gate Charge	Qg	V_{DS} = 20V, V_{GS} = 4.5V, I_D = 12A	--	19.8	--	nC
Gate Resistance	Rg	V_{DS} = 0V, f=1MHz	--	0.4	--	Ohms
Output Capacitance	Coss	V_{DS} = 20V, V_{GS} = 0V, f=1MHz	--	2.4	--	nF
Input Capacitance	Ciss	V_{DS} = 20V, V_{GS} = 0V, f=1MHz	--	320	--	pF
Reverse transfer capacitance	Crss	V_{DS} = 20V, V_{GS} = 0V, f=1MHz	--	TBD	--	pF
Reverse Recovery time Source-Drain Diode	trr	If = 12A, di/dt = 100A/us Tj = 150°C	--	--	40	ns
Forward On-Voltage Source-Drain Diode	V_{SD}	Is = 12A, V_{GS} = 0V	--	0.75	--	V
On-State Drain Current	ID(on)	V_{GS} = 4.5V, V_{DS} = 1V	25	--	--	A
Avalanche Energy UIS	Eas	Single Pulse 10us, V_{DS} > BV_{DSS}	2.5	--	--	mJ

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