
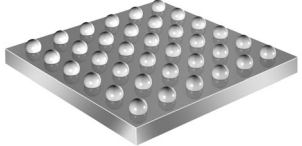
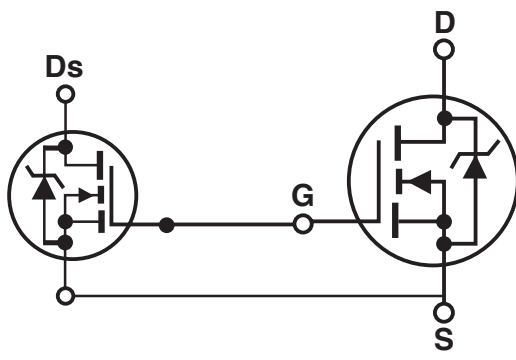
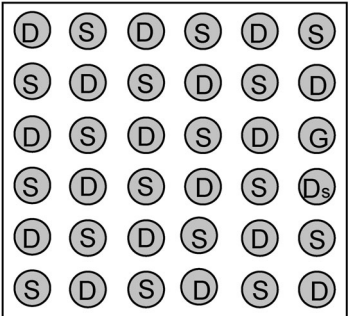


PRELIMINARY DATA SHEET

	<h3 style="margin: 0;">TS12N20CS</h3> <p style="margin: 0;">Single N-Channel 4.5V Specified MicroSurf™</p>
	<p>Drain-Source Voltage 20 Volt</p> <p>Current I_D 12 Ampere</p>
<p>Features</p> <ul style="list-style-type: none"> ✧ 12A, 20V $R_{DS(ON)}=3.9m\Omega$ at 4.5Volts ✧ 12A, 20V $Q_g=19.8nC$ 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 	
<p>Description</p> <p>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 $Q_g \times R_{DS(ON)}$ figure of merit.</p> <p style="font-size: 2em; opacity: 0.5; transform: rotate(-15deg); position: absolute; top: 50%; left: 50%;">Patent Pending</p>	<p>Internal Block Diagram</p> 
<p>Pin Configuration</p>  <p style="margin-top: 5px;">Bottom: Bump Side</p>	<p>Standard Application</p> <p>MicroSurf™ for High Frequency DC-DC Converters</p>

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Absolute Maximum Ratings $T_A=25^{\circ}\text{C}$ unless otherwise noted						
Parameter	Symbol	Value	Unit			
Drain-Source Voltage	V_{DSS}	20	V			
Gate-Source Voltage	V_{GSS}	+12	V			
Drain Current	I_D	– Continuous	6 A			
		– Pulsed	25 A			
Power Dissipation (Steady State)	P_D	2.2	W			
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$			
Thermal Characteristics						
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	56	$^{\circ}\text{C}/\text{W}$			
Thermal Resistance, Junction-to-Ball	$R_{\theta JB}$	4.5	$^{\circ}\text{C}/\text{W}$			
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.6	$^{\circ}\text{C}/\text{W}$			
TS12N20CS Electrical Specifications $T_A=25^{\circ}\text{C}$ unless otherwise specified						
Characteristics	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	20	--	--	V
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 12\text{V}, V_{DS}=0\text{V}$	--	--	± 150	nA
Zero Gate Voltage Drain Current	I_{DSS}	$T_J=150^{\circ}\text{C}, V_{DS}=20\text{V}, V_{GS}=0\text{V}$	--	--	250	μA
Drain to Drain Sense Leakage	I_{DDS}	$T_J=150^{\circ}\text{C}, V_{DS}=20\text{V}, V_{GS}=0\text{V}$	--	--	250	μA
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{V}, I_D=12\text{A}$	--	3.9	--	$\text{m}\Omega$
Drain Sense On-Resistance	$R_{DSDS(on)}$	$V_{GS}=4.5\text{V}, I_D=0.35\text{A}$	--	137	--	$\text{m}\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	--	1.3	--	V
Total Gate Charge	Q_g	$V_{DS}=20\text{V}, V_{GS}=4.5\text{V}, I_D=12\text{A}$	--	19.8	--	nC
Gate Resistance	R_g	$V_{DS}=0\text{V}, f=1\text{MHz}$	--	0.4	--	Ohms
Output Capacitance	C_{oss}	$V_{DS}=20\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$	--	2.4	--	nF
Input Capacitance	C_{iss}	$V_{DS}=20\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$	--	320	--	pF
Reverse transfer capacitance	C_{rss}	$V_{DS}=20\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$	--	TBD	--	pF
Reverse Recovery time Source-Drain Diode	t_{rr}	$I_f=12\text{A}, di/dt=100\text{A}/\mu\text{s}$ $T_J=150^{\circ}\text{C}$	--	--	40	ns
Forward On-Voltage Source-Drain Diode	V_{SD}	$I_S=12\text{A}, V_{GS}=0\text{V}$	--	0.75	--	V
On-State Drain Current	$I_{D(on)}$	$V_{GS}=4.5\text{V}, V_{DS}=1\text{V}$	25	--	--	A
Avalanche Energy UIS	E_{as}	Single Pulse 10 $\mu\text{s}, V_{DS}>BV_{DSS}$	2.5	--	--	mJ

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