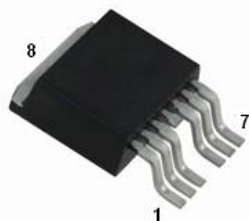


Main Product Characteristics:

V_{DSS}	75V
$R_{DS(on)}$	2.5mΩ(typ.)
I_D	220A ①


TO-263-7L

1, Gate
2~3,5~7 Source
4,8 Drain

Pin Assignment

Schematic Diagram
Features and Benefits:

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 175°C operating temperature


Description:

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

Absolute max Rating:

Symbol	Parameter	Max.	Units
I_D @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V ①	220	A
I_D @ TC = 100°C	Continuous Drain Current, V_{GS} @ 10V ①	170	
I_{DM}	Pulsed Drain Current ②	880	
P_D @TC = 25°C	Power Dissipation ③	333	W
	Linear Derating Factor	2.2	W/°C
V_{DS}	Drain-Source Voltage	75	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ L=2mH	1936	mJ
I_{AS}	Avalanche Current @ L=2mH	44	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	°C

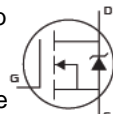
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	0.45	$^{\circ}C/W$
$R_{\theta JA}$	Junction-to-ambient ($t \leq 10s$)④	—	62	$^{\circ}C/W$
	Junction-to-Ambient (PCB mounted, steady-state) ④	—	40	$^{\circ}C/W$

Electrical Characteristics @ $T_A=25^{\circ}C$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	75	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	2.5	4.0	m Ω	$V_{GS}=10V, I_D = 40A$ $T_J = 125^{\circ}C$
		—	4.1	—		
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$ $T_J = 125^{\circ}C$
		—	2.17	—		
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	$V_{DS} = 75V, V_{GS} = 0V$ $T_J = 125^{\circ}C$
		—	—	50		
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 20V$ $V_{GS} = -20V$
		—	—	-100		
Q_g	Total gate charge	—	282	—	nC	$I_D = 40A,$ $V_{DS}=60V,$ $V_{GS} = 10V$
Q_{gs}	Gate-to-Source charge	—	51	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	110	—		
$t_{d(on)}$	Turn-on delay time	—	29	—	nS	$V_{GS}=10V, V_{DS} = 38V,$ $R_L=0.95\Omega,$ $R_{GEN}=1.2\Omega$ $I_D = 40A$
t_r	Rise time	—	85	—		
$t_{d(off)}$	Turn-Off delay time	—	93	—		
t_f	Fall time	—	81	—		
C_{iss}	Input capacitance	—	10747	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 600KHz$
C_{oss}	Output capacitance	—	833	—		
C_{riss}	Reverse transfer capacitance	—	788	—		

Source-Drain Ratings and Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	220 ①	A	MOSFET symb showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	880	A	
V_{SD}	Diode Forward Voltage	—	0.81	1.3	V	$I_S=40A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	—	53	—	nS	$T_J = 25^{\circ}C, I_F = 40A, di/dt = 100A/\mu s$
Q_{rr}	Reverse Recovery Charge	—	114	—	nC	

Test circuits and Waveforms

EAS Test Circuit:

Gate charge test circuit:

Switching Time Test Circuit:

Switching Waveforms:


Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④ The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$

Typical electrical and thermal characteristics

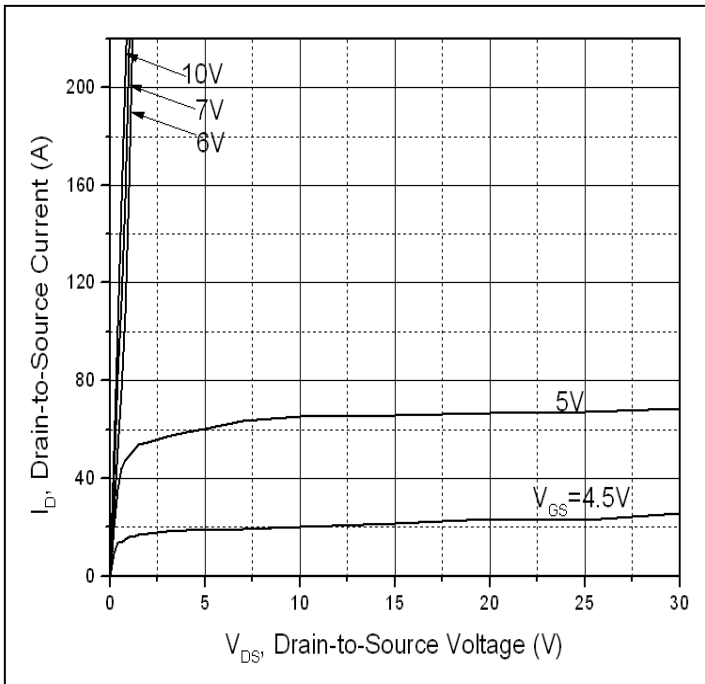


Figure 1: Typical Output Characteristics

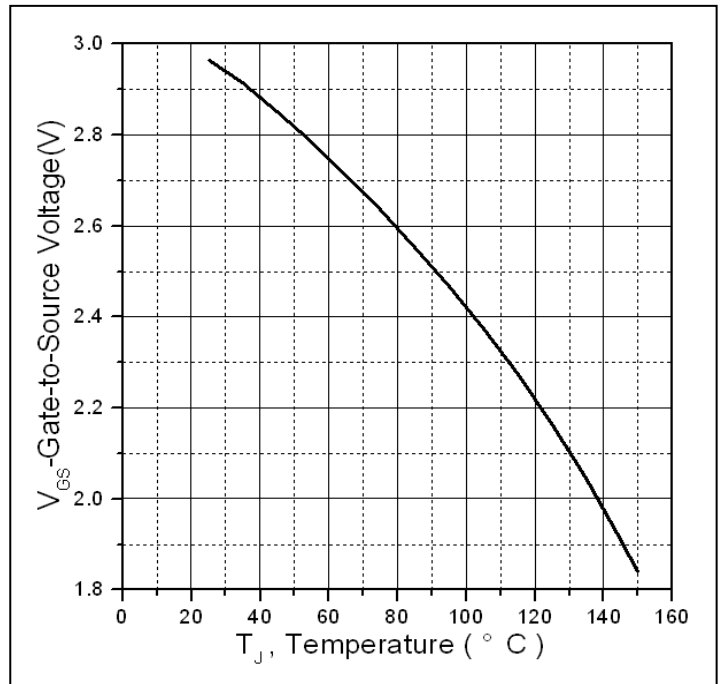


Figure 2: Gate to source cut-off voltage

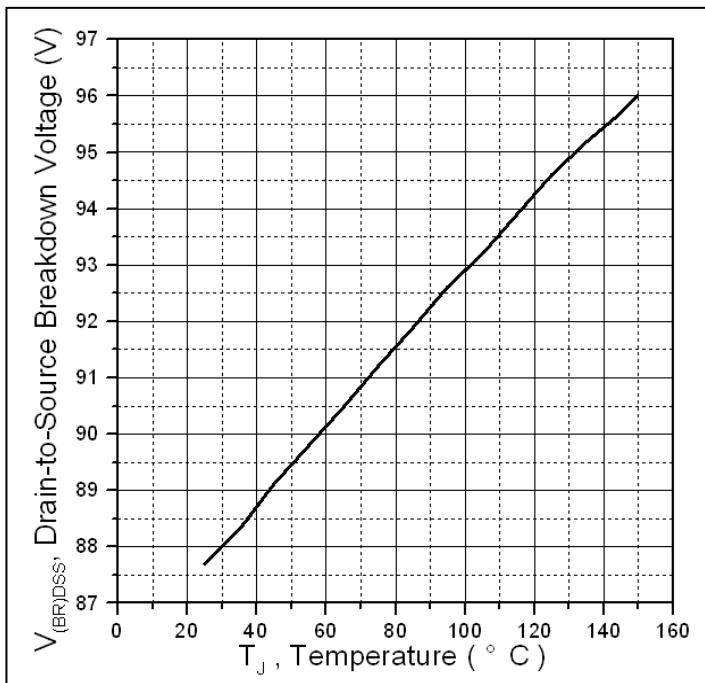


Figure 3: Drain-to-Source Breakdown Voltage vs. Temperature

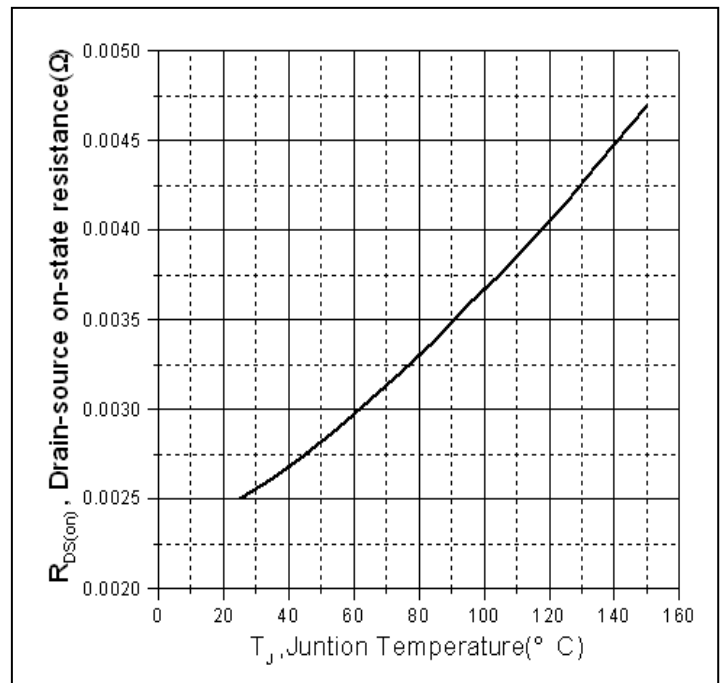


Figure 4: Normalized On-Resistance Vs. Case Temperature

Typical electrical and thermal characteristics

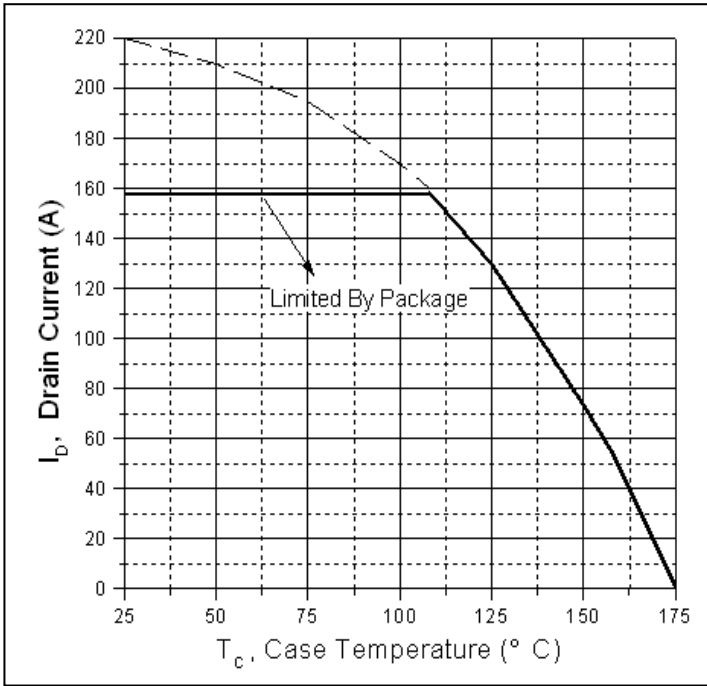


Figure 5. Maximum Drain Current Vs. Case Temperature

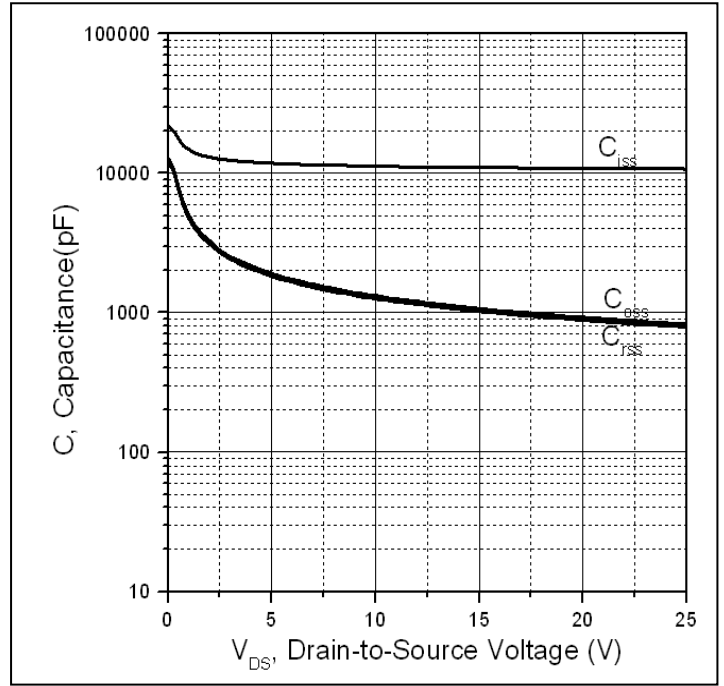


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

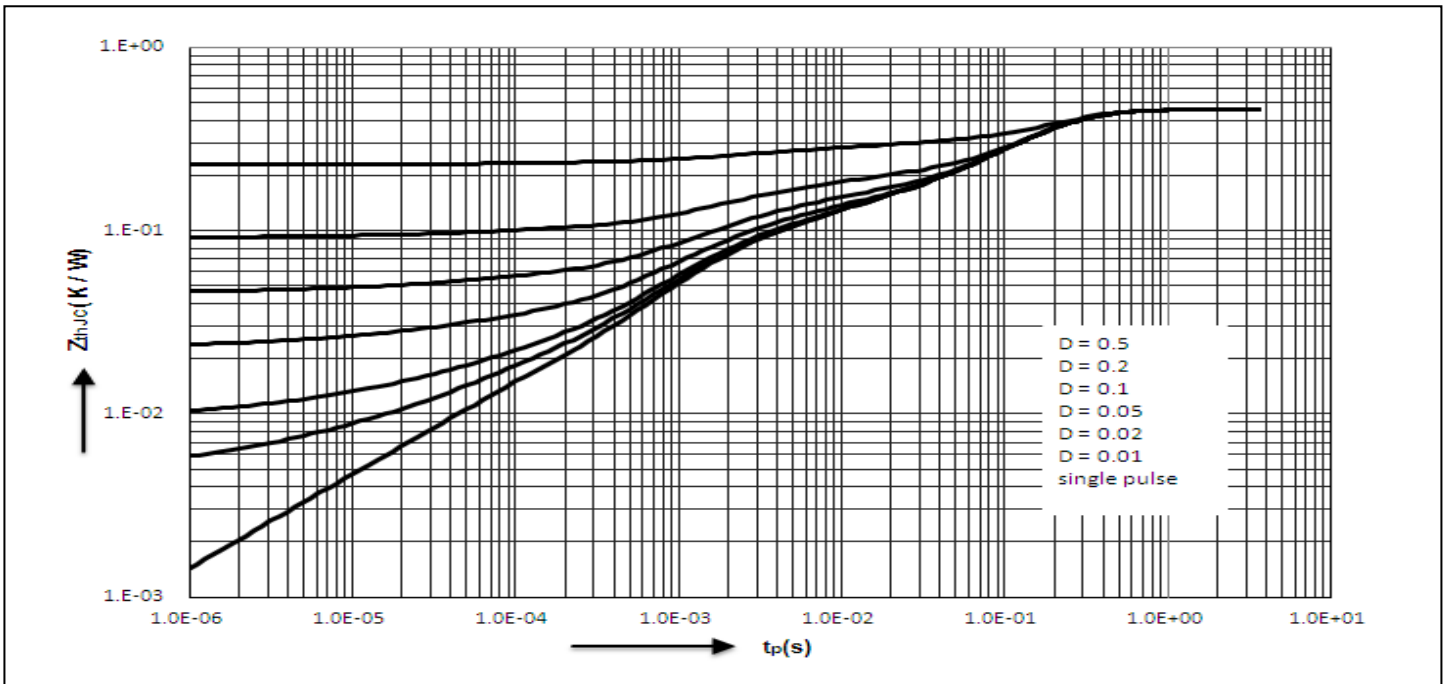
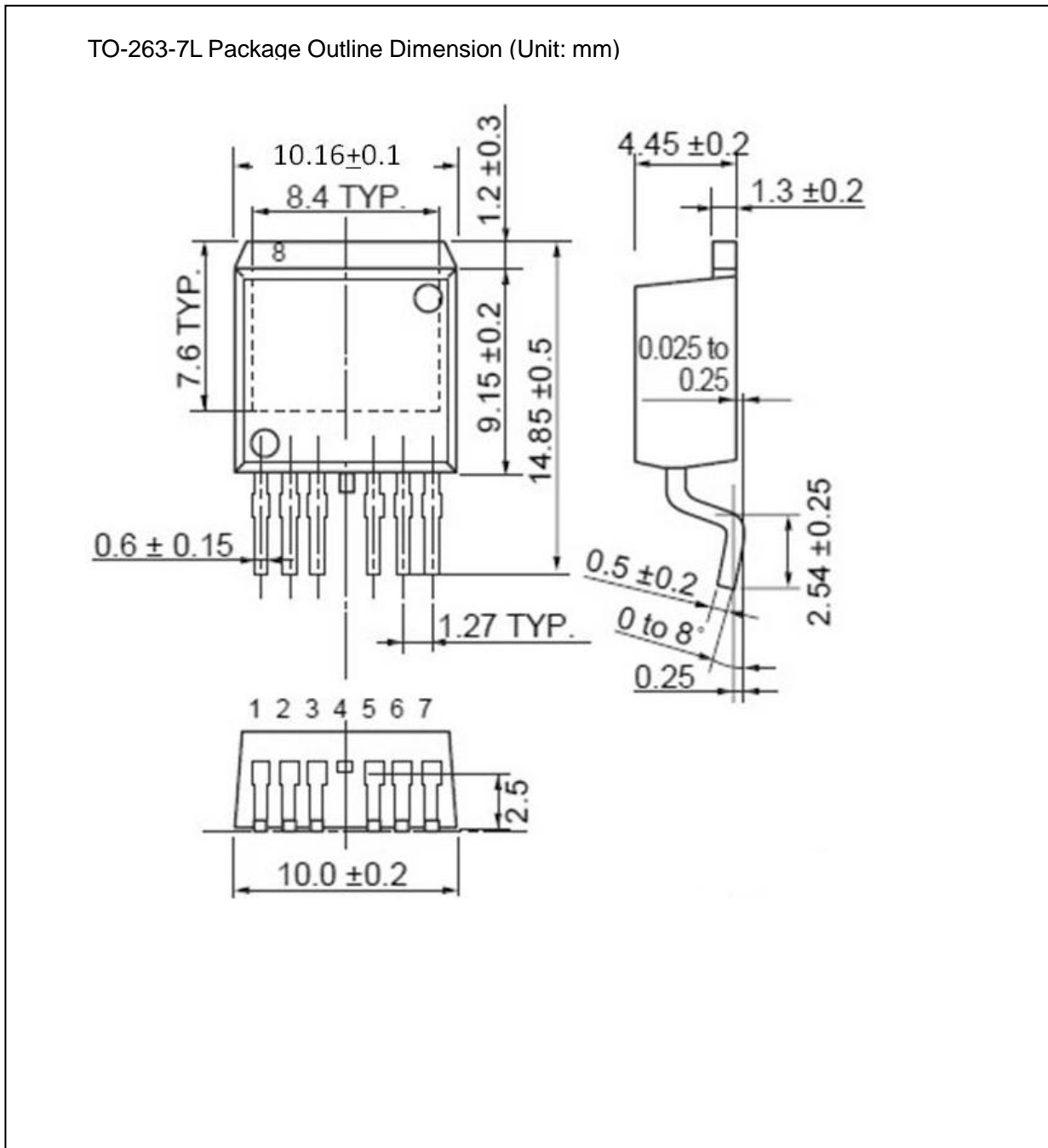


Figure 8. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Mechanical Data:



Ordering and Marking Information

Device Marking: SSF7504A7 Package (Available) TO-263-7L Operating Temperature Range C : -55 to 175 °C
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Devices per Unit

Package Type	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO-263-7L	50	20	1000	6	6000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	T _j =125°C to 175°C @ 80% of Max V _{DSS} /V _{CES} /V _R	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	T _j =125°C or 175°C @ 100% of Max V _{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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Sales@silikron.com

Technical Support:

Technical@silikron.com

Suzhou Silikron Semiconductor Corp.

11A, 428 Xinglong Street, Suzhou Industrial Park, P.R.China

TEL: (86-512) 62560688

FAX: (86-512) 65160705

E-mail: Sales@silikron.com