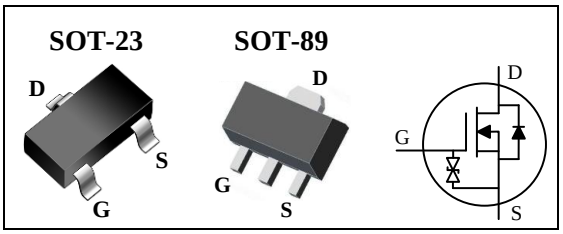
600V N-Channel Depletion-Mode Power MOSFET

General Features

- Depletion Mode (Normally-on)
- Free from Secondary Breakdown
- Proprietary Advanced Planar Technology
- Rugged Polysilicon Gate Cell Structure
- ESD Improved Capability
- High Input Impedance
- RoHS Compliant
- Halogen-free Available

BV_{DSX}	$R_{DS(on)(Typ.)}$	$I_{DSS(Min.)}$
600V	**600Ω**	**10mA**



Applications

- Start-up Circuits
- Normally-on Switches
- Constant Current Source
- Power Supply Circuits

Ordering Information

Part Number	Package	Marking	Remark
DMZ11C55EA	SOT-23	11C55	Halogen Free
DMX11C55EA	SOT-89	11C55	Halogen Free

Absolute Maximum Ratings

T_A = 25℃ unless otherwise specified

Symbol	Parameter	DMZ11C55EA	DMX11C55EA	Unit
V_{DSX}	Drain-to-Source Voltage [1]	600		V
V_{DGX}	Drain-to-Gate Voltage [1]	600		V
V_{GS}	Gate-to-Source Voltage	±20		V
I_D	Continuous Drain Current [2]	0.02	0.028	A
I_{DM}	Pulsed Drain Current [3]	0.08	0.1	A
P_D	Power Dissipation [4]	0.5	1	W
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300		℃
T_J & T_{STG}	Operating and Storage Temperature Range	-55 to 150		℃

Caution: Stresses beyond those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	DMZ11C55EA	DMX11C55EA	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	250	125	℃/W

Electrical Characteristics

OFF Characteristics

T_A = 25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSX}	Drain-to-Source Breakdown Voltage	600	--	--	V	V_{GS} = -5V, I_D = 250μA
$I_{D(off)}$	Drain-to-Source Leakage Current	--	--	1	μA	V_{DS} = 600V, V_{GS} = -5V
I_{GSS}	Gate-to-Source Leakage Current	--	--	10	μA	V_{GS} = 20V, V_{DS} = 0V
		--	--	-10		V_{GS} = -20V, V_{DS} = 0V

ON Characteristics

T_A = 25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
I_{DSS}	Saturated Drain-to-Source Current	10	--	30	mA	V_{DS}=25V, V_{GS}=0V
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	--	600	700	Ω	V_{GS} = 0V, I_D = 5mA [5]
$V_{GS(off)}$	Gate-to-Source Cut-off Voltage	-3.3	--	-1.5	V	V_{DS} = 5V, I_D = 8μA
g_{fs}	Forward Transconductance	--	14	--	mS	V_{DS} = 10V, I_D = 5mA

Dynamic Characteristics

T_A = 25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	11.4	--	pF	V_{GS} = -5V, V_{DS} = 25V, f = 1.0MHz
C_{oss}	Output Capacitance	--	7.7	--		
C_{rss}	Reverse Transfer Capacitance	--	3.5	--		
Q_g	Total Gate Charge	--	0.56	--	nC	V_{GS} = -5 to 5V, V_{DD} = 25V, I_D = 10mA
Q_{gs}	Gate-to-Source Charge	--	0.27	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	0.07	--		

Resistive Switching Characteristics

T_A = 25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time	--	9.2	--	ns	V_{GS} = -5 to 5V, V_{DD} = 25V, I_D = 10mA, R_G = 10Ω
t_r	Rise Time	--	30.0	--		
$t_{d(off)}$	Turn-off Delay Time	--	13.6	--		
t_f	Fall Time	--	91.6	--		

Source-Drain Diode Characteristics

T_A = 25℃ unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	--	--	1.2	V	I_{SD} = 5mA, V_{GS} = -5V

NOTE：

[1] T_J = +25℃ to +150℃.
[2] T_C = +25℃.
[3] Repetitive rating, pulse width limited by maximum junction temperature.
[4] T_C = +25℃.
[5] Pulse width ≤ 380μs, duty cycle ≤ 2%.

Typical Characteristics

T_A = 25℃ unless otherwise specified

Figure 1. Maximum Power Dissipation vs. Ambient Temperature

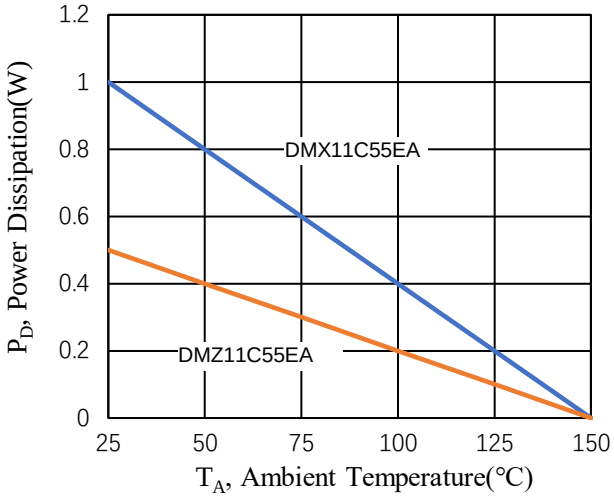


Figure 2. Maximum Continuous Drain Current vs. Ambient Temperature

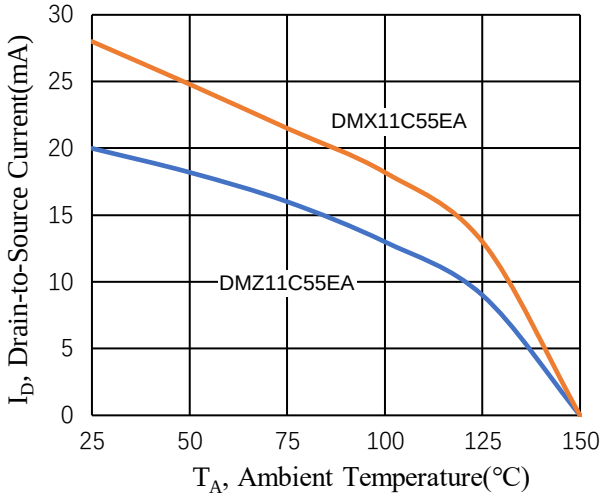


Figure 3. Typical Output Characteristics

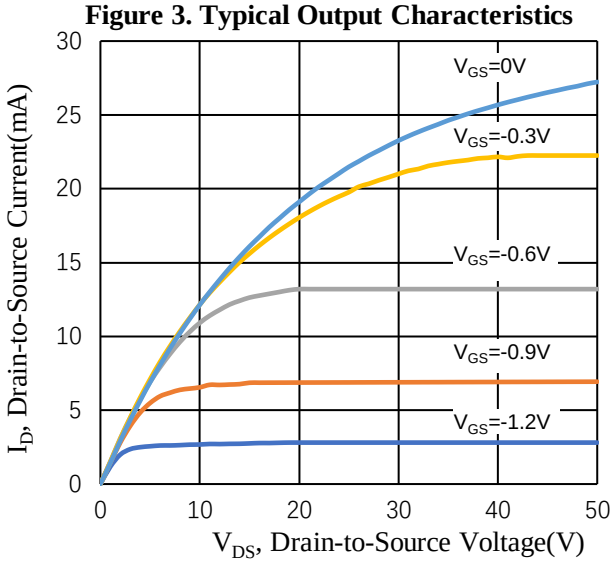


Figure 4. Typical Transfer Characteristics

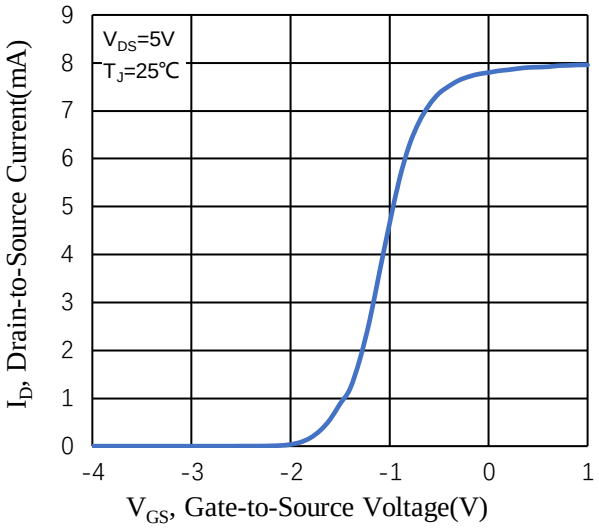


Figure 5. Typical Capacitance vs. Drain-to-Source Voltage

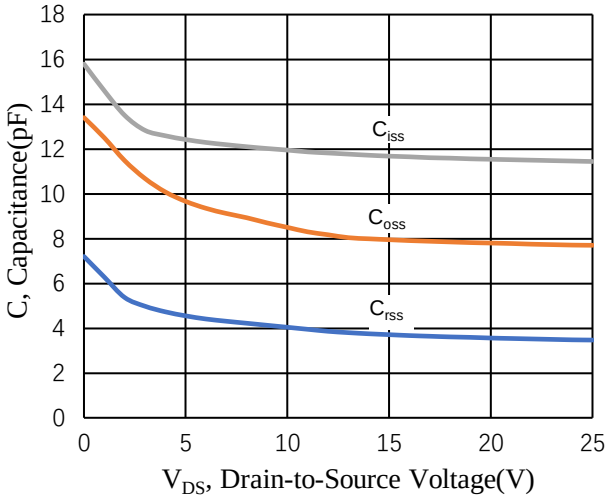


Figure 6. Typical Gate Charge vs. Gate-to-Source Voltage

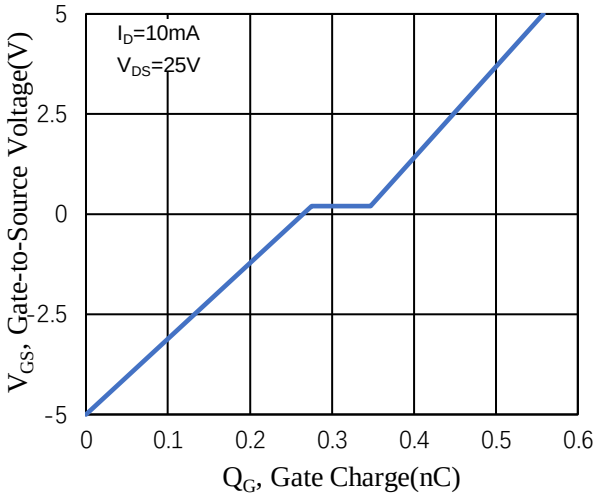


Figure 7. Normalized On-Resistance vs. Junction Temperature

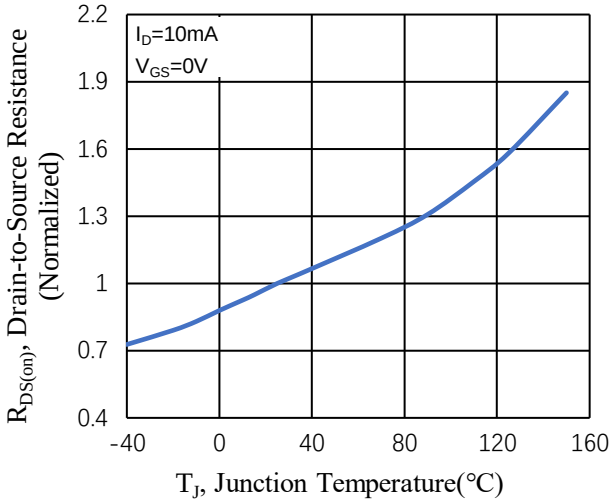


Figure 8. Gate-to-Source Cut-off Voltage vs. Junction Temperature

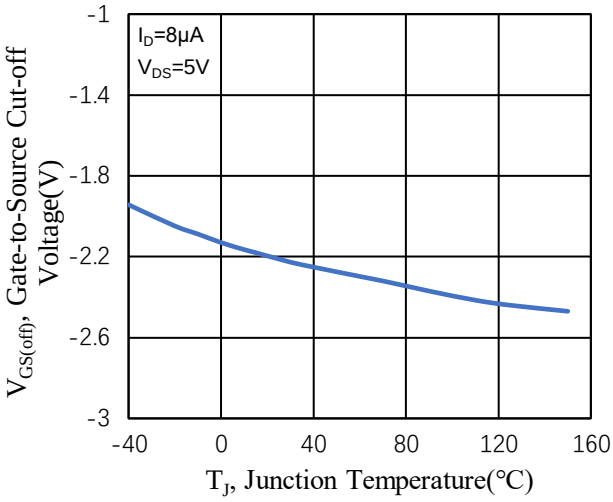


Figure 9. Drain-to-Source Breakdown Voltage vs. Junction Temperature

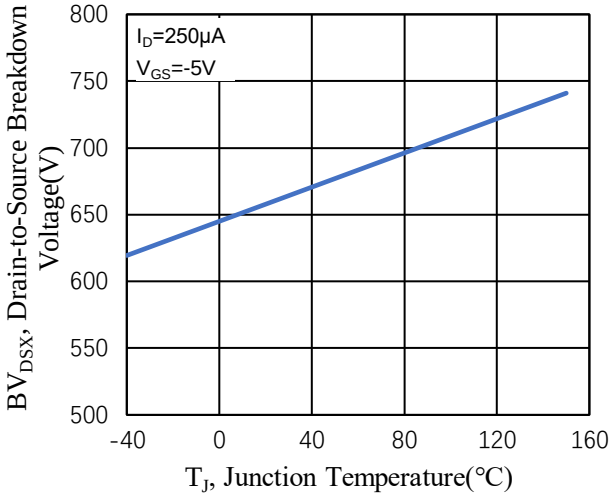
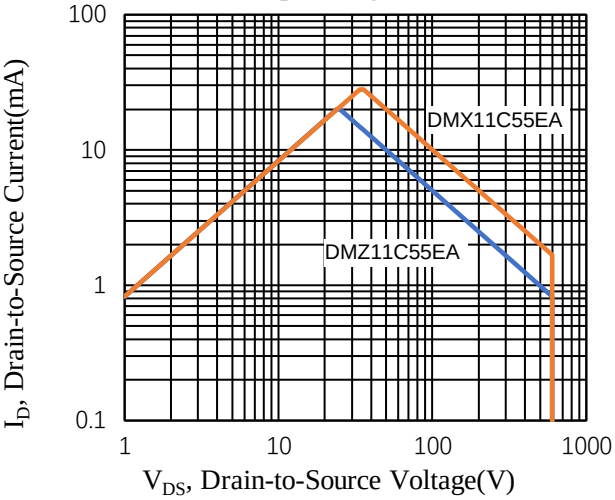
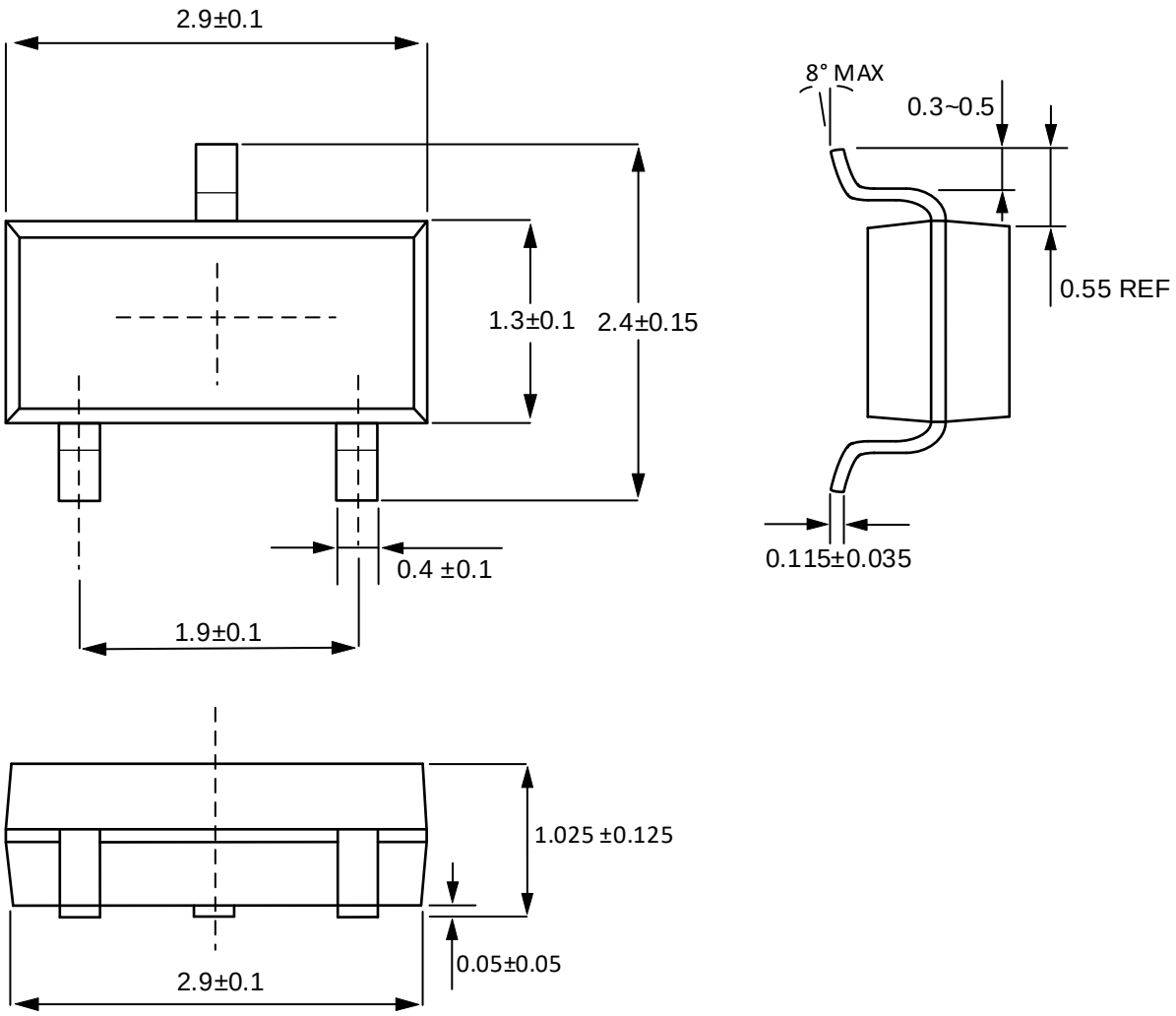


Figure 10. Maximum Forward Safe Operating Area

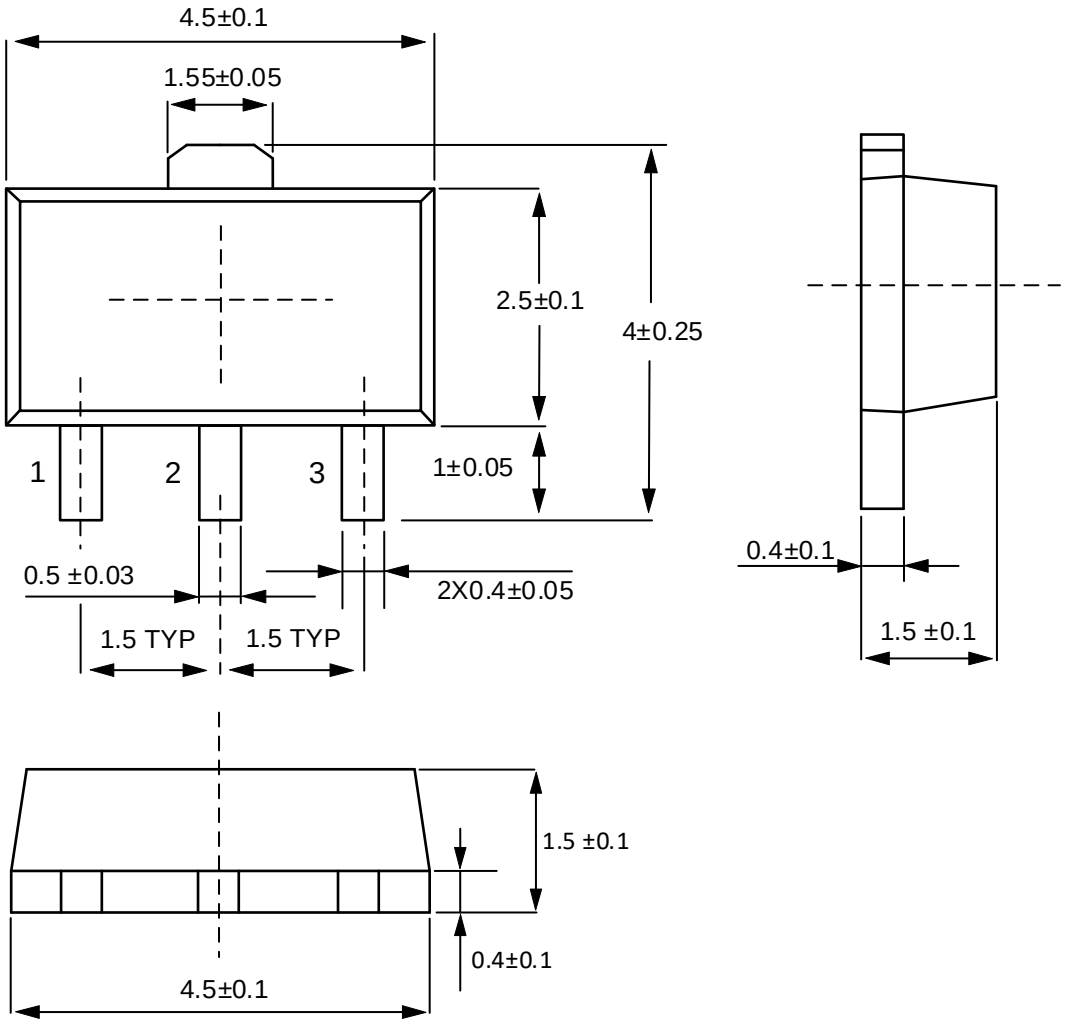


Package Dimensions

SOT-23



SOT-89


4.5±0.1
1.55±0.05
2.5±0.1
4±0.25
1
2
3
1±0.05
0.5 ±0.03
2X0.4±0.05
1.5 TYP
1.5 TYP
0.4±0.1
1.5 ±0.1
1.5 ±0.1
0.4±0.1
4.5±0.1

Published by
ARK Microelectronics Co., Ltd.
Add: D26, UESTC National Science Park, No. 1 Shuangxing Avenue, Chengdu, Sichuan
Tel: +86 (028) 8523-2215 Email: sales@ark-micro.com Website: www.ark-micro.com

Disclaimers

ARK Microelectronics Co., Ltd. reserves the right to make change without notice in order to improve reliability, function or design and to discontinue any product or service without notice. Customers should obtain the latest relevant information before orders and should verify that such information is current and complete. All products are sold subject to ARK Microelectronics Co., Ltd.'s terms and conditions supplied at the time of order acknowledgement.

ARK Microelectronics Co., Ltd. warrants performance of its hardware products to the specifications at the time of sale, Testing, reliability and quality control are used to the extent ARK Microelectronics Co., Ltd deems necessary to support this warrantee. Except where agreed upon by contractual agreement, testing of all parameters of each product is not necessary performed.

ARK Microelectronics Co., Ltd. does not assume any liability arising from the use of any product or circuit designs described herein. Customers are responsible for their products and applications using ARK Microelectronics Co., Ltd.'s components. To minimize risk, customers must provide adequate design and operating safeguards.

ARK Microelectronics Co., Ltd. does not warrant or convey any license either expressed or implied under its patent rights, nor the rights of others. Reproduction of information in ARK Microelectronics Co., Ltd.'s data sheets or data books is permissible only if reproduction is without modification or alteration. Reproduction of this information with any alteration is an unfair and deceptive business practice. ARK Microelectronics Co., Ltd. is not responsible or liable for such altered documentation.

Resale of ARK Microelectronics Co., Ltd.'s products with statements different from or beyond the parameters stated by ARK Microelectronics Co., Ltd. for the product or service voids all express or implied warrantees for the associated ARK Microelectronics Co., Ltd.'s product or service and is unfair and deceptive business practice. ARK Microelectronics Co., Ltd. is not responsible or liable for any such statements.

Life Support Policy:

ARK Microelectronics Co., Ltd.'s products are not authorized for use as critical components in life support devices or systems without the express written approval of ARK Microelectronics Co., Ltd.

As used herein:

1. Life support devices or systems are devices or systems which:
   a. Are intended for surgical implant into the human body,
   b. Support or sustain life, or
   c. When used in accordance with instructions provided in their labeling, whose failure to perform can be reasonably expected to result in significant injury to the patient.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to:
   a. Cause the failure of the life support device or system, or
   b. Affect its safety or effectiveness.