

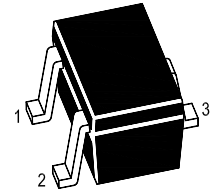
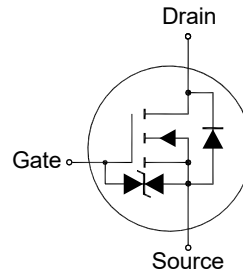
# MKB06N192LK

## N-Channel Enhancement Mode MOSFET

### Features

- Built-in G-S Protection Diode
- Typical ESD Protection HBM Class 1C

Classification	Voltage Range(V)
0A	< 125
0B	125 to < 250
1A	250 to < 500
1B	500 to < 1000
1C	1000 to < 2000
2	2000 to < 4000
3A	4000 to < 8000
3B	≥ 8000



1. Gate 2. Source 3. Drain  
SOT-323 Plastic Package

### Applications

- Portable appliances
- Battery management
- High speed switch
- Low power DC to DC Converter

### Absolute Maximum Ratings(at $T_a = 25^\circ\text{C}$ unless otherwise specified)

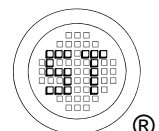
Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	2	A
Peak Drain Current , Pulsed <sup>1)</sup>	$I_{DM}$	8	A
Total Power Dissipation <sup>2)</sup>	$P_{tot}$	500	mW
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to + 150	$^\circ\text{C}$

### Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient <sup>2)</sup>	$R_{\theta JA}$	250	$^\circ\text{C}/\text{W}$

<sup>1)</sup> Pulse Test: Pulse Width  $\leq 100 \mu\text{s}$ , Duty Cycle  $\leq 2\%$ , Repetitive rating, pulse width limited by junction temperature  $T_{J(\text{MAX})}=150^\circ\text{C}$ .

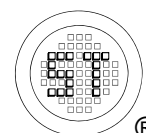
<sup>2)</sup> Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.



# MKB06N192LK

Characteristics at  $T_a = 25^\circ\text{C}$  unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
<b>STATIC PARAMETERS</b>					
Drain-Source Breakdown Voltage at $I_D = 250 \mu\text{A}$	$V_{(BR)DSS}$	60	-	-	V
Zero Gate Voltage Drain Current at $V_{DS} = 48 \text{ V}$	$I_{DSS}$	-	-	1	$\mu\text{A}$
Gate-Source Leakage at $V_{GS} = \pm 16 \text{ V}$	$I_{GSS}$	-	-	$\pm 10$	$\mu\text{A}$
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$	$V_{GS(th)}$	1	-	2.5	V
Drain-Source On-State Resistance at $V_{GS} = 10 \text{ V}$ , $I_D = 1 \text{ A}$ at $V_{GS} = 4.5 \text{ V}$ , $I_D = 0.5 \text{ A}$	$R_{DS(on)}$	- -	- -	137 192	$\text{m}\Omega$
<b>DYNAMIC PARAMETERS</b>					
Forward Transconductance at $V_{DS} = 5 \text{ V}$ , $I_D = 1 \text{ A}$	$g_{fs}$	-	4.8	-	S
Gate Resistance at $V_{GS} = 0 \text{ V}$ , $V_{DS} = 0 \text{ V}$ , $f = 1 \text{ MHz}$	$R_g$	-	5.7	-	$\Omega$
Input Capacitance at $V_{GS} = 0 \text{ V}$ , $V_{DS} = 30 \text{ V}$ , $f = 1 \text{ MHz}$	$C_{iss}$	-	310	-	pF
Output Capacitance at $V_{GS} = 0 \text{ V}$ , $V_{DS} = 30 \text{ V}$ , $f = 1 \text{ MHz}$	$C_{oss}$	-	23.8	-	pF
Reverse Transfer Capacitance at $V_{GS} = 0 \text{ V}$ , $V_{DS} = 30 \text{ V}$ , $f = 1 \text{ MHz}$	$C_{rss}$	-	18	-	pF
Total Gate Charge at $V_{DS} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 1 \text{ A}$ at $V_{DS} = 30 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ , $I_D = 1 \text{ A}$	$Q_g$	- -	6.8 3.3	- -	nC
Gate to Source Charge at $V_{DS} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 1 \text{ A}$	$Q_{gs}$	-	1.3	-	nC
Gate to Drain Charge at $V_{DS} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 1 \text{ A}$	$Q_{gd}$	-	1	-	nC
Turn-On Delay Time at $V_{DS} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 1 \text{ A}$ , $R_g = 3.9 \Omega$	$t_{d(on)}$	-	5	-	ns
Turn-On Rise Time at $V_{DS} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 1 \text{ A}$ , $R_g = 3.9 \Omega$	$t_r$	-	2	-	ns
Turn-Off Delay Time at $V_{DS} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 1 \text{ A}$ , $R_g = 3.9 \Omega$	$t_{d(off)}$	-	7	-	ns
Turn-Off Fall Time at $V_{DS} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 1 \text{ A}$ , $R_g = 3.9 \Omega$	$t_f$	-	6	-	ns
<b>Body-Diode PARAMETERS</b>					
Drain-Source Diode Forward Voltage at $I_S = 1 \text{ A}$	$V_{SD}$	-	-	1.2	V
Body Diodes Continuous Current	$I_S$	-	-	2	A
Body Diode Reverse Recovery Time at $I_S = 1 \text{ A}$ , $di/dt = 100 \text{ A} / \mu\text{s}$	$t_{rr}$	-	7.8	-	ns
Body Diode Reverse Recovery Charge at $I_S = 1 \text{ A}$ , $di/dt = 100 \text{ A} / \mu\text{s}$	$Q_{rr}$	-	4	-	nC



## Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

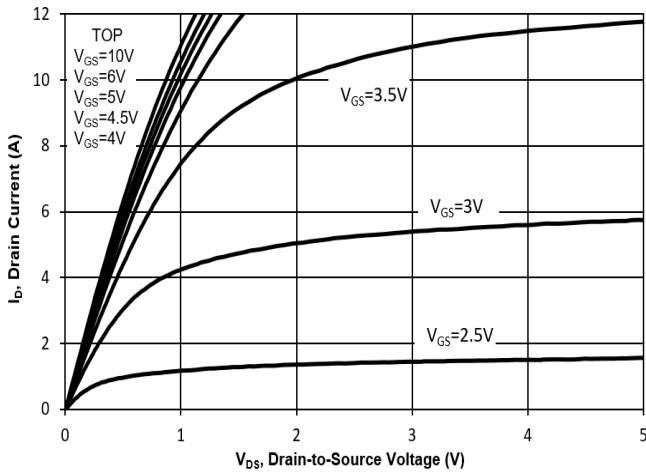


Fig. 2 Typical Transfer Characteristics

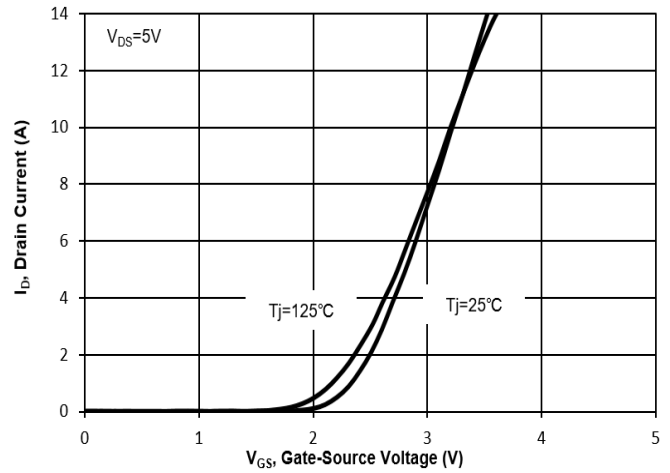


Fig. 3 On-Resistance vs. Drain Current

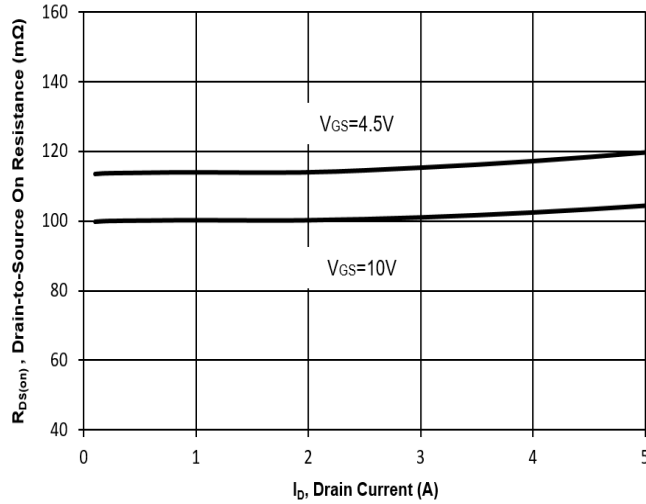


Fig. 4 On-Resistance vs. Gate-Source Voltage

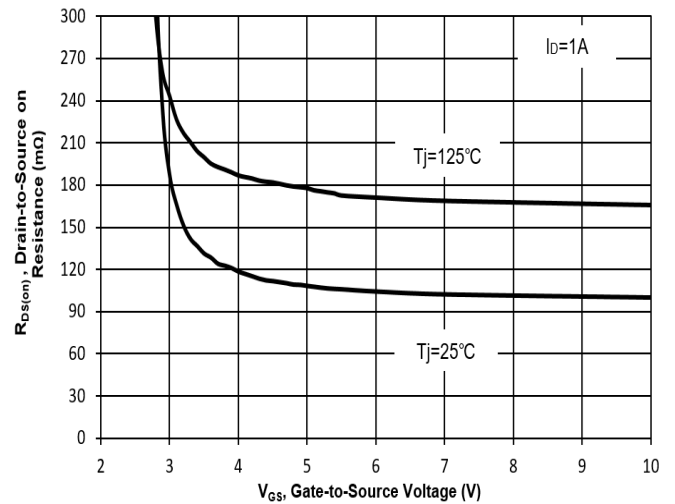


Fig. 5 On-Resistance vs.  $T_J$

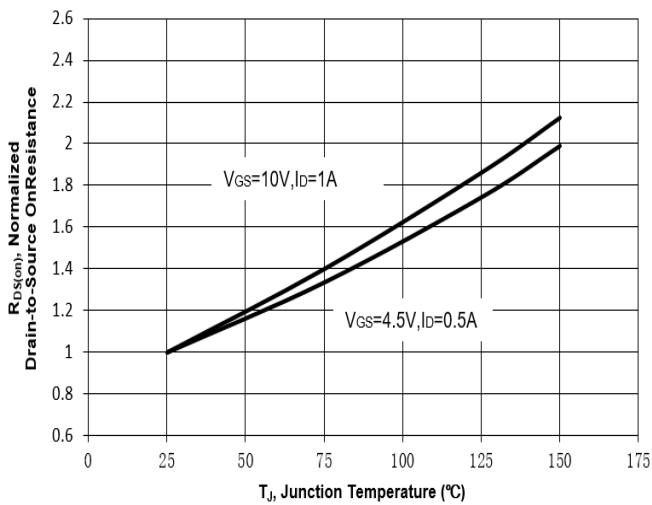
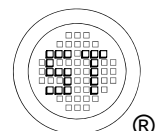
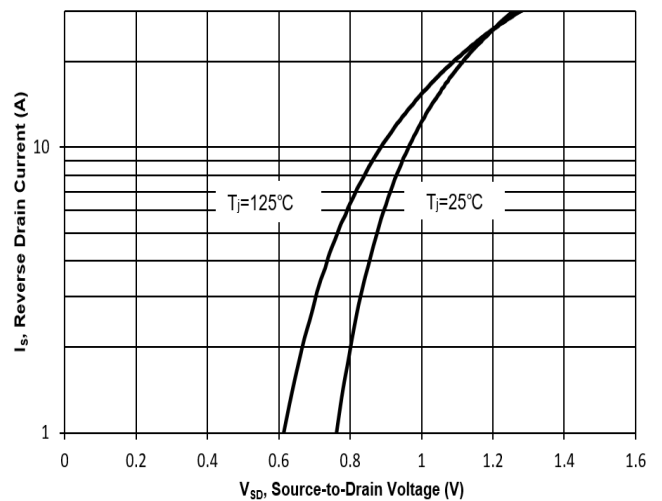


Fig. 6 Typical Body-Diode Forward Characteristics



## Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

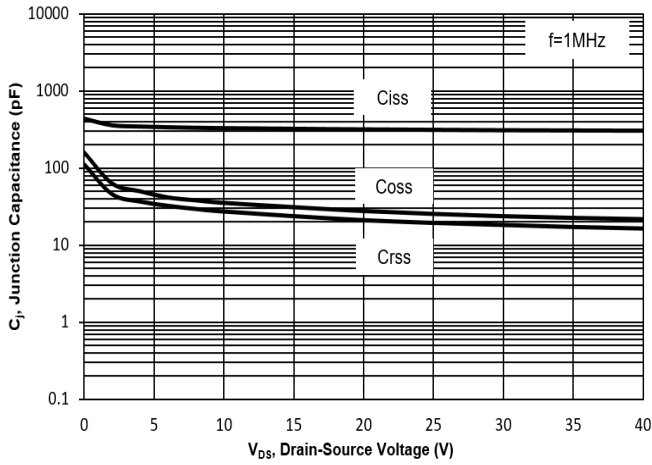


Fig. 8 Drain-Source Leakage Current vs.  $T_j$

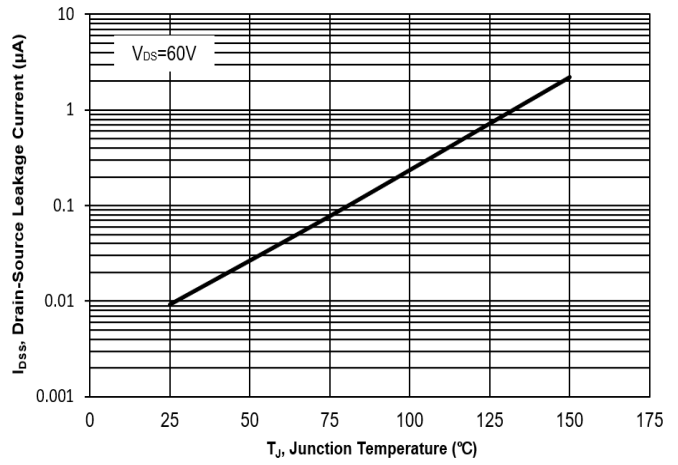


Fig. 9  $V_{(BR)DSS}$  vs. Junction Temperature

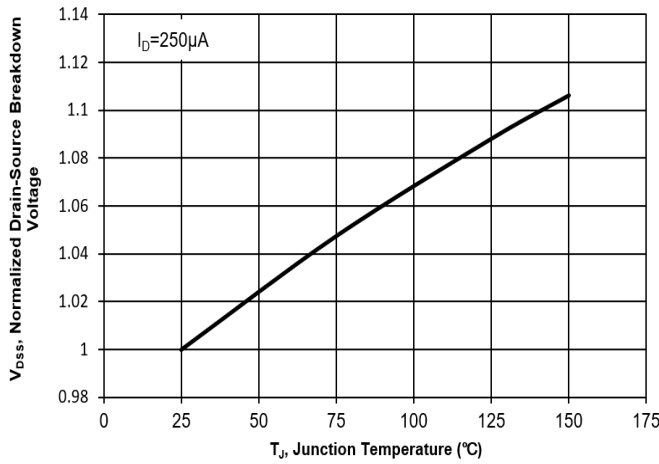


Fig. 10 Gate Threshold Variation vs.  $T_j$

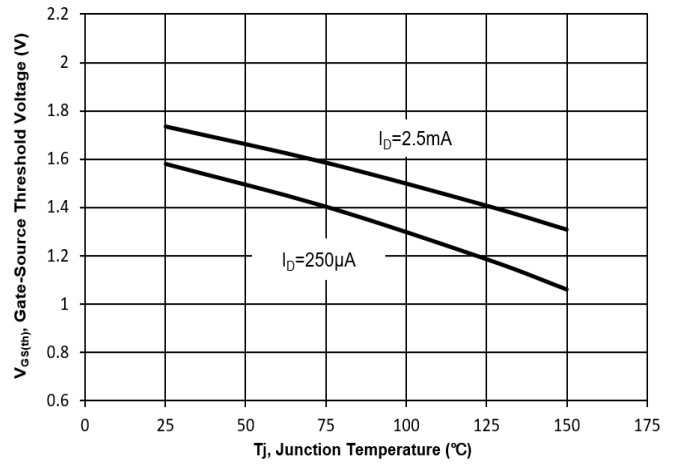
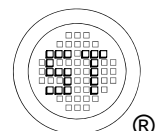
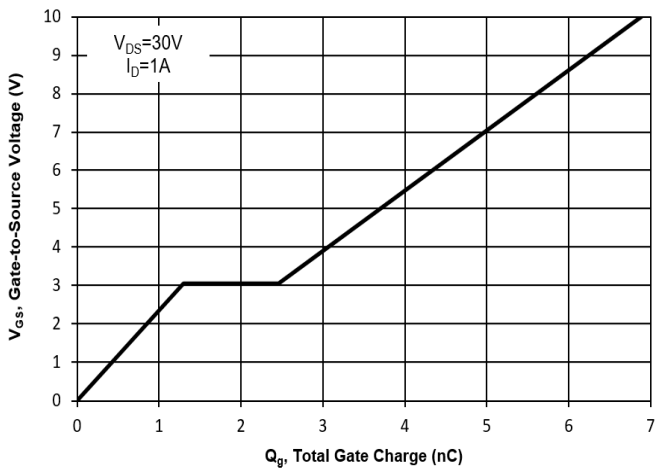


Fig. 11 Gate Charge



## Test Circuits

Fig.1-1 Switching times test circuit

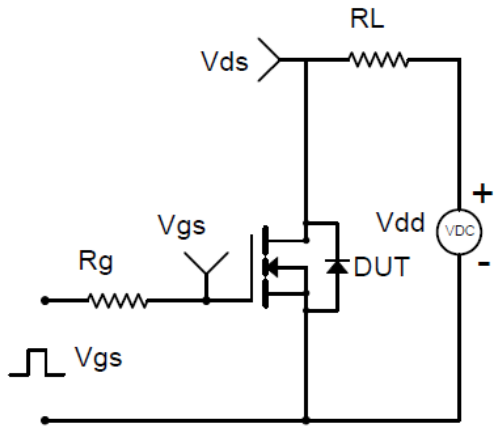


Fig.1-2 Switching Waveform

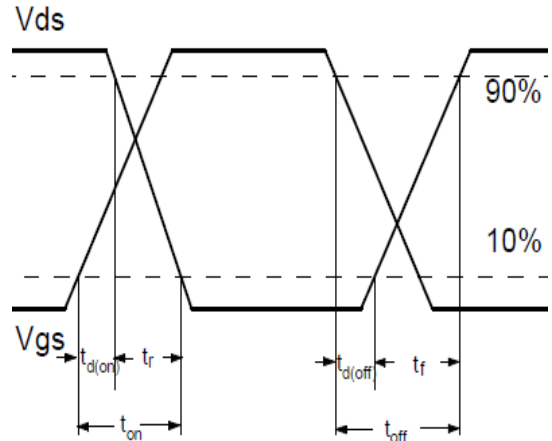


Fig.2-1 Gate charge test circuit

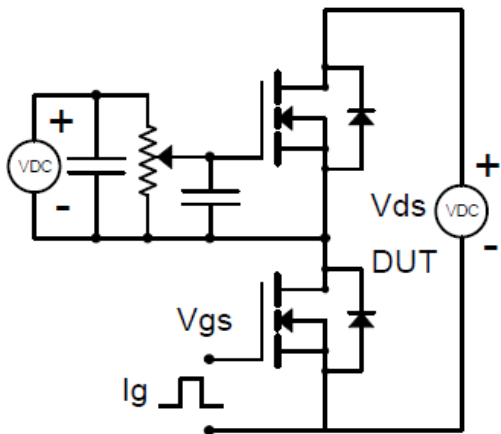
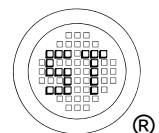
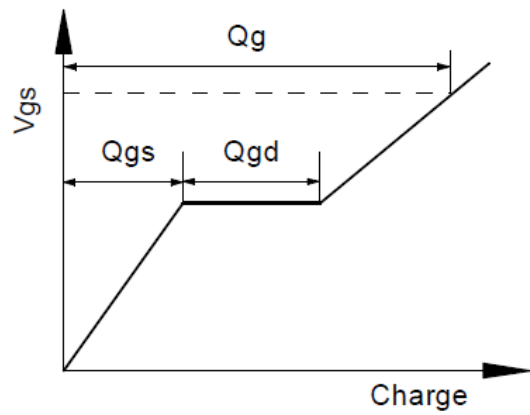


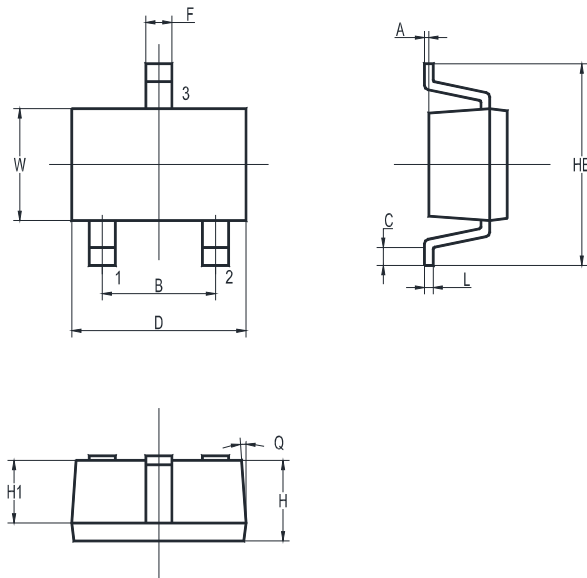
Fig.2-2 Gate charge waveform



# MKB06N192LK

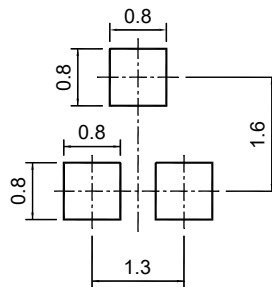
## Package Outline Dimensions (Units: mm)

SOT-323



UNIT	A	B	C	D	H	H1	HE	F	L	W	Q
mm	0.1 MAX.	1.4 1.2	0.2 MIN.	2.1 1.9	1.0 0.8	0.7 TYP.	2.4 2.0	0.35 0.25	0.15 0.05	1.35 1.15	5° MAX.

## Recommended Soldering Footprint

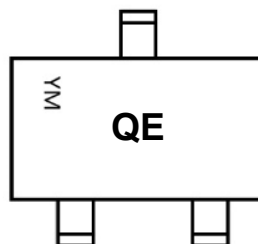


## Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-323	8	4 ± 0.1	0.157 ± 0.004	178	7	3,000

## Marking information

- "QE" = Part No.
  - "YM" = Date Code Marking
  - "Y" = Year
  - "M" = Month
- Font type: Arial



Disclaimer: Our company reserve the right to make modifications, enhancements, improvements, corrections or other changes to improve product design, functions and reliability, anytime without notice. Semtech Electronics Limited makes no warranties, representations or warranties regarding the suitability of its products for any particular purpose, and does not accept any liability arising from the application or use of any product or circuit such as: Apply to medical, military, aircraft, space or life support equipment and expressly waive any and all liability, including but not limited to special, consequential or collateral damage.

