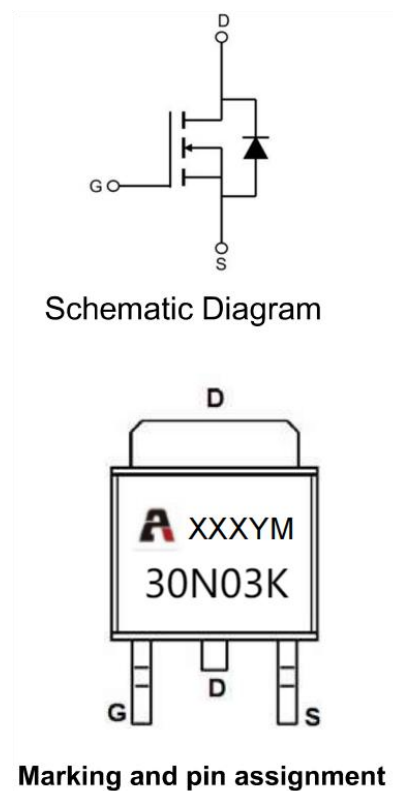


Features

- 30V,30A
 $R_{DS(on)} < 20m\Omega @ V_{GS}=10V$ TYP:15m Ω
 $R_{DS(on)} < 25m\Omega @ V_{GS}=10V$ TYP:20m Ω
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(on)}$ and Low Gate Charge

Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible Power Supply



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
30N03K	AP30N03KR1	TO-252	-	-	2500

ABSOLUTE MAXIMUM RATINGS ($T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c=25^\circ\text{C}$) ⁽¹⁾	I_D	30	A
Continuous Drain Current ($T_c=100^\circ\text{C}$)	I_D	20	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	120	A
Drain Power Dissipation	P_D	45	W
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	42	mJ
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	60	$^\circ\text{C/W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.8	$^\circ\text{C/W}$
Junction Temperature	T_J	-55~ +150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

Notes:

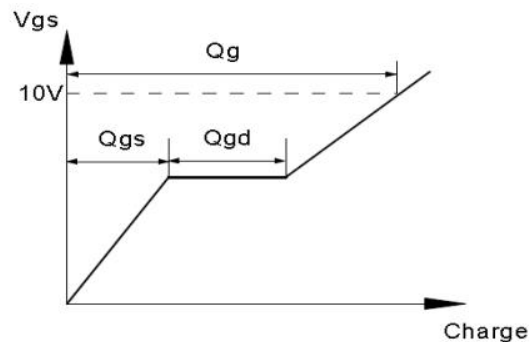
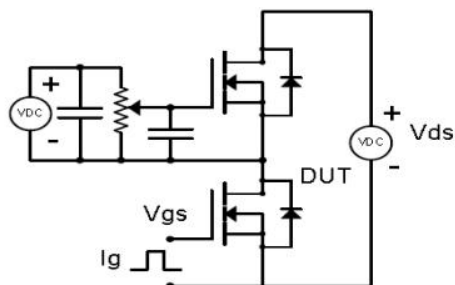
- 1) Repetitive Rating: pulse width limited by maximum junction temperature
- 2) EAS condition : $T_J=25^\circ\text{C}$, $V_{DD}=50\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$, $R_g=25\Omega$, $I_{AS}=13\text{A}$

MOSFET ELECTRICAL CHARACTERISTICS($T_J=25^{\circ}\text{C}$ unless otherwise noted)

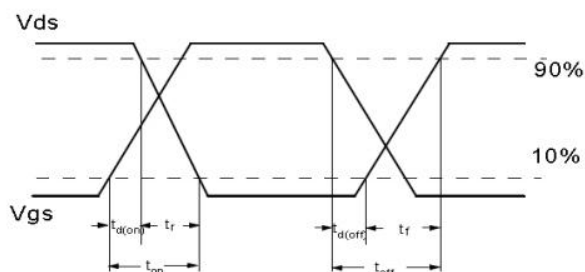
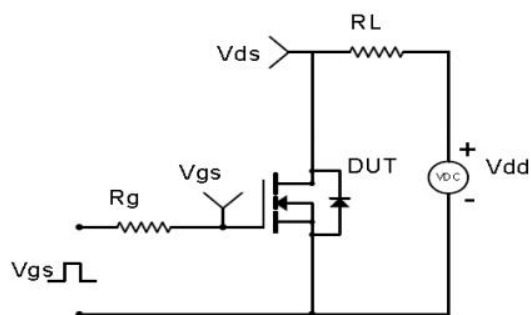
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	30	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =30V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ± 20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.0	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =5A	-	15	20	mΩ
		V _{GS} =4.5V, I _D =3A	-	20	25	
Forward transconductance	R _g	f=1.0MHz	-	1.5	-	Ω
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =15V, VGS=0V, f=1MHz	-	490	-	pF
Output Capacitance	C _{oss}		-	79	-	
Reverse Transfer Capacitance	C _{rss}		-	61	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =15V, I _D =5A, R _G =3Ω, V _{GS} =10V	-	4.5	-	nS
Turn-on rise time	t _r		-	2.5	-	
Turn-off delay time	t _{d(off)}		-	14.5	-	
Turn-off fall time	t _f		-	3.5	-	
Total Gate Charge	Qg	V _{DS} =15V, I _D =5A, V _{GS} =10V	-	5.2	-	nC
Gate-Source Charge	Qgs		-	0.9	-	
Gate-Drain Charge	Qgd		-	1.3	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V _{SD}	T _J =25℃, V _{GS} =0V, I _S =5A	-	0.8	1.2	V
Diode Forward current	I _S	T _C =25℃	-	-	30	A
Body Diode Reverse Recovery Time	T _{rr}	di/dt=100A/us,IF=5A	-	15	-	nS
Body Diode Reverse Recovery Charge	Q _{rr}	di/dt=100A/us,IF=5A	-	14	-	nC

Test Circuit & Waveform

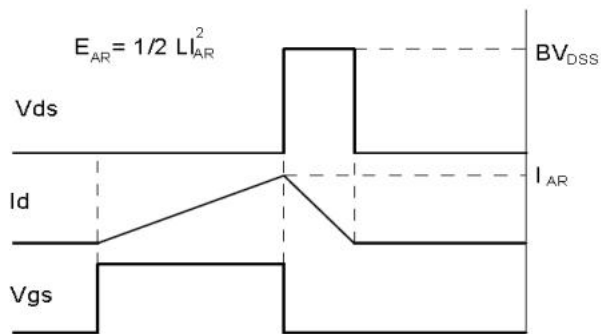
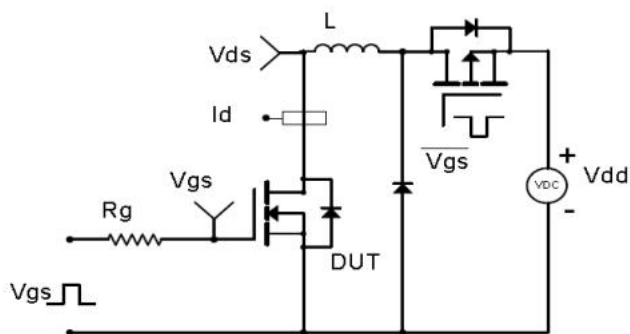
Gate Charge Test Circuit & Waveform



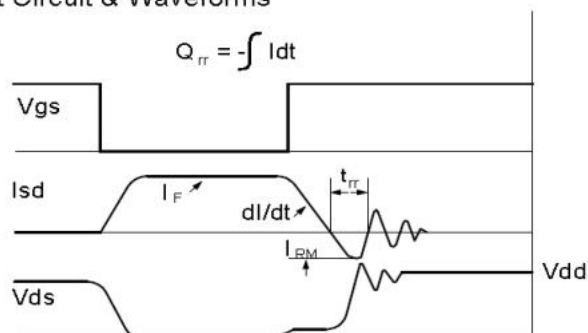
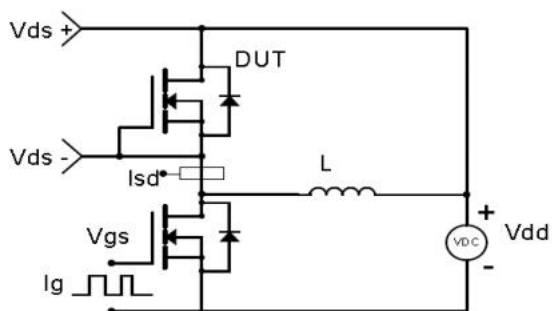
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Characteristics

Figure 1: Output Characteristics

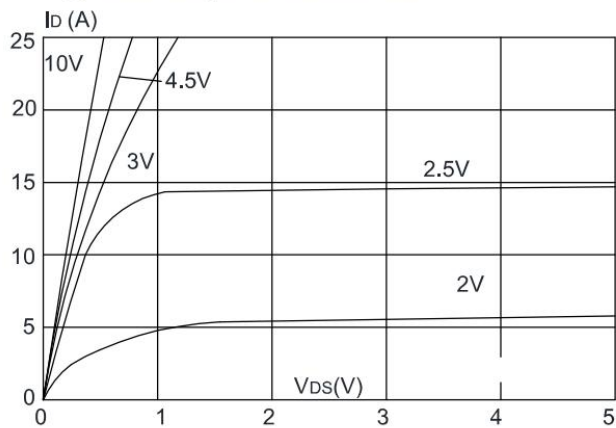


Figure 2: Typical Transfer Characteristics

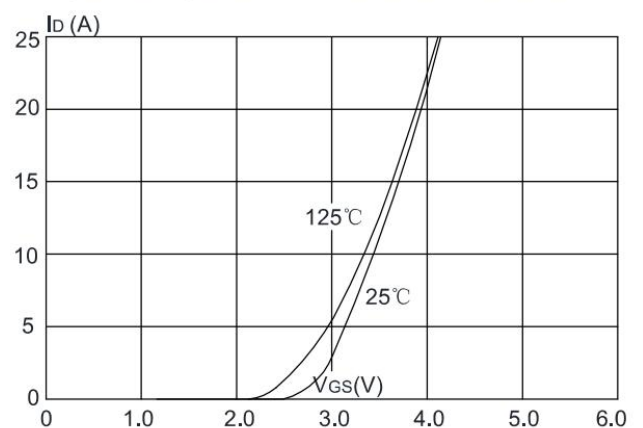


Figure 3: On-resistance vs. Drain Current

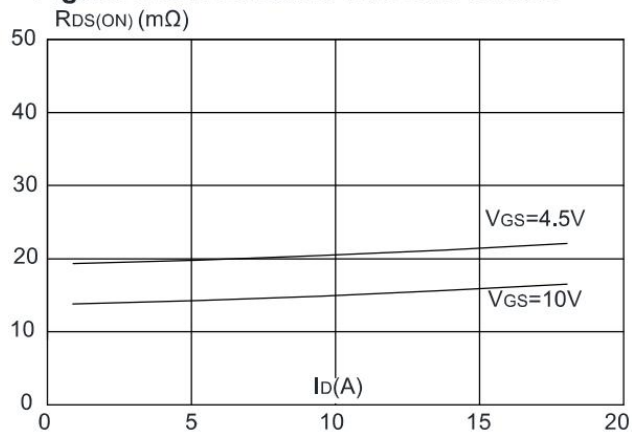


Figure 4: Body Diode Characteristics

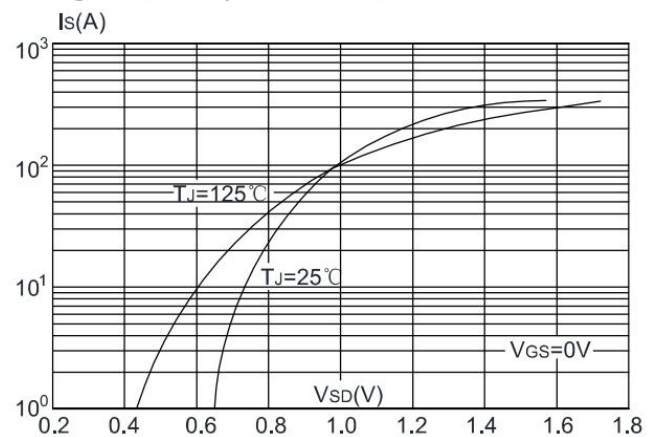


Figure 5: Gate Charge Characteristics

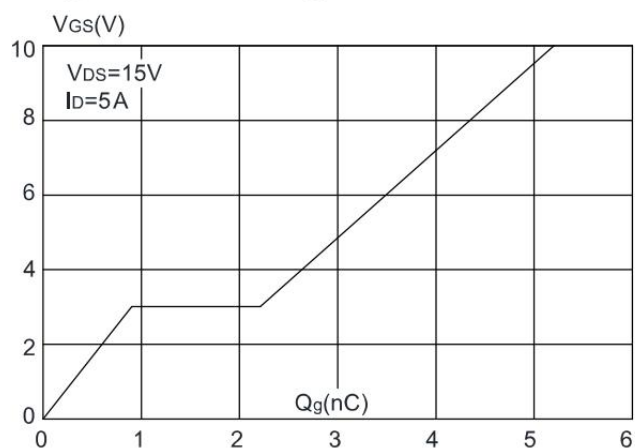
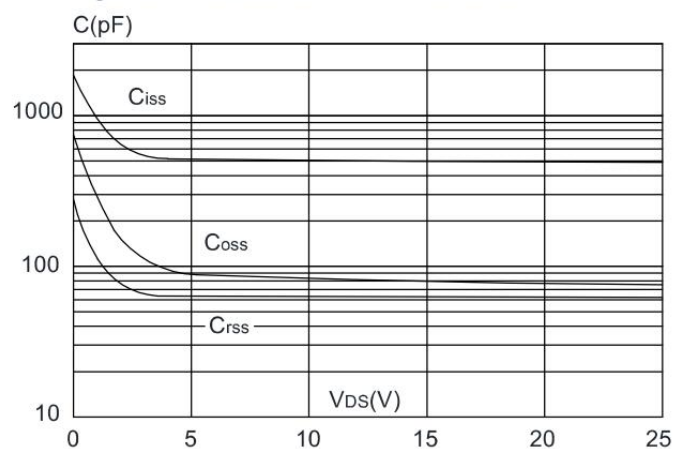


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

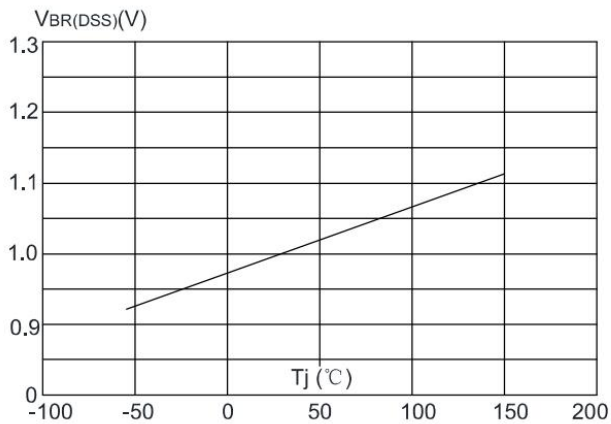


Figure 8: Normalized on Resistance vs. Junction Temperature

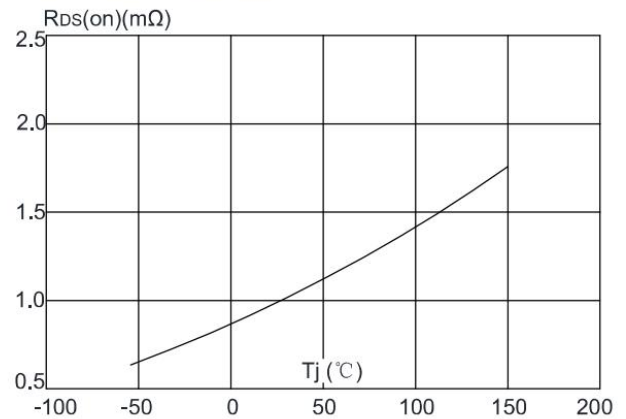


Figure 9: Maximum Continuous Drain Current vs. Ambient Temperature

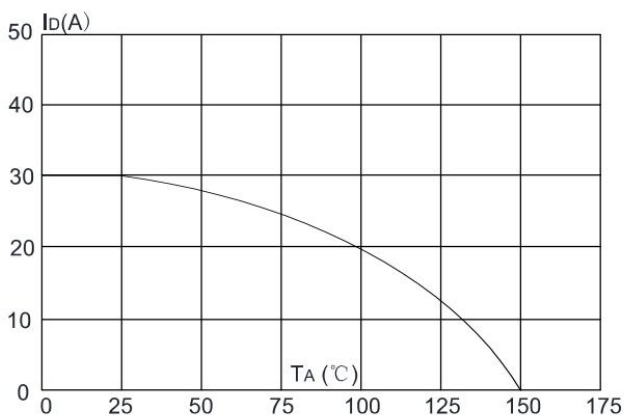


Figure 10: Maximum Safe Operating Area

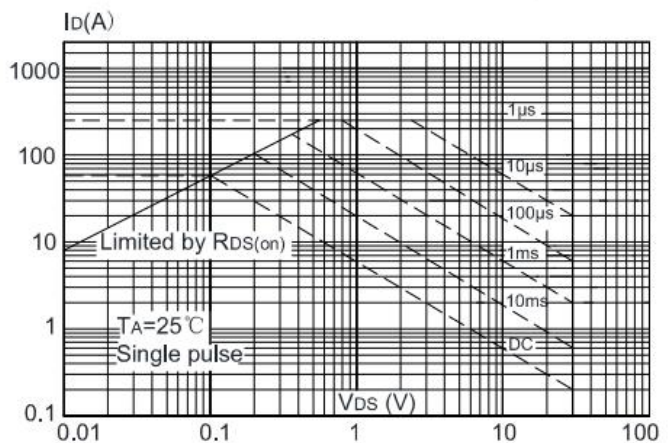
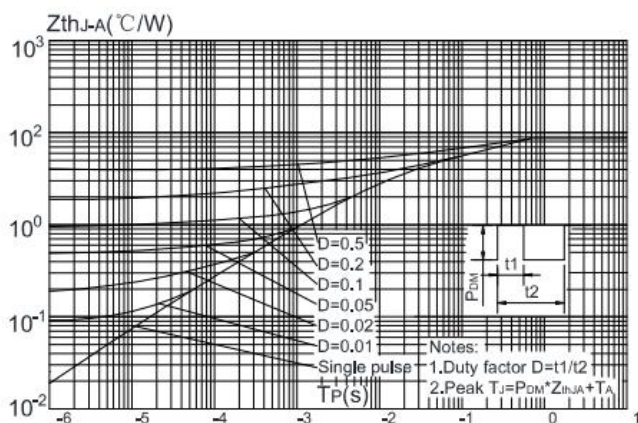
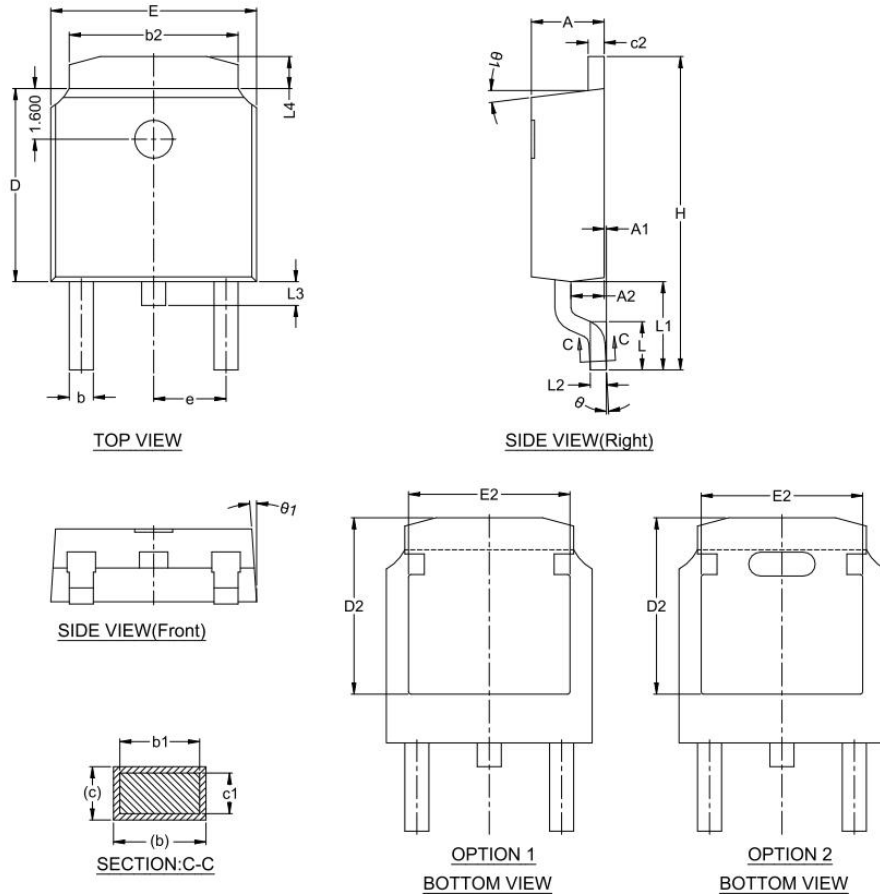


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



TO-252 Package Information



DIM SYMBOL	MIN.	NOM.	MAX.
A	2.200	2.300	2.400
A1	0.000	0.070	0.130
A2	0.950	1.050	1.150
b	0.700	0.800	0.900
b1	0.660	0.760	0.860
b2	5.134	5.334	5.534
c	0.448	0.548	0.648
c1	0.458	0.508	0.558
c2	0.448	0.548	0.648
D	6.000	6.100	6.200
D2	5.372	5.572	5.772
E	6.400	6.500	6.600
E2	4.900	5.100	5.300
e	2.286 BSC.		
H	9.700	9.900	10.100
L	1.380	1.525	1.725
L1	2.588	2.788	2.988
L2	0.508 BSC.		
L3	0.600	0.750	0.950
L4	0.812	1.012	1.212
θ	1°	3°	5°
θ_1	6°	7°	8°

Revision History

Revision	Release	Remark
V1.0	2024/08/16	Initial Release

Disclaimer

The information given in this document describes the independent performance of the product, but similar performance is not guaranteed under other working conditions, and cannot be guaranteed when installed with other products or equipment. To achieve the required performance of the product in actual scenarios, the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings, operating conditions, or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability. Customers using or selling these products for use in medical, life-saving, or life-sustaining applications do so at their own risk and agree to fully indemnify.

Due to product or technical improvements, the information described or contained herein may be changed without prior notice.