

## DKG1020

Aug. 2011

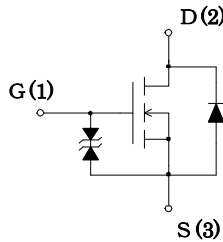
### Features

- Low on-state resistance
- Built-in gate protection diode
- SMD PKG

### Applications

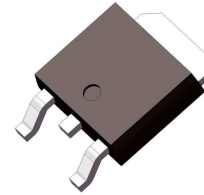
- DC / DC converter
- Switching

### Internal Equivalent Circuit



### Package

TO252



### Key Specifications

- $V_{(BR)DSS} = 100V$  ( $I_D = 100\mu A$ )
- $R_{DS(ON)} = 52 m\Omega$  max. ( $V_{GS} = 10V, I_D = 10A$ )
- $R_{DS(ON)} = 59 m\Omega$  max. ( $V_{GS} = 4.5V, I_D = 10A$ )

### Absolute maximum ratings

( $T_a = 25^\circ C$ )

Characteristic	Symbol	Rating	Unit
Drain to Source Voltage	$V_{DSS}$	100	V
Gate to Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$\pm 20$	A
Maximum Power Dissipation	$P_D$	40 ( $T_c = 25^\circ C$ )	W
Single Pulse Avalanche Energy	$E_{AS}^{*1}$	62.5	mJ
Channel Temperature	$T_{ch}$	150	$^\circ C$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ C$
Maximum Drain to Source dv/dt	dv/dt 1 <sup>*1</sup>	0.6	V/ns
Peak diode recovery dv/dt	dv/dt 2 <sup>*2</sup>	5	V/ns
Peak diode recovery di/dt	di/dt <sup>*2</sup>	100	A/ $\mu s$

\*1  $V_{DD} = 14V, L = 1mH, I_L = 11A$ , unclamped, See Fig.1

\*2  $I_{SD} = 20A$ , See Fig.2

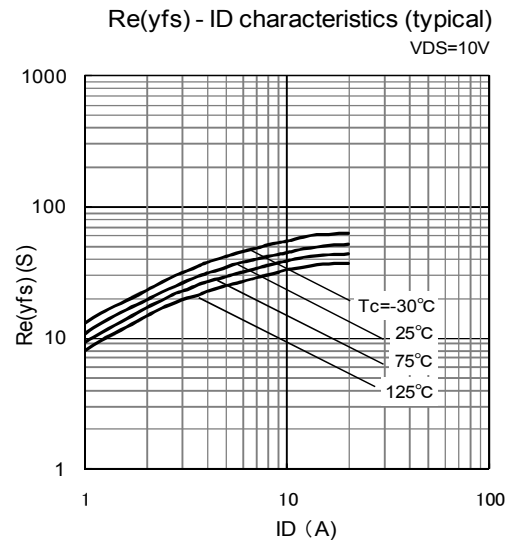
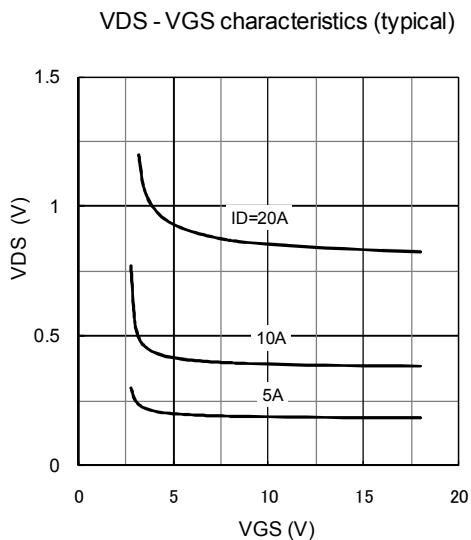
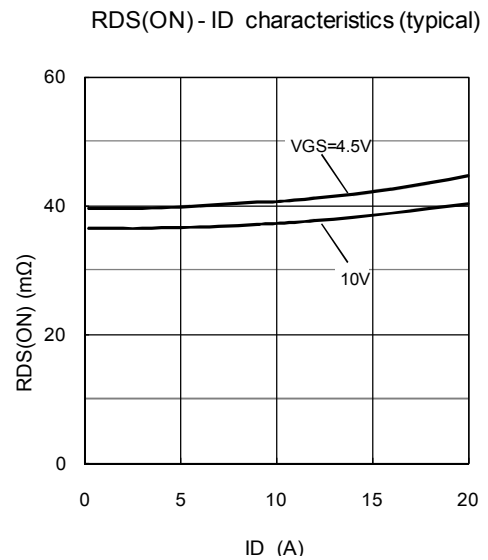
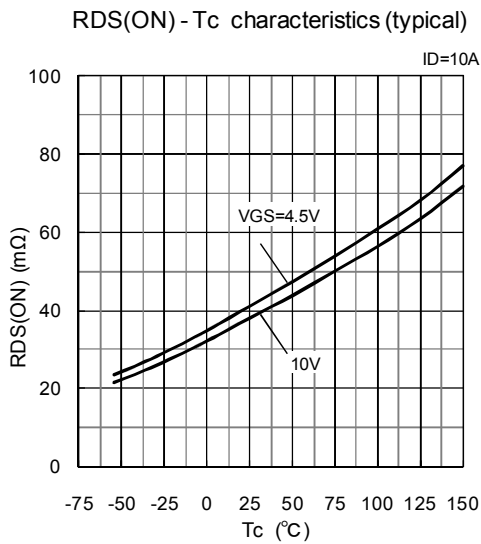
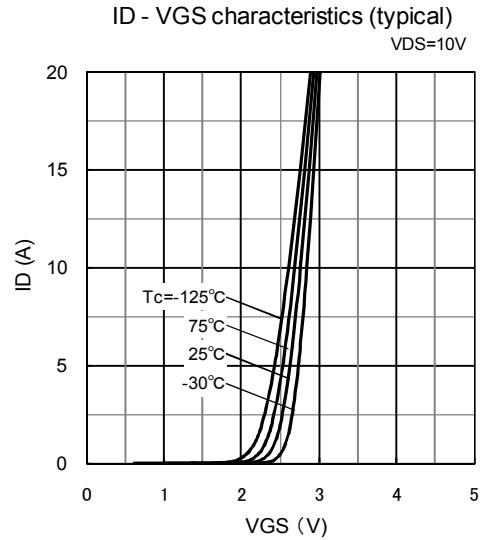
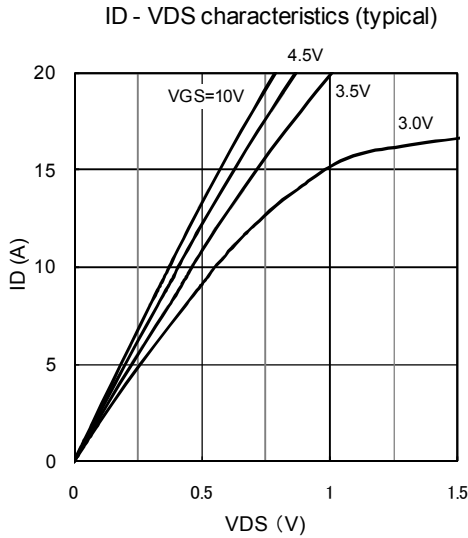
**Electrical characteristics**

(Ta=25°C)

Characteristic	Symbol	Test Conditions	Limits			Unit
			MIN	TYP	MAX	
Drain to Source breakdown Voltage	$V_{(BR)DSS}$	$I_D=100\mu A, V_{GS}=0V$	100			V
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V$			$\pm 10$	$\mu A$
Drain to Source Leakage Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V$			100	$\mu A$
Gate Threshold Voltage	$V_{TH}$	$V_{DS}=10V, I_D=1mA$	1.5	2.0	2.5	V
Forward Transconductance	$Re(yfs)$	$V_{DS}=10V, I_{D10A}$	9.0			S
Static Drain to Source On-Resistance	$R_{DS(ON)}$	$I_D=10A, V_{GS}=10V$		41	52	m $\Omega$
		$I_D=10A, V_{GS}=4.5V$		45	59	
Input Capacitance	$C_{iss}$	$V_{DS}=10V$ $V_{GS}=0V$ $f=1MHz$		2200		pF
Output Capacitance	$C_{oss}$			210		
Reverse Transfer Capacitance	$C_{rss}$			110		
Turn-On Delay Time	$t_{d(on)}$	$I_D=10A, V_{DD}=50V$ $R_G=20\Omega, R_L=5\Omega$ $V_{GS}=10V$ See Fig.3		40		ns
Rise Time	$t_r$			140		
Turn-Off Delay Time	$t_{d(off)}$			280		
Fall Time	$t_f$			340		
Total Gate Charge	$Q_g$	$V_{DD}=50V$ $V_{GS}=10V$ $I_D=20V$		47		nC
Gate to Source Charge	$Q_{gs}$			8		
Gate to Source Charge	$Q_{gd}$			7		
Source-Drain Diode Forward Voltage	$V_{SD}$	$I_{SD}=20A, V_{GS}=0V$		0.9	1.2	V
Source-Drain Diode Reverse Recovery Time	$t_{rr}$	$I_{SD}=20A$ $di/dt=100A/\mu s$		50		ns
Source-Drain Diode Reverse Recovery Time	$Q_{rr}$			60		nC
Thermal Resistance Junction to Case	$R_{th(ch-c)}$				3.125	$^{\circ}C/W$

The information included herein is believed to be accurate and reliable. However, SANKEN ELECTRIC CO., LTD assumes no responsibility for its use ; nor for any infringements of patents or other rights of third parties that may result from its use.

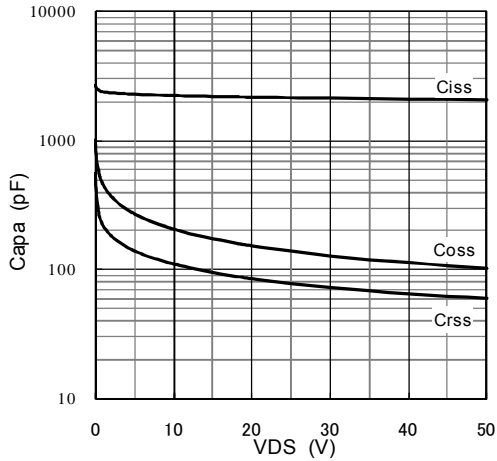
**Characteristic Curves (Tc=25°C)**



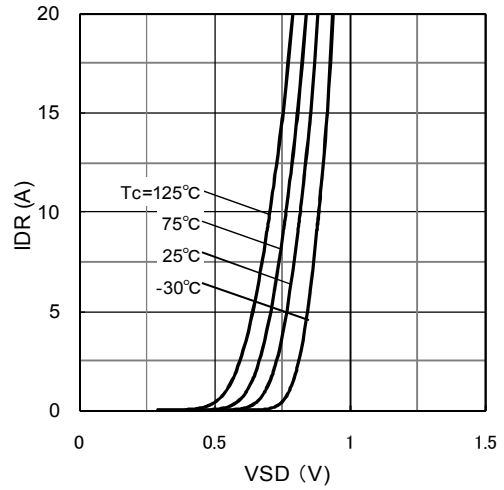
The information included herein is believed to be accurate and reliable. However, SANKEN ELECTRIC CO., LTD assumes no responsibility for its use ; nor for any infringements of patents or other rights of third parties that may result from its use.

**Characteristic Curves (Tc=25°C)**

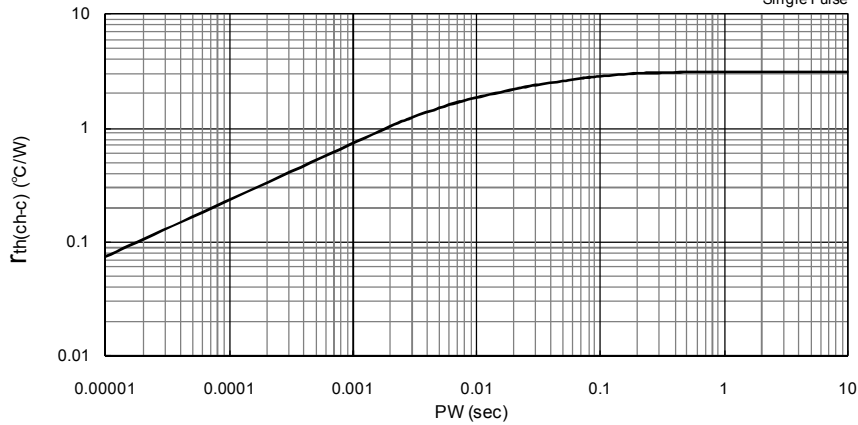
Capacitance - VDS characteristics (typical)  
VGS=0V  
f=1MHz



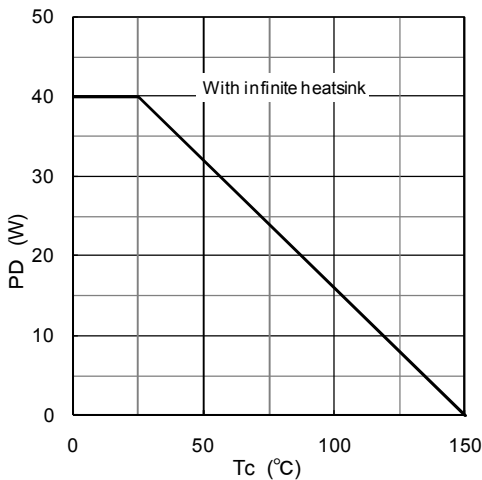
IDR - VSD characteristics (typical)



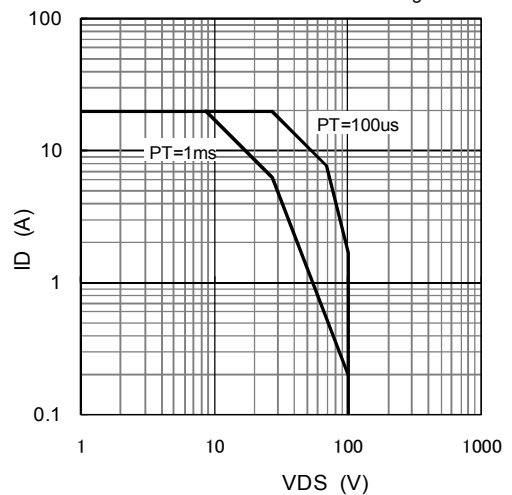
TRANSIENT THERMAL RESISTANCE - PULSE WIDTH (Single Pulse)



PD-Tc characteristics



SAFE OPERATING AREA (Tc=25°C, Single Pulse)



The information included herein is believed to be accurate and reliable. However, SANKEN ELECTRIC CO., LTD assumes no responsibility for its use ; nor for any infringements of patents or other rights of third parties that may result from its use.

**DKG1020**

Aug. 2011

Fig.1 Unclamped Inductive Test Method

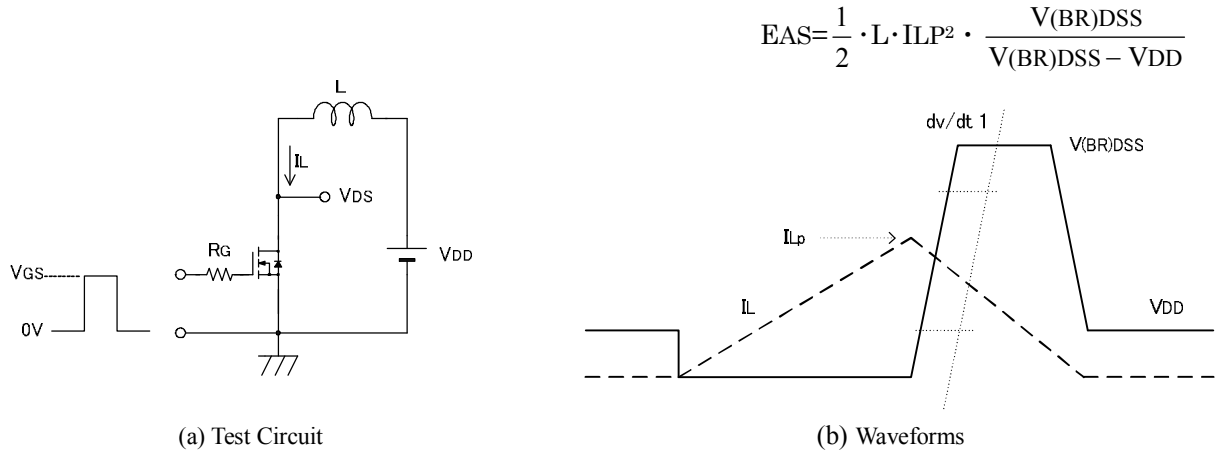


Fig.2 Diode Reverse Recovery Time Test Method

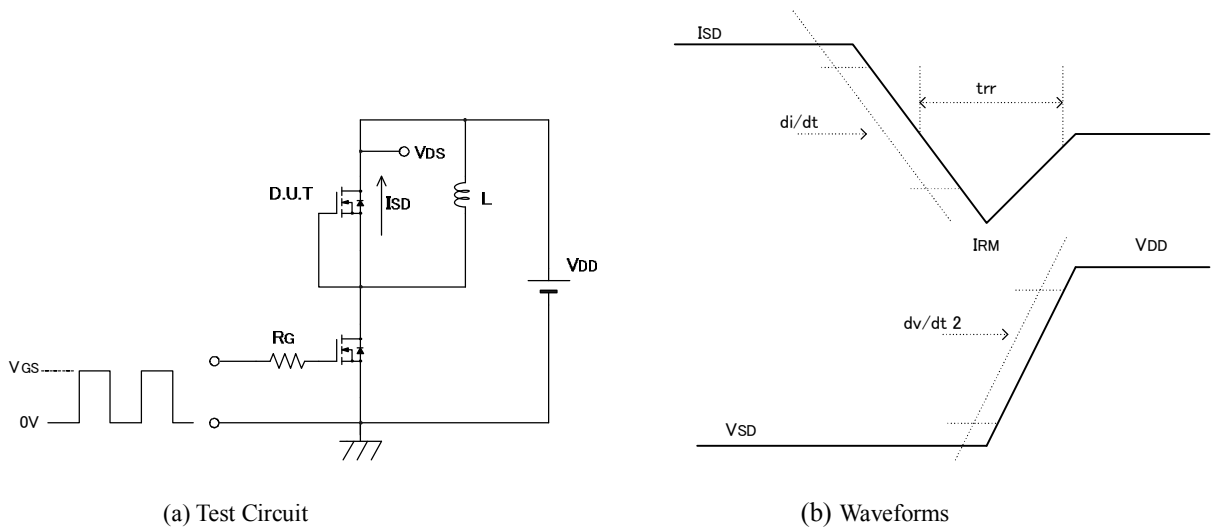
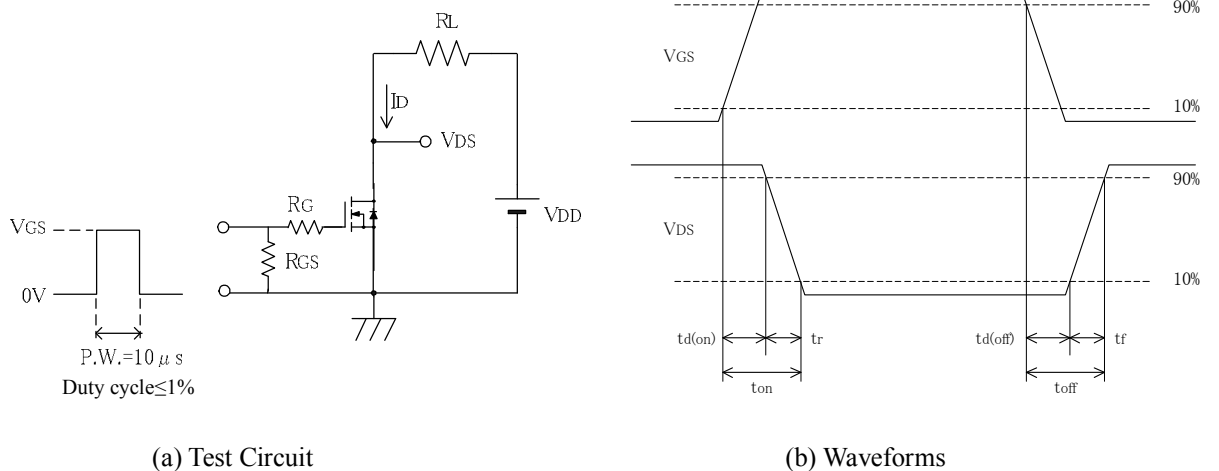


Fig.3 Switching Time Test Method



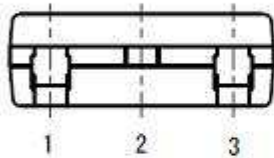
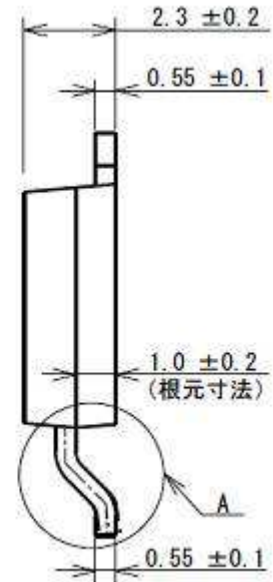
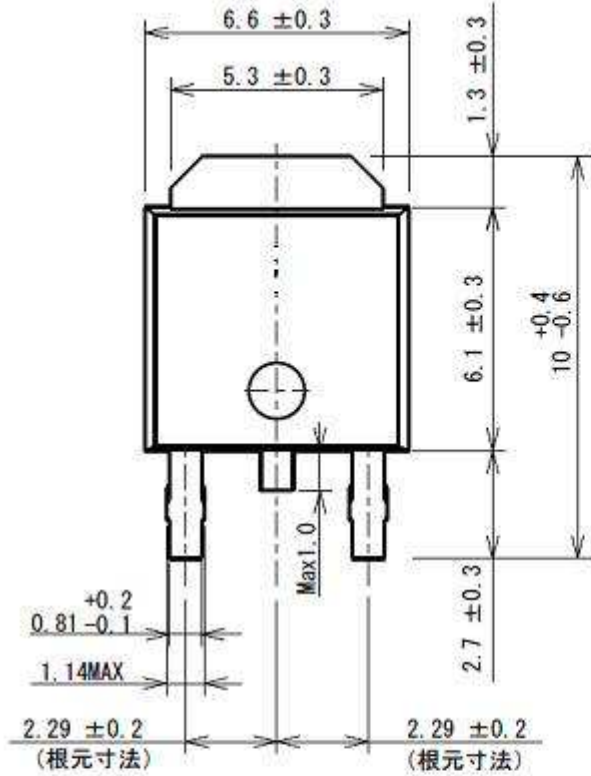
The information included herein is believed to be accurate and reliable. However, SANKEN ELECTRIC CO., LTD assumes no responsibility for its use ; nor for any infringements of patents or other rights of third parties that may result from its use.

**DKG1020**

Aug. 2011

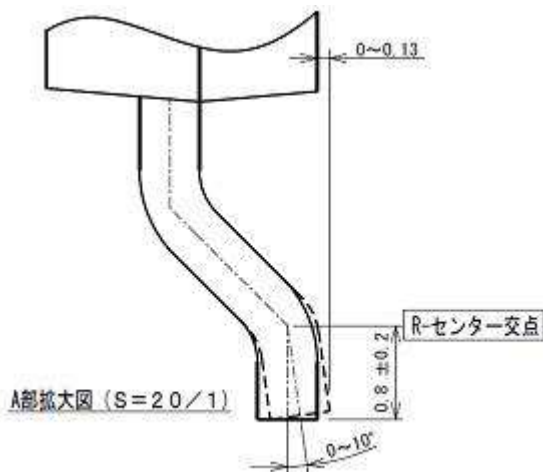
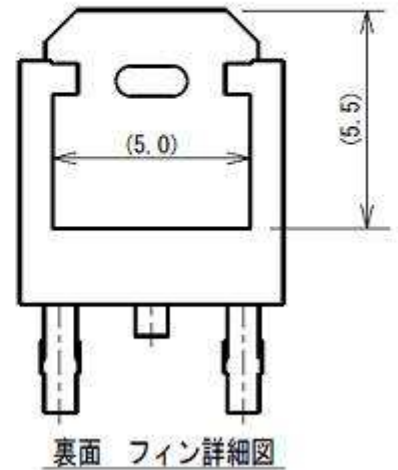
Outline

TO252



Pin assignment

- (1) Gate
- (2) Drain
- (3) Source



Weight Approx.0.33g

The information included herein is believed to be accurate and reliable. However, SANKEN ELECTRIC CO., LTD assumes no responsibility for its use ; nor for any infringements of patents or other rights of third parties that may result from its use.