SANKEN ELECTRIC

DKG1020

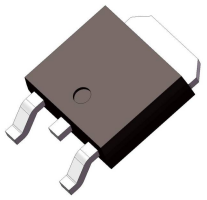
Aug. 2011

Features

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

Package

TO252



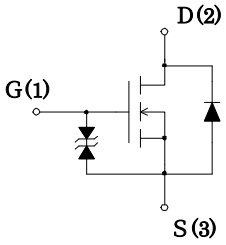
Applications

- DC / DC converter
- Switching

Key Specifications

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

Internal Equivalent Circuit



Absolute maximum ratings

(Ta=25°C)

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

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

*2 Is_D=20A, See Fig.2

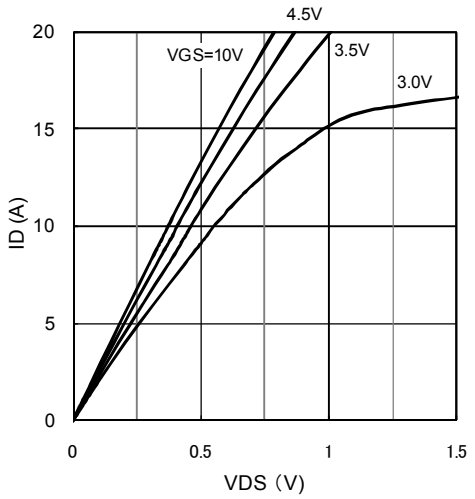
Electrical characteristics

(Ta=25°C)

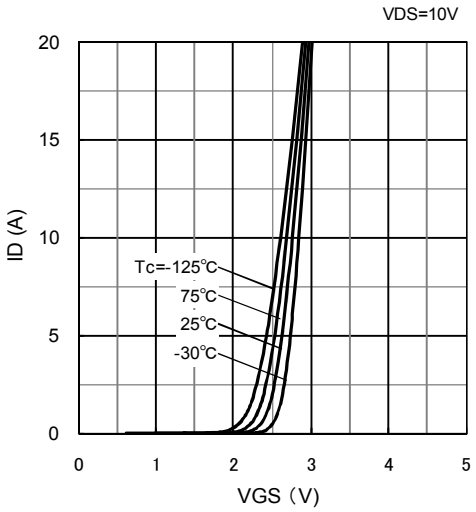
Characteristic	Symbol	Test Conditions	Limits			Unit
			MIN	TYP	MAX	
Drain to Source breakdown Voltage	$V_{(BR)DSS}$	I_D=100μA,V_{GS}=0V	100			V
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±20V			±10	μA
Drain to Source Leakage Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V			100	μA
Gate Threshold Voltage	V_{TH}	V_{DS}=10V, I_D=1mA	1.5	2.0	2.5	V
Forward Transconductance	Re(yfs)	V_{DS}=10V, I_DD=10A	9.0			S
Static Drain to Source On-Resistance	$R_{DS(ON)}$	I_D=10A, V_{GS}=10V		41	52	mΩ
		I_D=10A, V_{GS}=4.5V		45	59	
Input Capacitance	Ciss	V_{DS}=10V V_{GS}=0V f=1MHz		2200		pF
Output Capacitance	Coss			210		
Reverse Transfer Capacitance	Crss			110		
Turn-On Delay Time	td(on)	I_D=10A, V_{DD}=50V R_G=20Ω, R_L=5Ω V_{GS}=10V See Fig.3		40		ns
Rise Time	tr			140		
Turn-Off Delay Time	td(off)			280		
Fall Time	tf			340		
Total Gate Charge	Qg	V_{DD}=50V V_{GS}=10V I_D=20V		47		nC
Gate to Source Charge	Qgs			8		
Gate to Source Charge	Qgd			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	trr	I_{SD} =20A di/dt=100A/μs		50		ns
Source-Drain Diode Reverse Recovery Time	Qrr			60		nC
Tharmal Resistance Junction to Case	Rth(ch-c)				3.125	°C/W

Characteristic Curves (Tc=25°C)

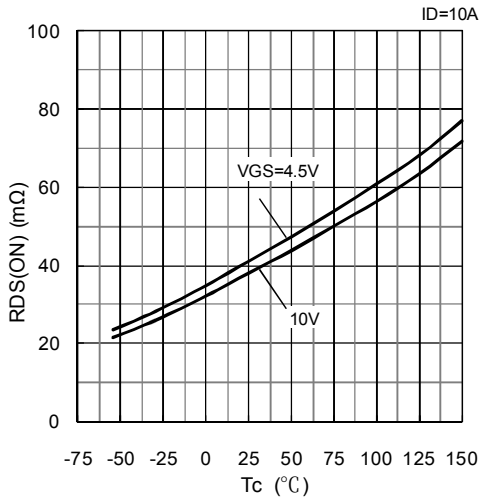
ID - VDS characteristics (typical)



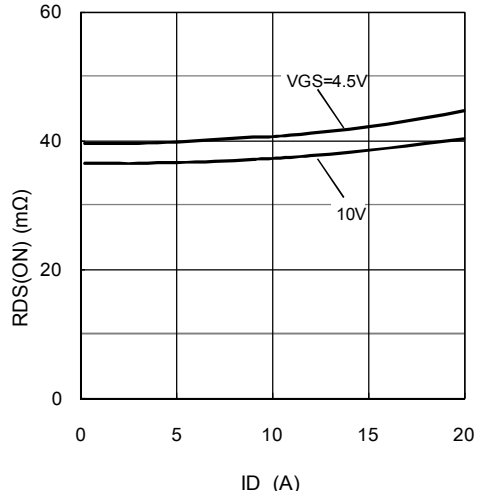
ID - VGS characteristics (typical)



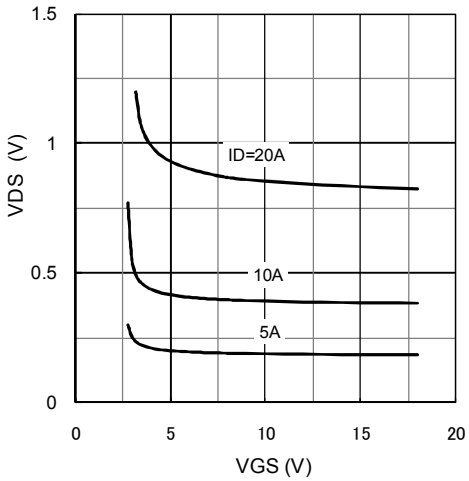
RDS(ON) - Tc characteristics (typical)



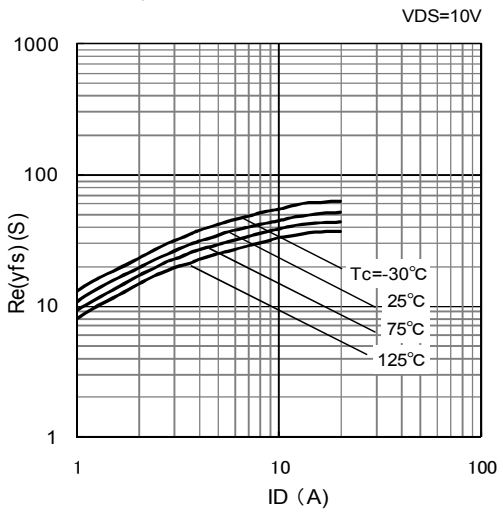
RDS(ON) - ID characteristics (typical)



VDS - VGS characteristics (typical)

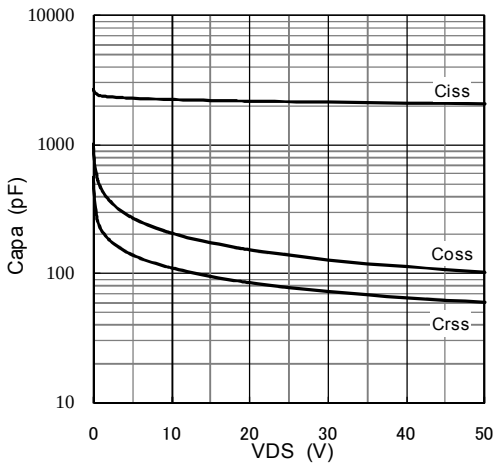


Re(yfs) - ID characteristics (typical)

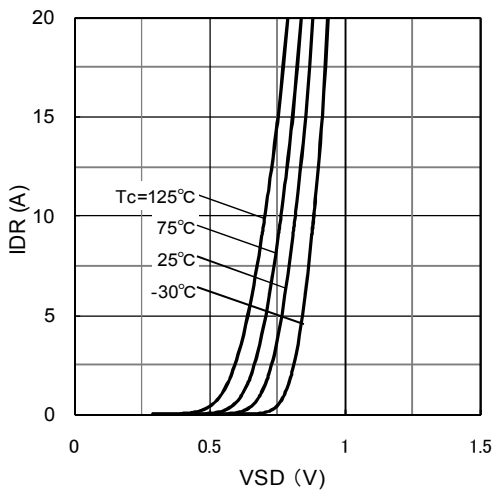


Characteristic Curves (Tc=25°C)

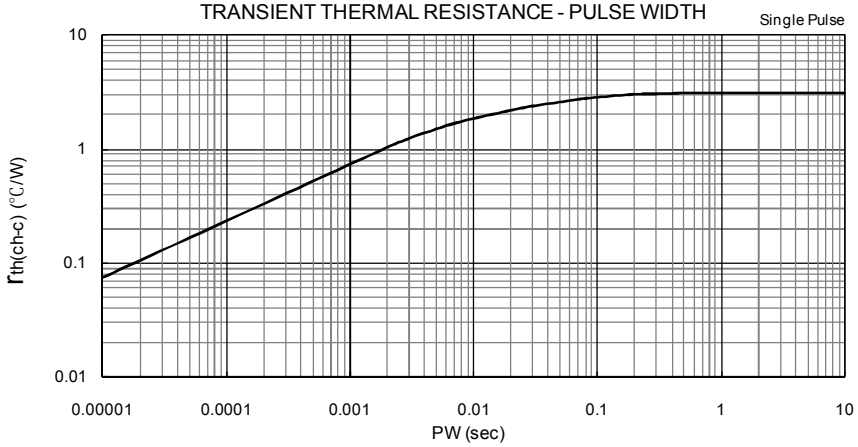
Capacitance - VDS characteristics (typical)



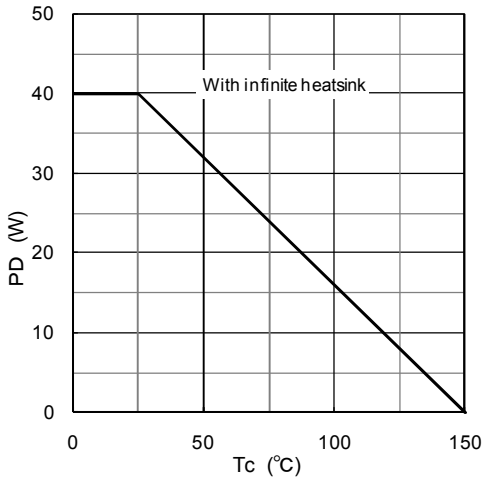
IDR - VSD characteristics (typical)



TRANSIENT THERMAL RESISTANCE - PULSE WIDTH



PD-Tc characteristics



SAFE OPARATING AREA

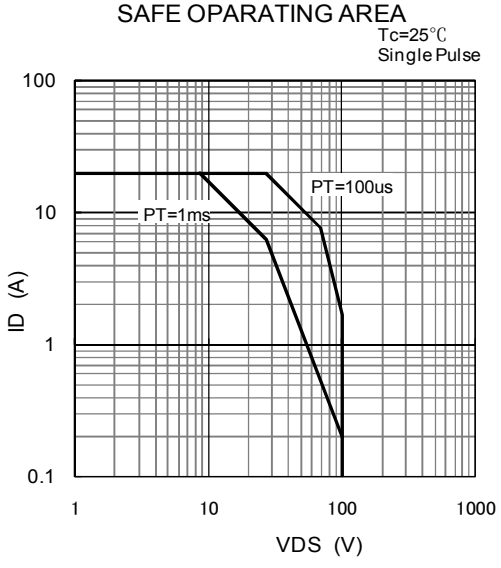
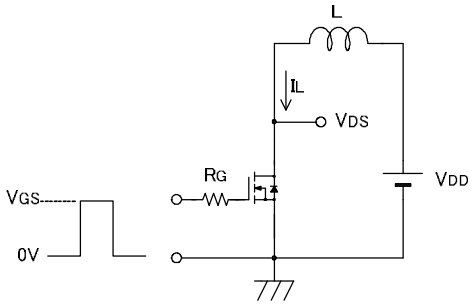
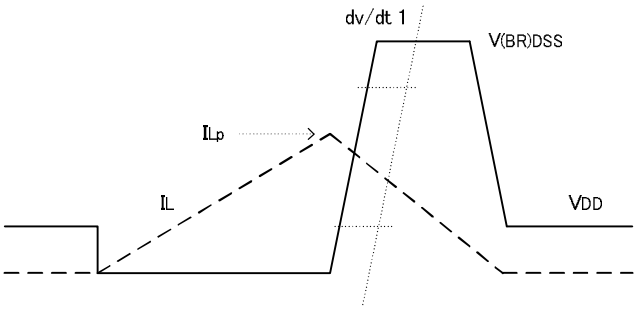


Fig.1 Unclamped Inductive Test Method

$$EAS = \frac{1}{2} \cdot L \cdot I_{LP}^2 \cdot \frac{V_{(BR)DSS}}{V_{(BR)DSS} - V_{DD}}$$

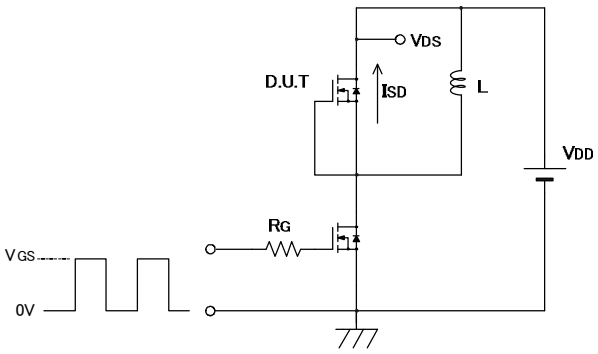


(a) Test Circuit

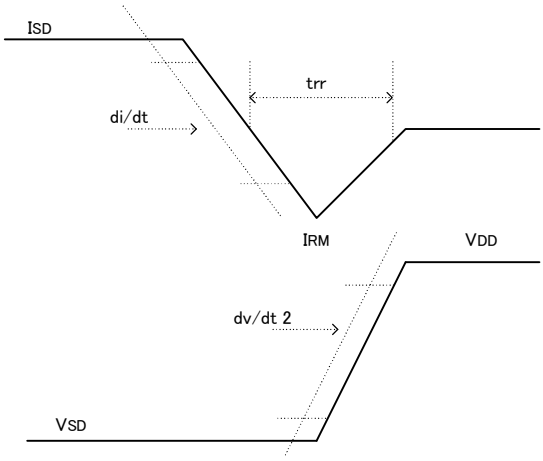


(b) Waveforms

Fig.2 Diode Reverse Recovery Time Test Method

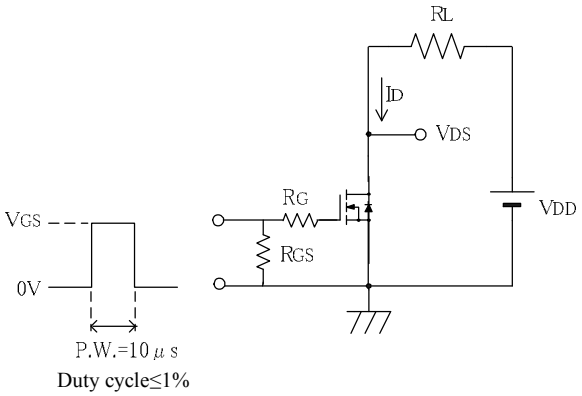


(a) Test Circuit

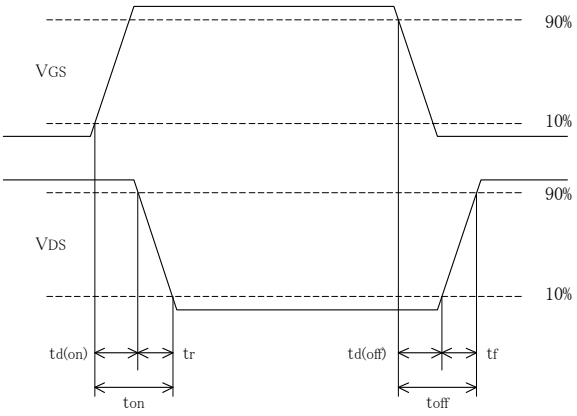


(b) Waveforms

Fig.3 Switching Time Test Method



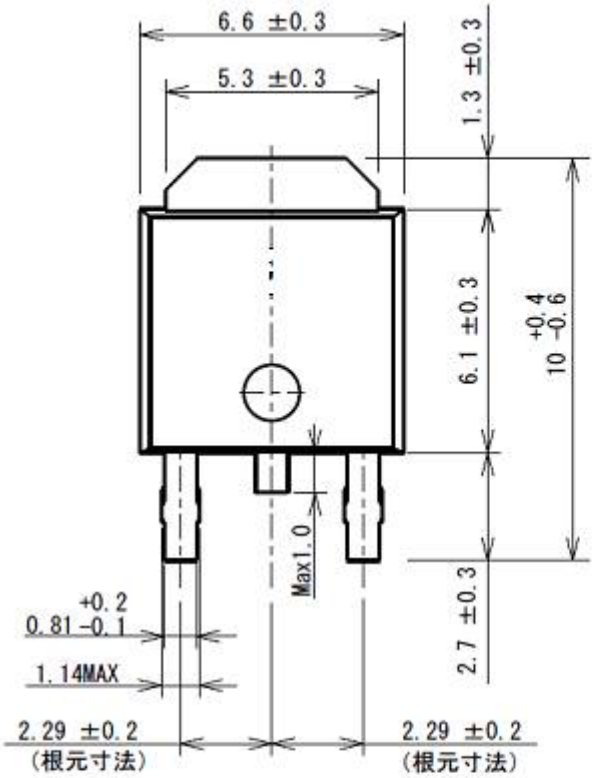
(a) Test Circuit

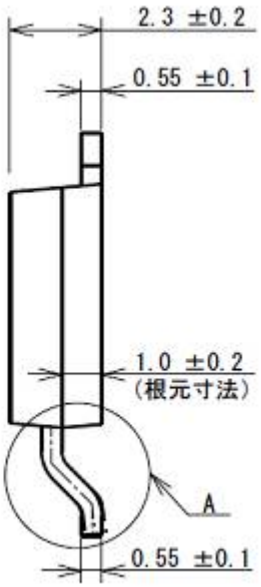


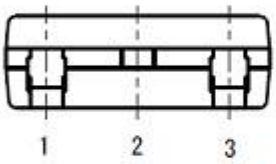
(b) Waveforms

Outline

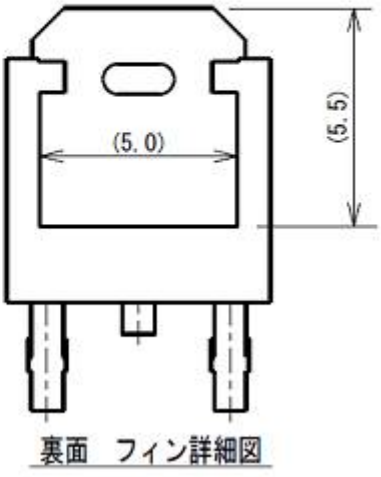
TO252



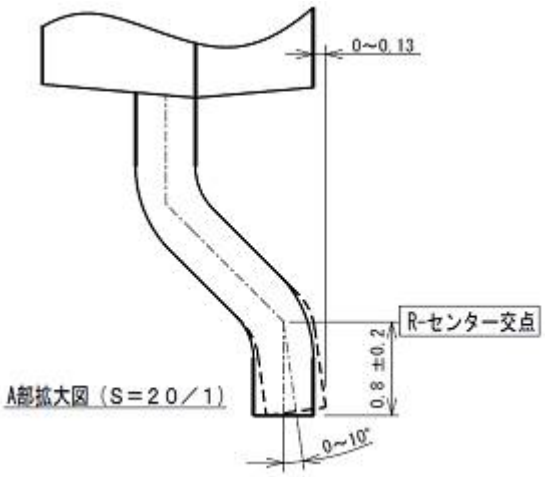




Pin assignment
(1) Gate
(2) Drain
(3) Source



裏面 フィン詳細図



Weight Approx.0.33g

