

## DKG1020

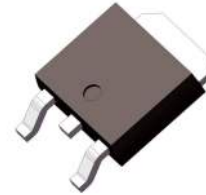
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### Features

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

### Package

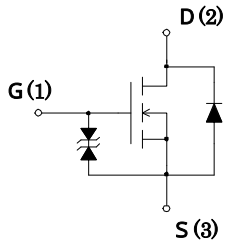
TO252



### Applications

- DC / DC converter
- Switching

### Internal Equivalent Circuit



### 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**

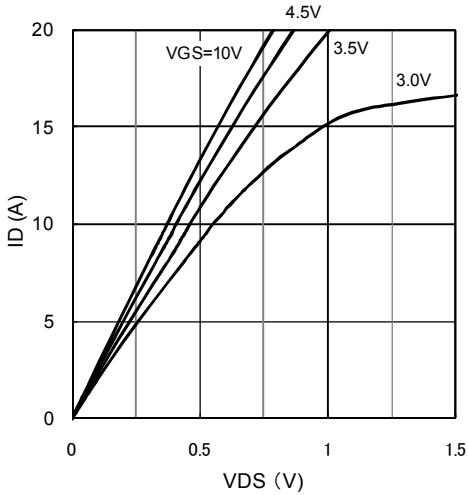
(Ta=25°C)

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	$^{\circ}C/W$

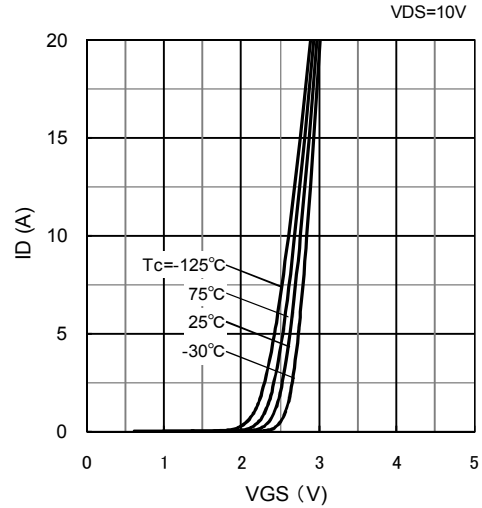
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**Characteristic Curves (Tc=25°C)**

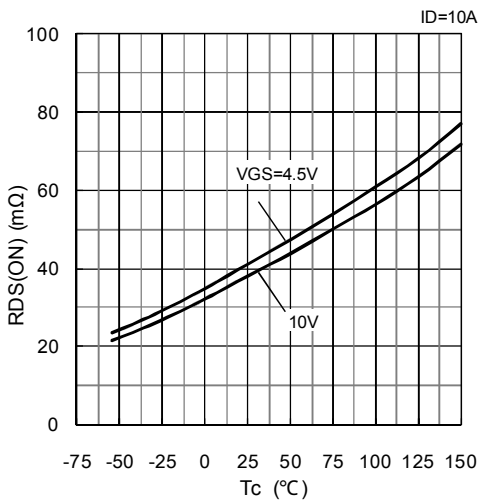
ID - VDS characteristics (typical)



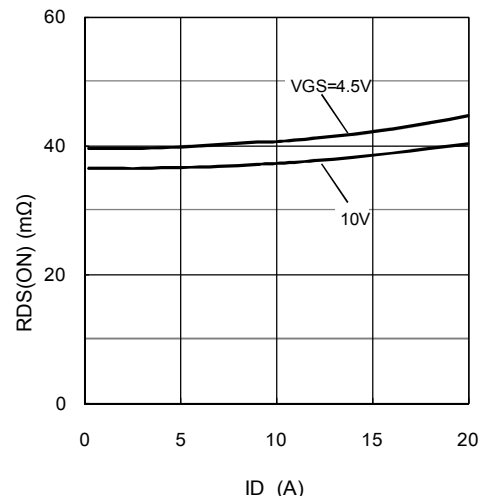
ID - VGS characteristics (typical)



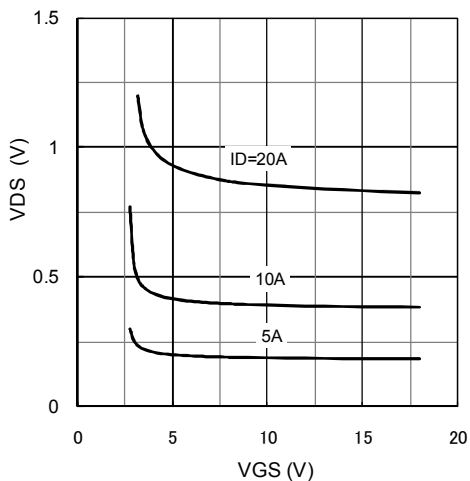
RDS(ON) - Tc characteristics (typical)



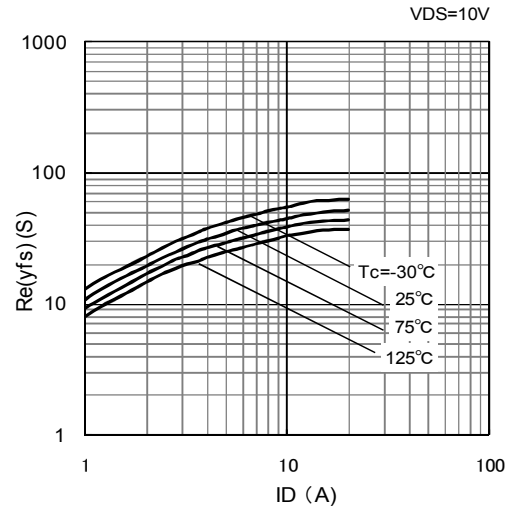
RDS(ON) - ID characteristics (typical)



VDS - VGS characteristics (typical)



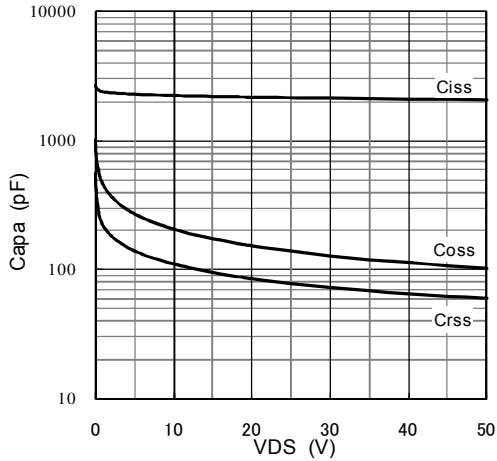
Re(yfs) - ID characteristics (typical)



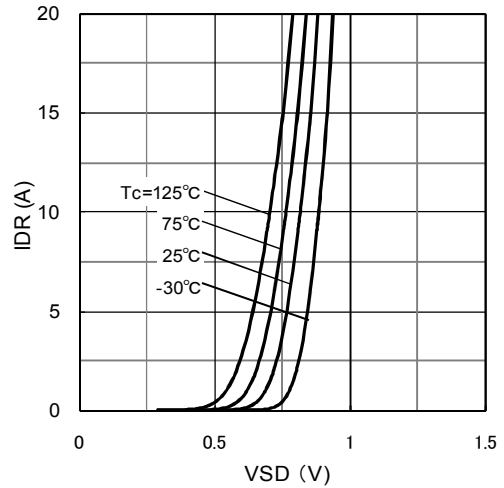
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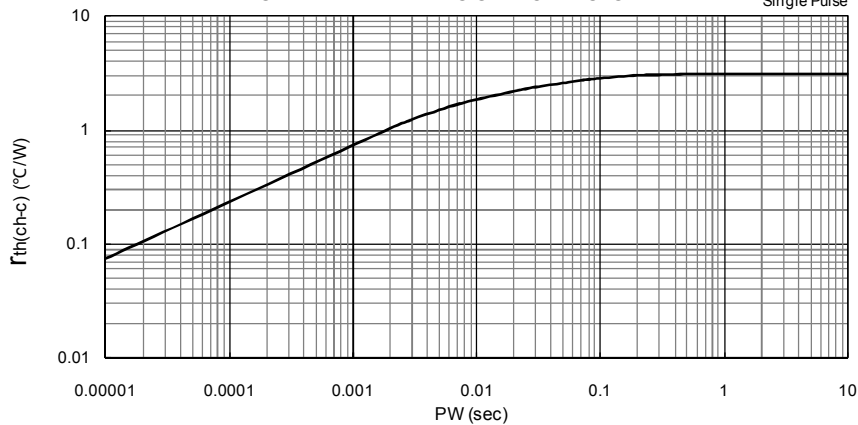
Capacitance - VDS characteristics (typical)  
VGS=0V  
f=1MHz



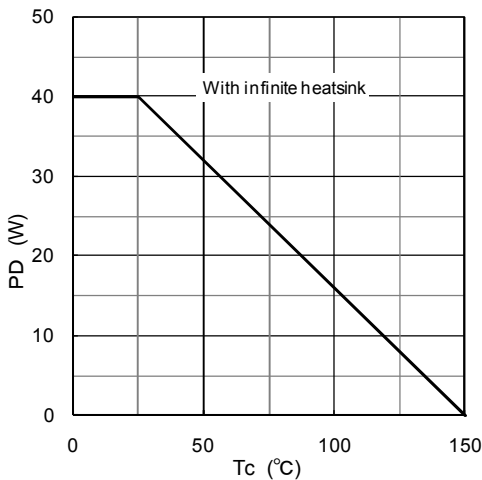
IDR - VSD characteristics (typical)



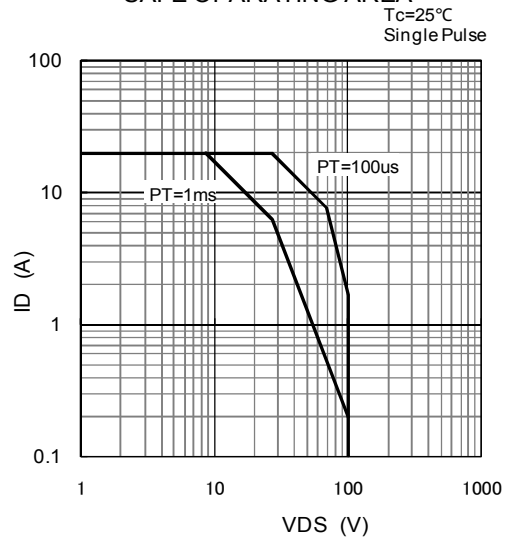
TRANSIENT THERMAL RESISTANCE - PULSE WIDTH (Single Pulse)



PD-Tc characteristics



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



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Fig.1 Unclamped Inductive Test Method

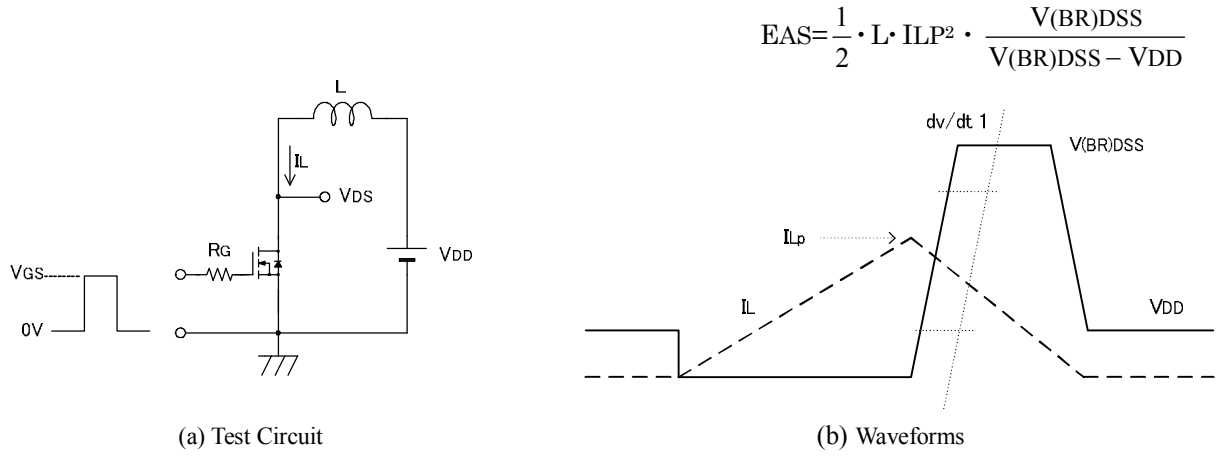


Fig.2 Diode Reverse Recovery Time Test Method

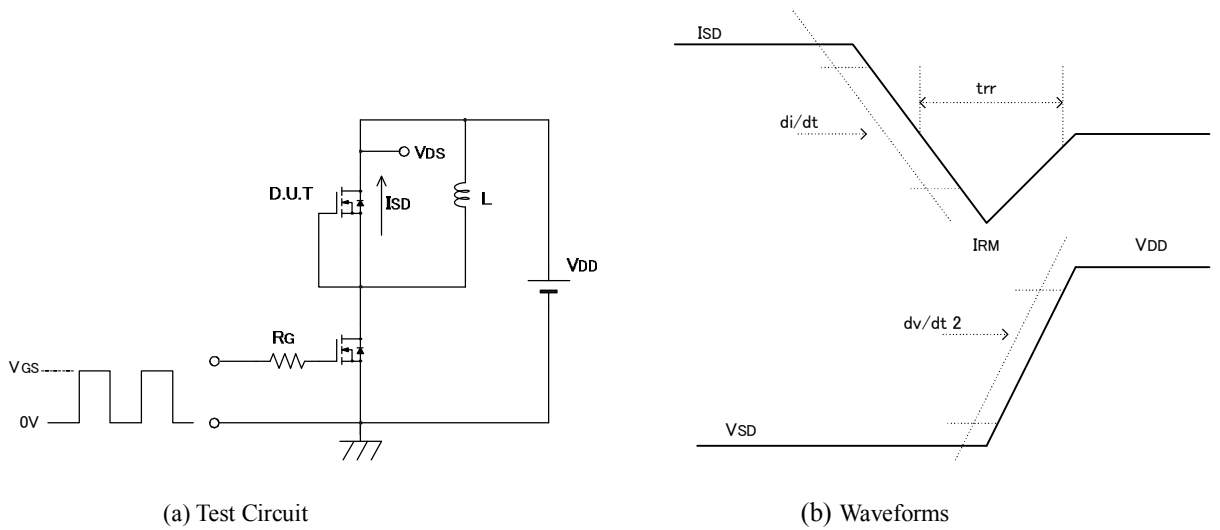
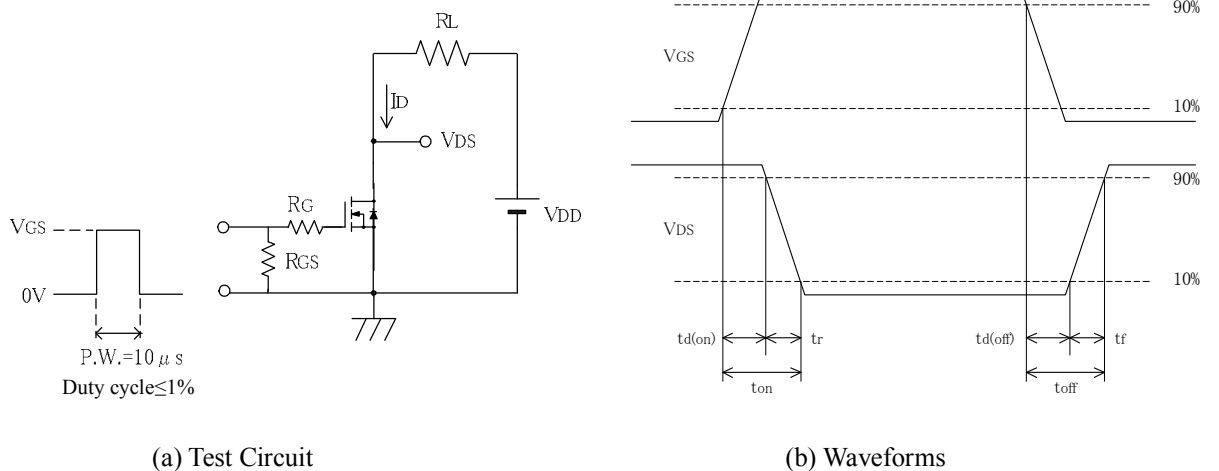


Fig.3 Switching Time Test Method



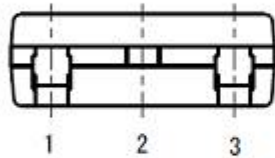
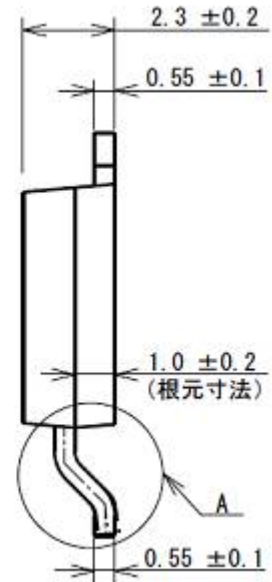
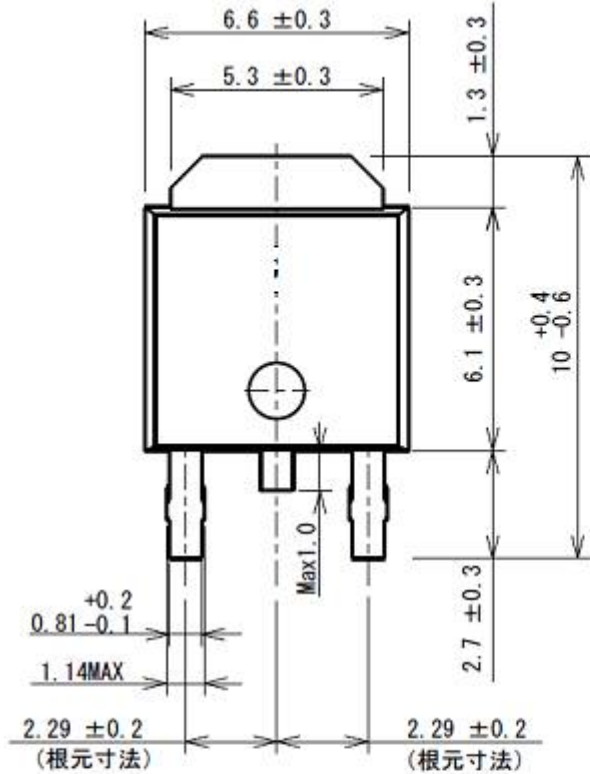
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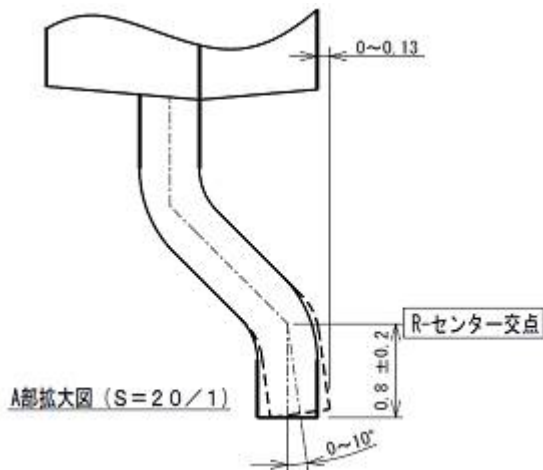
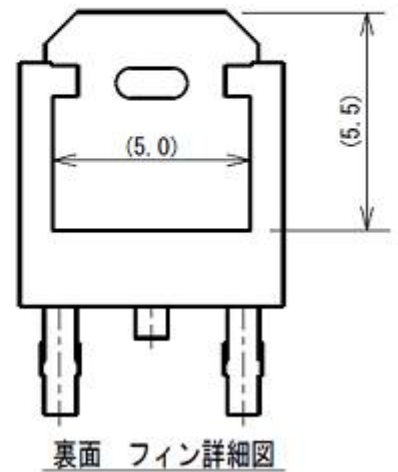
Outline

TO252



Pin assignment

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



Weight Approx.0.33g