SANKEN ELECTRIC

2SK3710

May. 2011

Features

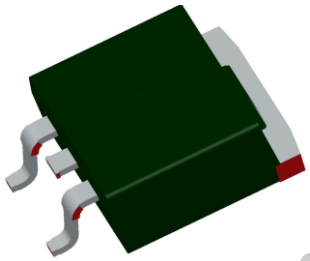
- Low on-state resistance 5.0mΩ VGS=10V
- Built-in gate protection diode
- SMD PKG

Applications

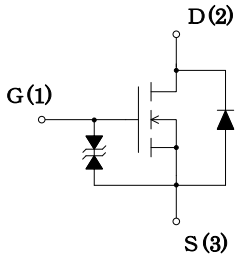
- DC－DC converter
- Mortar drive

Package

TO220S



Internal Equivalent Circuit



Key Specifications

- V(BR)DSS = 60V (ID=100uA)
- RDS(ON) = 5mΩ max (ID=35A / VGS=10V)

Not Recommended for New Designs

Absolute maximum ratings

(Ta=25°C)

Characteristic	Symbol	Rating	Unit
Drain to Source Voltage	V_{DSS}	60	V
Gate to Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	I_D	±85	A
Pulsed Drain Current	$I_{D(pulse)}$ *1	±170	A
Maximum Power Dissipation	P_D	100 (Tc=25°C)	W
Single Pulse Avalanche Energy	E_{AS} *2	400	mJ
Maximum avalanche current	I_{AS}	25	A
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	-55 ~ +150	°C
Maximum Drain to Source dv/dt 1	dv/dt 1*2	0.5	V/ns
Peak diode recovery dv/dt 2	dv/dt 2*3	3	V/ns
Peak diode recovery di/dt	di/dt*3	100	A/μs

*1 PW≤100μsec. duty cycle≤1%

*2 V_{DD}=20V, L=1mH, I_L=25A, unclamped, Rg=50Ω, See Fig.1

*3 I_{SD}=25A, See Fig.2

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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	60			V
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±15V			±10	μA
Drain to Source Leakage Current	I_{DSS}	V_{DS}=60V V_{GS}=0V			100	μA
Gate Threshold Voltage	V_{TH}	V_{DS}=10V, I_D=1mA	2.0	3.4	4.0	V
Forward Transconductance	Re(yfs)	V_{DS}=10V I_D=35A	30	80		S
Static Drain to Source On-Resistance	$R_{DS(ON)}$	I_D=35A, V_{GS}=10V		5.0	6.0	mΩ
Input Capacitance	Ciss	V_{DS}=10V V_{GS}=0V f=1MHz		8400		pF
Output Capacitance	Coss			1200		
Reverse Transfer Capacitance	Crss			930		
Turn-On Delay Time	td(on)	I_D=35A V_{DD}=20V R_G=22Ω R_{GS}=50Ω R_L=0.57Ω V_{GS}=10V See Fig.3		160		ns
Rise Time	tr			170		
Turn-Off Delay Time	td(off)			430		
Fall Time	tf			185		
Source-Drain Diode Forward Voltage	V_{SD}	I_{SD}=50A V_{GS}=0V		0.9	1.5	V
Source-Drain Diode Reverse Recovery Time	trr	I_{SD}=25A di/dt=50A/μs		65		ns
Thermal Resistance Junction to Case	Rth(ch-c)				1.25	°C/W
Thermal Resistance Junction to Ambient	Rth(ch-a)				62.5	°C/W

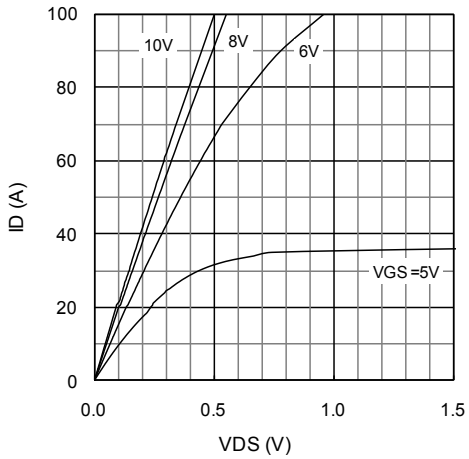
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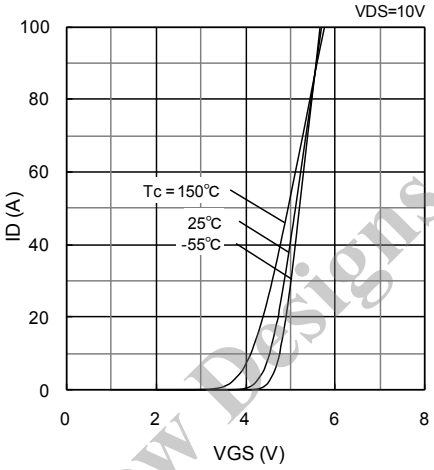
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Characteristic Curves (Tc=25°C)

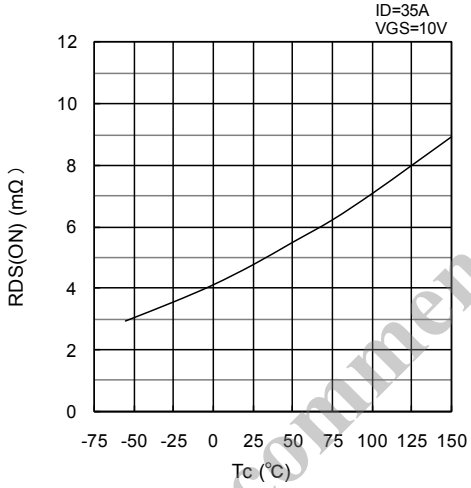
ID-VDS characteristics (typical)



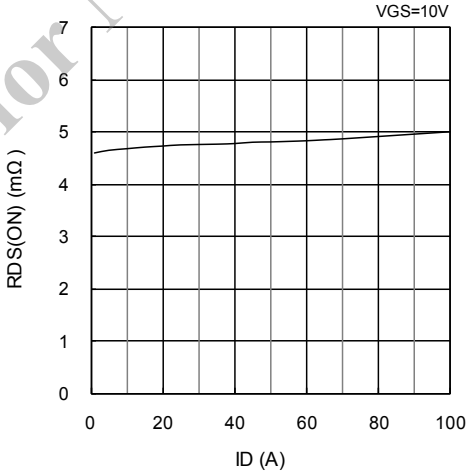
ID-VGS characteristics (typical)



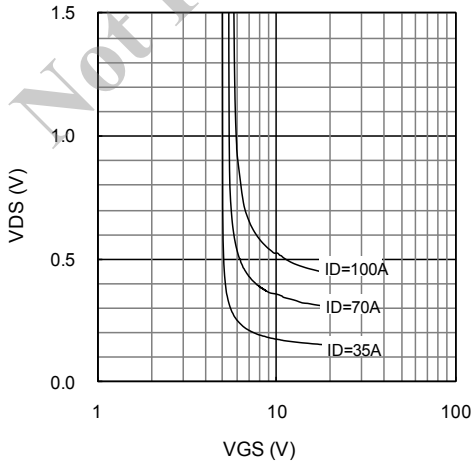
RDS(ON)-Tc characteristics (typical)



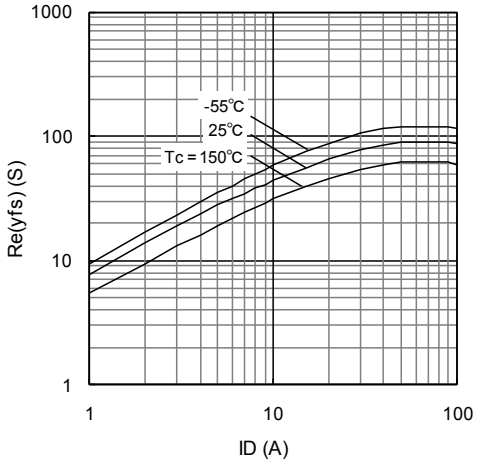
RDS(ON)-ID characteristics (typical)



VDS-VGS characteristics (typical)



Re(yfs)-ID characteristics (typical)



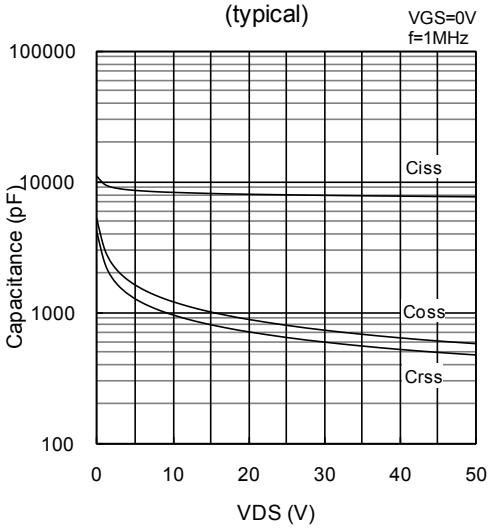
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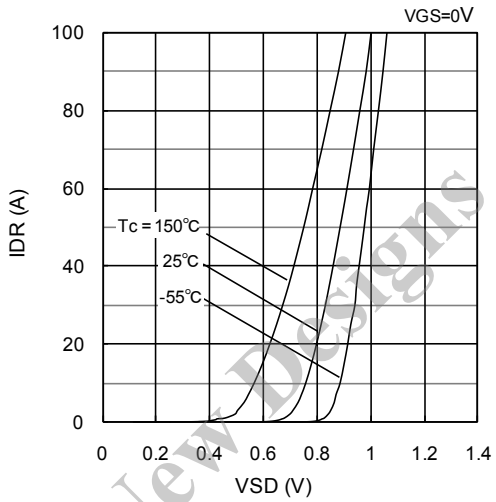
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Characteristic Curves (Tc=25°C)

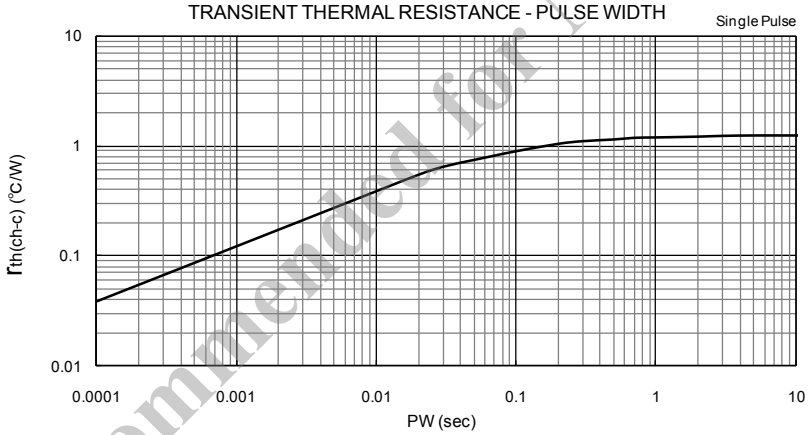
Capacitance-VDS characteristics (typical)



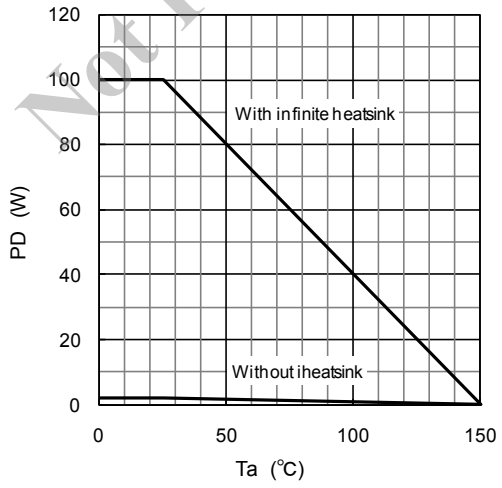
IDR-VSD characteristics (typical)



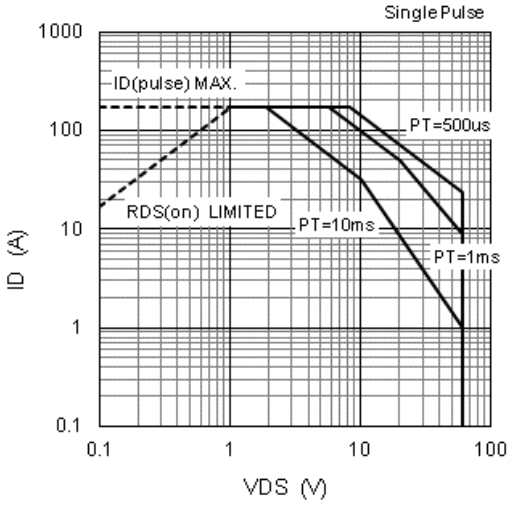
TRANSIENT THERMAL RESISTANCE - PULSE WIDTH



PD-Ta characteristics (typical)



SAFE OPARATING AREA



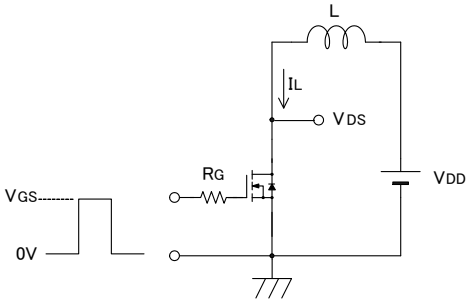
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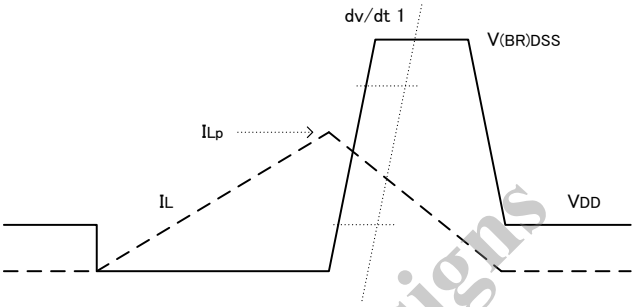
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Fig.1 Unclamped Inductive Test Method

$$EAS = \frac{1}{2} \cdot L \cdot ILP^2 \cdot \frac{V(BR)DSS}{V(BR)DSS - VDD}$$

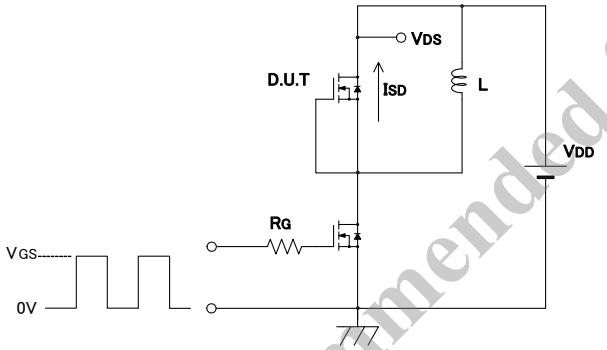


(a) Test Circuit

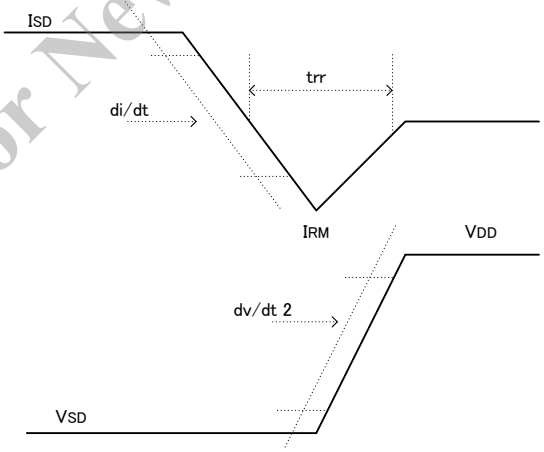


(b) Waveforms

Fig.2 Diode Reverse Recovery Time Test Method

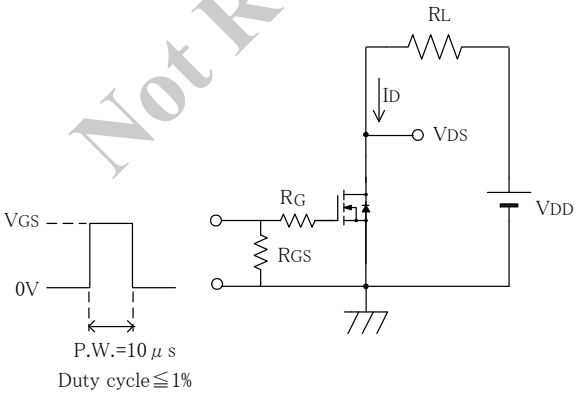


(a) Test Circuit

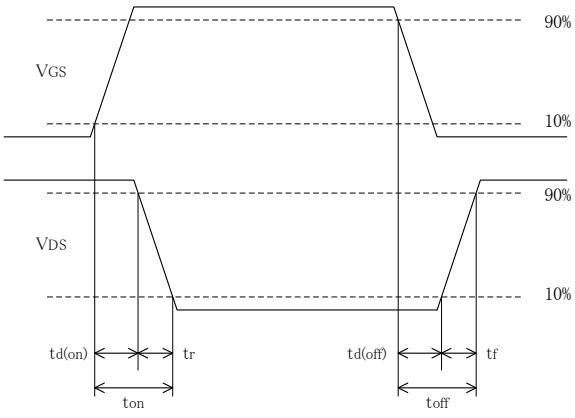


(b) Waveforms

Fig.3 Switching Time Test Method



(a) Test Circuit



(b) Waveforms

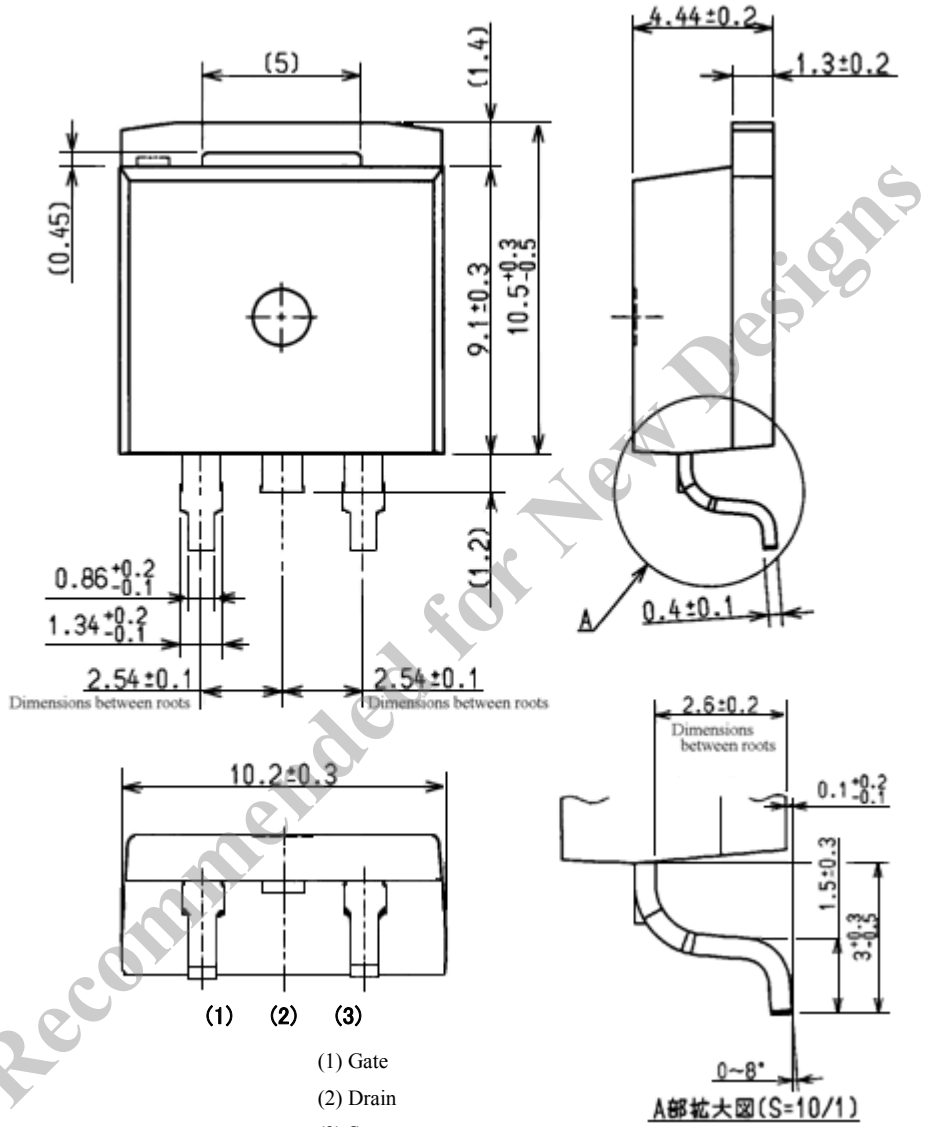
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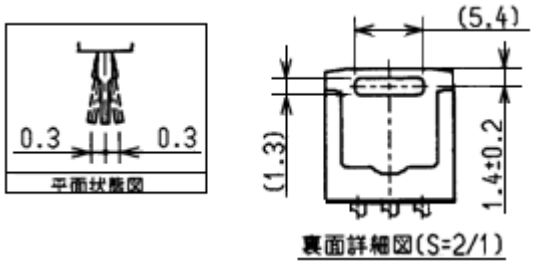
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Outline

TO220S



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



Weight Approx. 1.4g

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