To all our customers

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Renesas Technology Home Page: http://www.renesas.com

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.
   Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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2SK1947

Silicon N-Channel MOS FET

ADE-208-1334 (Z)
1st. Edition
Mar. 2001

Application

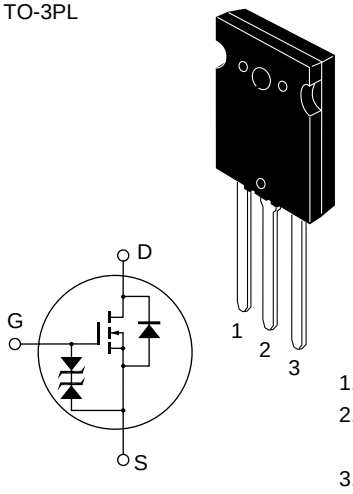
High speed power switching

Features

- Low on-resistance
- High speed switching
- Low Drive Current
- Built-In Fast Recovery Diode (t_{rr} = 140 ns)
- Suitable for Switching regulator, Motor Control

Outline

TO-3PL



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

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	250	V
Gate to source voltage	V_{GSS}	±30	V
Drain current	I_D	50	A
Drain peak current	$I_{D(pulse)}$*[1]	200	A
Body to drain diode reverse drain current	I_{DR}	50	A
Channel dissipation	Pch*[2]	200	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

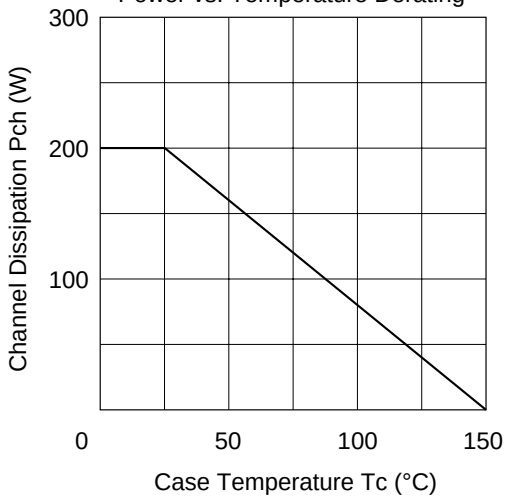
Notes 1. PW 10 µs, duty cycle 1 %
2. Value at Tc = 25 °C

Electrical Characteristics (Ta = 25°C)

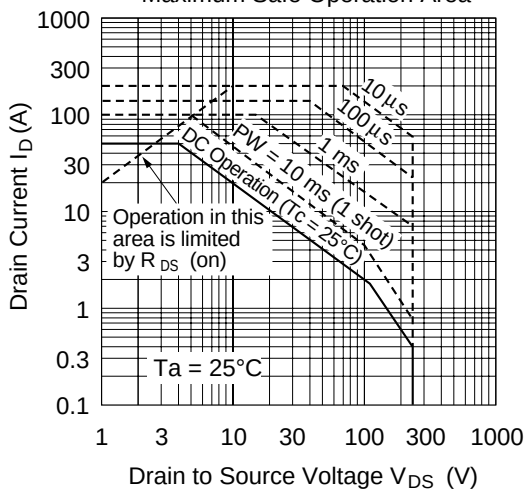
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	250	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±30	—	—	V	I_G = ±100 µA, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	µA	V_{GS} = ±25 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	250	µA	V_{DS} = 200 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	3.0	V	I_D = 1 mA, V_{DS} = 10 V
Static drain to source on state resistance	$R_{DS(on)}$	—	0.047	0.06		I_D = 25 A V_{GS} = 10 V*[1]
Forward transfer admittance	$\|y_{fs}\|$	20	30	—	S	I_D = 25 A V_{DS} = 10 V*[1]
Input capacitance	Ciss	—	5810	—	pF	V_{DS} = 10 V
Output capacitance	Coss	—	2360	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	270	—	pF	f = 1 MHz
Turn-on delay time	$t_{d(on)}$	—	75	—	ns	I_D = 25 A
Rise time	t_r	—	270	—	ns	V_{GS} = 10 V
Turn-off delay time	$t_{d(off)}$	—	420	—	ns	R_L = 1.2
Fall time	t_f	—	200	—	ns	
Body to drain diode forward voltage	V_{DF}	—	1.2	—	V	I_F = 50 A, V_{GS} = 0
Body to drain diode reverse recovery time	t_{rr}	—	140	—	ns	I_F = 50 A, V_{GS} = 0, di_F / dt = 100 A / µs

Note 1. Pulse Test

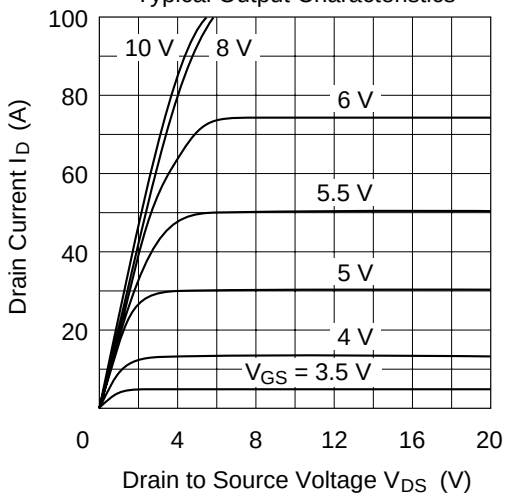
Power vs. Temperature Derating



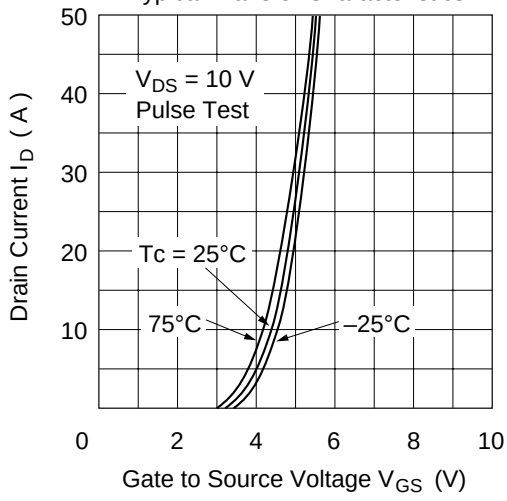
Maximum Safe Operation Area



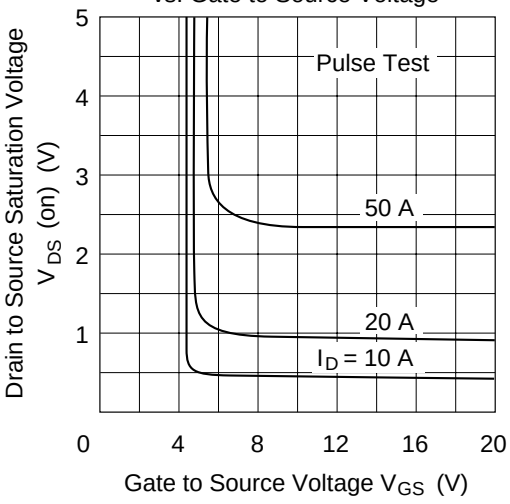
Typical Output Characteristics



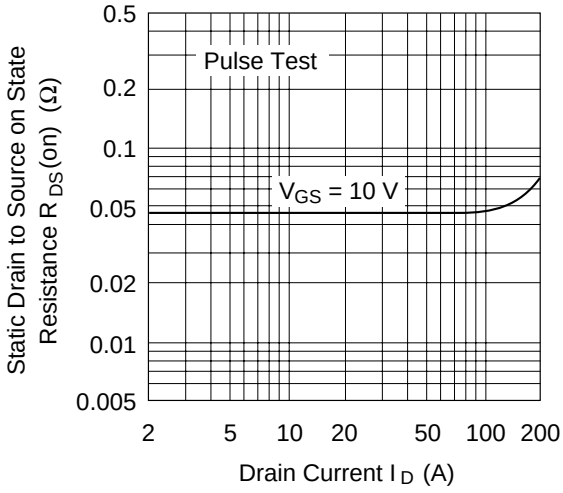
Typical Transfer Characteristics



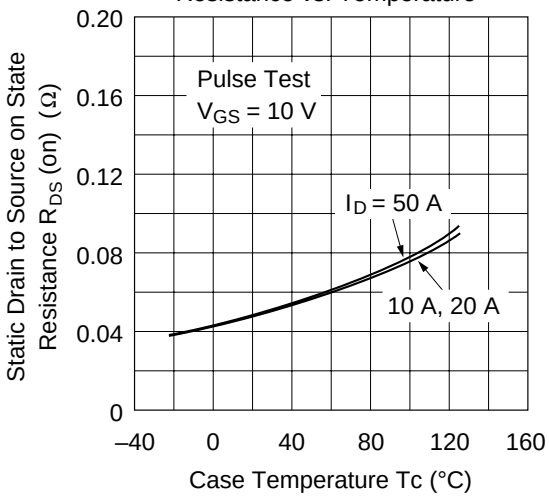
Drain to Source Saturation Voltage vs. Gate to Source Voltage



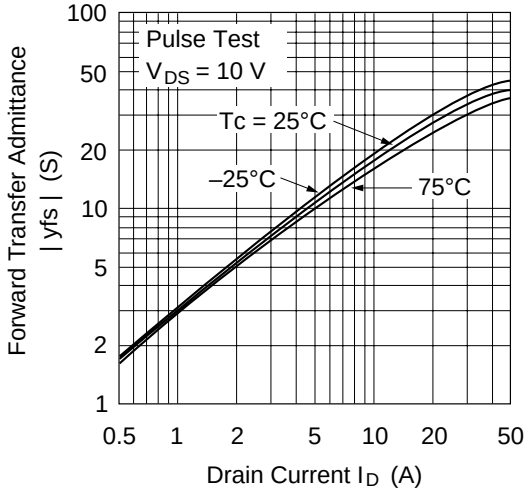
Static Drain to Source on State Resistance vs. Drain Current



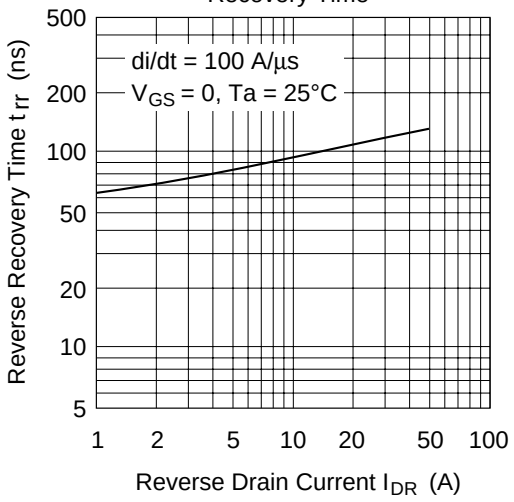
Static Drain to Source on State Resistance vs. Temperature



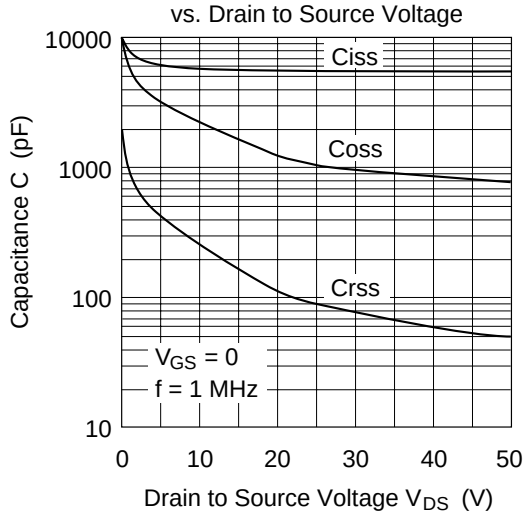
Forward Transfer Admittance vs. Drain Current



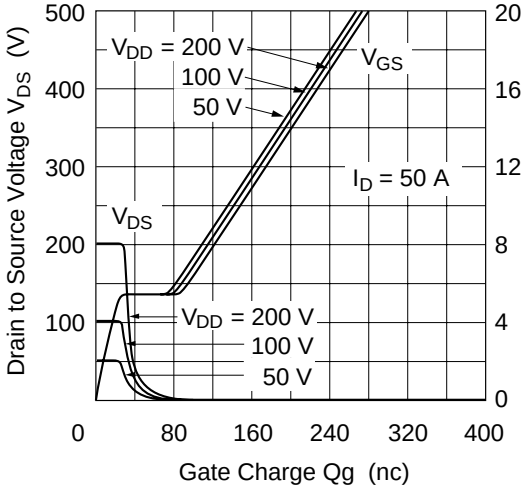
Body to Drain Diode Reverse Recovery Time



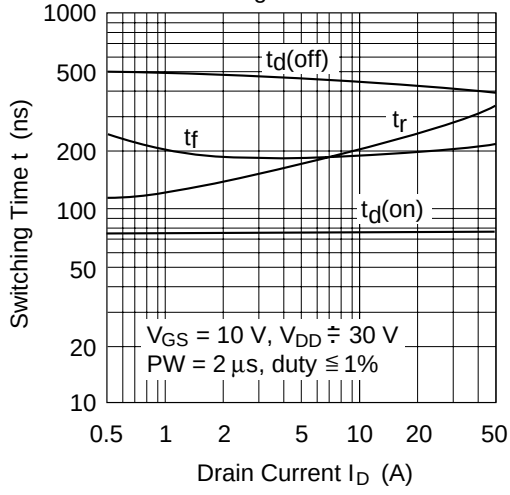
Typical Capacitance vs. Drain to Source Voltage



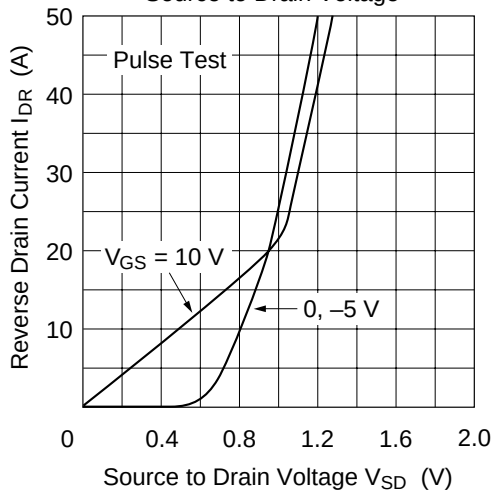
Dynamic Input Characteristics



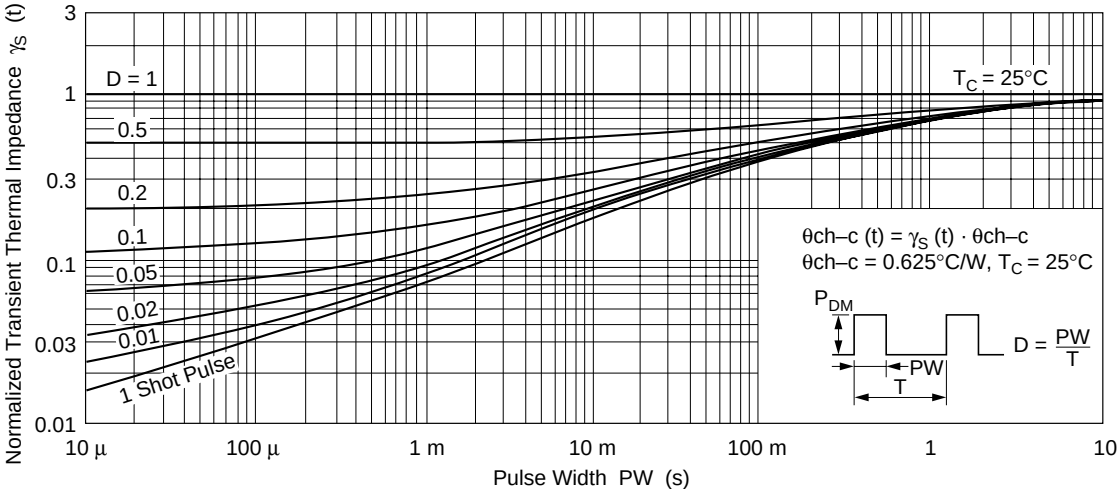
Switching Characteristics



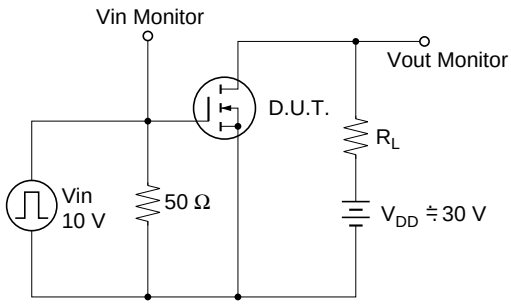
Reverse Drain Current vs.
Source to Drain Voltage



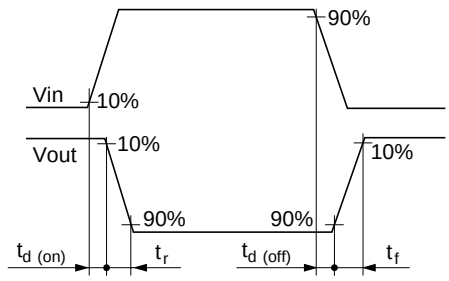
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



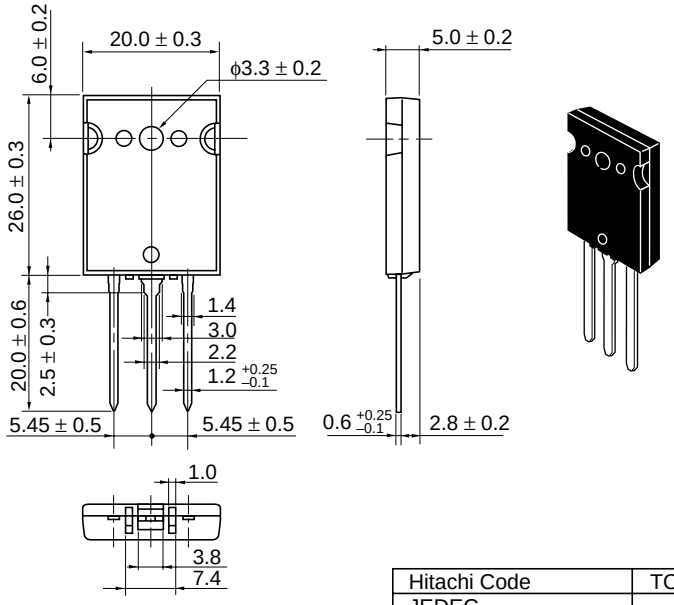
Waveforms



Package Dimensions

As of January, 2001

Unit: mm



Hitachi Code	TO-3PL
JEDEC	—
EIAJ	—
Mass (reference value)	9.9 g

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