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# 2SK1947

Silicon N-Channel MOS FET

# HITACHI

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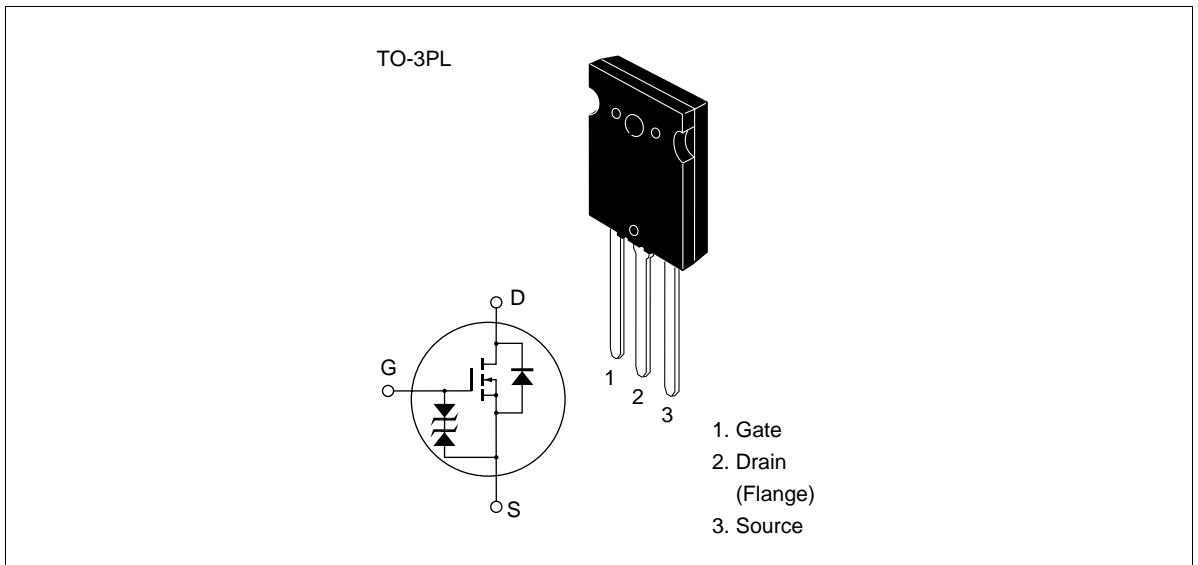
## Application

High speed power switching

## Features

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

## Outline



**Absolute Maximum Ratings** ( $T_a = 25^\circ\text{C}$ )

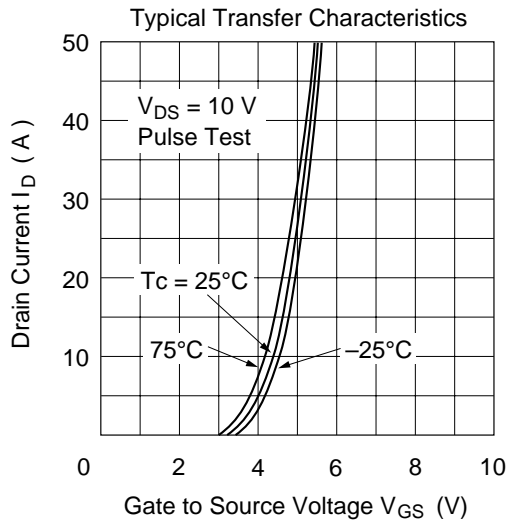
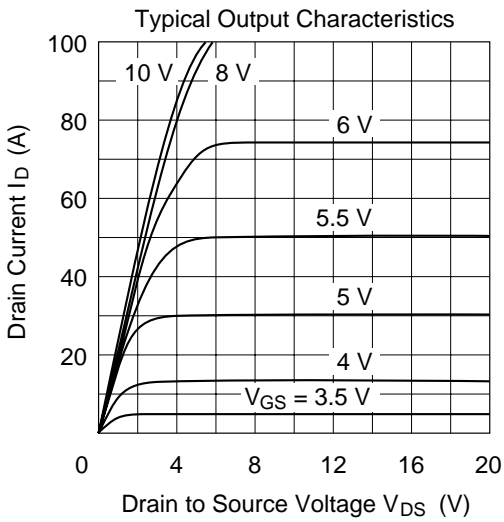
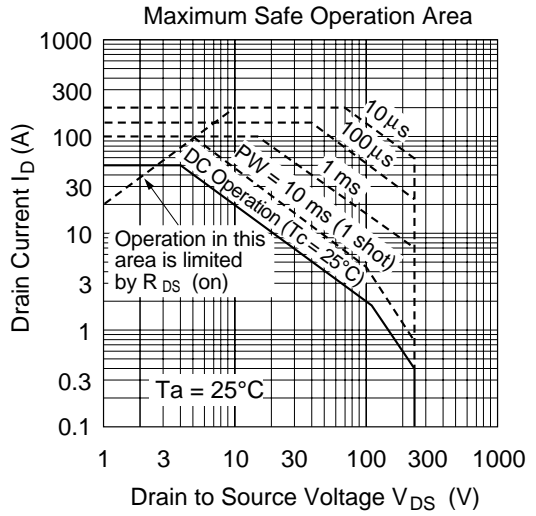
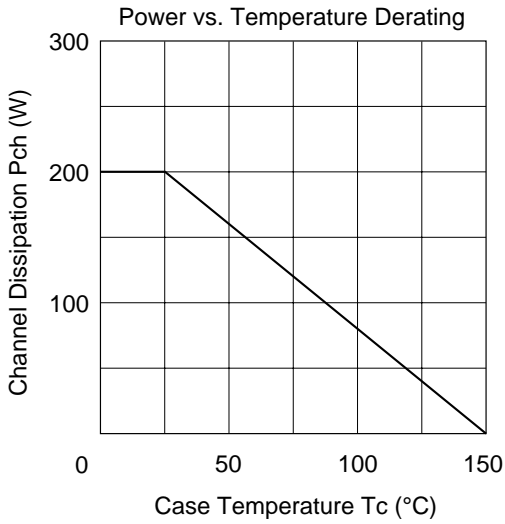
<b>Item</b>	<b>Symbol</b>	<b>Ratings</b>	<b>Unit</b>
Drain to source voltage	$V_{\text{DSS}}$	250	V
Gate to source voltage	$V_{\text{GSS}}$	$\pm 30$	V
Drain current	$I_{\text{D}}$	50	A
Drain peak current	$I_{\text{D(pulse)}}^{*1}$	200	A
Body to drain diode reverse drain current	$I_{\text{DR}}$	50	A
Channel dissipation	$P_{\text{ch}}^{*2}$	200	W
Channel temperature	$T_{\text{ch}}$	150	$^\circ\text{C}$
Storage temperature	$T_{\text{stg}}$	-55 to +150	$^\circ\text{C}$

Notes 1.  $PW = 10 \mu\text{s}$ , duty cycle = 1 %  
2. Value at  $T_c = 25^\circ\text{C}$

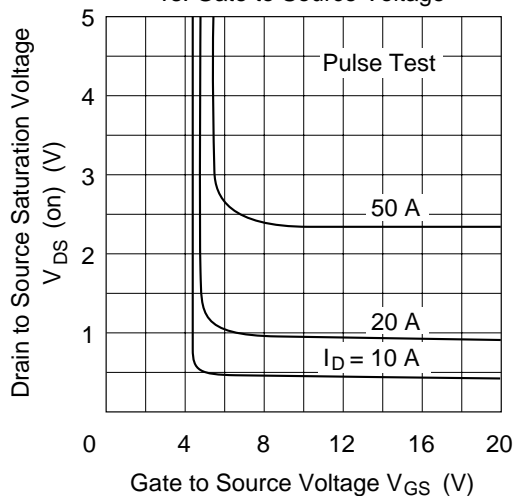
## Electrical Characteristics (Ta = 25°C)

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

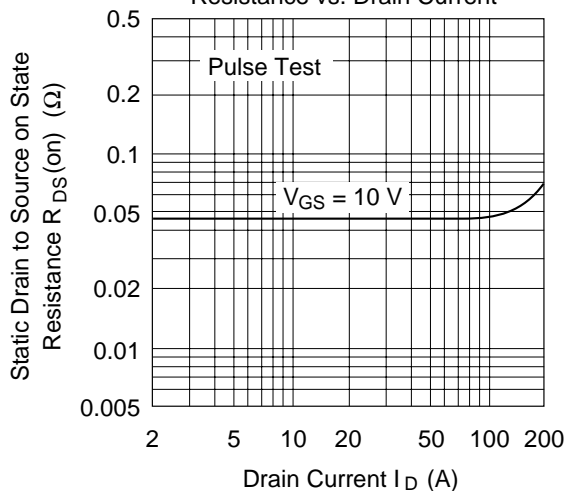
Note 1. Pulse Test



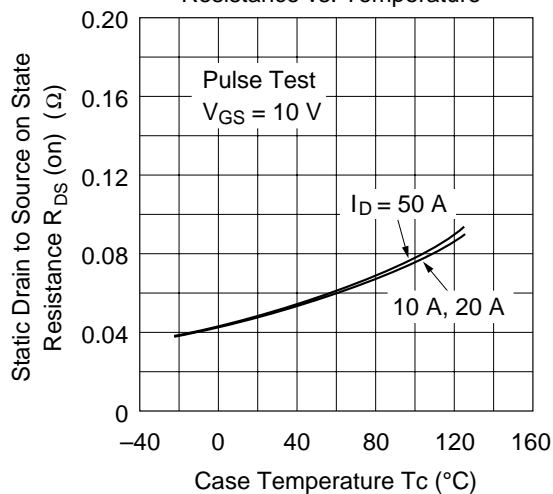
Drain to Source Saturation Voltage vs. Gate to Source Voltage



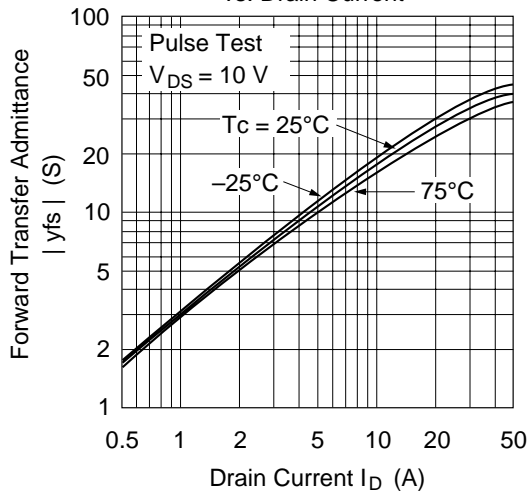
Static Drain to Source on State Resistance vs. Drain Current



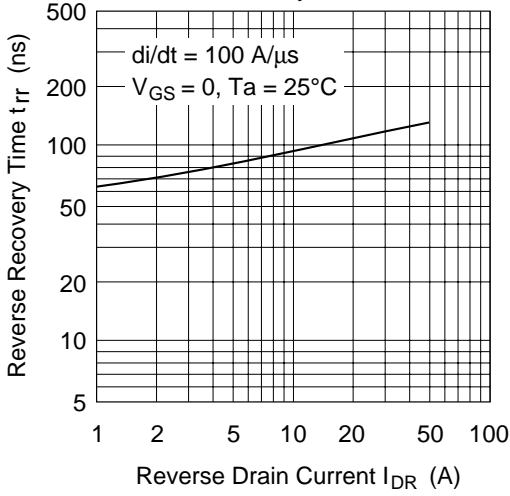
Static Drain to Source on State Resistance vs. Temperature



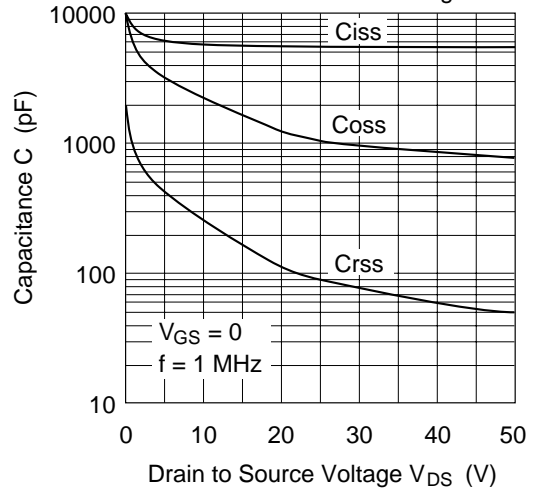
Forward Transfer Admittance vs. Drain Current



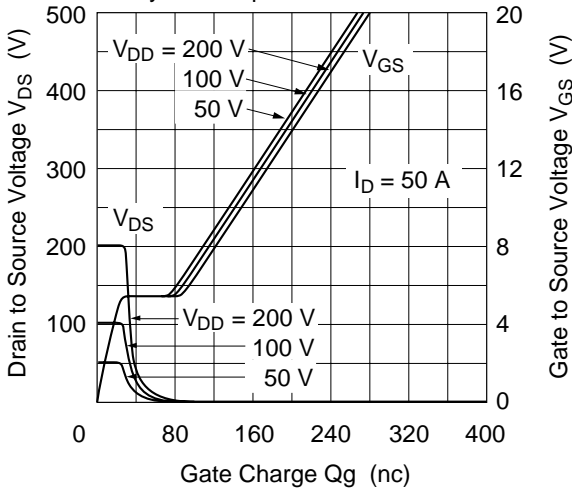
Body to Drain Diode Reverse Recovery Time



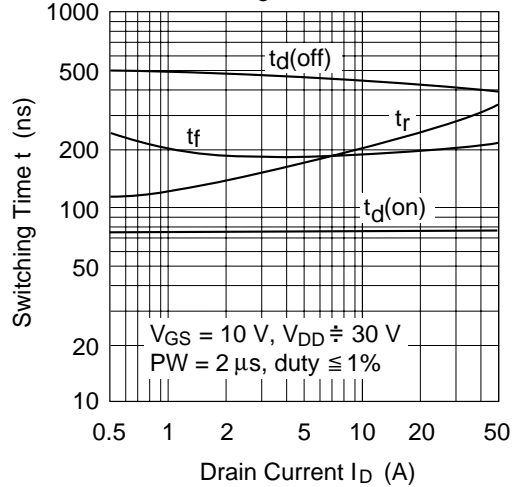
Typical Capacitance vs. Drain to Source Voltage

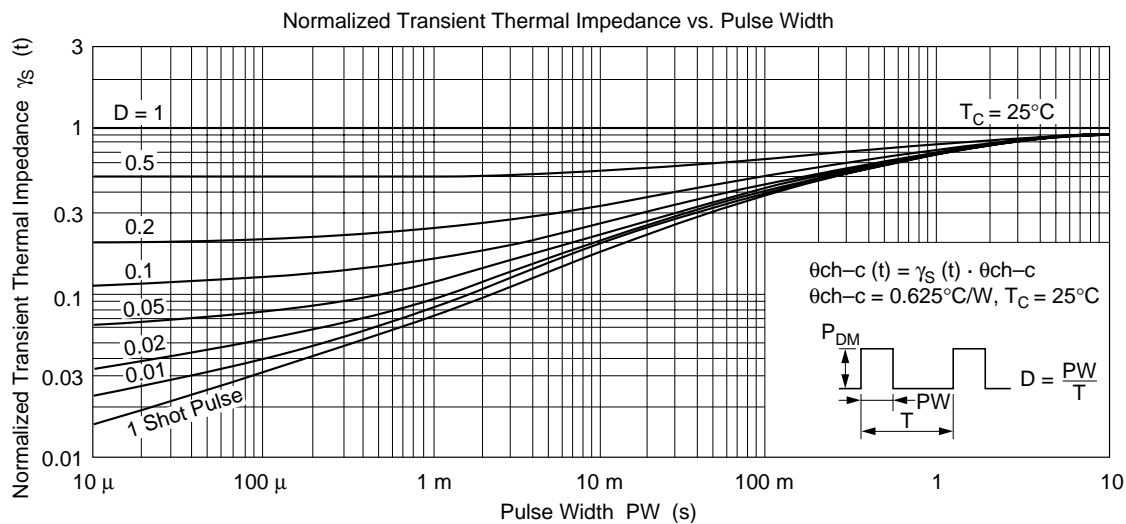
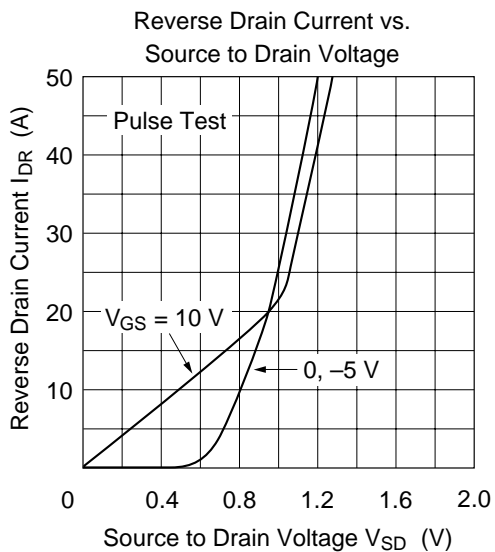


Dynamic Input Characteristics

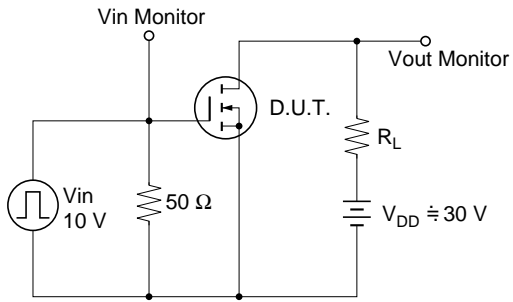


Switching Characteristics

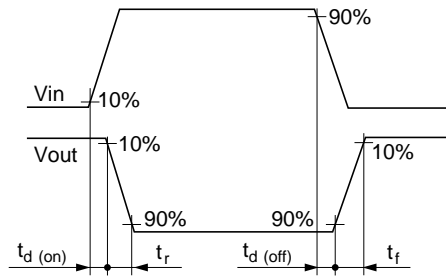




Switching Time Test Circuit



Waveforms





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