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# 2SK1405

Silicon N-Channel MOS FET

# HITACHI

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## Application

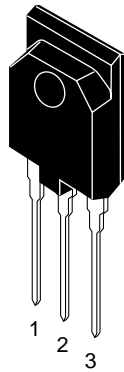
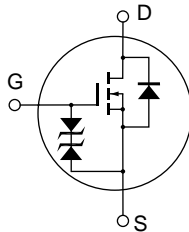
High speed power switching

## Features

- Low on-resistance
- High speed switching
- Low drive current
- Built-in fast diode ( $t_{rr} = 140$  ns)
- Suitable for motor control, switching regulator, DC-DC converter

## Outline

TO-3PFM



1. Gate
2. Drain
3. Source

## 2SK1405

### Absolute Maximum Ratings (Ta = 25°C)

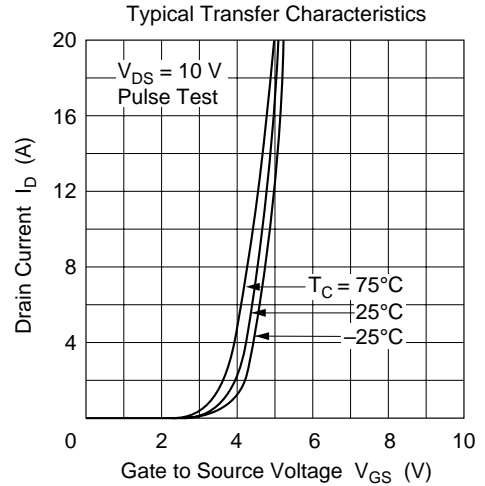
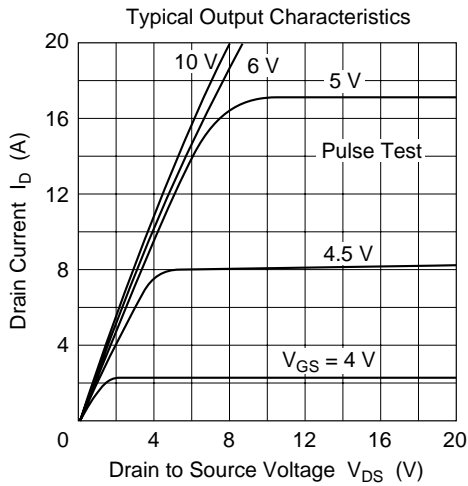
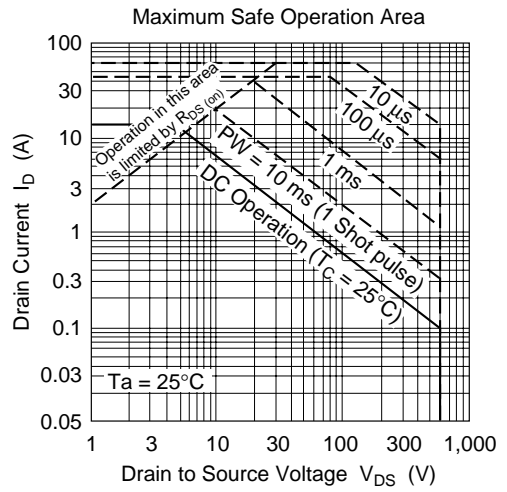
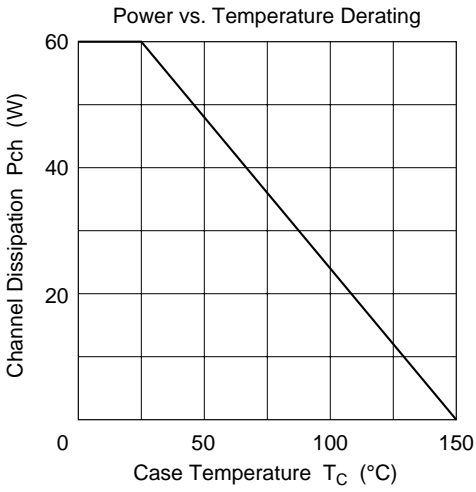
Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	600	V
Gate to source voltage	$V_{GSS}$	±30	V
Drain current	$I_D$	15	A
Drain peak current	$I_{D(pulse)}^{*1}$	60	A
Body to drain diode reverse drain current	$I_{DR}$	15	A
Channel dissipation	$P_{ch}^{*2}$	60	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

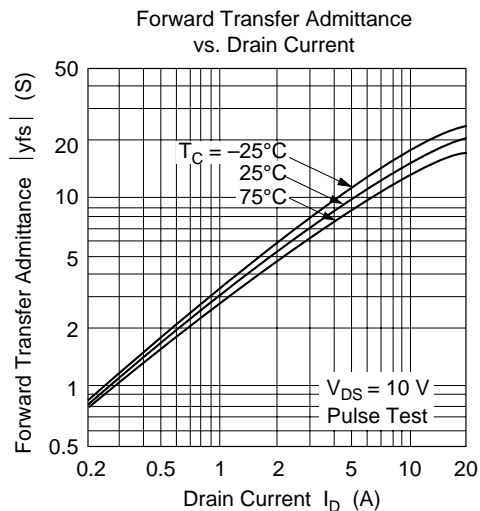
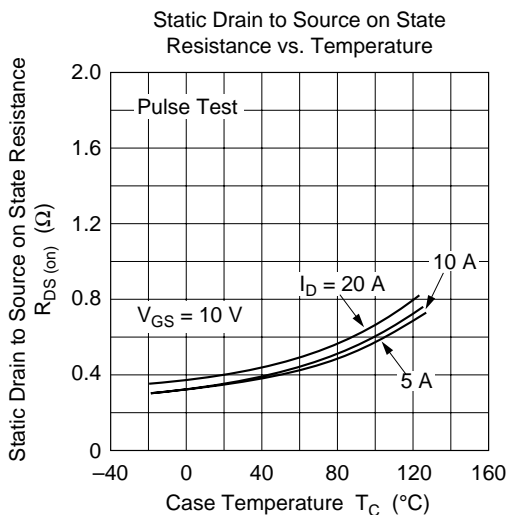
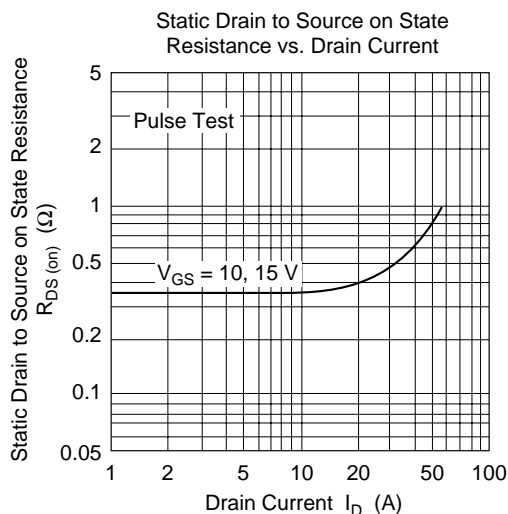
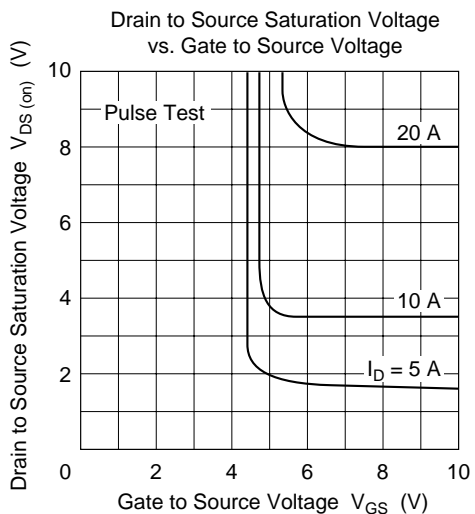
Notes: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$   
2. Value at  $T_c = 25^\circ C$

## Electrical Characteristics (Ta = 25°C)

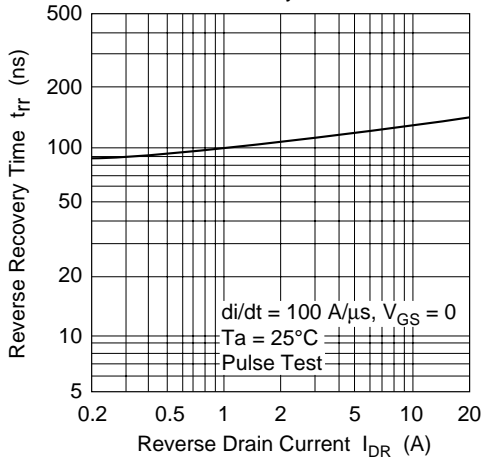
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 30$	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}, V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	250	$\mu\text{A}$	$V_{DS} = 500 \text{ V}, V_{GS} = 0$
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	$R_{DS(on)}$	—	0.35	0.50	$\Omega$	$I_D = 8 \text{ A}, V_{GS} = 10 \text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	9	14	—	S	$I_D = 8 \text{ A}, V_{DS} = 10 \text{ V}^{*1}$
Input capacitance	$C_{iss}$	—	3150	—	pF	$V_{DS} = 10 \text{ V}, V_{GS} = 0,$
Output capacitance	$C_{oss}$	—	780	—	pF	$f = 1 \text{ MHz}$
Reverse transfer capacitance	$C_{rss}$	—	110	—	pF	
Turn-on delay time	$t_{d(on)}$	—	35	—	ns	$I_D = 8 \text{ A}, V_{GS} = 10 \text{ V},$
Rise time	$t_r$	—	120	—	ns	$R_L = 3.75 \text{ }\Omega$
Turn-off delay time	$t_{d(off)}$	—	240	—	ns	
Fall time	$t_f$	—	100	—	ns	
Body to drain diode forward voltage	$V_{DF}$	—	1.0	—	V	$I_F = 15 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	$t_{rr}$	—	140	—	ns	$I_F = 15 \text{ A}, V_{GS} = 0,$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

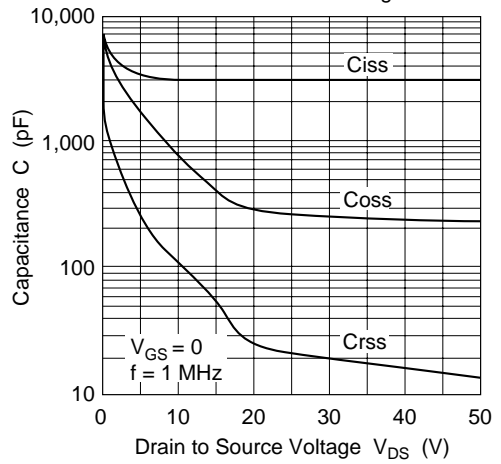




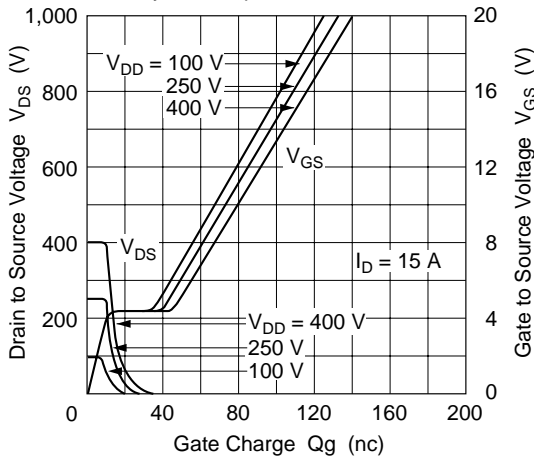
Body to Drain Diode Reverse Recovery Time



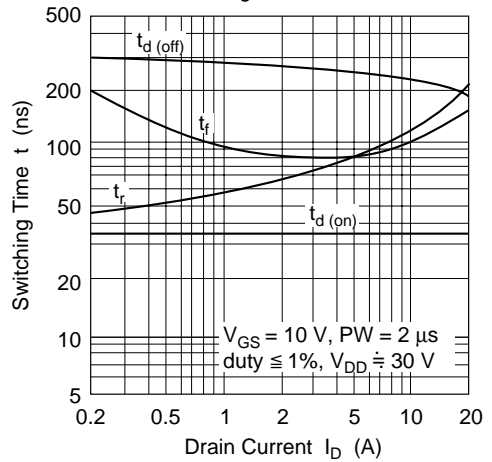
Typical Capacitance vs. Drain to Source Voltage

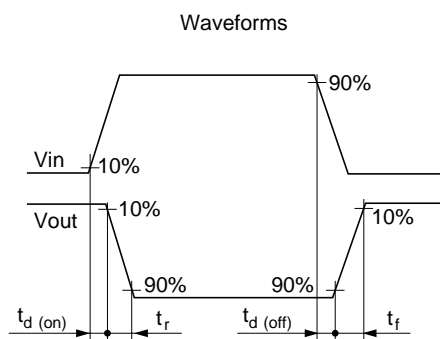
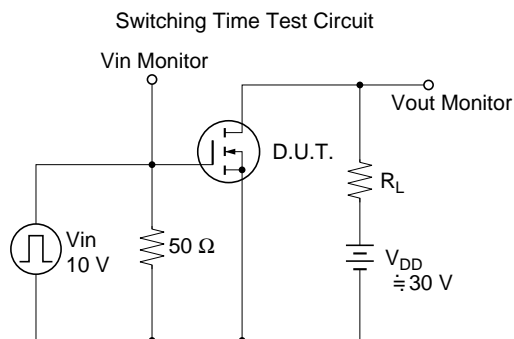
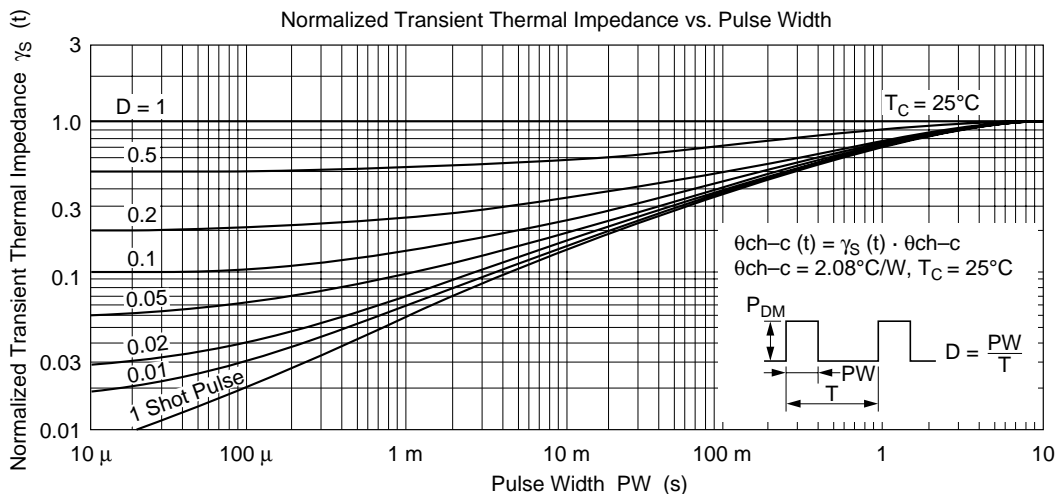
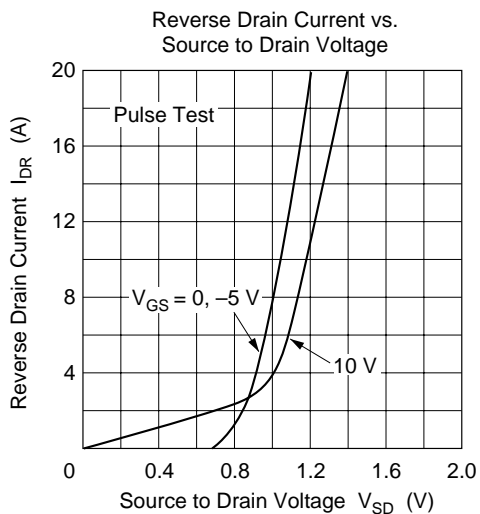


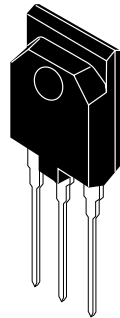
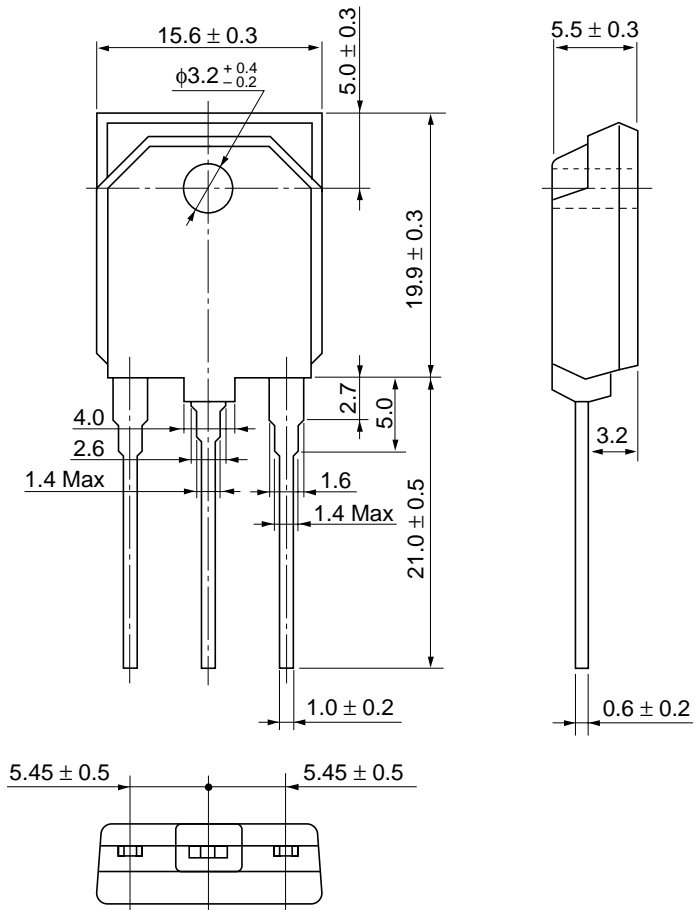
Dynamic Input Characteristics



Switching Characteristics







Hitachi Code	TO-3PFB
JEDEC	—
EIAJ	—
Weight (reference value)	5.6 g



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