

2SK1404

Silicon N-Channel MOS FET

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Application

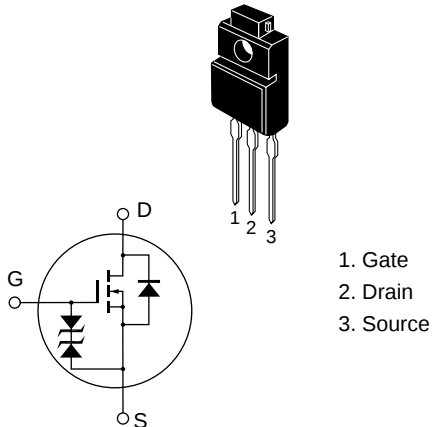
High speed power switching

Features

- Low on-resistance
- High speed switching
- Low drive current
- No secondary breakdown
- Suitable for switching regulator and DC-DC converter

Outline

TO-220FM



2SK1404

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	5	A
Drain peak current	I _{D(pulse)} ^{*1}	20	A
Body to drain diode reverse drain current	I _{DR}	5	A
Channel dissipation	Pch ^{*2}	35	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

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

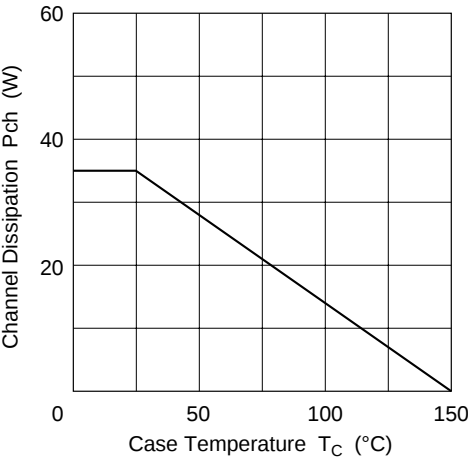
Electrical Characteristics (Ta = 25°C)

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	$V_{(BR)GSS}$	± 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	$V_{DS} = 500\text{ V}$, $V_{GS} = 0$
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	$R_{DS(on)}$	—	1.1	1.5	Ω	$I_D = 2.5\text{ A}$, $V_{GS} = 10\text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	3.0	5.0	—	S	$I_D = 2.5\text{ A}$, $V_{DS} = 10\text{ V}^{*1}$
Input capacitance	C_{iss}	—	1000	—	pF	$V_{DS} = 10\text{ V}$, $V_{GS} = 0$, $f = 1\text{ MHz}$
Output capacitance	C_{oss}	—	250	—	pF	
Reverse transfer capacitance	C_{rss}	—	45	—	pF	
Turn-on delay time	$t_{d(on)}$	—	12	—	ns	$I_D = 2.5\text{ A}$, $V_{GS} = 10\text{ V}$, $R_L = 12\text{ }\Omega$
Rise time	t_r	—	45	—	ns	
Turn-off delay time	$t_{d(off)}$	—	105	—	ns	
Fall time	t_f	—	55	—	ns	
Body to drain diode forward voltage	V_{DF}	—	0.9	—	V	$I_F = 5\text{ A}$, $V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	500	—	ns	$I_F = 5\text{ A}$, $V_{GS} = 0$, $di_F/dt = 100\text{ A}/\mu\text{s}$

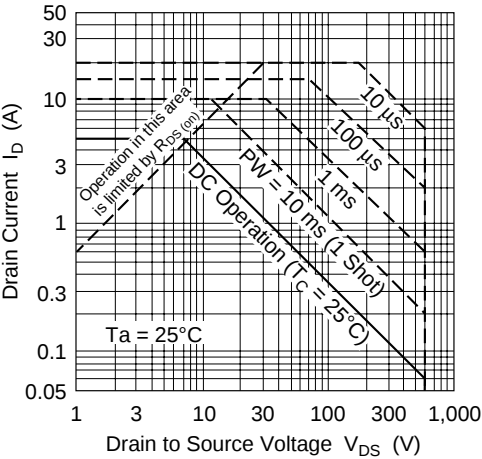
Note: 1. Pulse test

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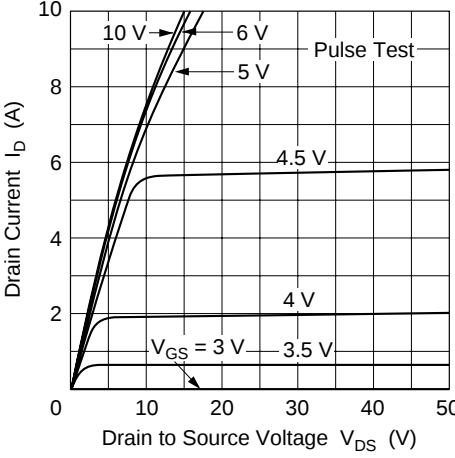
Power vs. Temperature Derating



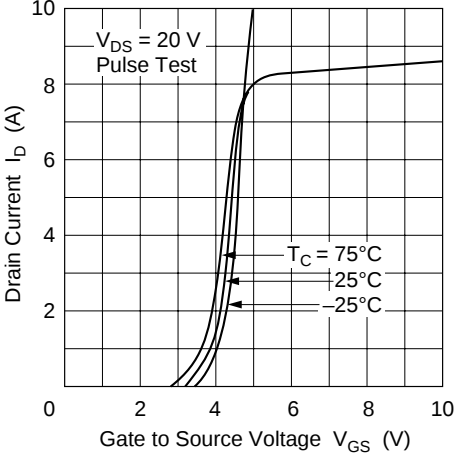
Maximum Safe Operation Area



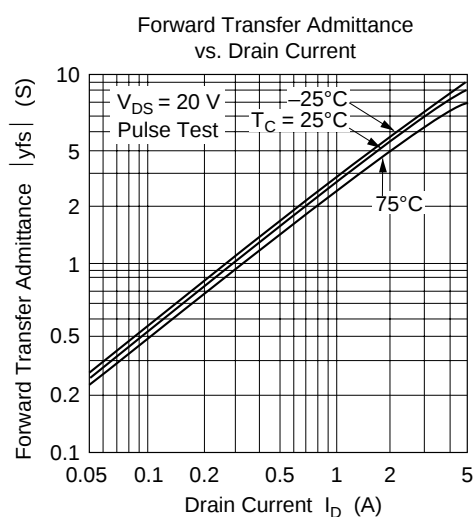
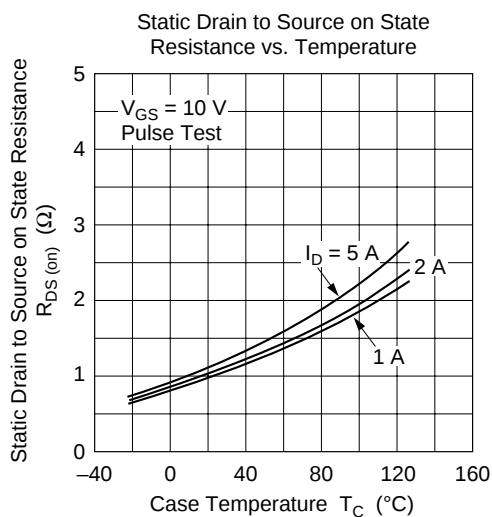
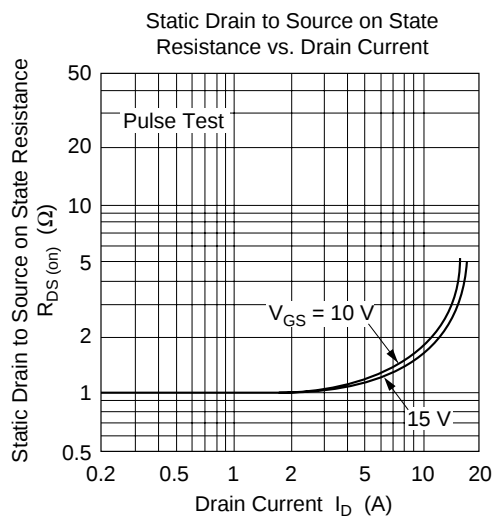
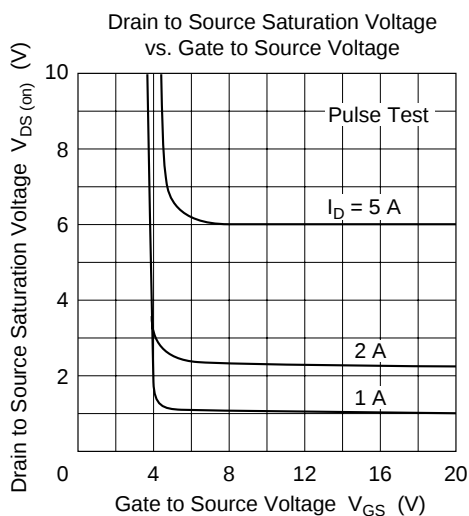
Typical Output Characteristics



Typical Transfer Characteristics

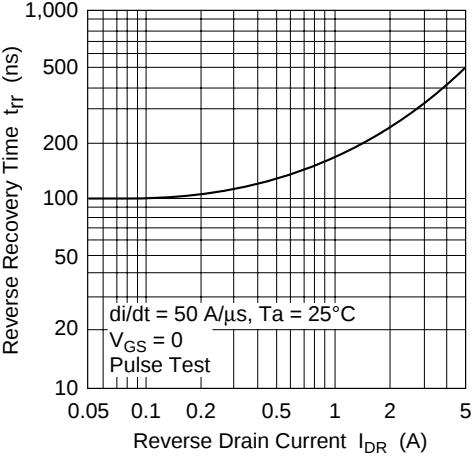


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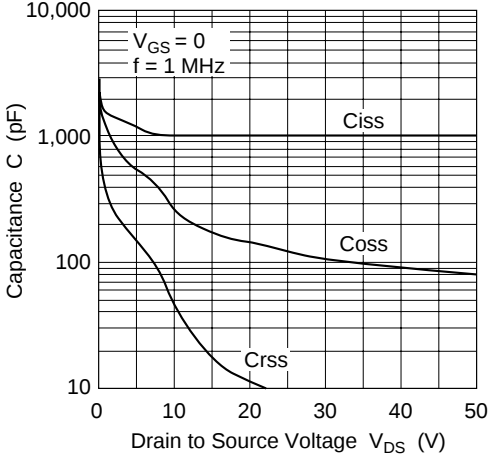
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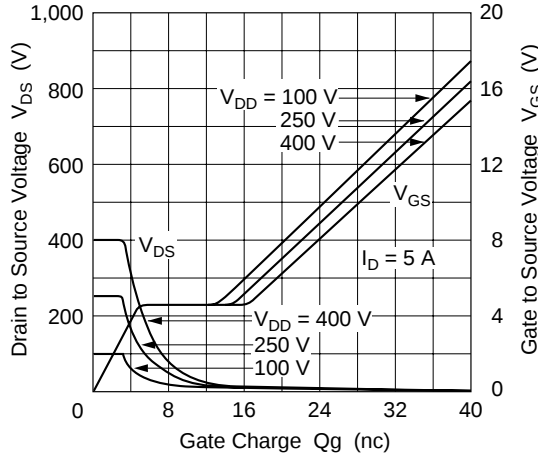
Body to Drain Diode Reverse Recovery Time



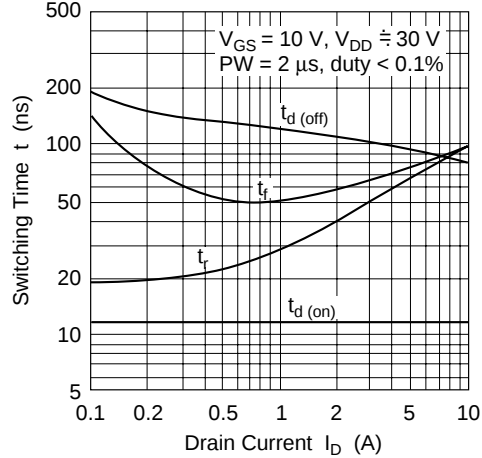
Typical Capacitance vs. Drain to Source Voltage



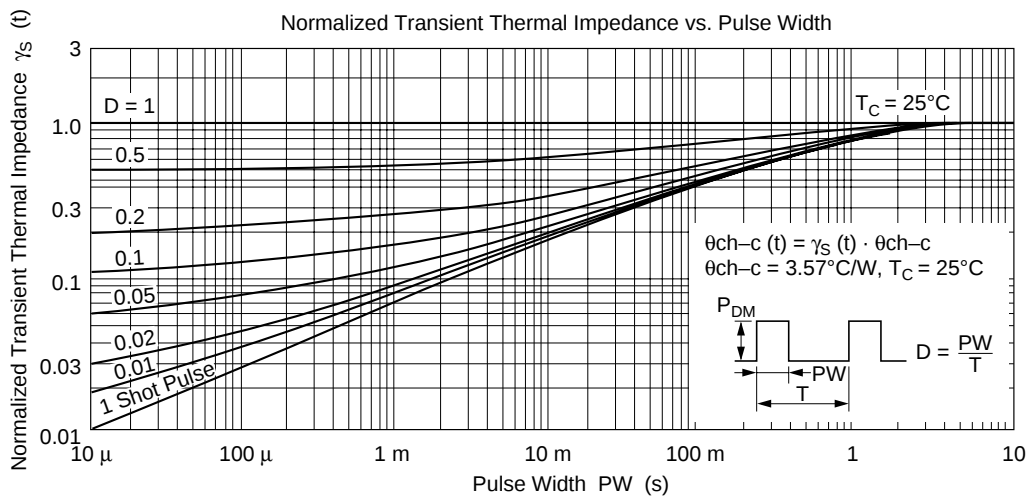
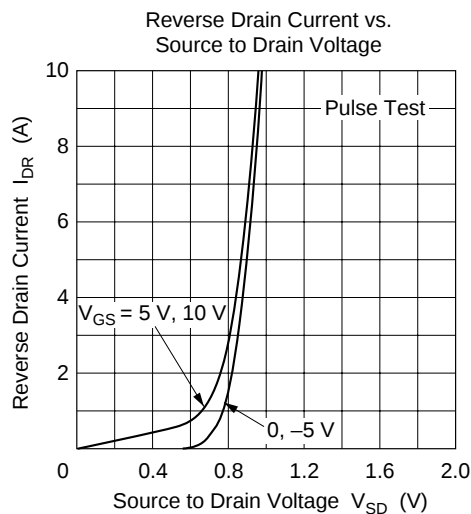
Dynamic Input Characteristics



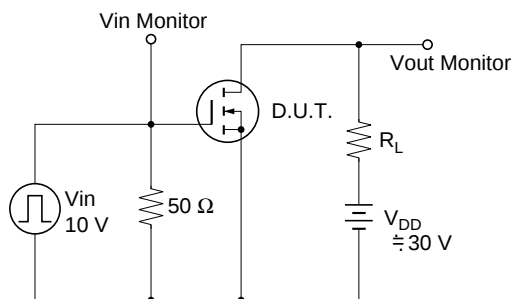
Switching Characteristics



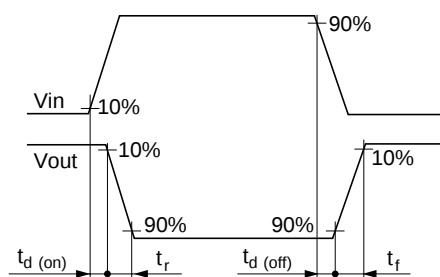
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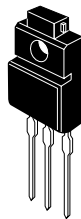
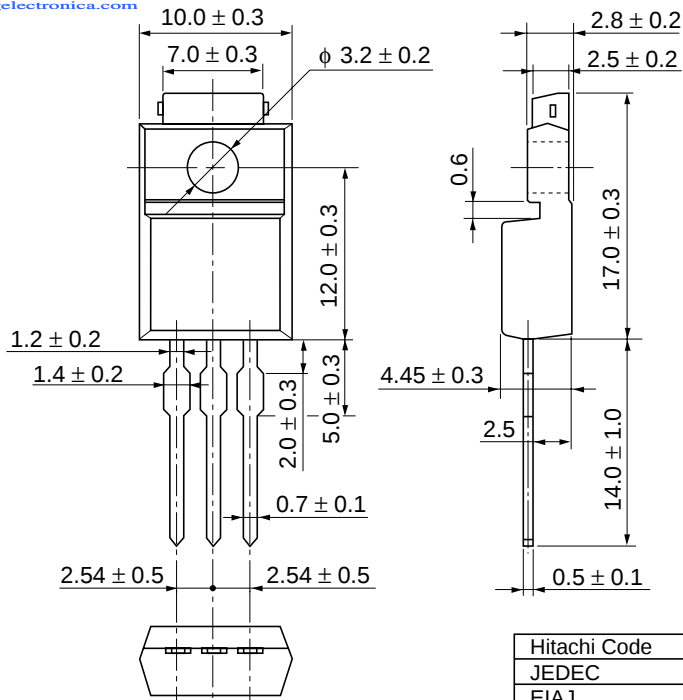
Switching Time Test Circuit



Waveforms



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Hitachi Code	TO-220FM
JEDEC	—
EIAJ	Conforms
Weight (reference value)	1.8 g

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