

2SK1957

Silicon N-Channel MOS FET

HITACHI

ADE-208-1336 (Z)
1st. Edition
Mar. 2001

Application

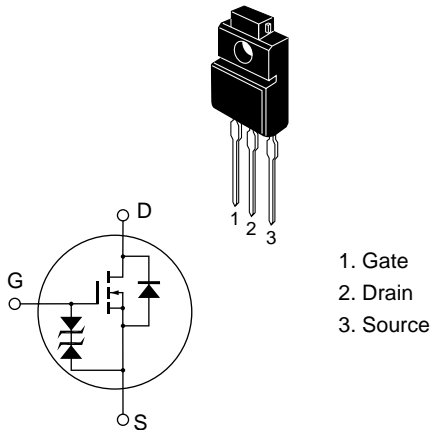
High speed power switching

Features

- Low on-resistance
- High speed switching
- Low drive current
- No Secondary Breakdown
- Suitable for Switching regulator, DC - DC converter, Motor Control

Outline

TO-220FM



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

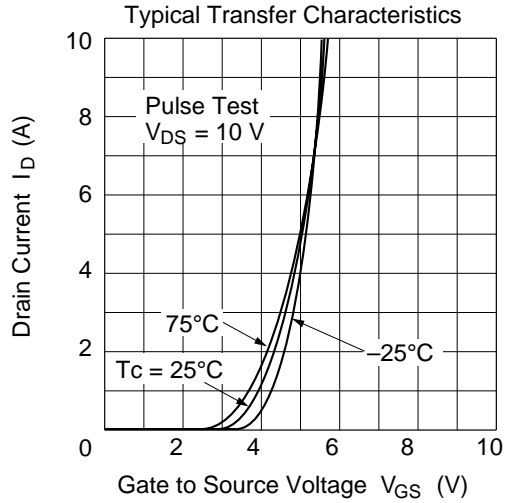
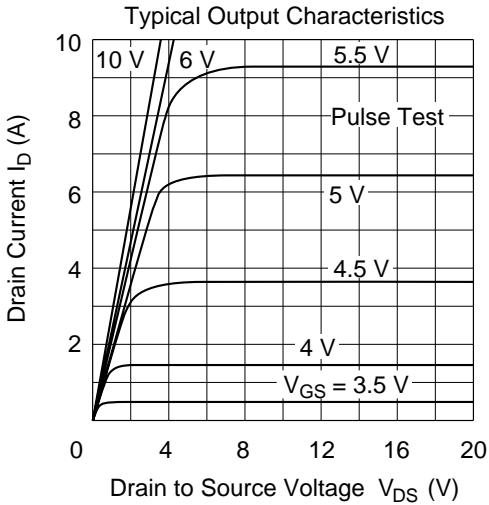
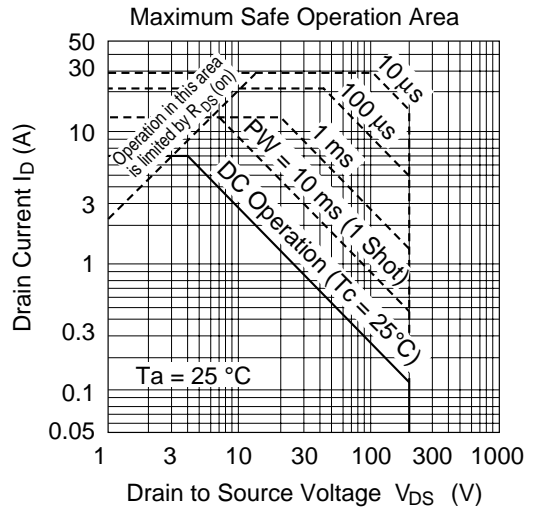
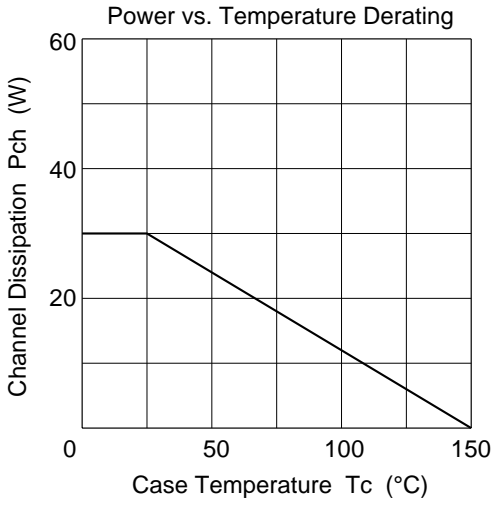
Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	200	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_{D}	7	A
Drain peak current	$I_{\text{D(pulse)}}^{*1}$	28	A
Body to drain diode reverse drain current	I_{DR}	7	A
Channel dissipation	P_{ch}^{*2}	30	W
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

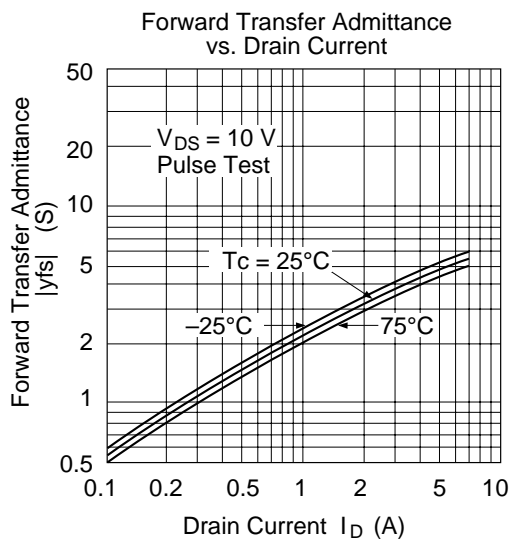
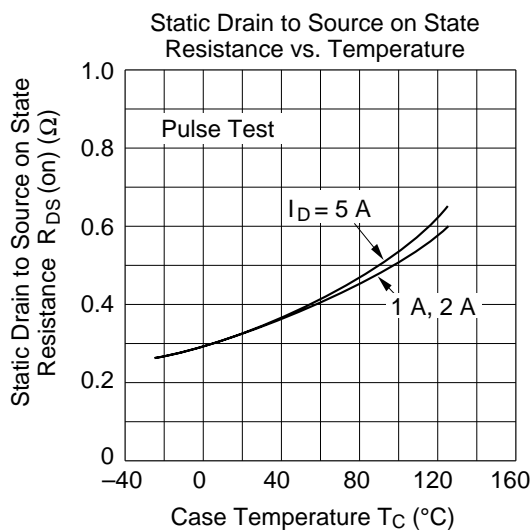
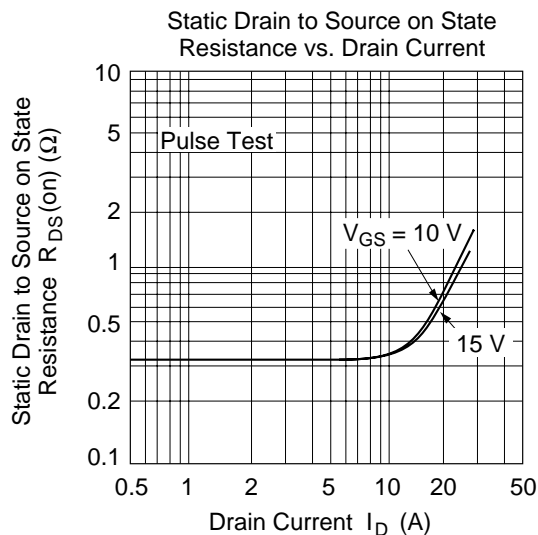
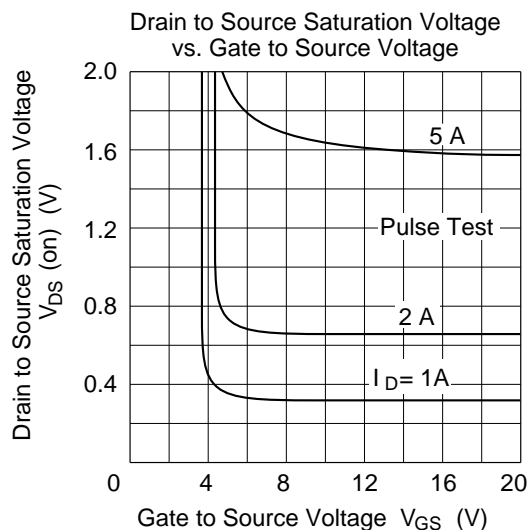
Notes 1. $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$
2. Value at $T_c = 25^\circ\text{C}$

Electrical Characteristics (Ta = 25°C)

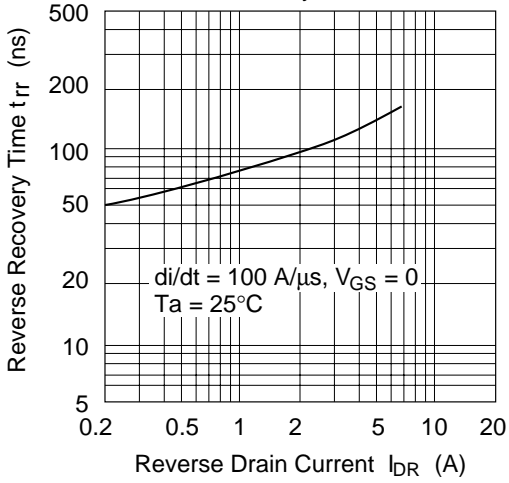
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	200	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}, V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	250	μA	$V_{DS} = 160 \text{ V}, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	4.0	V	$I_D = 1 \text{ mA}, V_{DS} = 10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.33	0.45	Ω	$I_D = 4 \text{ A}$ $V_{GS} = 10 \text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	3.0	4.5	—	S	$I_D = 4 \text{ A}$ $V_{DS} = 10 \text{ V}^{*1}$
Input capacitance	C_{iss}	—	700	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	260	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	45	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	20	—	ns	$I_D = 4 \text{ A}$
Rise time	t_r	—	45	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	50	—	ns	$R_L = 7.5 \Omega$
Fall time	t_f	—	35	—	ns	
Body to drain diode forward voltage	V_{DF}	—	1.1	—	V	$I_F = 7 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	150	—	ns	$I_F = 7 \text{ A}, V_{GS} = 0,$ $di_F / dt = 100 \text{ A} / \mu\text{s}$

Note 1. Pulse Test

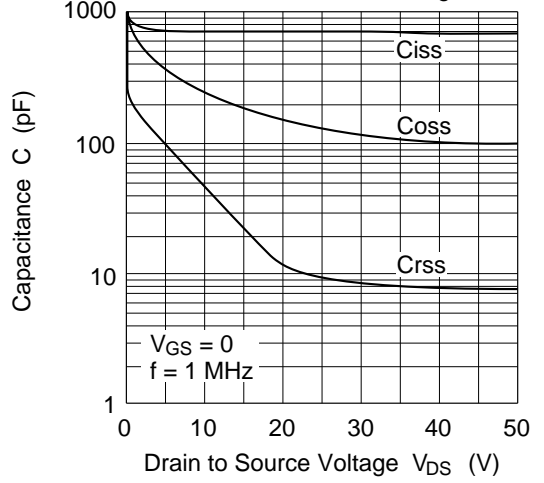




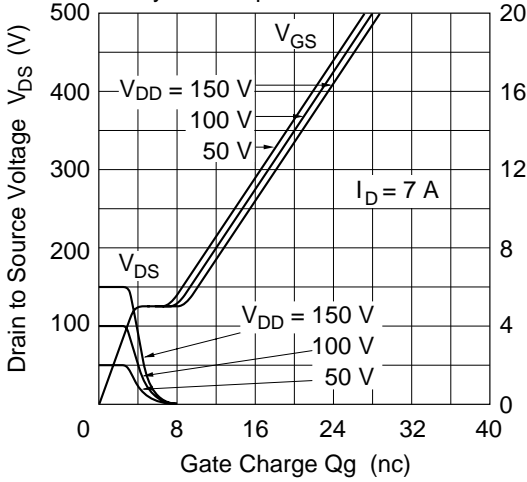
Body to Drain Diode Reverse Recovery Time



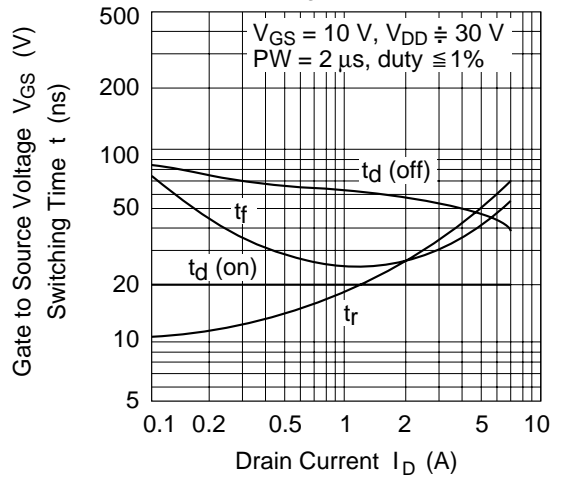
Typical Capacitance vs. Drain to Source Voltage

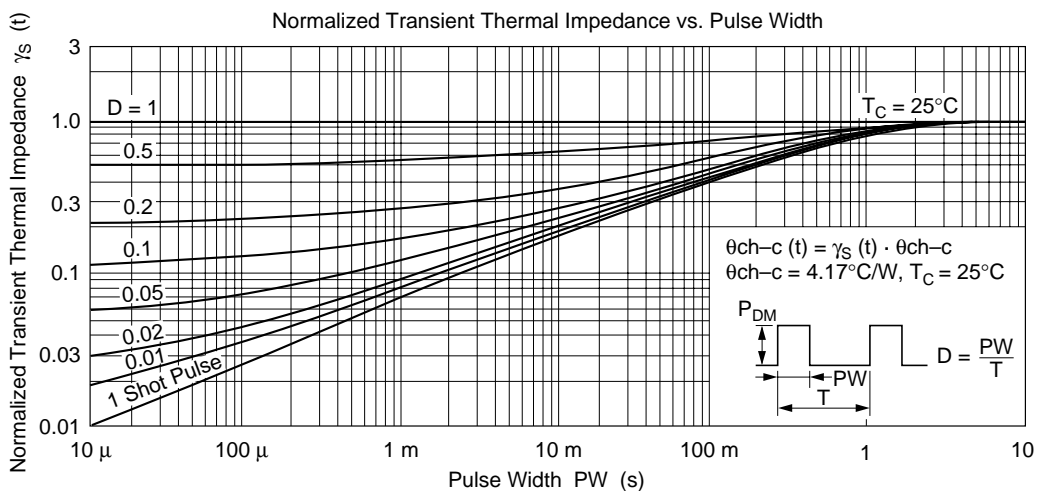
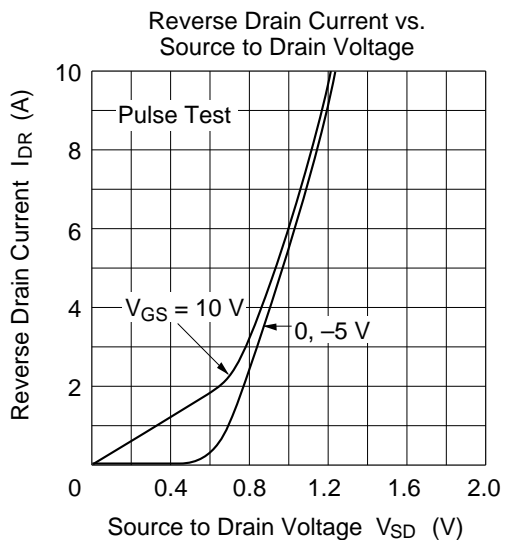


Dynamic Input Characteristics

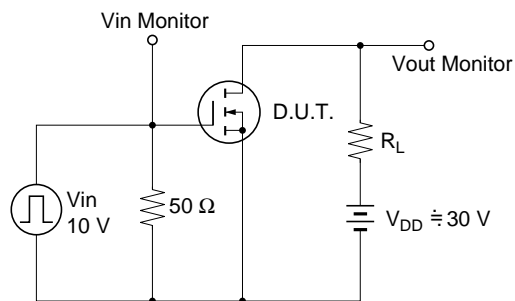


Switching Characteristics

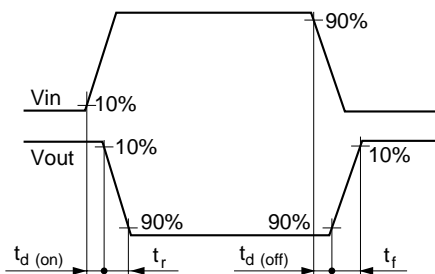




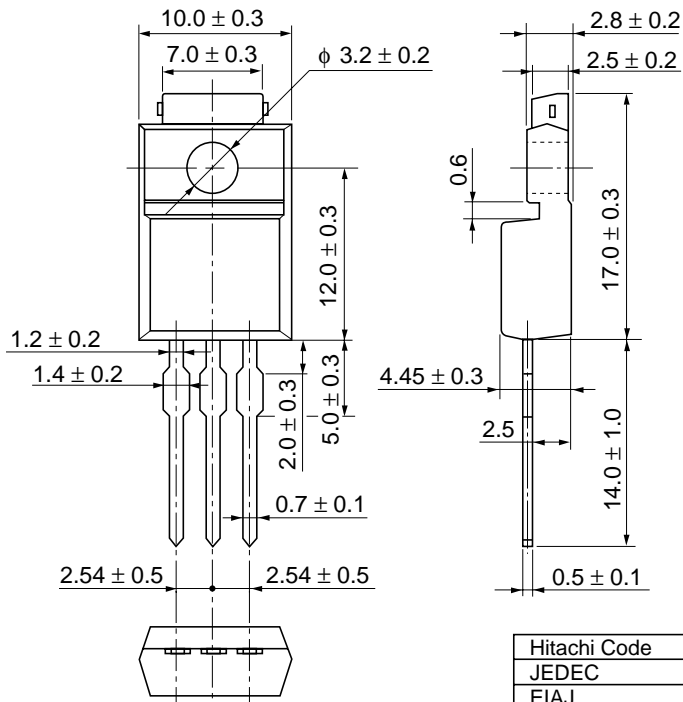
Switching Time Test Circuit



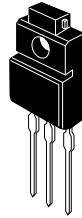
Waveforms



Package Dimensions



As of January, 2001
Unit: mm



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

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