

2SK2937

Silicon N Channel MOS FET
High Speed Power Switching

HITACHI

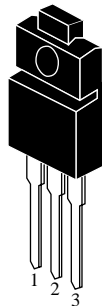
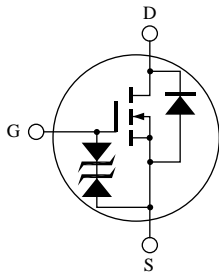
ADE-208-560C (Z)
4th. Edition
Jun 1998

Features

- Low on-resistance
 $R_{DS} = 0.026 \Omega$ typ.
- High speed switching
- 4V gate drive device can be driven from 5V source

Outline

TO-220FM



1. Gate
2. Drain
3. Source

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

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	60	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_D	25	A
Drain peak current	$I_{D(pulse)}^{Note1}$	100	A
Body-drain diode reverse drain current	I_{DR}	25	A
Avalanche current	I_{AP}^{Note3}	20	A
Avalanche energy	E_{AR}^{Note3}	34	mJ
Channel dissipation	P_{ch}^{Note2}	25	W
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

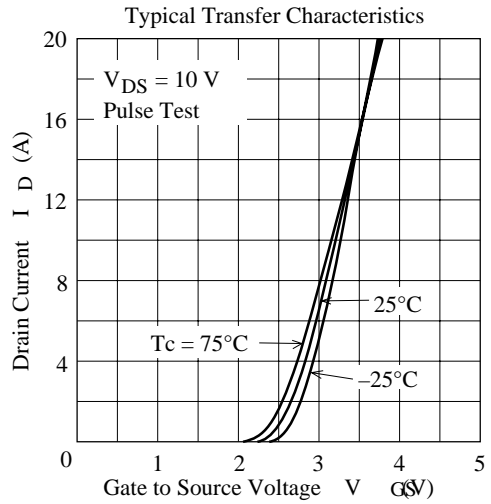
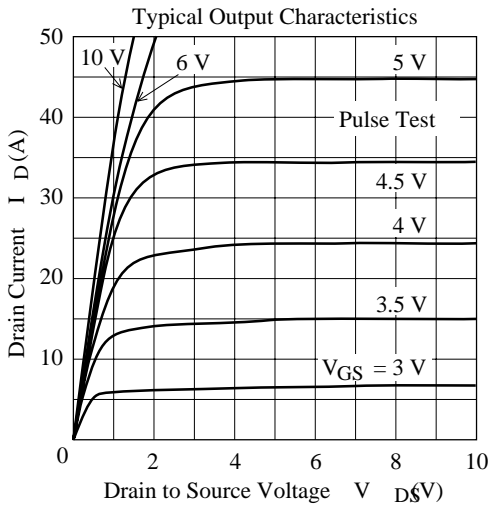
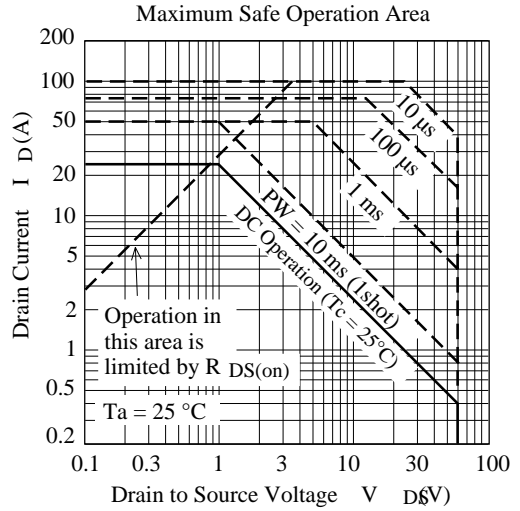
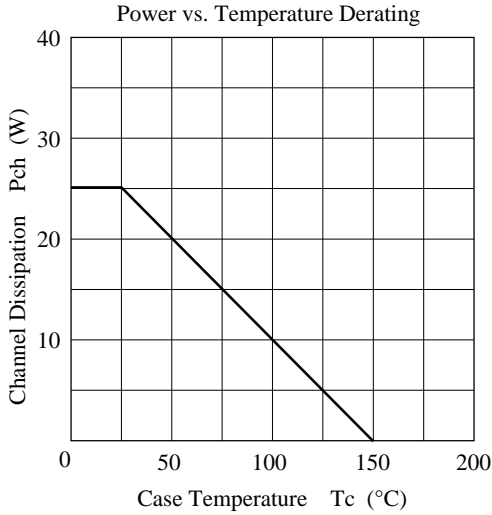
Note: 1. $PW \leq 10\mu\text{s}$, duty cycle $\leq 1\%$
2. Value at $T_c = 25^\circ\text{C}$
3. Value at $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50\Omega$

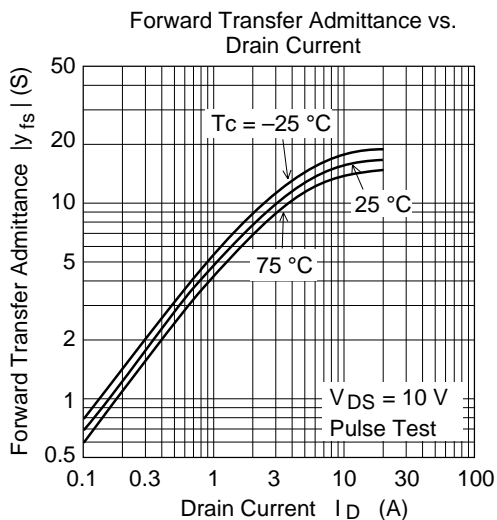
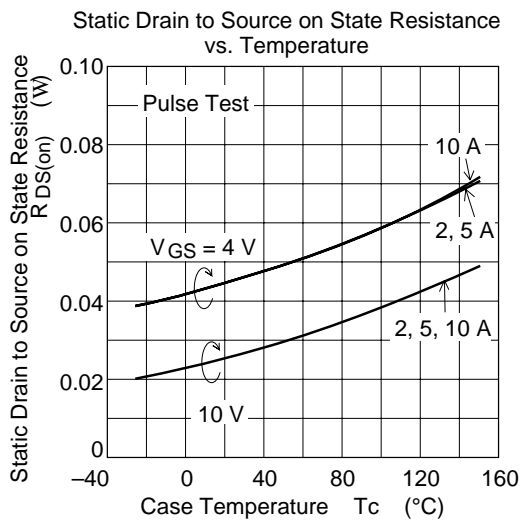
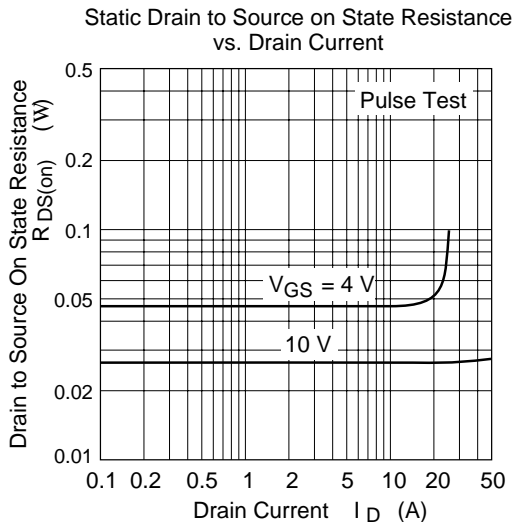
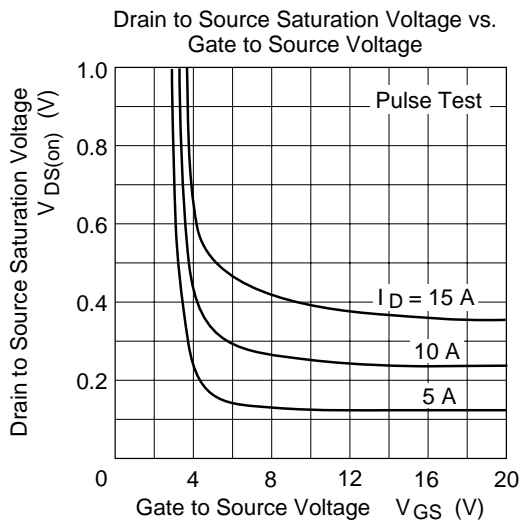
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10\text{mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100\mu\text{A}$, $V_{DS} = 0$
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}	—	—	10	μA	$V_{DS} = 60\text{V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.5	—	2.5	V	$I_D = 1\text{mA}$, $V_{DS} = 10\text{V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.026	0.034	Ω	$I_D = 15\text{A}$, $V_{GS} = 10\text{V}$ ^{Note4}
	$R_{DS(on)}$	—	0.045	0.070	Ω	$I_D = 15\text{A}$, $V_{GS} = 4\text{V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	11	17	—	S	$I_D = 15\text{A}$, $V_{DS} = 10\text{V}$ ^{Note4}
Input capacitance	C_{iss}	—	740	—	pF	$V_{DS} = 10\text{V}$
Output capacitance	C_{oss}	—	380	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	140	—	pF	$f = 1\text{MHz}$
Turn-on delay time	$t_{d(on)}$	—	10	—	ns	$I_D = 15\text{A}$, $V_{GS} = 10\text{V}$
Rise time	t_r	—	160	—	ns	$R_L = 2\Omega$
Turn-off delay time	$t_{d(off)}$	—	100	—	ns	
Fall time	t_f	—	150	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.95	—	V	$I_F = 25\text{A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	40	—	ns	$I_F = 25\text{A}$, $V_{GS} = 0$ $diF/dt = 50\text{A}/\mu\text{s}$

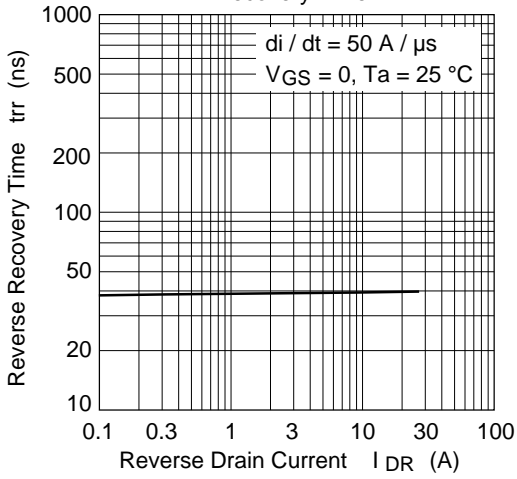
Note: 4. Pulse test

Main Characteristics

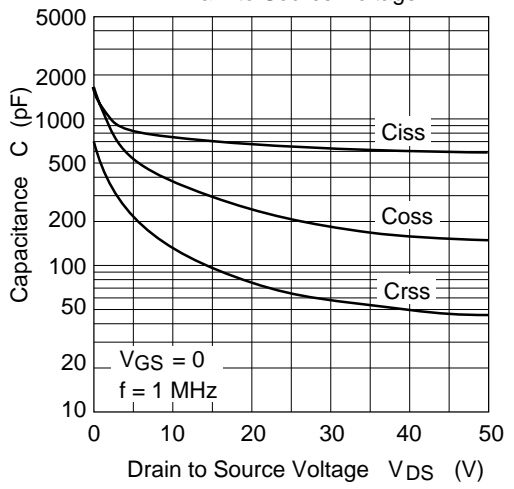




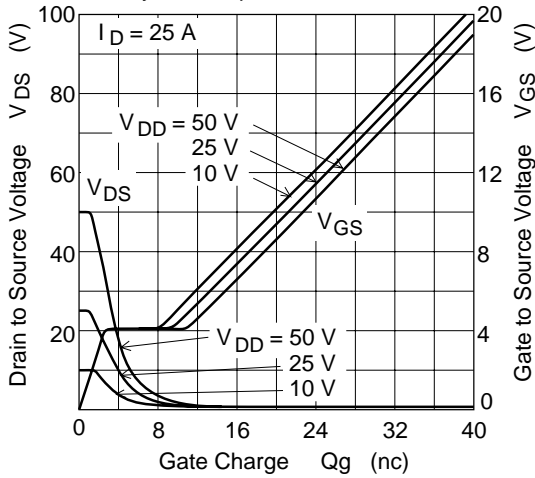
Body-Drain Diode Reverse Recovery Time



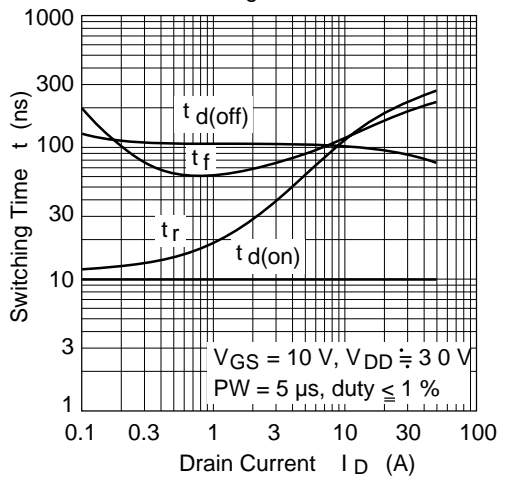
Typical Capacitance vs. Drain to Source Voltage

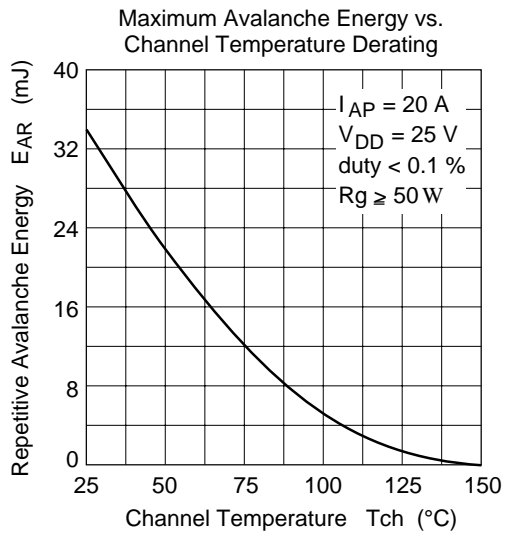
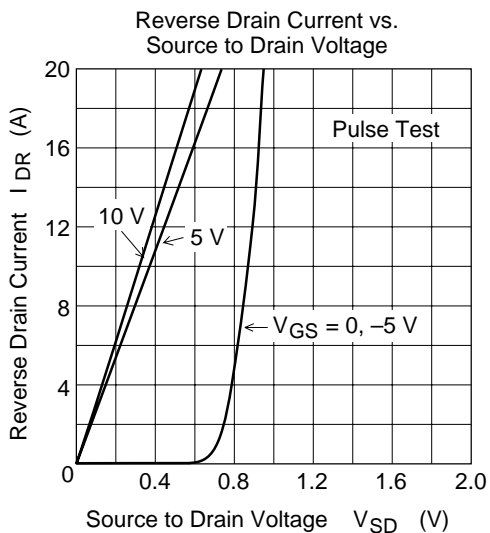


Dynamic Input Characteristics

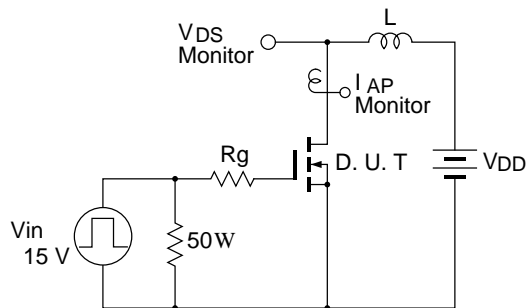


Switching Characteristics



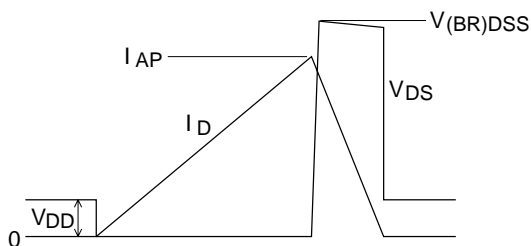


Avalanche Test Circuit

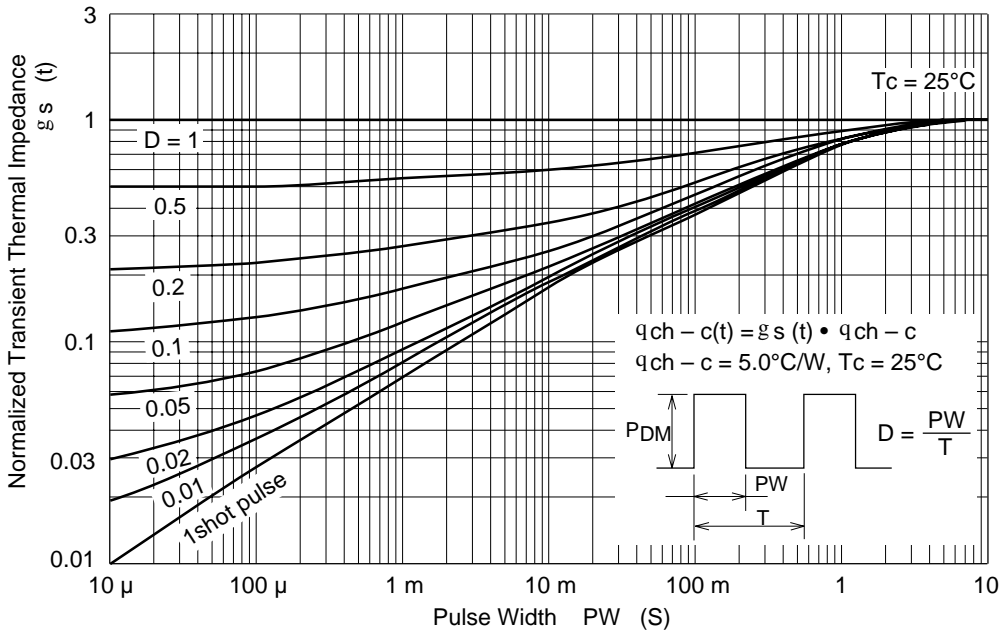


Avalanche Waveform

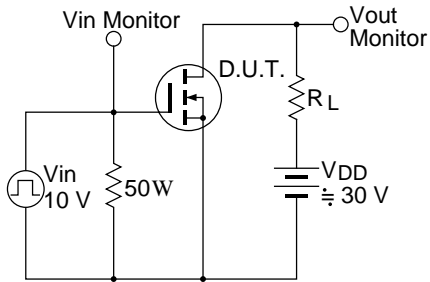
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



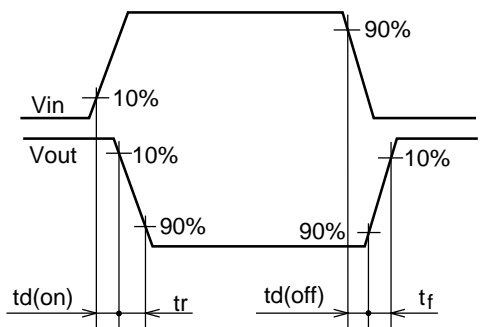
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

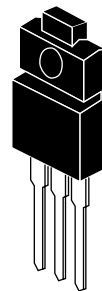
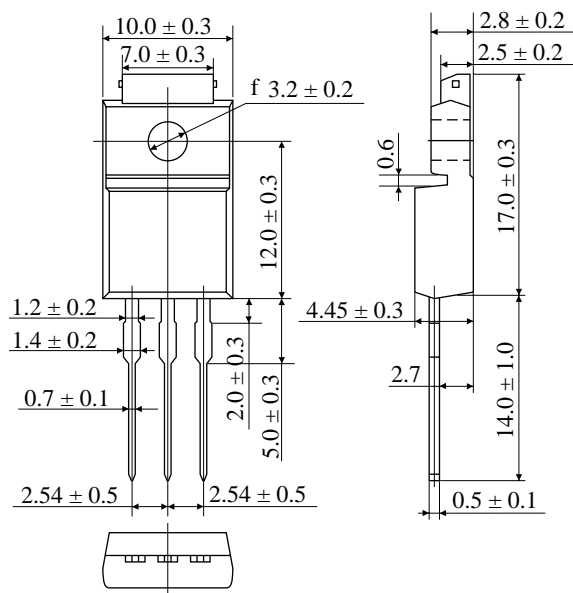


Waveform



Package Dimensions

Unit: mm



Hitachi Code	TO-220FM
EIAJ	SC-67
JEDEC	—

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Hitachi, Ltd.

Semiconductor & Integrated Circuits.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

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For further information write to:

Hitachi Semiconductor
(America) Inc.
179 East Tasman Drive,
San Jose, CA 95134
Tel: <1> (408) 433-1990
Fax: <1>(408) 433-0223

Hitachi Europe GmbH
Electronic components Group
Dornacher Straße 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 049318
Tel: 535-2100
Fax: 535-1533

Hitachi Asia Ltd.
Taipei Branch Office
3F, Hung Kuo Building, No.167,
Tun-Hwa North Road, Taipei (105)
Tel: <886> (2) 2718-3666
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower, World Finance Centre,
Harbour City, Canton Road, Tsim Sha Tsui,
Kowloon, Hong Kong
Tel: <852> (2) 735 9218
Fax: <852> (2) 730 0281
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