

2SK3418

Silicon N Channel MOS FET
High Speed Power Switching

HITACHI

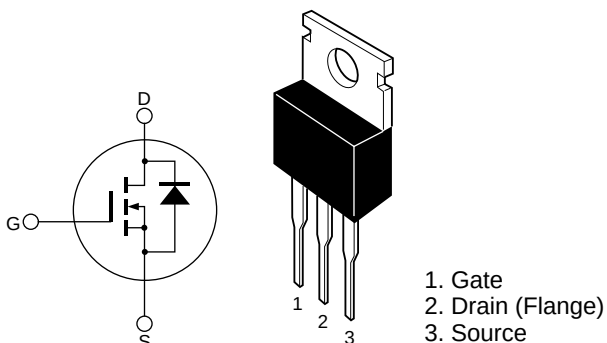
ADE-208-941 (Z)
1st. Edition
Mar. 2001

Features

- Low on-resistance
 $R_{DS(on)} = 4.3 \text{ m } \Omega$ typ.
- 4 V gate drive device
- High speed switching

Outline

TO-220AB



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V _{DSS}	60	V
Gate to source voltage	V _{GSS}	±20	V
Drain current	I _D	85	A
Drain peak current	I _{D (pulse)} ^{Note1}	340	A
Body-drain diode reverse drain current	I _{DR}	85	A
Avalanche current	I _{AP} ^{Note3}	60	A
Avalanche energy	E _{AR} ^{Note3}	308	mJ
Channel dissipation	P _{ch} ^{Note2}	110	W
Channel temperature	T _{ch}	150	°C
Storage temperature	T _{stg}	−55 to +150	°C

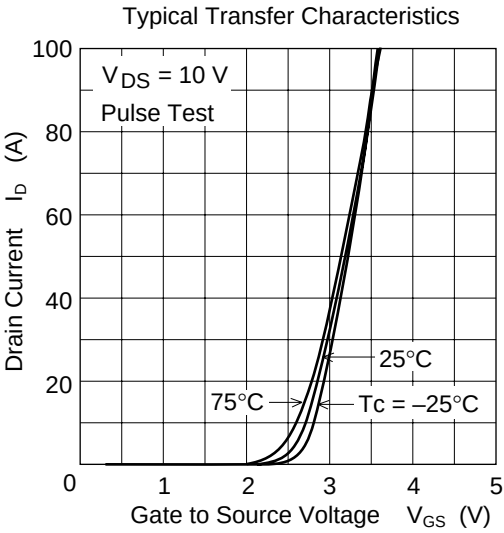
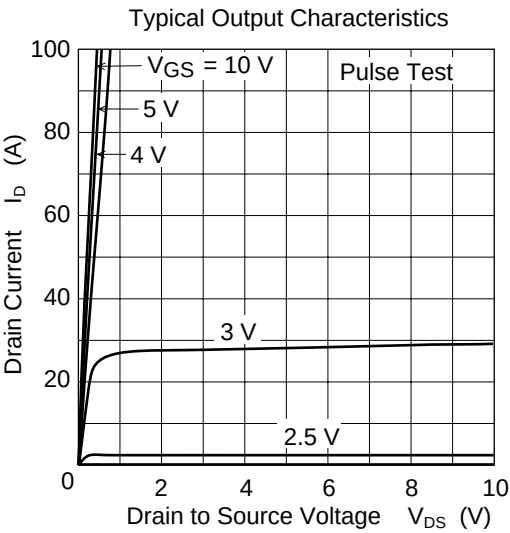
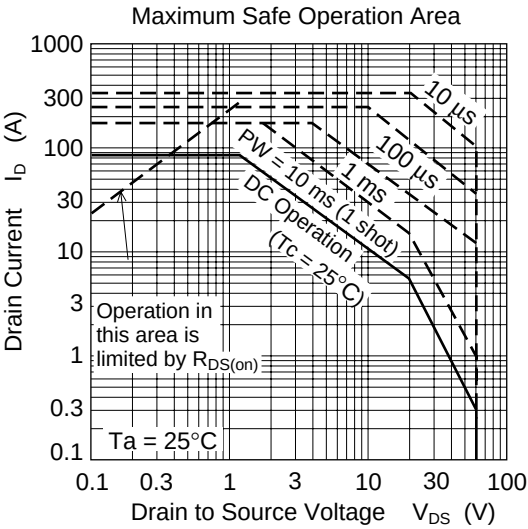
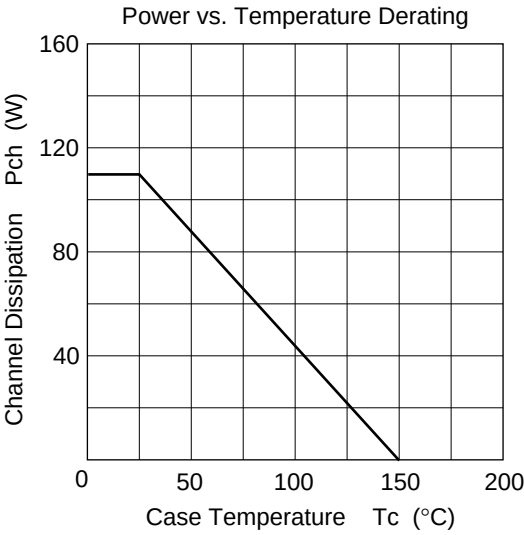
Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%
2. Value at Tc = 25°C
3. Value at Tch = 25°C: Rg ≥ 50 Ω

Electrical Characteristics (Ta = 25°C)

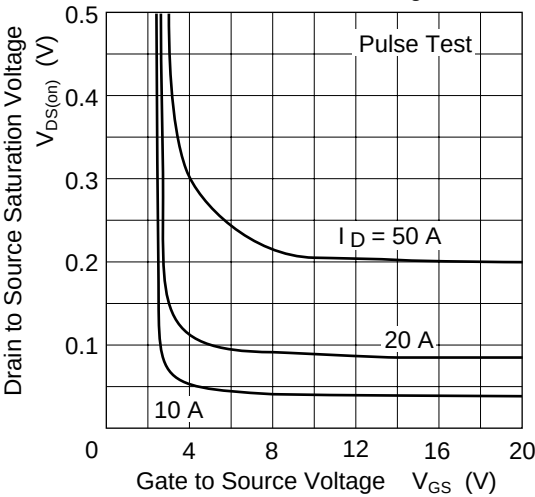
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 60 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	55	90	—	S	$I_D = 45 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Static drain to source on state resistance	$R_{DS(on)}$	—	4.3	5.5	$\text{m}\Omega$	$I_D = 45 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	6.0	9.0	$\text{m}\Omega$	$I_D = 45 \text{ A}$, $V_{GS} = 4 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	9770	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	1340	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	470	—	pF	$f = 1 \text{ MHz}$
Total gate charge	Q_g	—	180	—	nc	$V_{DD} = 50 \text{ V}$
Gate to source charge	Q_{gs}	—	32	—	nc	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	36	—	nc	$I_D = 85 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	53	—	ns	$V_{GS} = 10 \text{ V}$
Rise time	t_r	—	320	—	ns	$I_D = 45 \text{ A}$
Turn-off delay time	$t_{d(off)}$	—	700	—	ns	$R_L = 0.67 \Omega$
Fall time	t_f	—	380	—	ns	
Body-drain diode forward voltage	V_{DF}	—	1.0	—	V	$I_F = 85 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	70	—	ns	$I_F = 85 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 50 \text{ A}/\mu\text{s}$

Note: 4. Pulse test

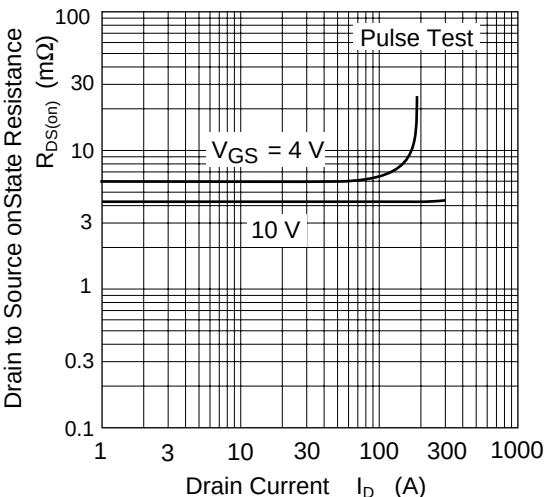
Main Characteristics



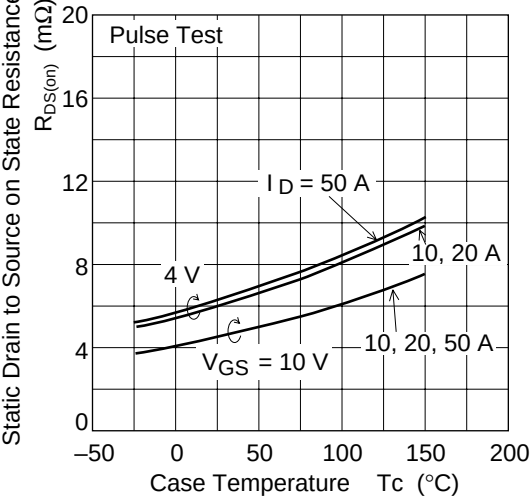
Drain to Source Saturation Voltage vs. Gate to Source Voltage



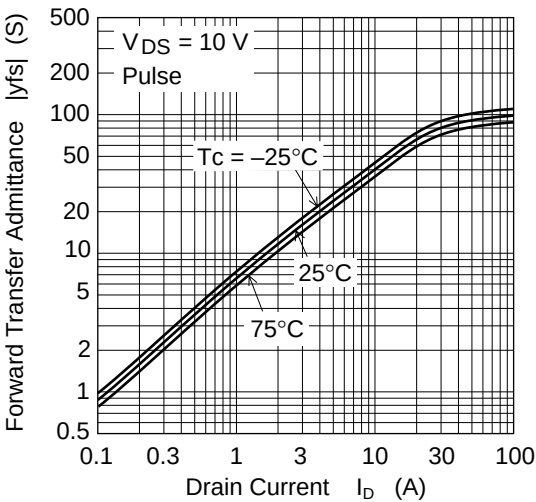
Static Drain to Source on State Resistance vs. Drain Current

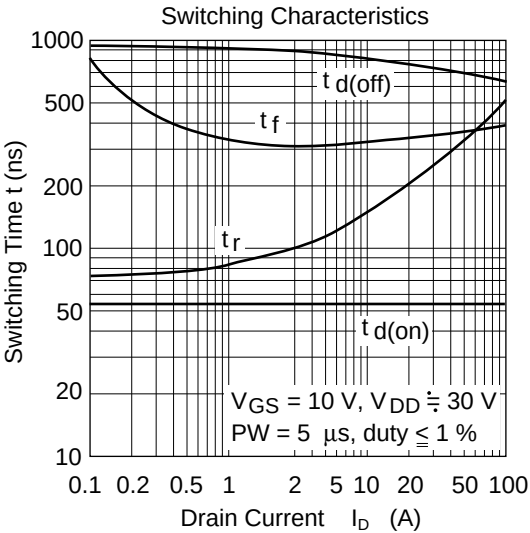
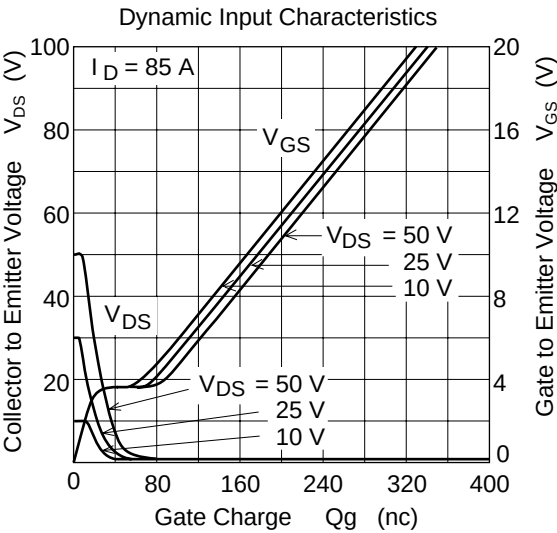
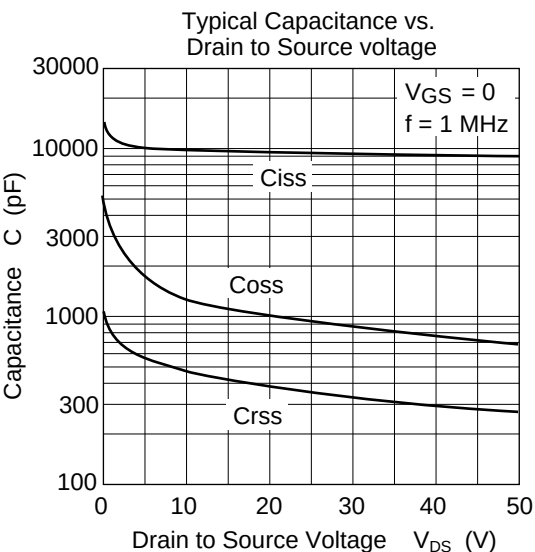
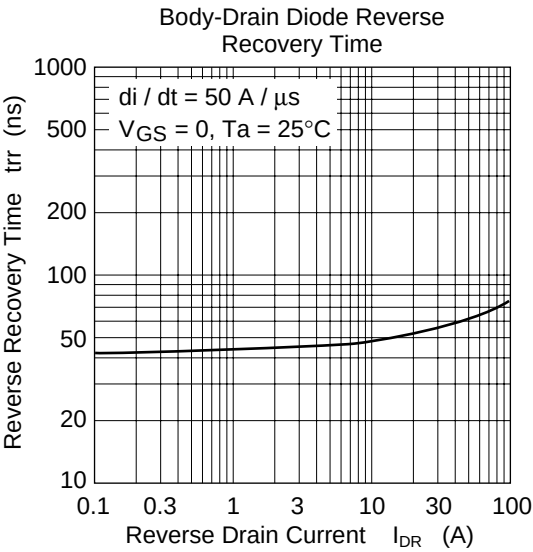


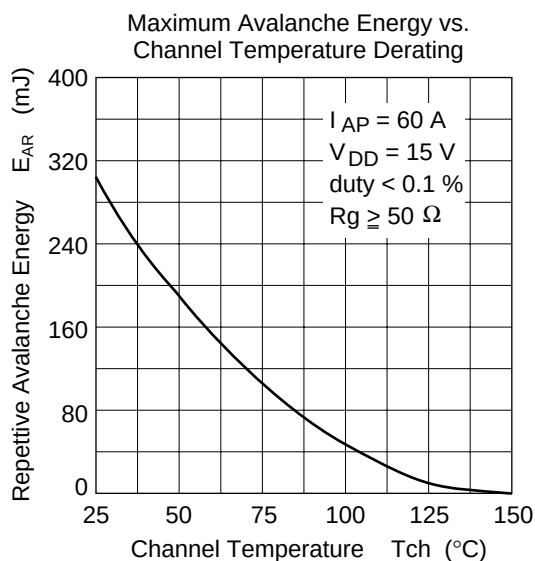
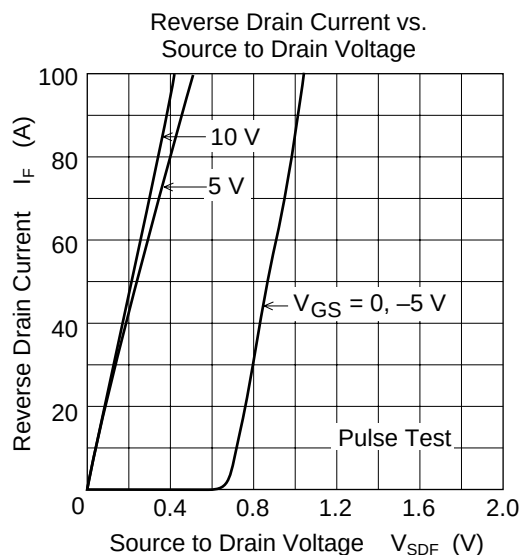
Static Drain to Source on State Resistance vs. Temperature



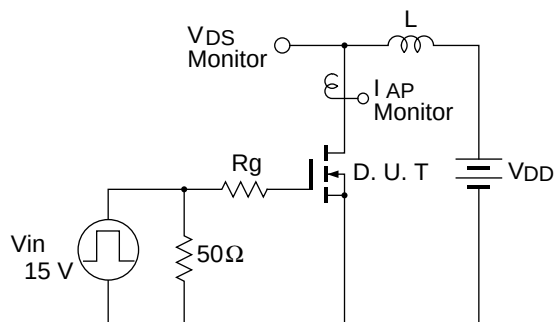
Forward Transfer Admittance vs. Drain Current





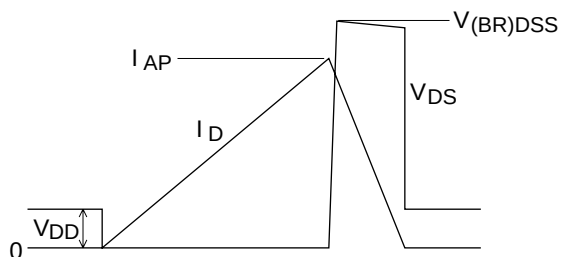


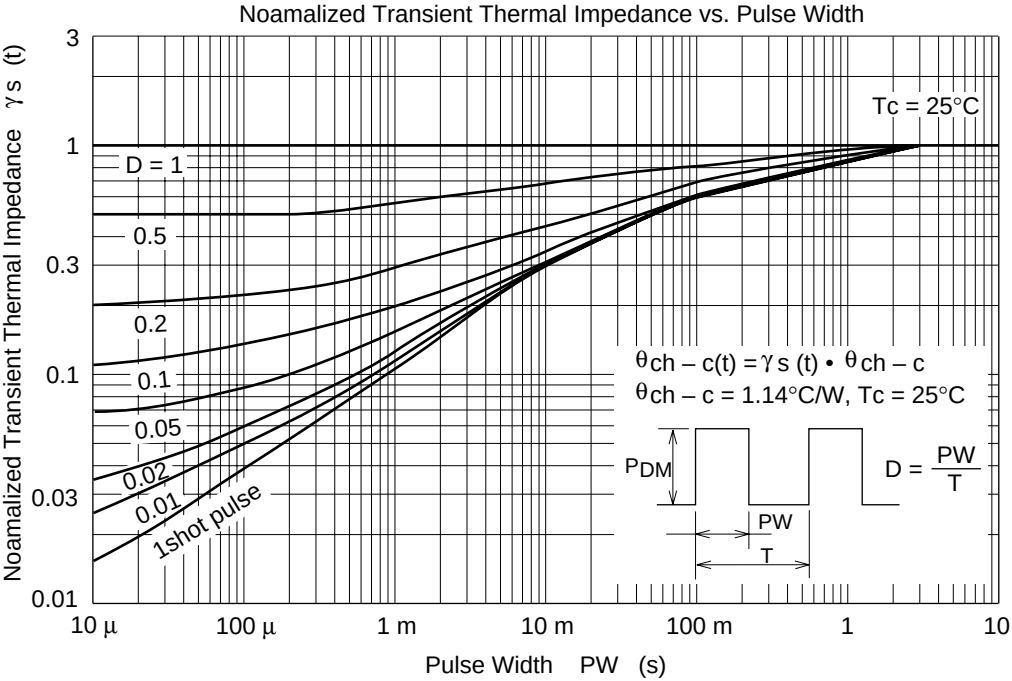
Avalanche Test Circuit



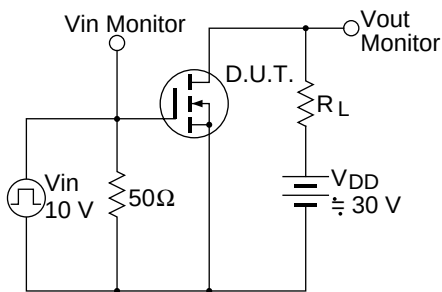
Avalanche Waveform

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

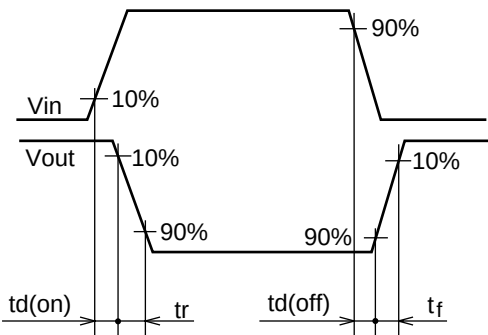




Switching Time Test Circuit

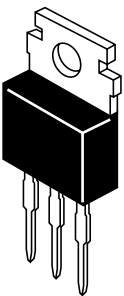
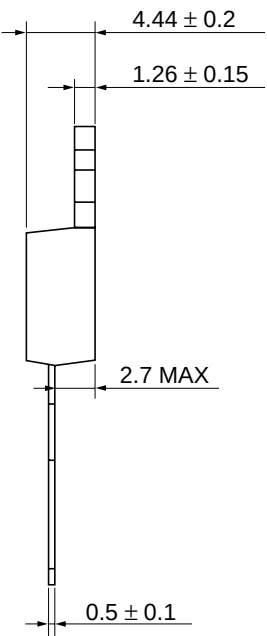
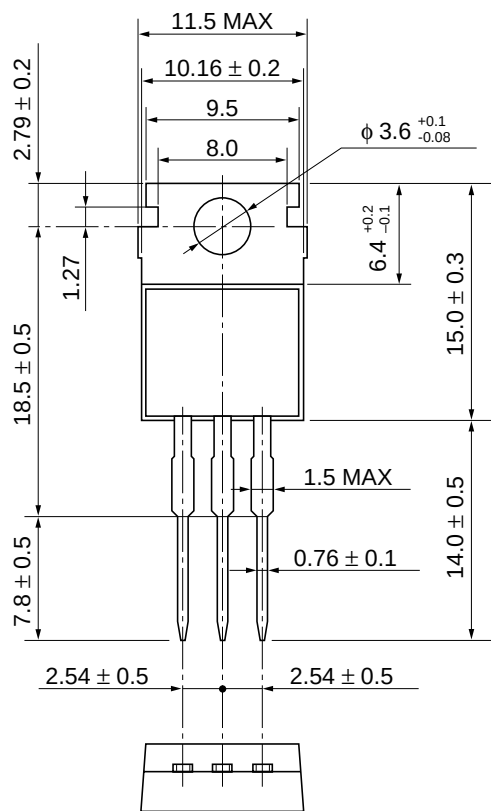


Waveform



Package Dimensions

As of January, 2001
Unit: mm



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

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