

H5N6001P

Silicon N-Channel MOSFET
High-Speed Power Switching

HITACHI

ADE-208-1425A (Z)

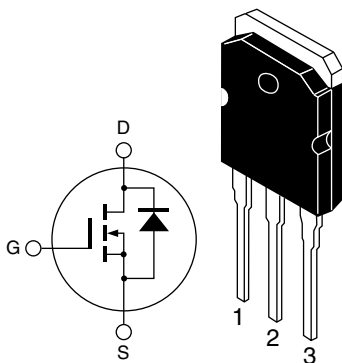
2nd. Edition
May 2001

Features

- Low on-resistance
- Low leakage current
- High speed switching
- Low gate charge (Qg)

Outline

TO-3P



1. Gate
2. Drain (Fringe)
3. Source

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V _{DSS}	600	V
Gate to source voltage	V _{GSS}	±30	V
Drain current	I _D	20	A
Drain peak current	I _D (pulse)*1	80	A
Body-drain diode reverse drain current	I _{DR}	20	A
Body-drain diode reverse drain peak current	I _{DR} (pulse)*1	80	A
Avalanche current	I _{AP} *3	6.5	A
Channel dissipation	Pch*2	150	W
Channel to case thermal inpedance	θ ch-c	0.833	°C/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 Tc = 25°C
3. $Tch \leq 150^{\circ}C$

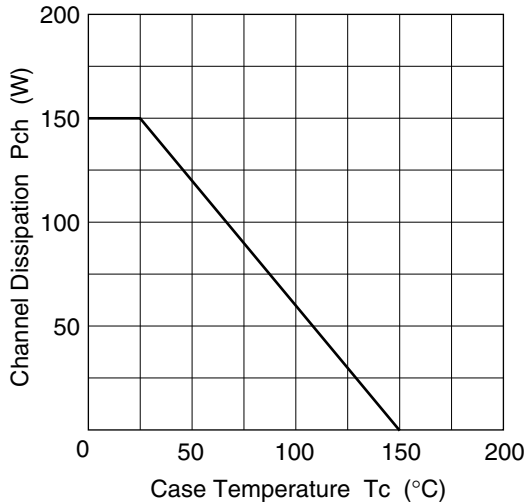
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 600 \text{ V}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.0	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Forward transfer admittance	$ y_{fs} $	12	20	—	S	$I_D = 10 \text{ A}$, $V_{DS} = 10 \text{ V}^{*4}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.30	0.38	Ω	$I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}^{*4}$
Input capacitance	C_{iss}	—	4640	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	C_{oss}	—	340	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	70	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	60	—	ns	$V_{DD} \cong 300 \text{ V}$, $I_D = 10 \text{ A}$
Rise time	t_r	—	100	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	220	—	ns	$R_L = 30 \Omega$
Fall time	t_f	—	90	—	ns	$R_g = 10 \Omega$
Total gate charge	Q_g	—	135	—	nC	$V_{DD} = 480 \text{ V}$
Gate to source charge	Q_{gs}	—	20	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	65	—	nC	$I_D = 20 \text{ A}$
Body-drain diode forward voltage	V_{DF}	—	0.9	1.4	V	$I_F = 20 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	590	—	ns	$I_F = 20 \text{ A}$, $V_{GS} = 0$ $diF/dt = 100 \text{ A}/\mu\text{s}$
Body-drain diode reverse recovery charge	Q_{rr}	—	6.5	—	μC	

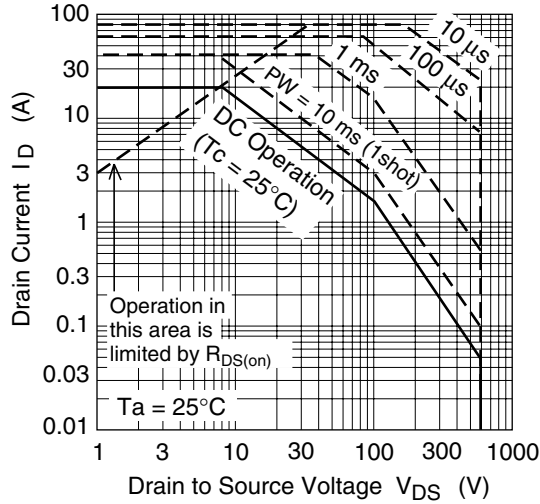
Note: 4. Pulse test

Main Characteristics

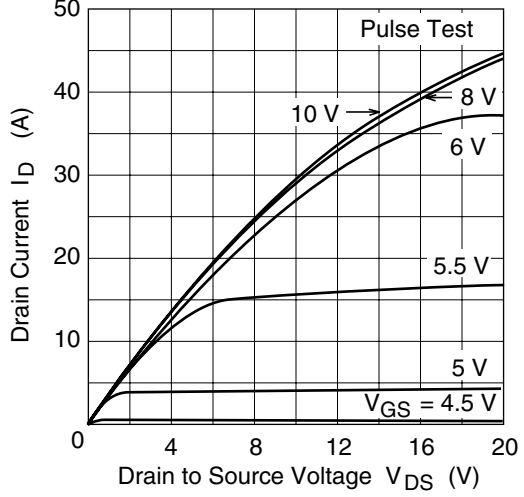
Power vs. Temperature Derating



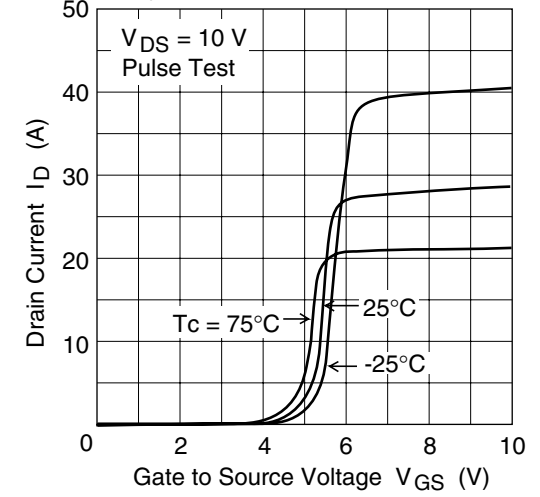
Maximum Safe Operation Area



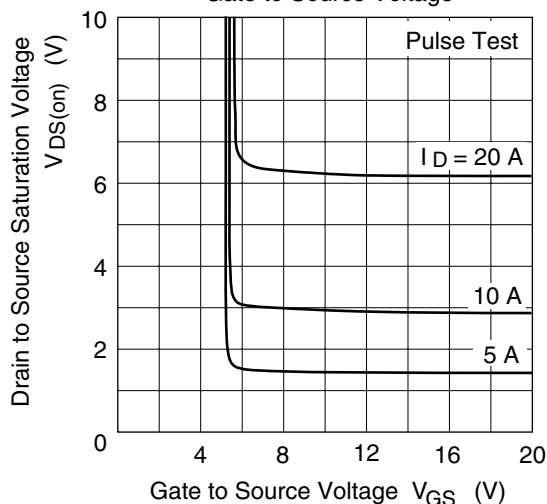
Typical Output Characteristics



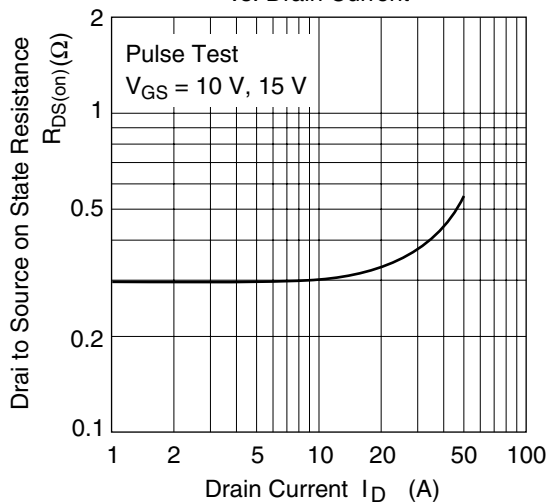
Typical Transfer Characteristics



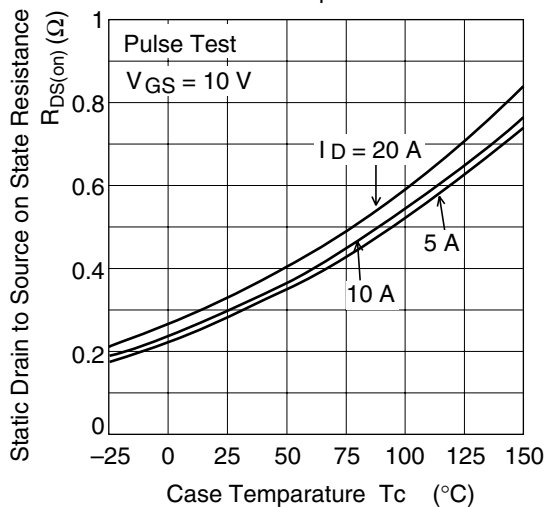
Drain to Source Saturation Voltage VS.
Gate to Source Voltage



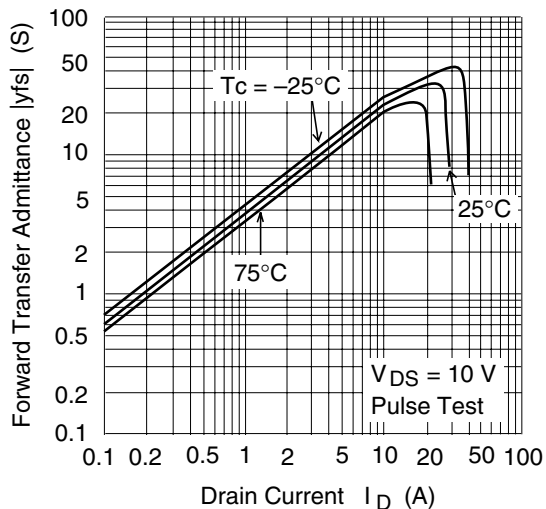
Static Drain to Source on State Resistance
vs. Drain Current



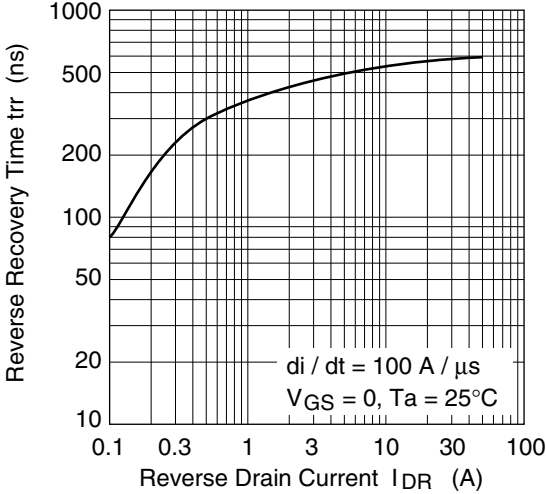
Static Drain to Source on State Resistance
vs. Temperature



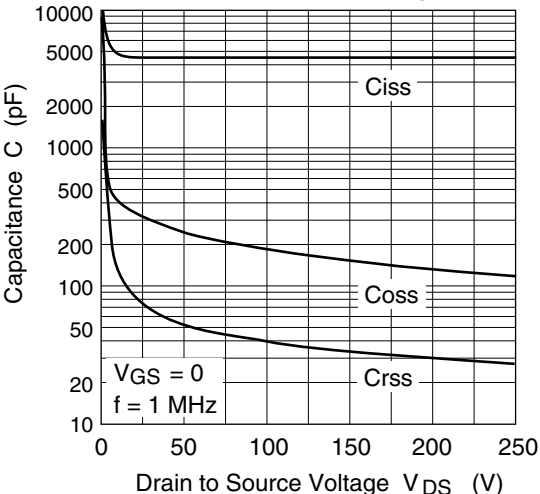
Forward Transfer Admittance vs.
Drain Current



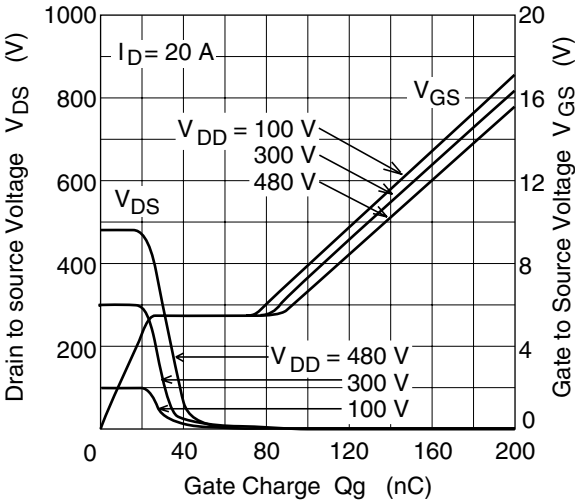
Body-Drain Diode Reverse Recovery Time



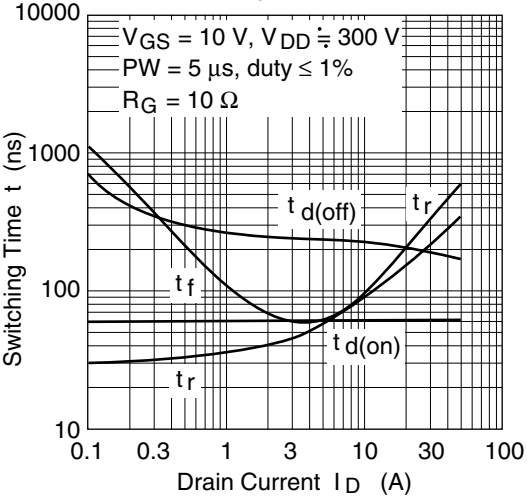
Typical Capacitance vs. Drain to Source Voltage

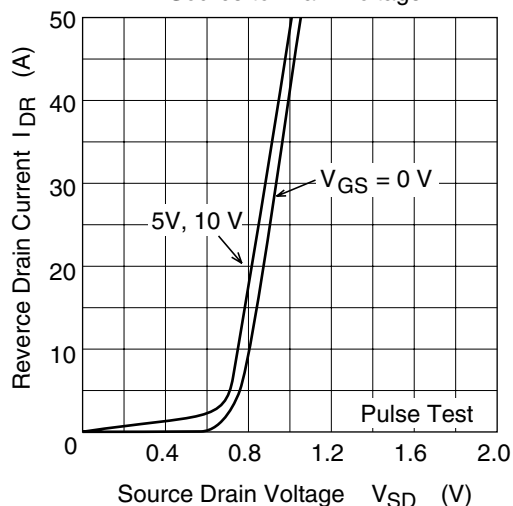
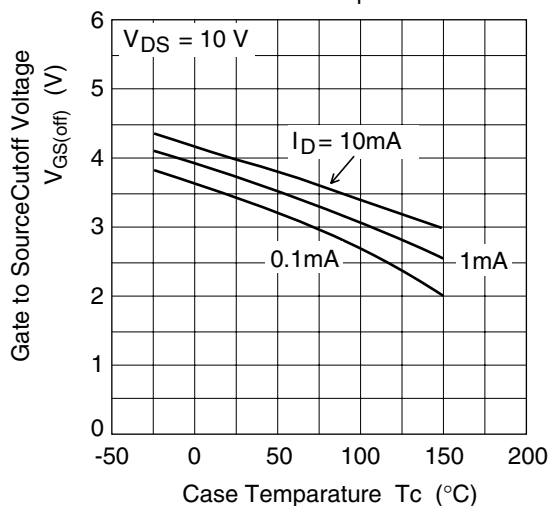


Dynamic Input Characteristics

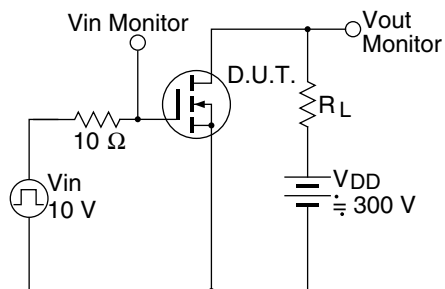


Switching Characteristics

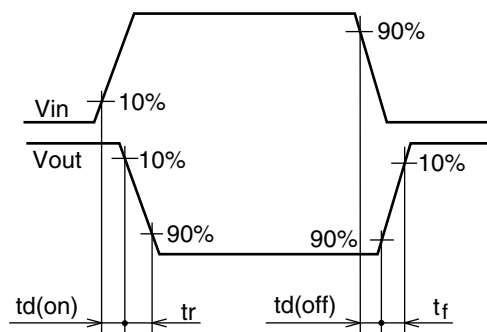


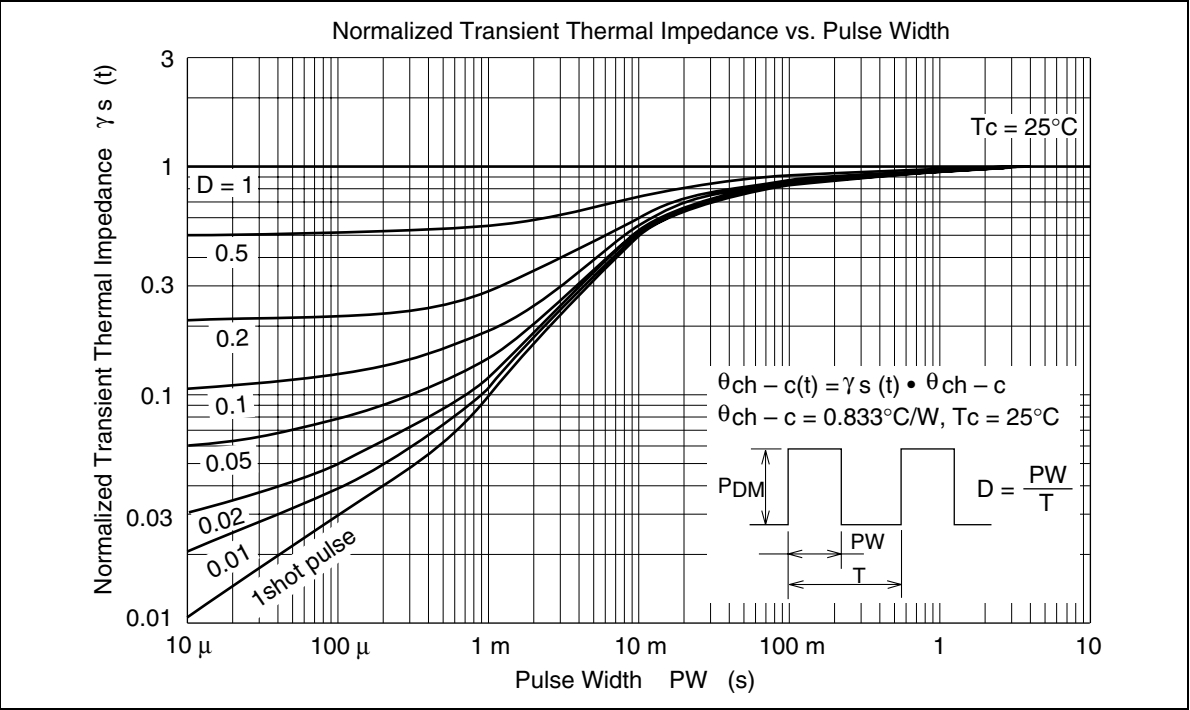
Reverse Drain Current vs.
Source to Drain VoltageGate to Source Cutoff Voltage
vs. Case Temperature

Switching Time Test Circuit

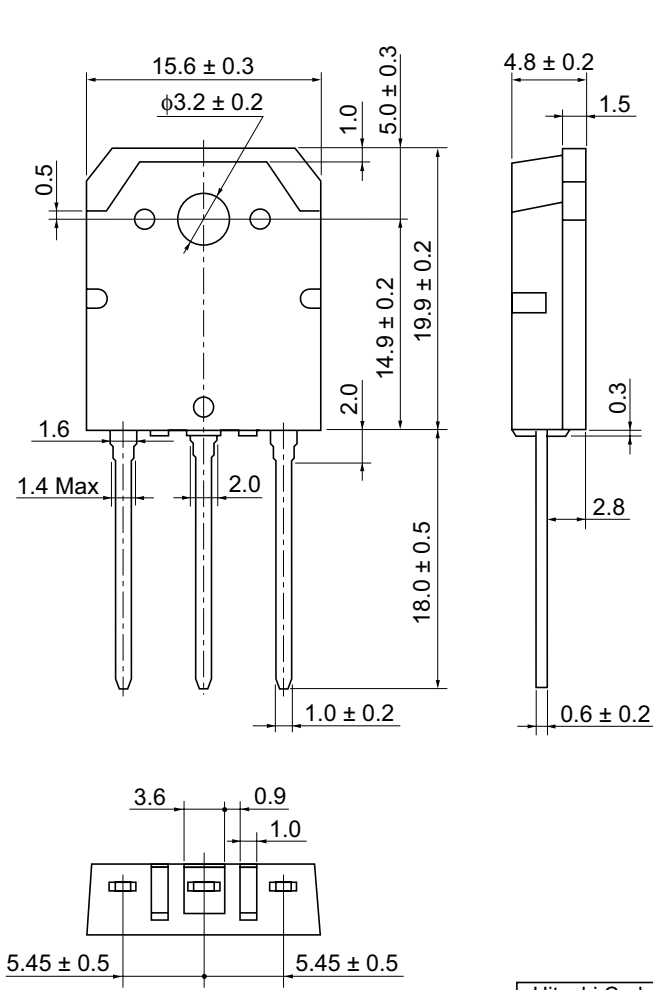


Waveform

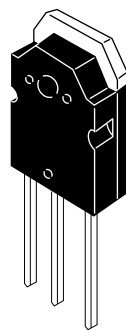




Package Dimensions



As of January, 2001
Unit: mm



Hitachi Code	TO-3P
JEDEC	—
EIAJ	Conforms
Mass (reference value)	5.0 g

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