

H5N5004PL

Silicon N Channel MOS FET
High Speed Power Switching

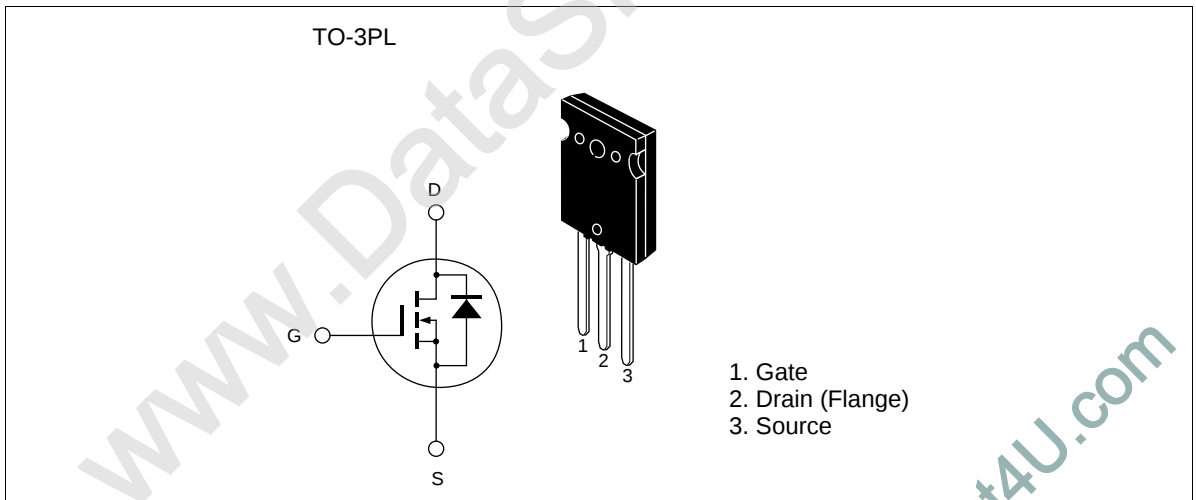
HITACHI

ADE-208-1381 (Z)
Target Specification 1st. Edition
Mar. 2001

Features

- Low on-resistance: $R_{DS(on)} = 0.09 \text{ typ.}$
- Low leakage current: $IDSS = 10 \text{ } \mu\text{A max (at } V_{DS} = 500 \text{ V)}$
- High speed switching: $t_f = 280 \text{ ns typ (at } V_{GS} = 10 \text{ V, } V_{DD} = 250 \text{ V, } I_D = 25 \text{ A)}$
- Low gate charge: $Q_g = 220 \text{ nC typ (at } V_{DD} = 400 \text{ V, } V_{GS} = 10 \text{ V, } I_D = 50 \text{ A)}$
- Avalanche ratings
- Built-in fast recovery diode: $t_{rr} = 190 \text{ ns typ}$

Outline



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	500	V
Gate to source voltage	V_{GSS}	±30	V
Drain current	I_D	50	A
Drain peak current	$I_{D (pulse)}^{Note1}$	200	A
Body-drain diode reverse drain current	I_{DR}	50	A
Body-drain diode reverse drain peak current	$I_{DR (pulse)}^{Note1}$	200	A
Avalanche current	I_{AP}^{Note3}	15	A
Channel dissipation	P_{ch}^{Note2}	250	W
Channel to case Thermal Impedance	θ_{ch-c}	0.5	°C/W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	−55 to +150	°C

Notes: 1. $PW \ 10 \mu s$, duty cycle 1%
2. Value at $T_c = 25^\circ C$
3. $T_{ch} \ 150^\circ C$

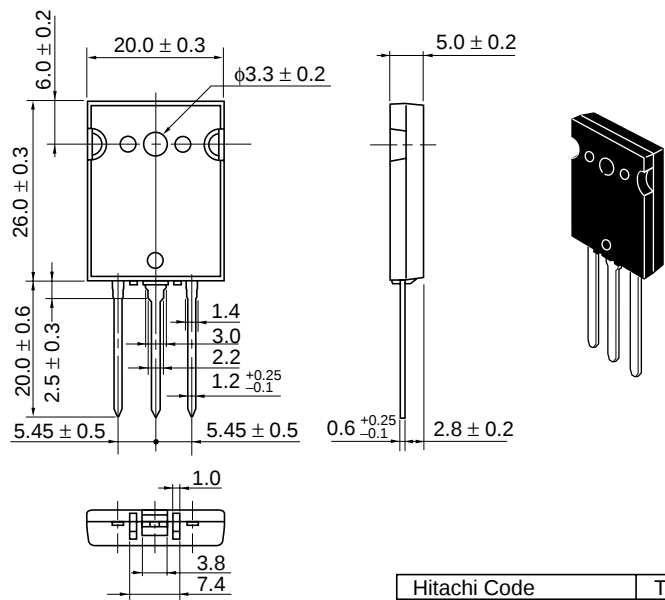
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	500	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 500 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	4.0	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.09	0.11		$I_D = 25 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	27	45	—	S	$I_D = 25 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	7630	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	C_{oss}	—	770	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	160	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	90	—	ns	$I_D = 25 \text{ A}$
Rise time	t_r	—	340	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	370	—	ns	$R_L = 10$
Fall time	t_f	—	280	—	ns	$R_g = 10$
Total gate charge	Q_g	—	220	—	nC	$V_{DD} = 400 \text{ V}$
Gate to source charge	Q_{gs}	—	30	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	110	—	nC	$I_D = 50 \text{ A}$
Body-drain diode forward voltage	V_{DF}	—	0.98	1.5	V	$I_F = 50 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	190	—	ns	$I_F = 50 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery charge	Q_{rr}	—	1.3	—	μC	$diF/dt = 100 \text{ A}/\mu\text{s}$

Note: 4. Pulse test

Package Dimensions

As of January, 2001
Unit: mm



Hitachi Code	TO-3PL
JEDEC	—
EIAJ	—
Mass (reference value)	9.9 g

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