

6AM15

Silicon N/P Channel MOS FET
High Speed Power Switching

HITACHI

ADE-208-719 (Z)

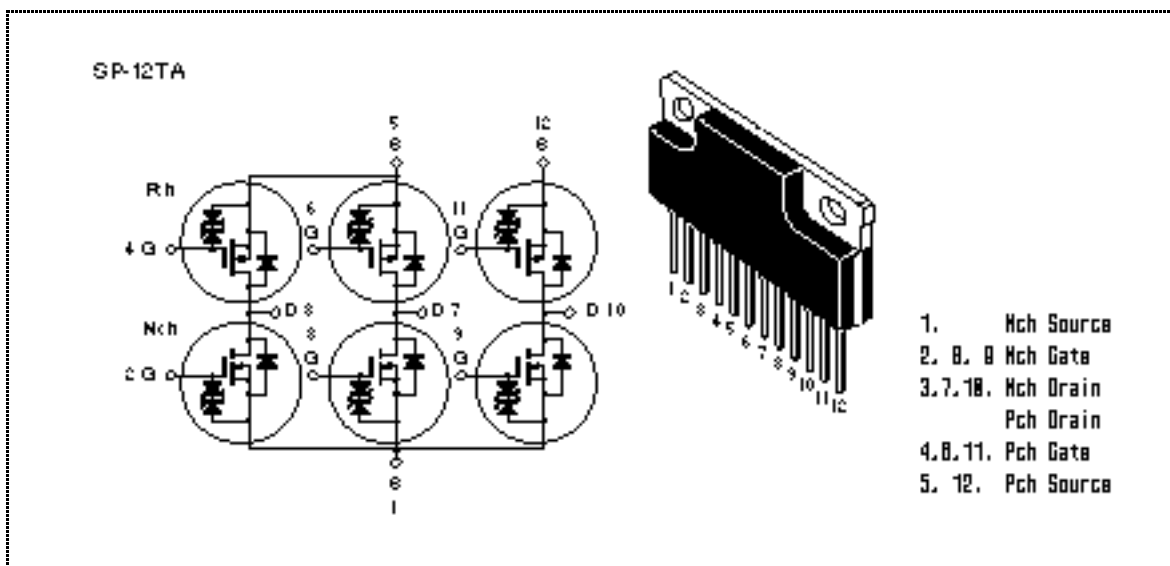
1st. Edition

February 1999

Features

- Low on-resistance
N Channel : $R_{DS(on)} = 0.045$ typ.
P Channel : $R_{DS(on)} = 0.085$ typ.
- High speed switching
- 4 V gate drive device can be driven from 5 V source
- High density mounting

Outline



6AM15

Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Ratings | | Unit |
|--|--------------------------|---------|-------------|------|
| | | Nch | Pch | |
| Drain to source voltage | V_{DSS} | 60 | -60 | V |
| Gate to source voltage | V_{GSS} | ±20 | ±20 | V |
| Drain current | I_D | 10 | -10 | A |
| Drain peak current | $I_{D(pulse)}$ Note1 | 40 | -40 | A |
| Body-drain diode reverse drain current | I_{DR} | 10 | -10 | A |
| Avalanche current | I_{AP} Note3 | 10 | -10 | A |
| Avalanche energy | E_{AR} Note3 | | 8.5 | mJ |
| Channel dissipation | Pch (Tc = 25°C) Note2 | | 42 | W |
| Channel dissipation | Pch Note2 | | 4.8 | W |
| Channel temperature | Tch | | 150 | °C |
| Storage temperature | Tstg | | -55 to +150 | °C |

Note: 1. PW 10 μs, duty cycle 1%
 2. 6 Devices operation
 3. Value at Ta = 25°C, Rg 50

Electrical Characteristics (N Channel) (Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|-----------------------------------|---------------|-----|-------|-------|------|--|
| Drain to source breakdown voltage | $V_{(BR)DS}$ | 60 | — | — | V | $I_D = 10 \text{ mA}$, $V_{GS} = 0$ |
| Gate to source breakdown voltage | $V_{(BR)GS}$ | ±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} | — | — | 10 | μA | $V_{DS} = 60 \text{ V}$, $V_{GS} = 0$ |
| Gate to source cutoff voltage | $V_{GS(off)}$ | 1.5 | — | 2.5 | V | $V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$ |
| Static drain to source on state | $R_{DS(on)}$ | — | 0.045 | 0.060 | | $I_D = 5 \text{ A}$, $V_{GS} = 10 \text{ V}$ Note5 |
| resistance | $R_{DS(on)}$ | — | 0.070 | 0.115 | | $I_D = 5 \text{ A}$, $V_{GS} = 4 \text{ V}$ Note5 |
| Forward transfer admittance | $ y_{fs} $ | 5.5 | 9 | — | S | $I_D = 5 \text{ A}$, $V_{DS} = 10 \text{ V}$ Note5 |
| Input capacitance | C_{iss} | — | 500 | — | pF | $V_{DS} = 10 \text{ V}$ |
| Output capacitance | C_{oss} | — | 260 | — | pF | $V_{GS} = 0$ |
| Reverse transfer capacitance | C_{rss} | — | 110 | — | pF | f = 1 MHz |
| Turn-on delay time | $t_{d(on)}$ | — | 10 | — | ns | $V_{GS} = 10 \text{ V}$, $I_D = 5 \text{ A}$ |

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|--|--------------|---|-----|---|----|---|
| Rise time | t_r | — | 50 | — | ns | $R_L = 6$ |
| Turn-off delay time | $t_{d(off)}$ | — | 90 | — | ns | |
| Fall time | t_f | — | 100 | — | ns | |
| Body-drain diode forward voltage | V_{DF} | — | 0.9 | — | V | $I_F = 10\text{ A}, V_{GS} = 0$ |
| Body-drain diode reverse recovery time | t_{rr} | — | 52 | — | ns | $I_F = 10\text{ A}, V_{GS} = 0$ $diF/dt = 50\text{ A}/\mu\text{s}$ |

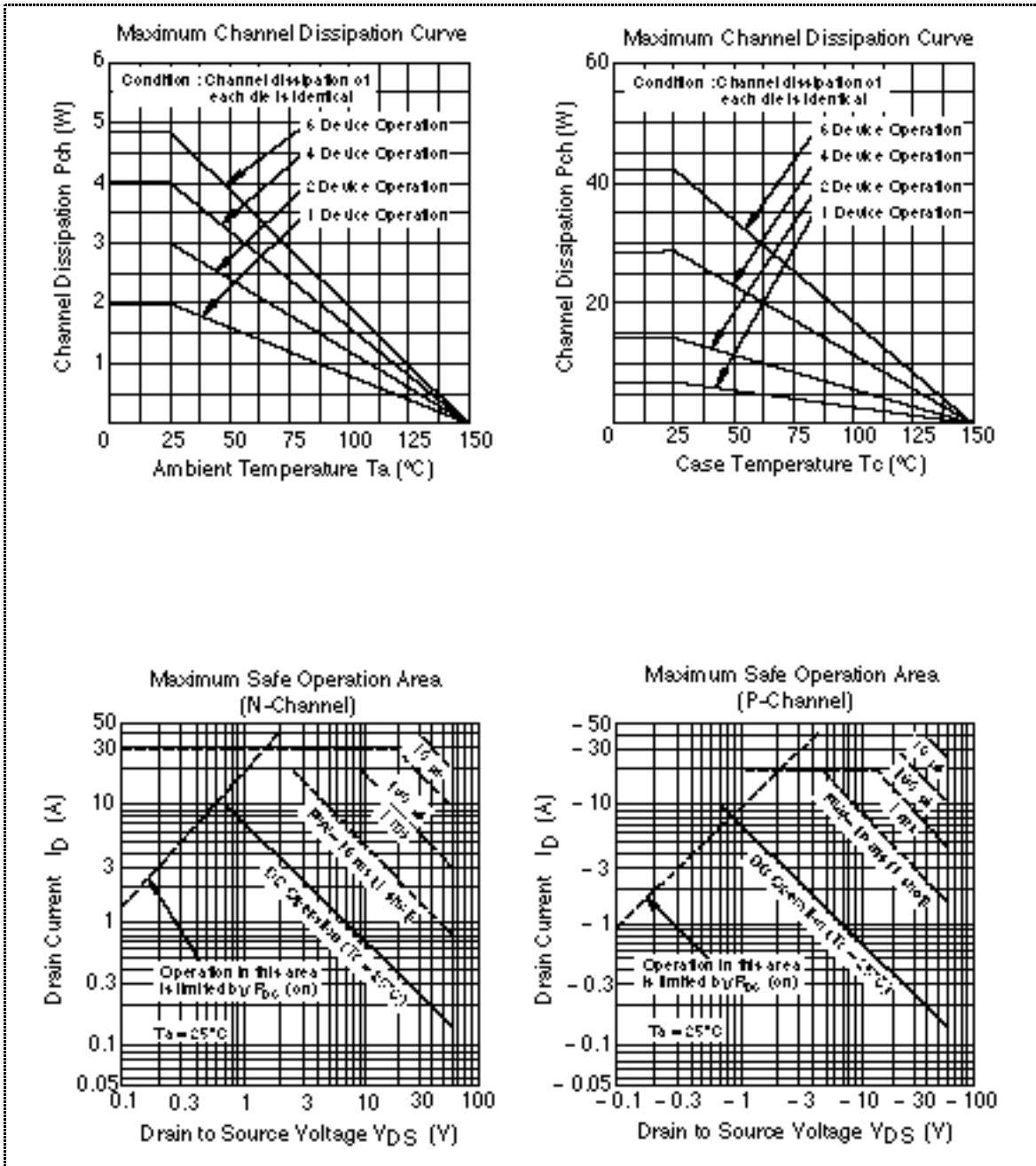
Note: 5. Pulse test

Electrical Characteristics (P Channel) ($T_a = 25^\circ\text{C}$)

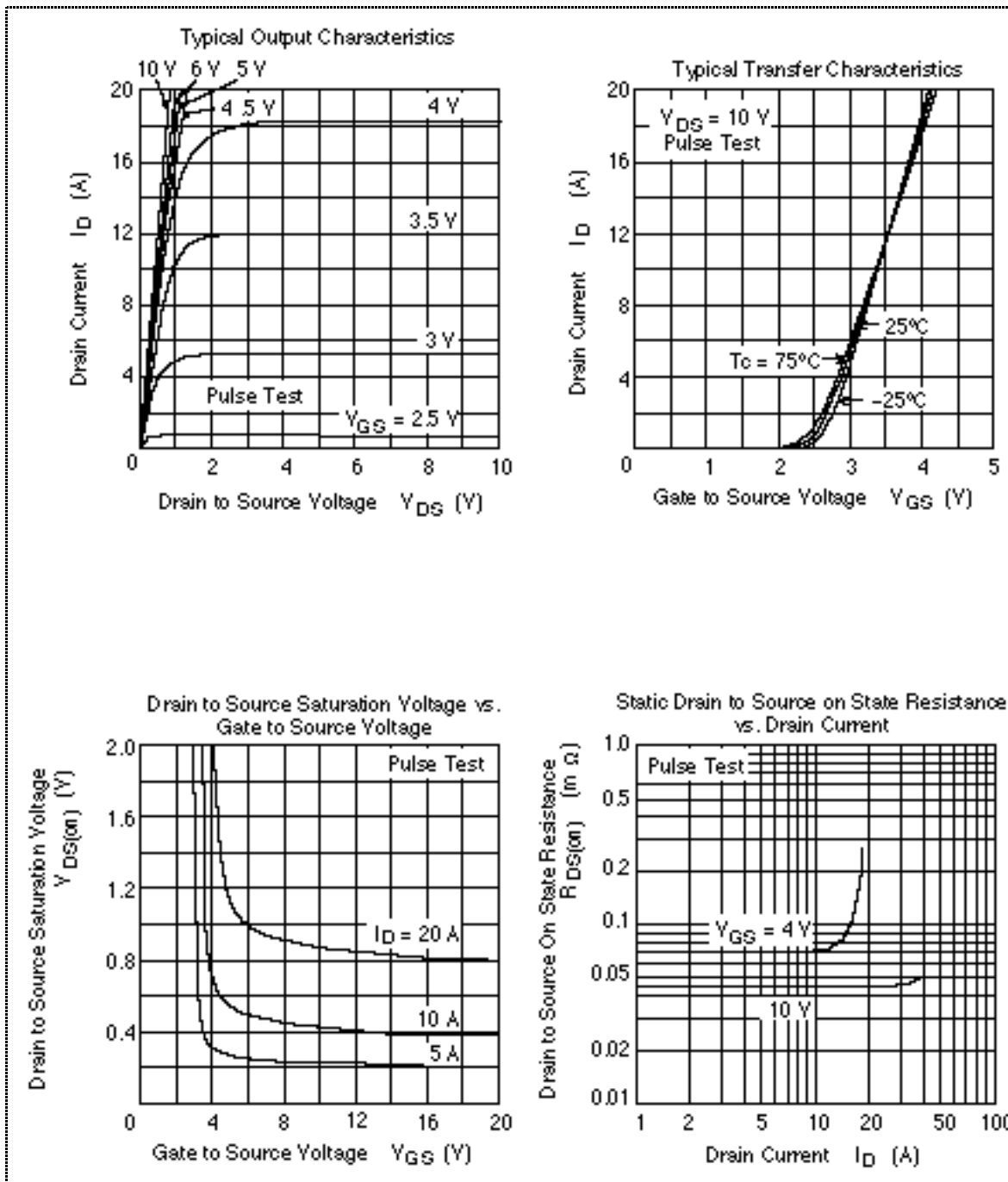
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|---------------|----------|-------|----------|---------------|--|
| Drain to source breakdown voltage | $V_{(BR)DS}$ | -60 | — | — | V | $I_D = -10\text{ mA}, V_{GS} = 0$ |
| Gate to source breakdown voltage | $V_{(BR)GS}$ | ± 20 | — | — | 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} | — | — | -10 | μA | $V_{DS} = -60\text{ V}, V_{GS} = 0$ |
| Gate to source cutoff voltage | $V_{GS(off)}$ | -1.0 | — | -2.0 | V | $V_{DS} = -10\text{ V}, I_D = -1\text{ mA}$ |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 0.085 | 0.105 | | $I_D = -5\text{ A}, V_{GS} = -10\text{ V}$ Note5 |
| | $R_{DS(on)}$ | — | 0.115 | 0.165 | | $I_D = -5\text{ A}, V_{GS} = -4\text{ V}$ Note5 |
| Forward transfer admittance | $ y_{fs} $ | 5.5 | 9 | — | S | $I_D = -5\text{ A}, V_{DS} = -10\text{ V}$ Note5 |
| Input capacitance | C_{iss} | — | 850 | — | pF | $V_{DS} = -10\text{ V}$ |
| Output capacitance | C_{oss} | — | 420 | — | pF | $V_{GS} = 0$ |
| Reverse transfer capacitance | C_{rss} | — | 110 | — | pF | $f = 1\text{ MHz}$ |
| Turn-on delay time | $t_{d(on)}$ | — | 12 | — | ns | $V_{GS} = -10\text{ V}, I_D = -5\text{ A}$ |
| Rise time | t_r | — | 55 | — | ns | $R_L = 6$ |
| Turn-off delay time | $t_{d(off)}$ | — | 130 | — | ns | |
| Fall time | t_f | — | 70 | — | ns | |
| Body-drain diode forward voltage | V_{DF} | — | -0.95 | — | V | $I_F = -10\text{ A}, V_{GS} = 0$ |
| Body-drain diode reverse recovery time | t_{rr} | — | 65 | — | ns | $I_F = -10\text{ A}, V_{GS} = 0$ $diF/dt = 50\text{ A}/\mu\text{s}$ |

Note: 5. Pulse test

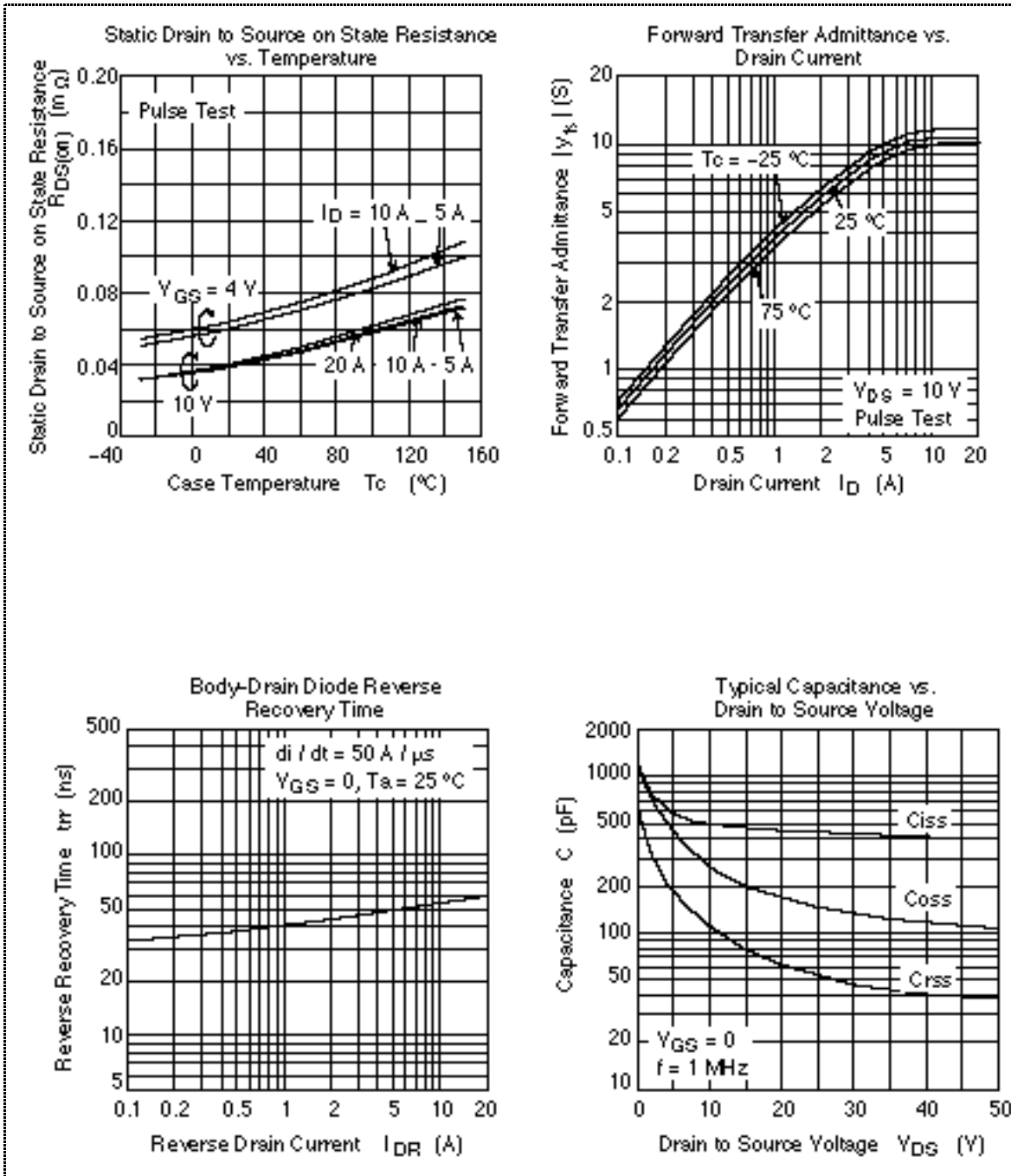
Main Characteristics



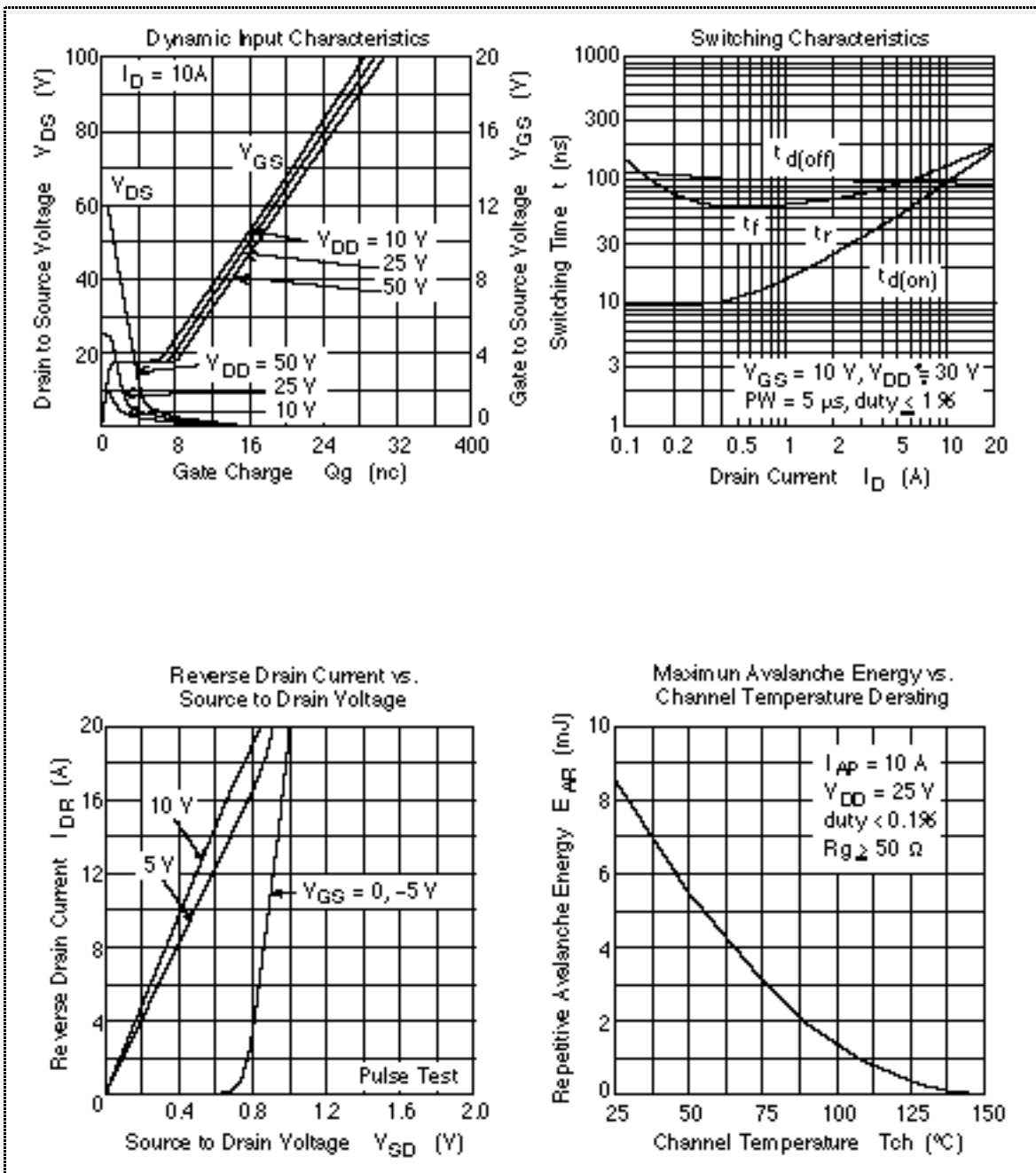
Main Characteristics (N Channel)



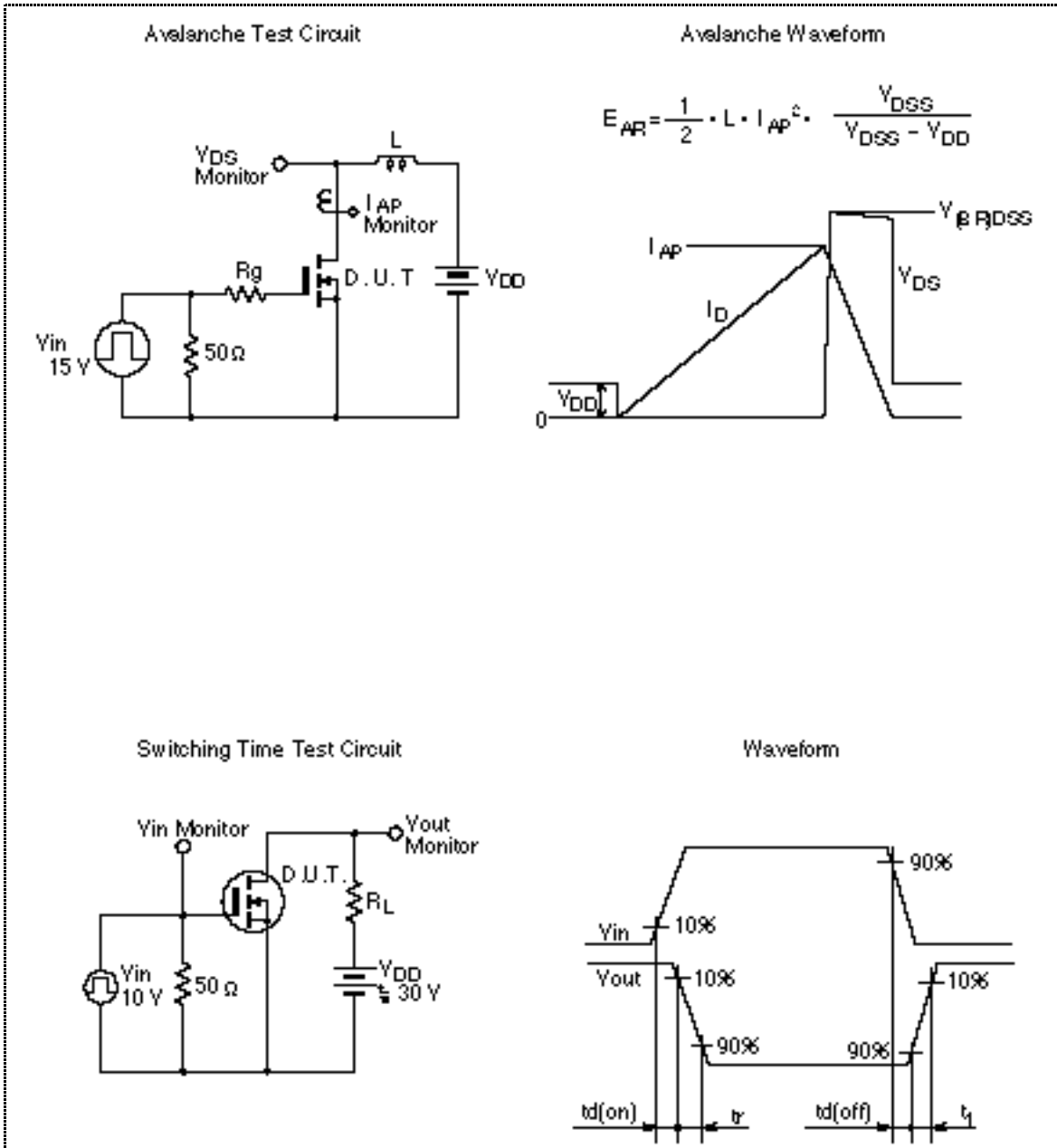
Main Characteristics (N Channel)



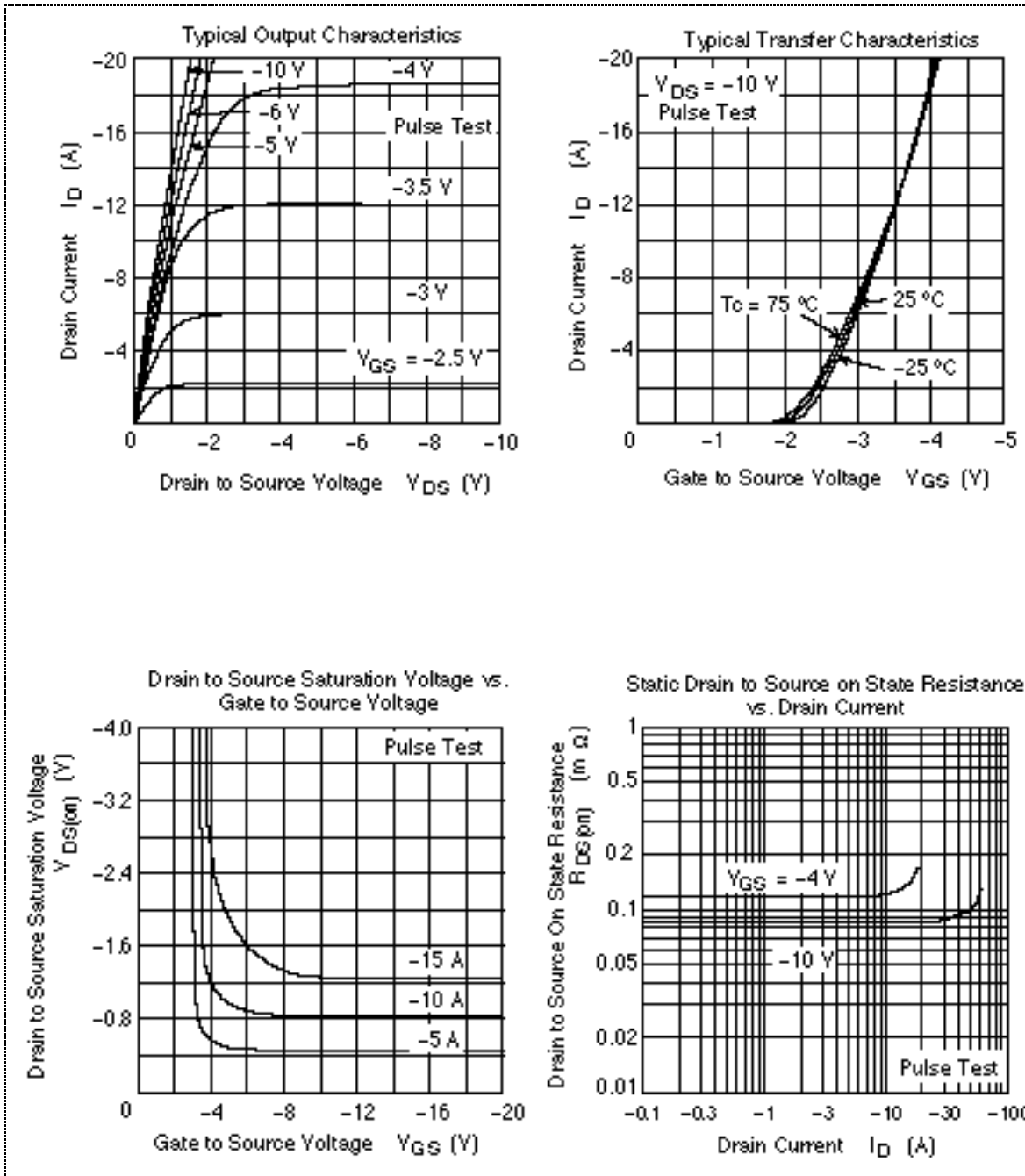
Main Characteristics (N Channel)



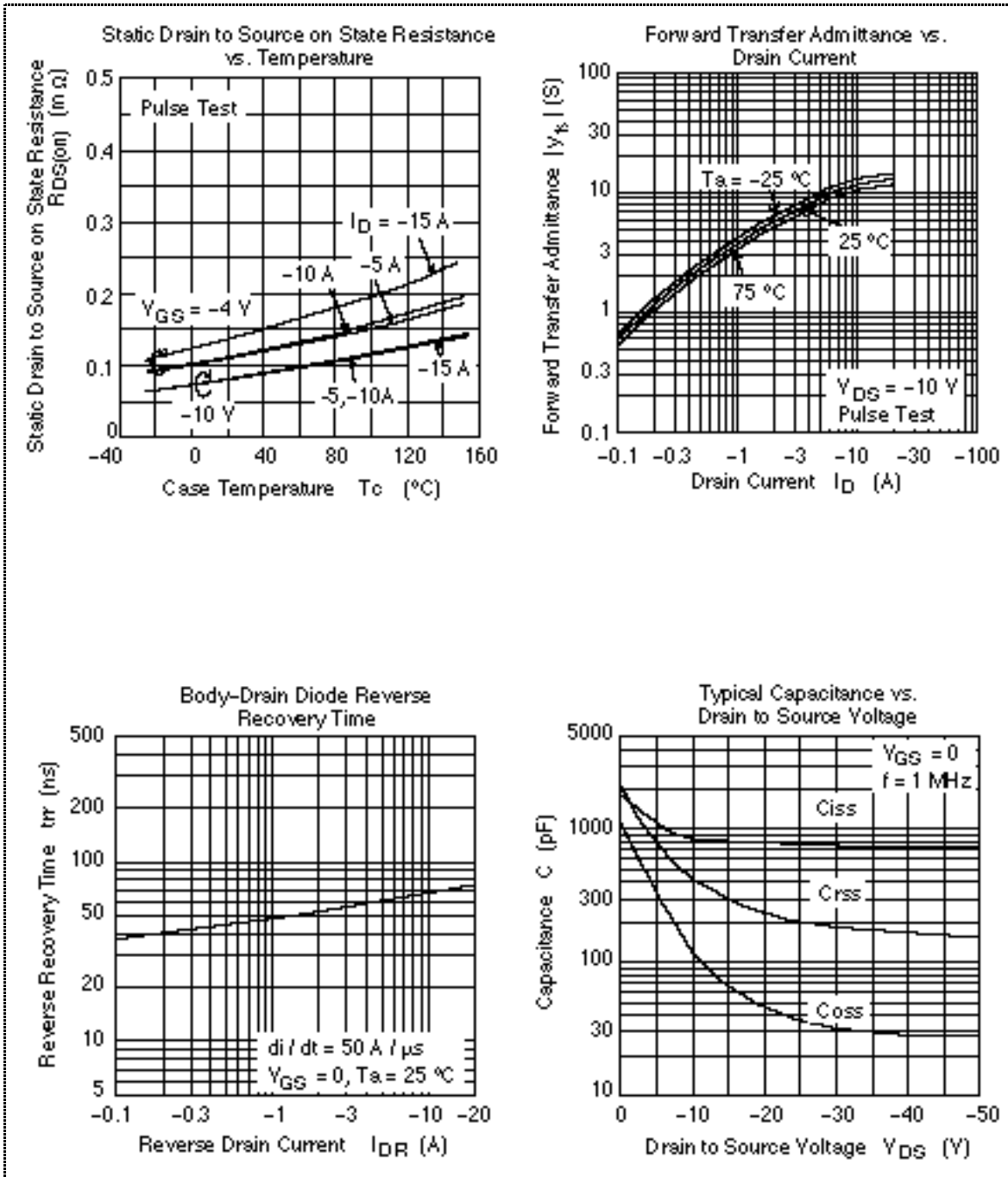
Main Characteristics (N Channel)



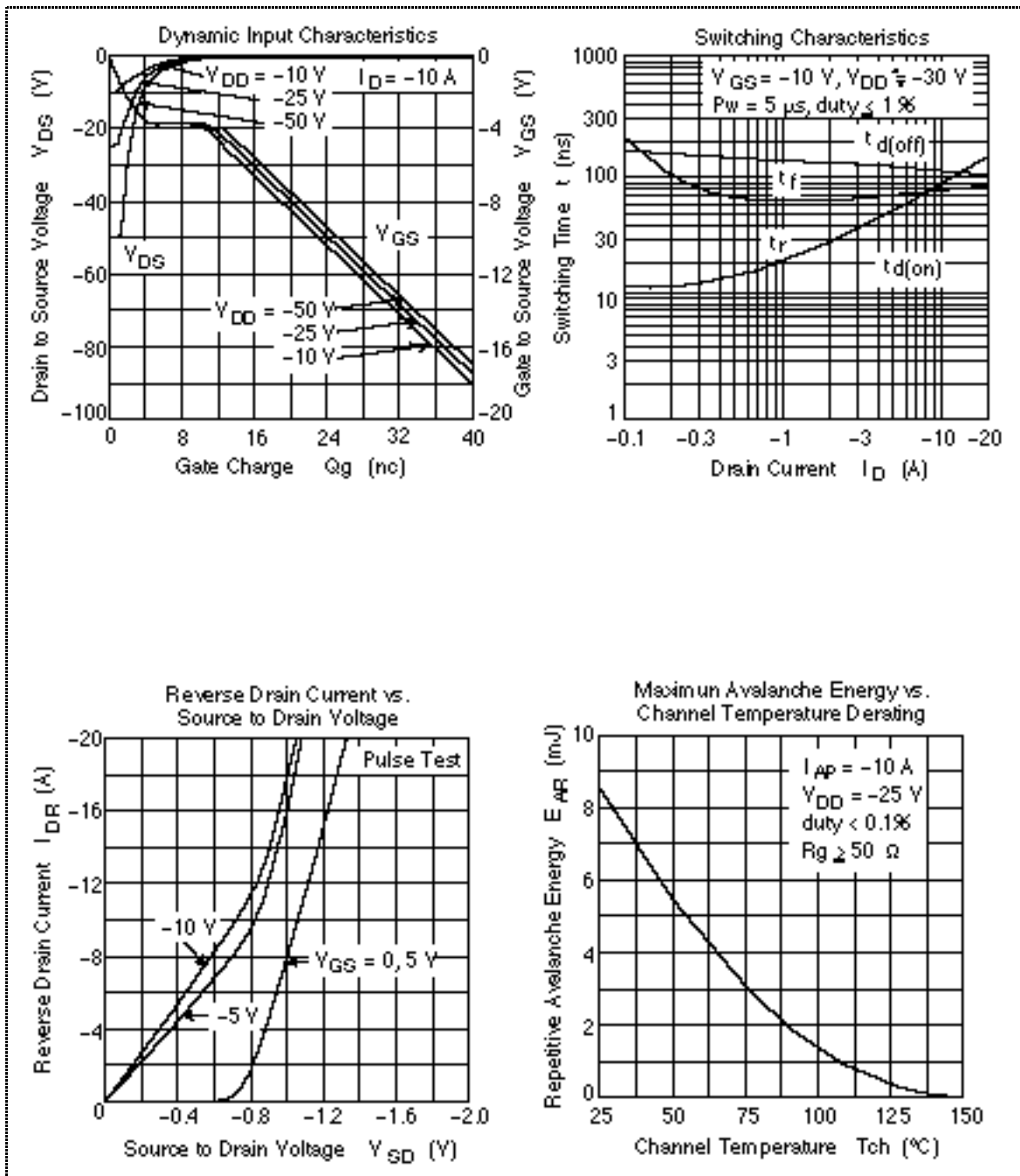
Main Characteristics (P Channel)



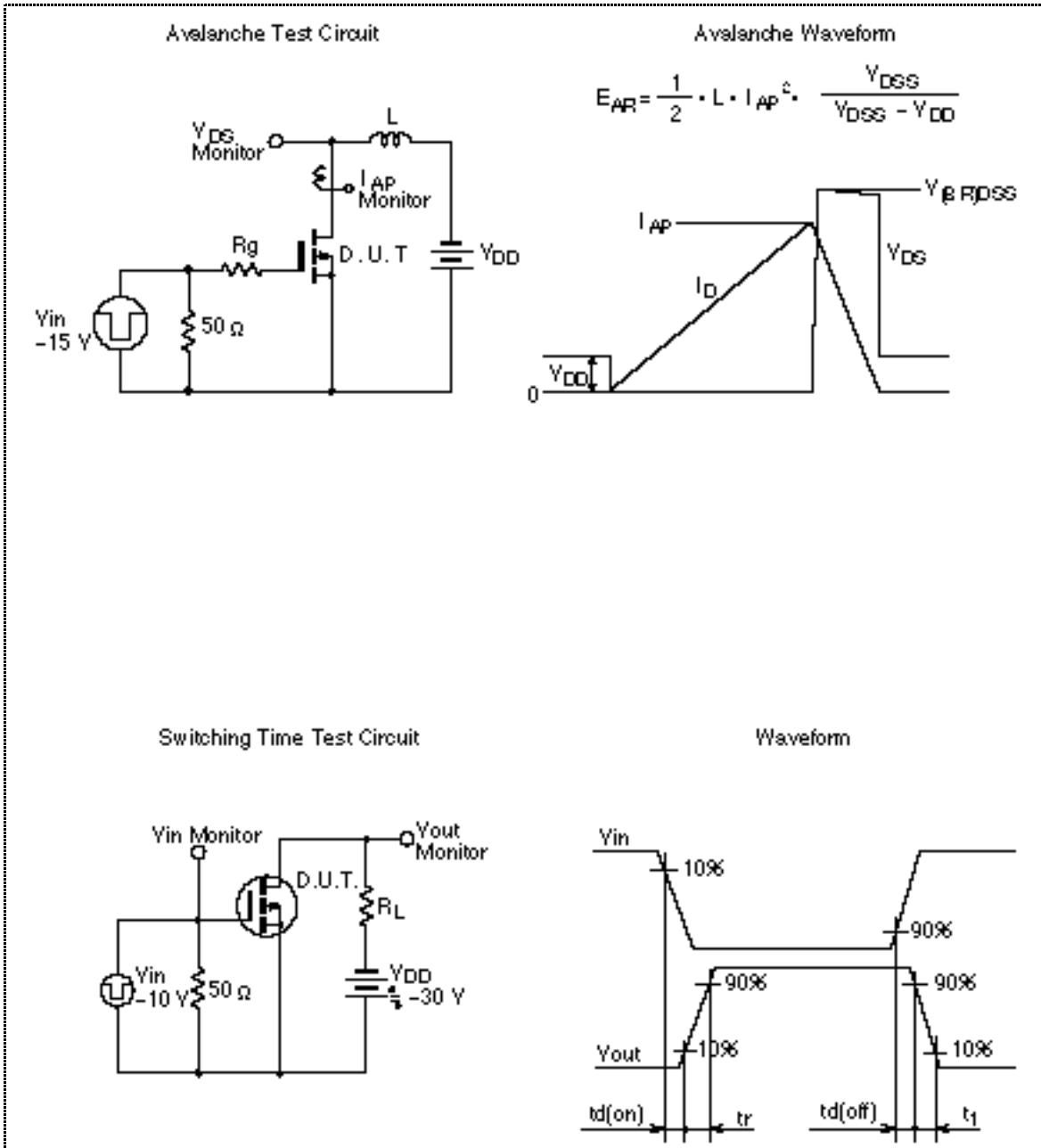
Main Characteristics (P Channel)



Main Characteristics (P Channel)

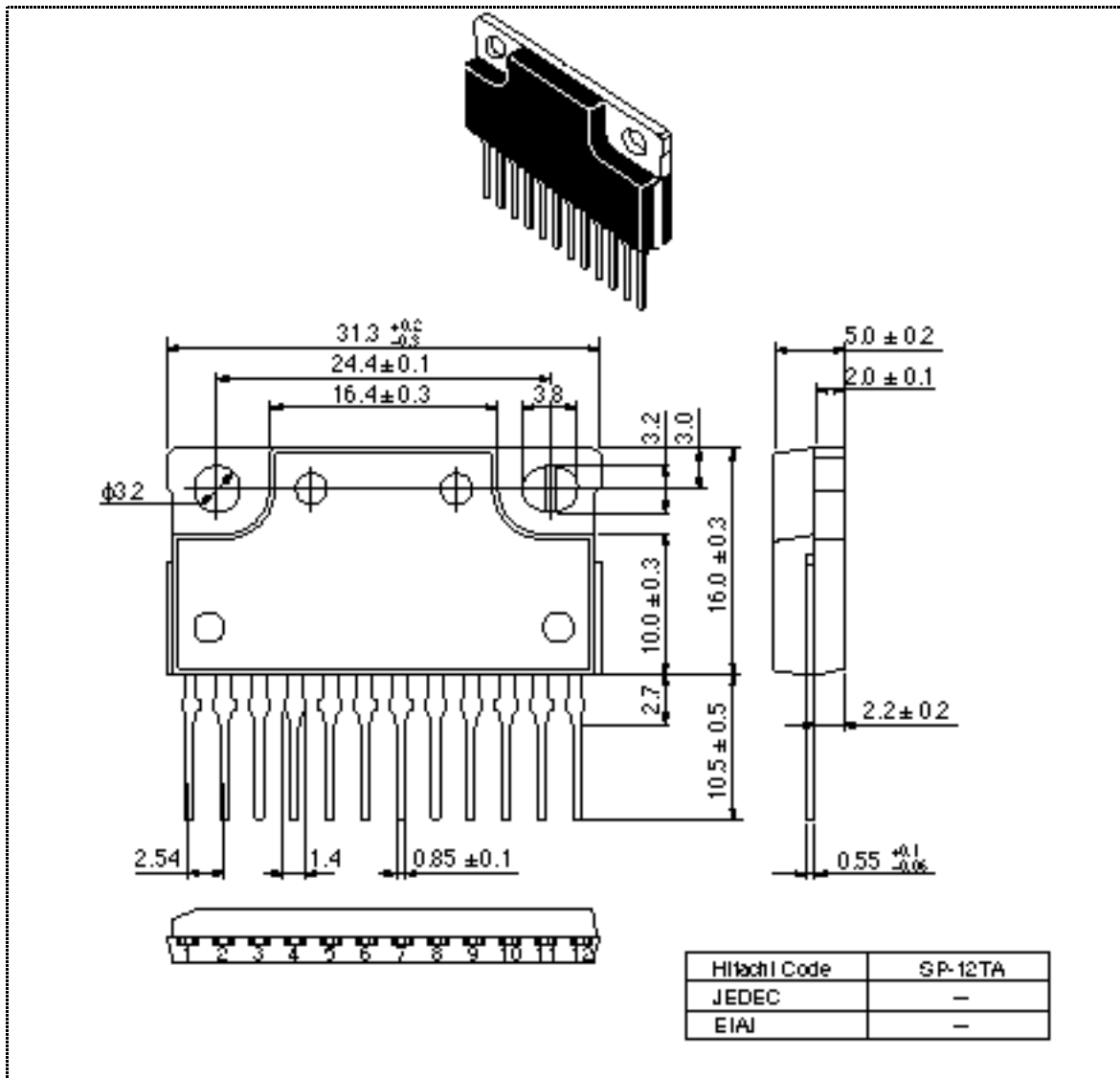


Main Characteristics (P Channel)



Package Dimensions

Unit: mm



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