

6AM15

Silicon N/P Channel MOS FET
High Speed Power Switching

HITACHI

ADE-208-719 (Z)

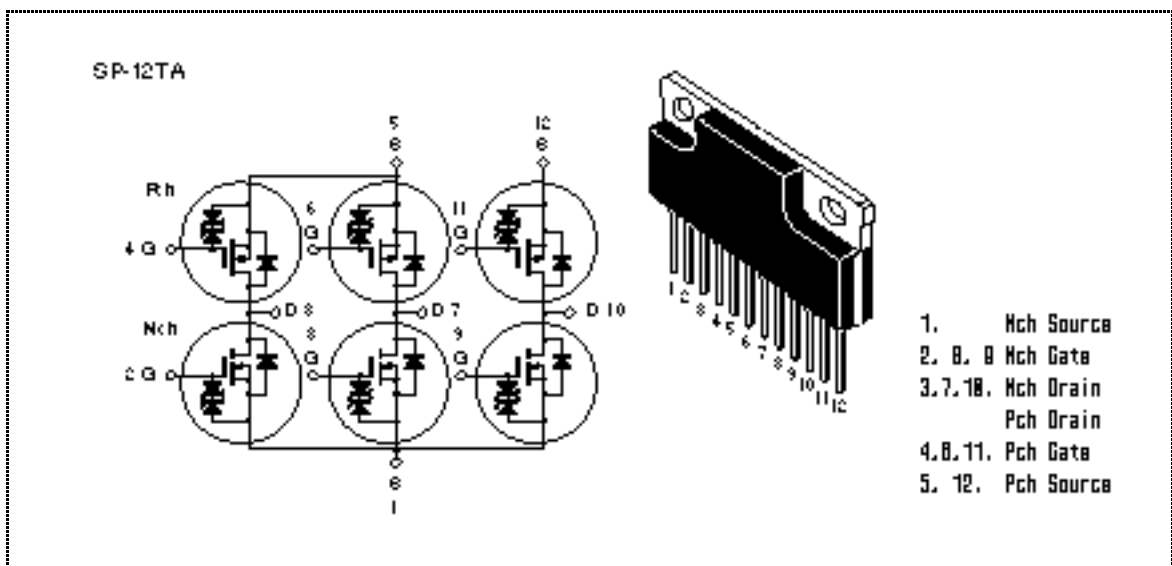
1st. Edition

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



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	P_{ch} (Tc = 25°C) ^{Note2}		42	W
Channel dissipation	P_{ch} ^{Note2}		4.8	W
Channel temperature	T_{ch}		150	°C
Storage temperature	T_{stg}		-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	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	10	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 5 \text{ A}$

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	$I_F = 10\text{ A}$, $V_{GS} = 0$ $diF/dt = 50\text{ A}/\mu\text{s}$

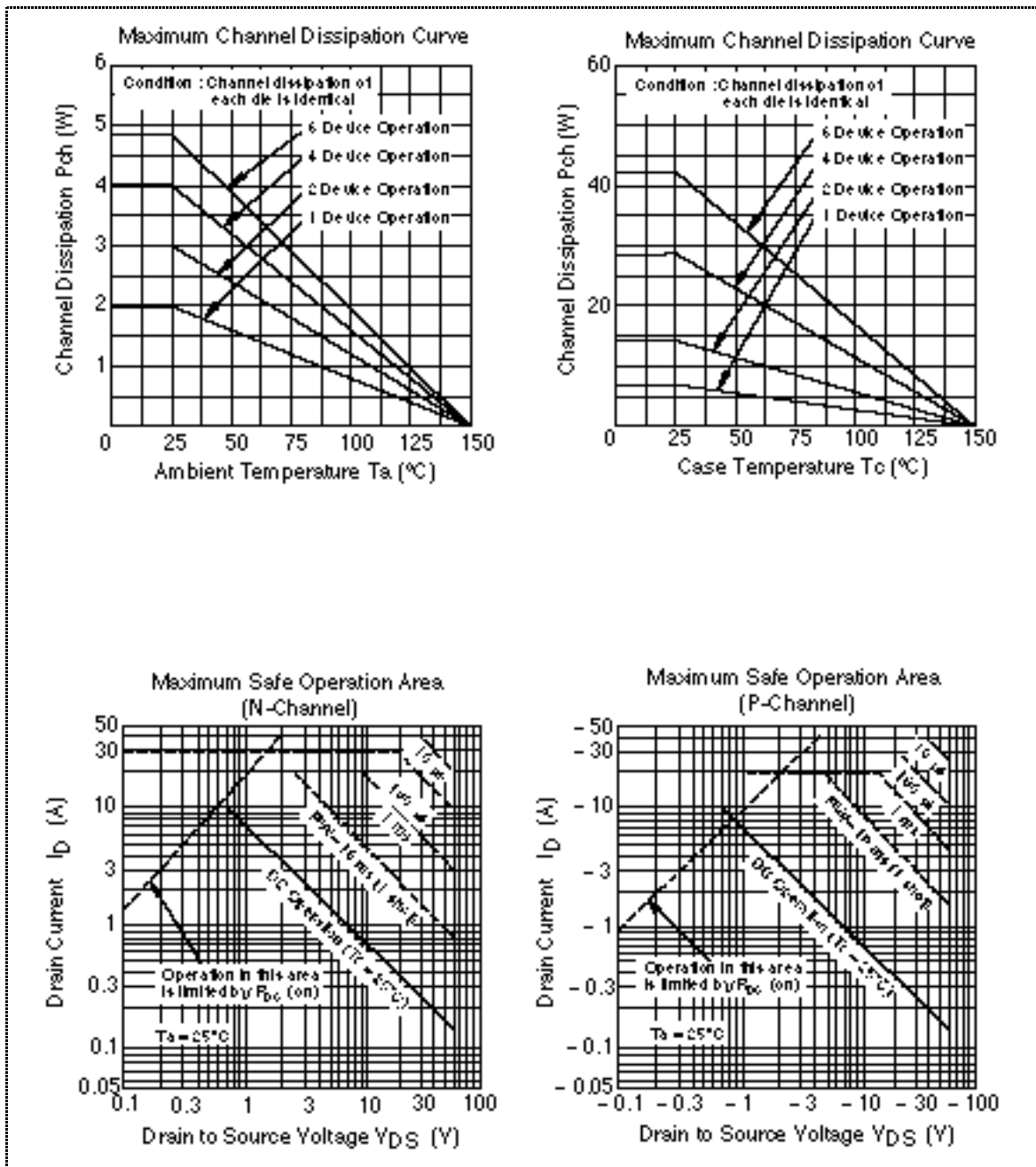
Note: 5. Pulse test

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	$R_{DS(on)}$	—	0.085	0.105		$I_D = -5\text{ A}$, $V_{GS} = -10\text{ V}$ Note5
resistance	$R_{DS(on)}$	—	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	$I_F = -10\text{ A}$, $V_{GS} = 0$ $diF/dt = 50\text{ A}/\mu\text{s}$

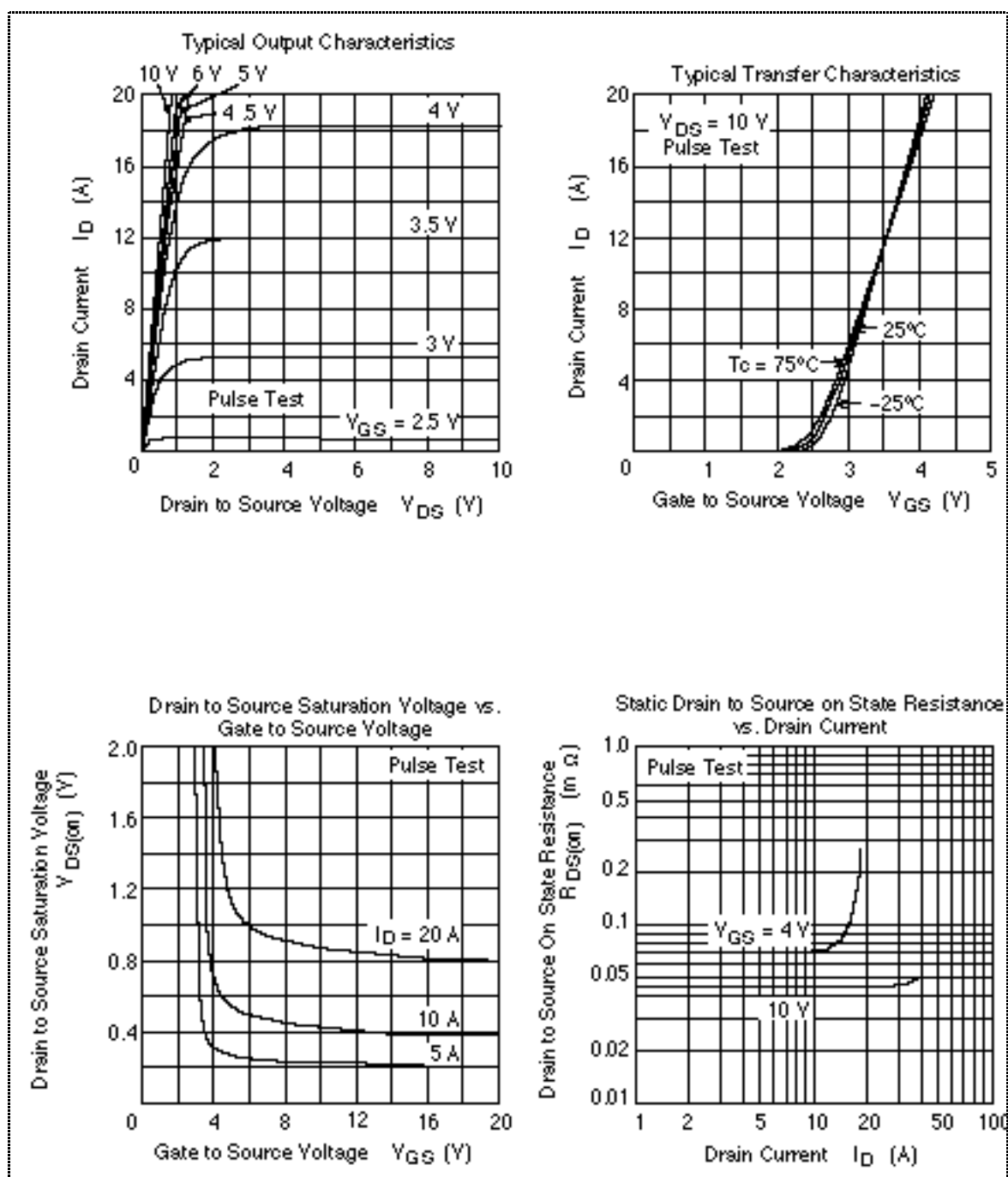
Note: 5. Pulse test

Main Characteristics



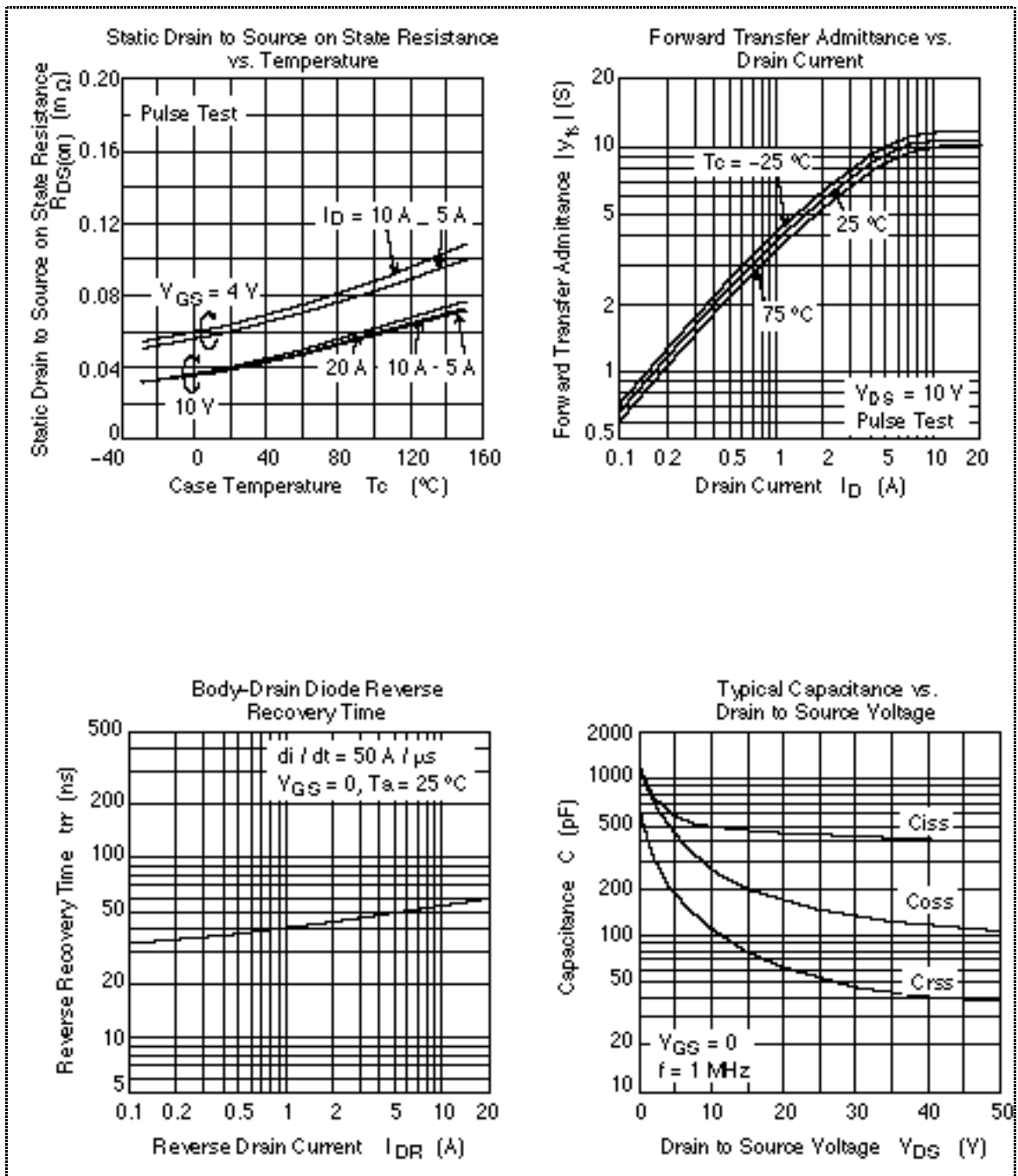
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Main Characteristics (N Channel)



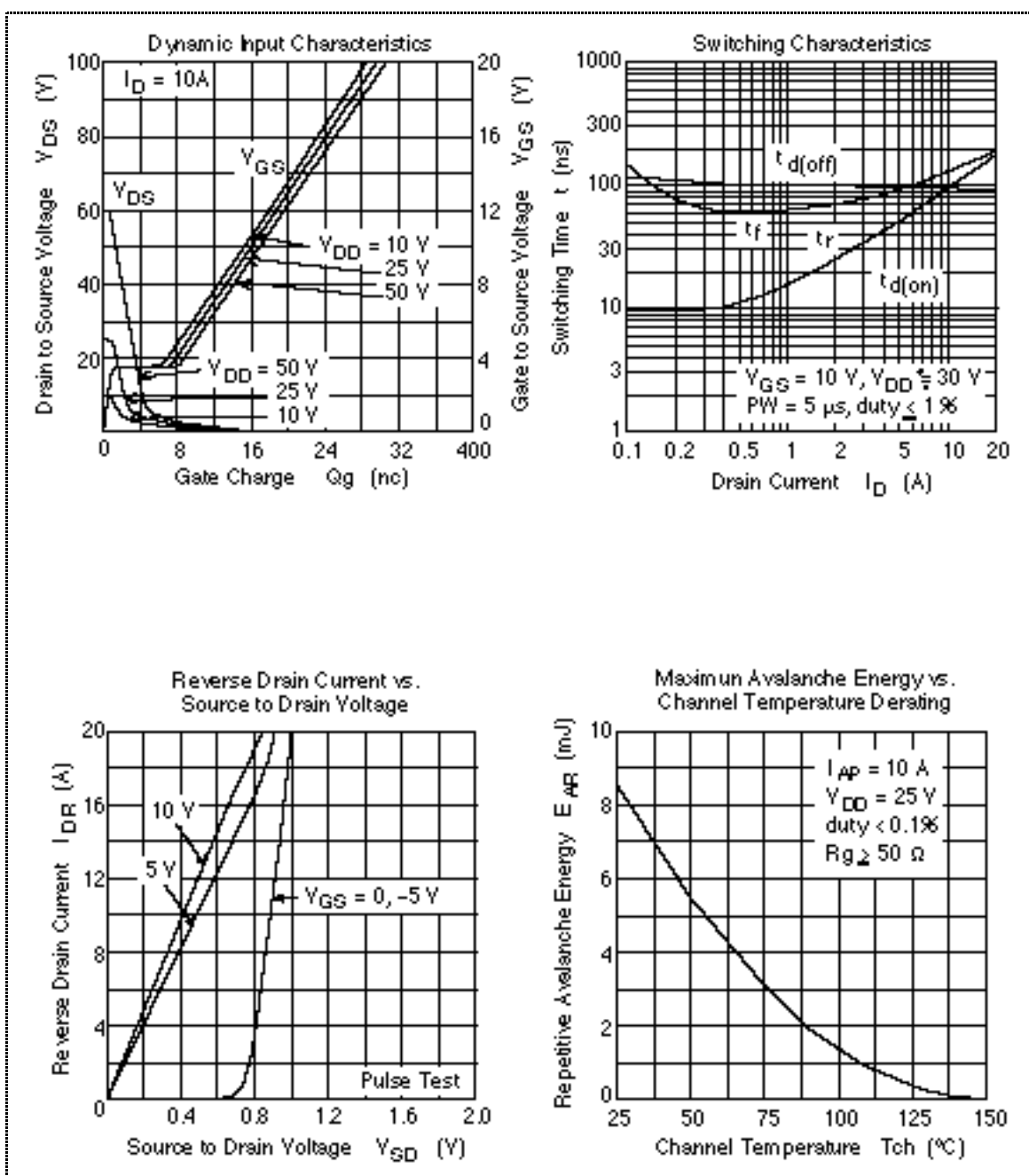
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Main Characteristics (N Channel)



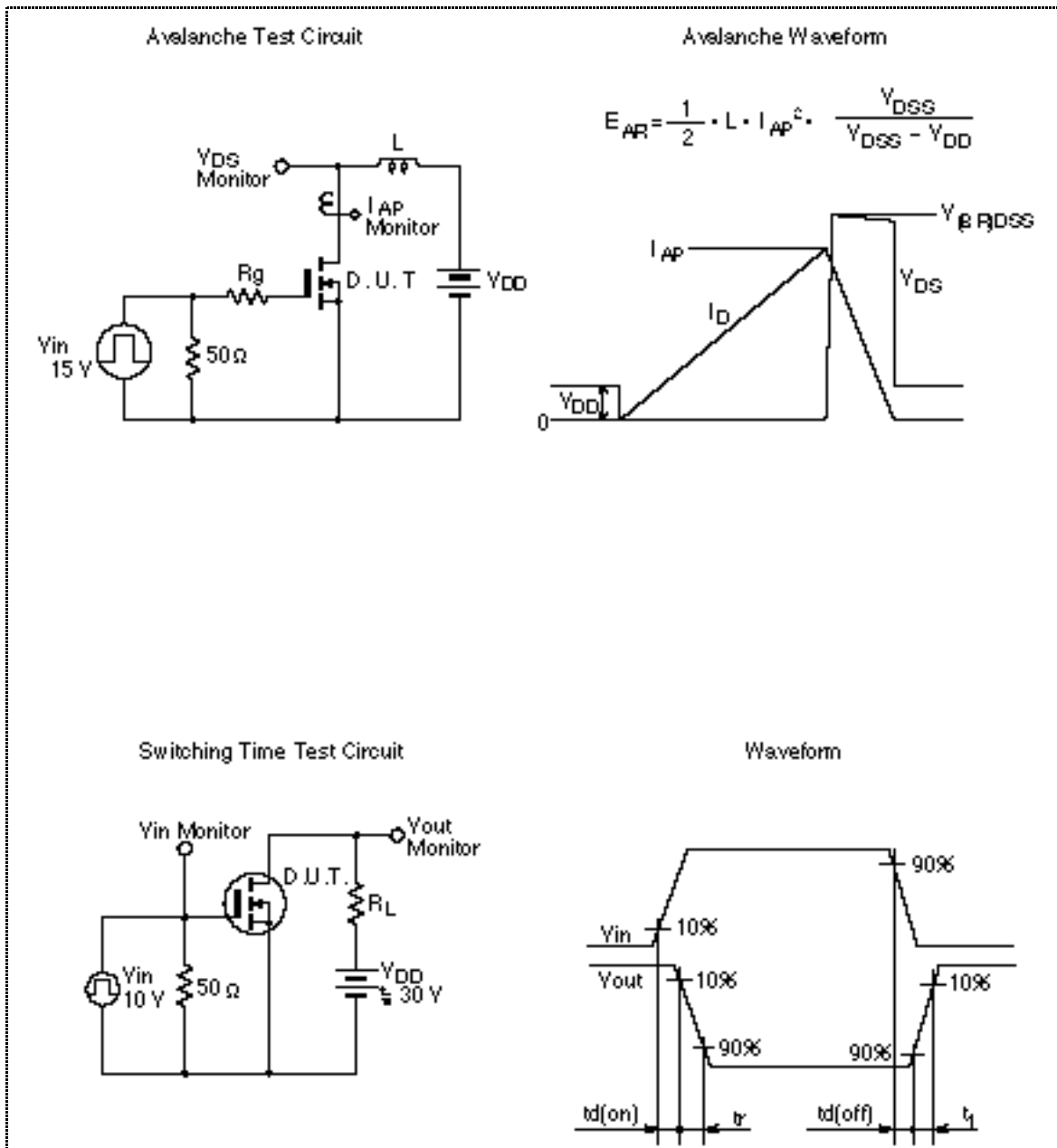
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Main Characteristics (N Channel)

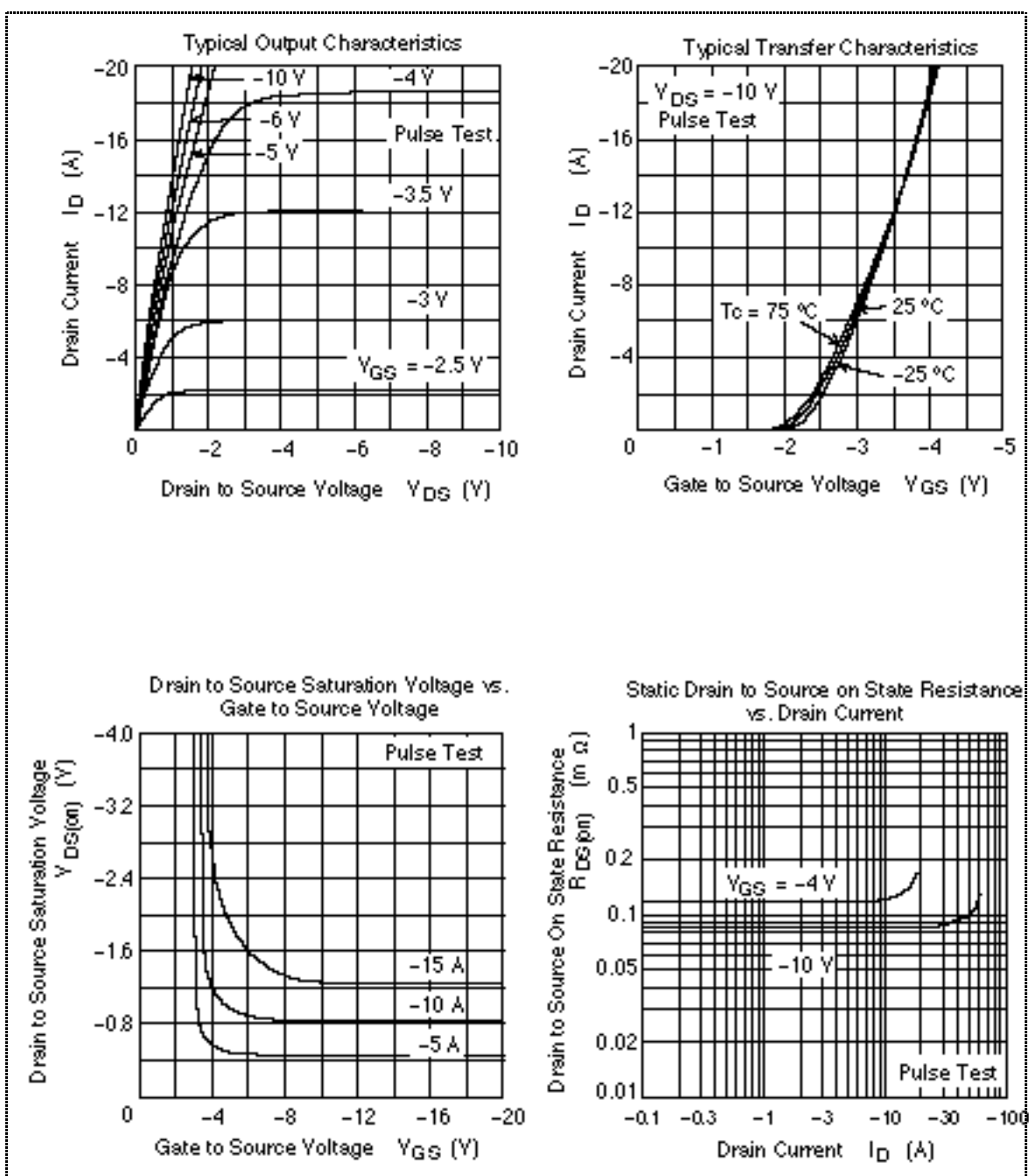


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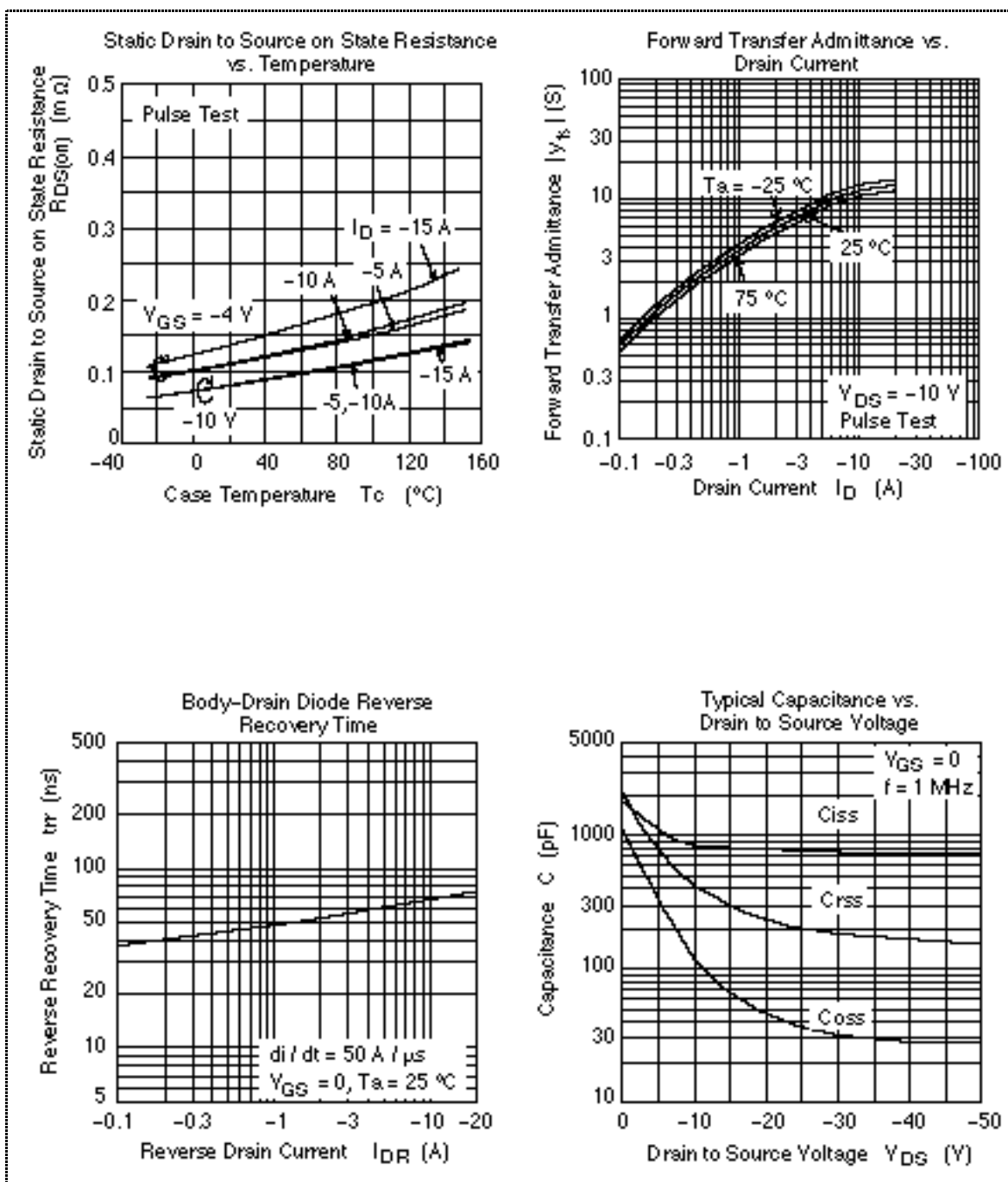
Main Characteristics (N Channel)



Main Characteristics (P Channel)

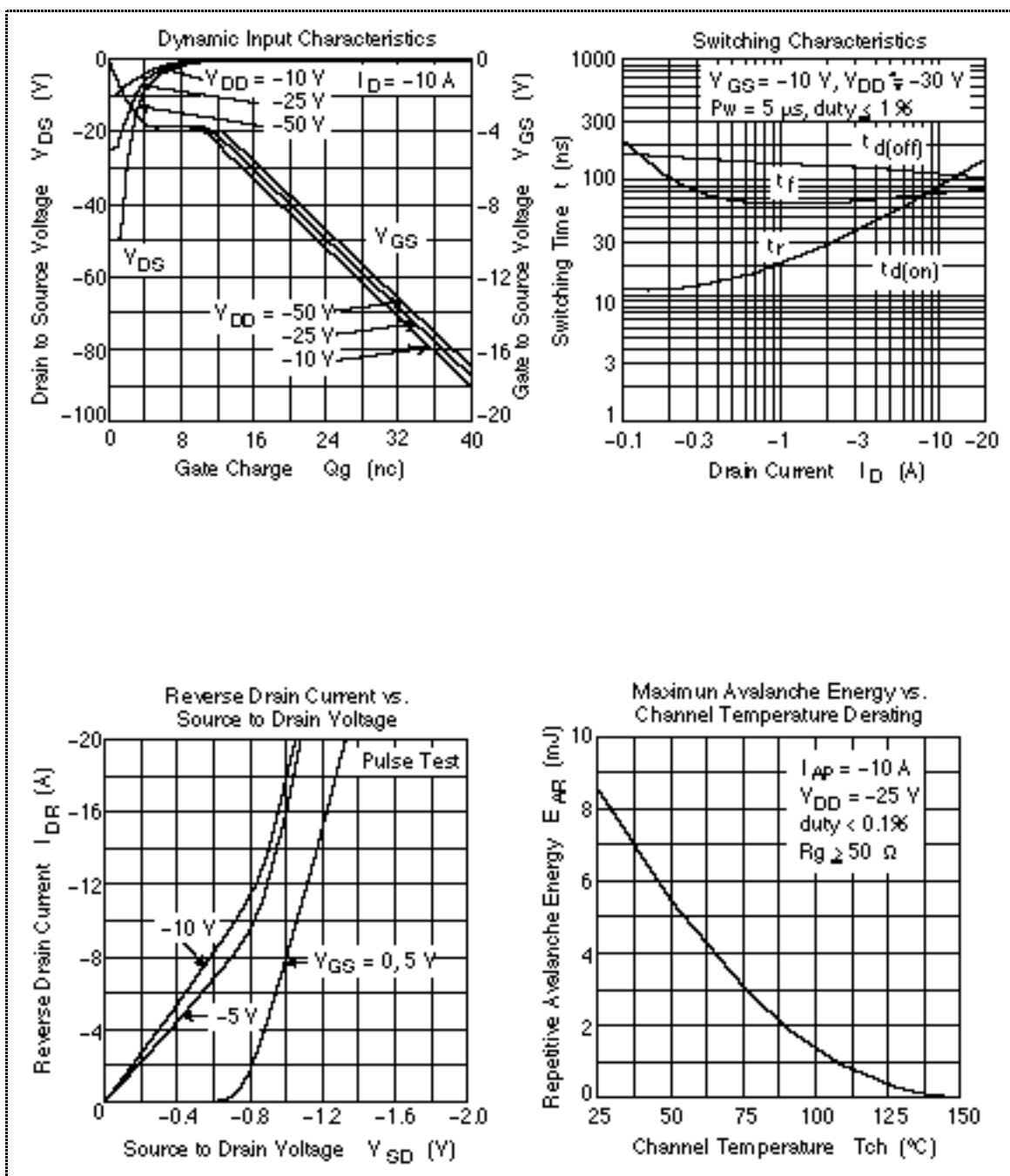


Main Characteristics (P Channel)



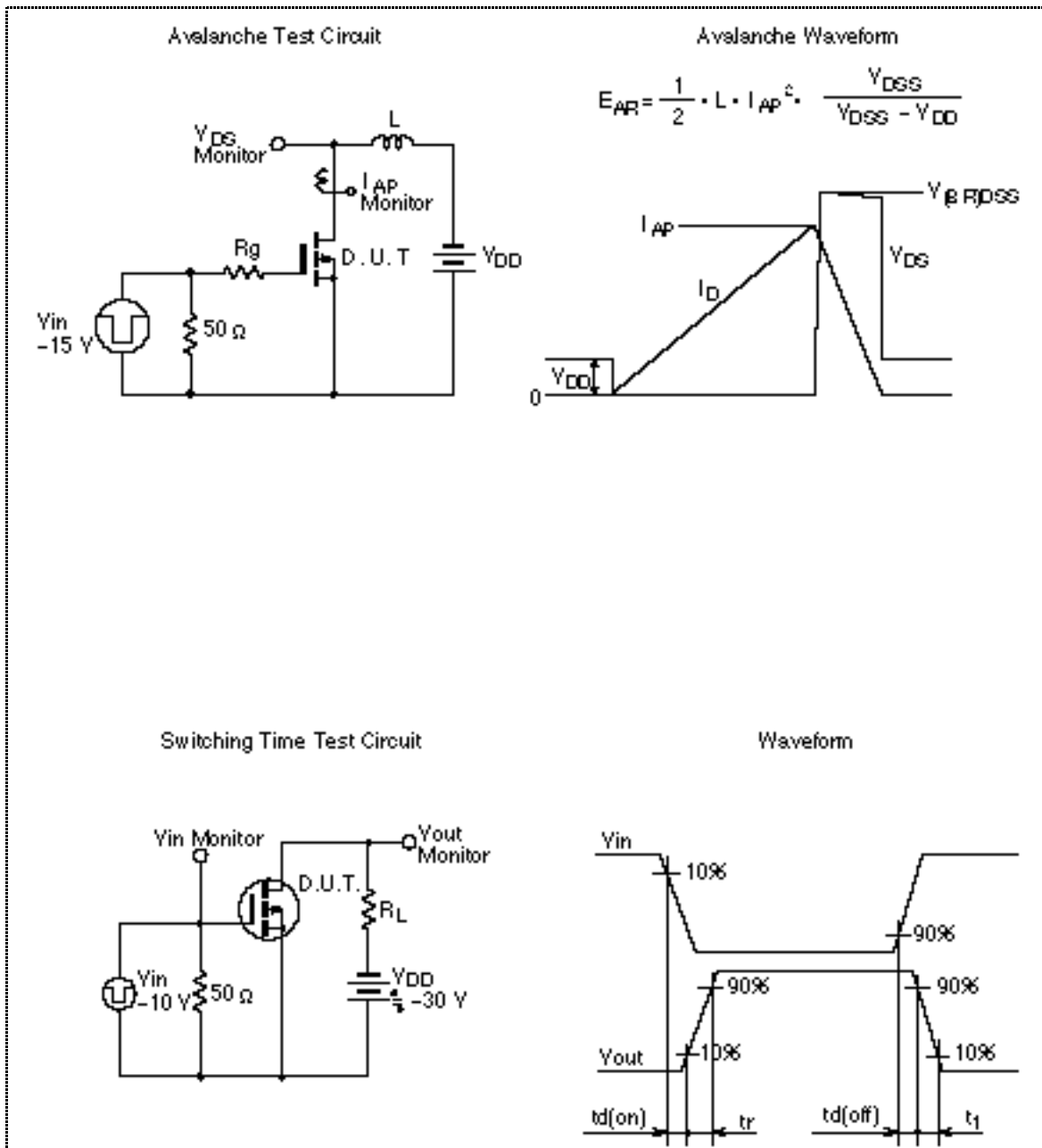
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Main Characteristics (P Channel)



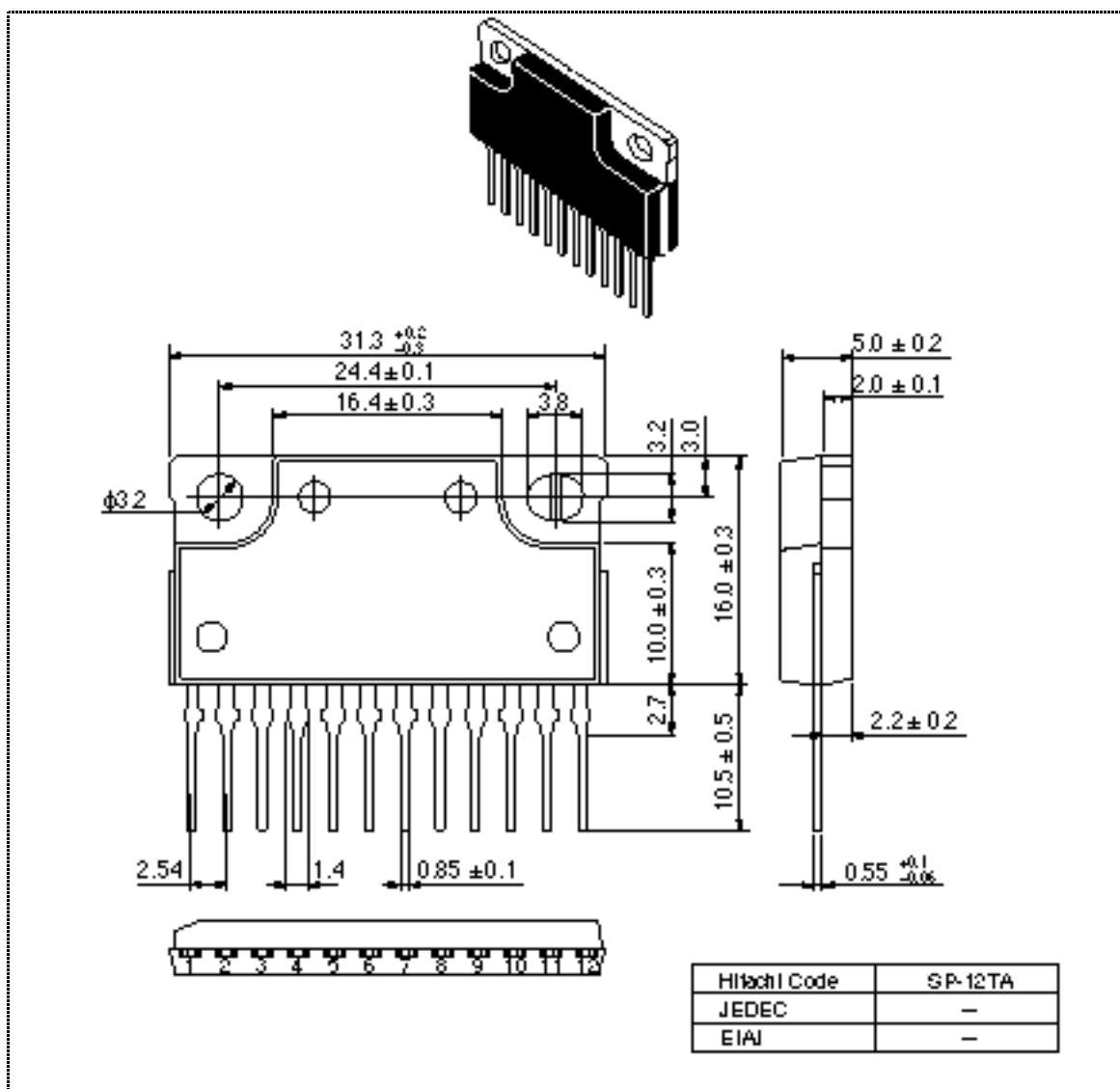
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Main Characteristics (P Channel)



Package Dimensions

Unit: mm

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