

2SK2939(L), 2SK2939(S)

Silicon N Channel MOS FET
High Speed Power Switching

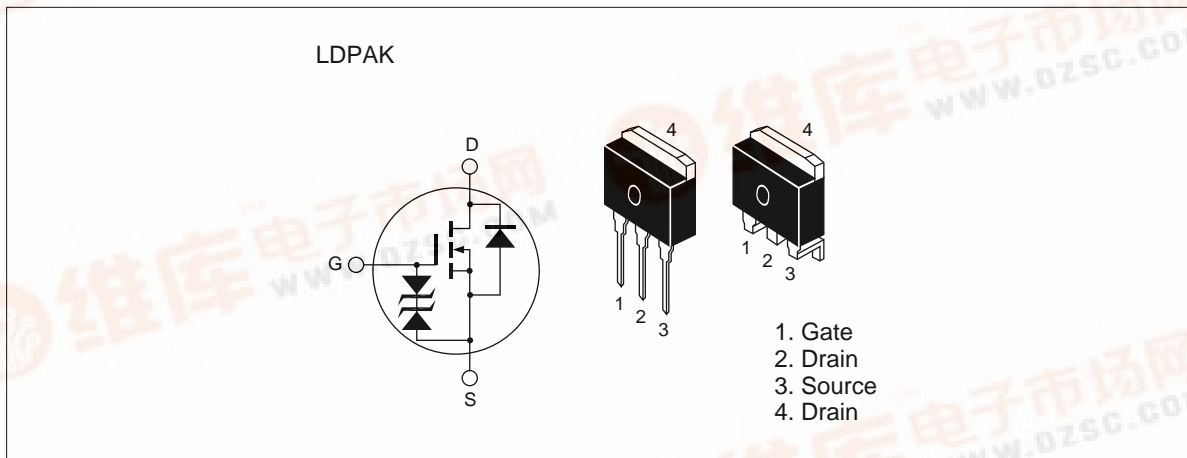
HITACHI

ADE-208-562D (Z)
5th. Edition
June 1, 1998

Features

- Low on-resistance
 $R_{DS} = 0.020 \Omega$ typ.
- High speed switching
- 4V gate drive device can be driven from 5V source

Outline



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Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V _{DSS}	60	V
Gate to source voltage	V _{GSS}	±20	V
Drain current	I _D	35	A
Drain peak current	I _{D(pulse)} ^{Note1}	140	A
Body-drain diode reverse drain current	I _{DR}	35	A
Avalanche current	I _{AP} ^{Note3}	35	A
Avalanche energy	E _{AR} ^{Note3}	105	mJ
Channel dissipation	P _{ch} ^{Note2}	50	W
Channel temperature	T _{ch}	150	°C
Storage temperature	T _{stg}	-55 to +150	°C

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

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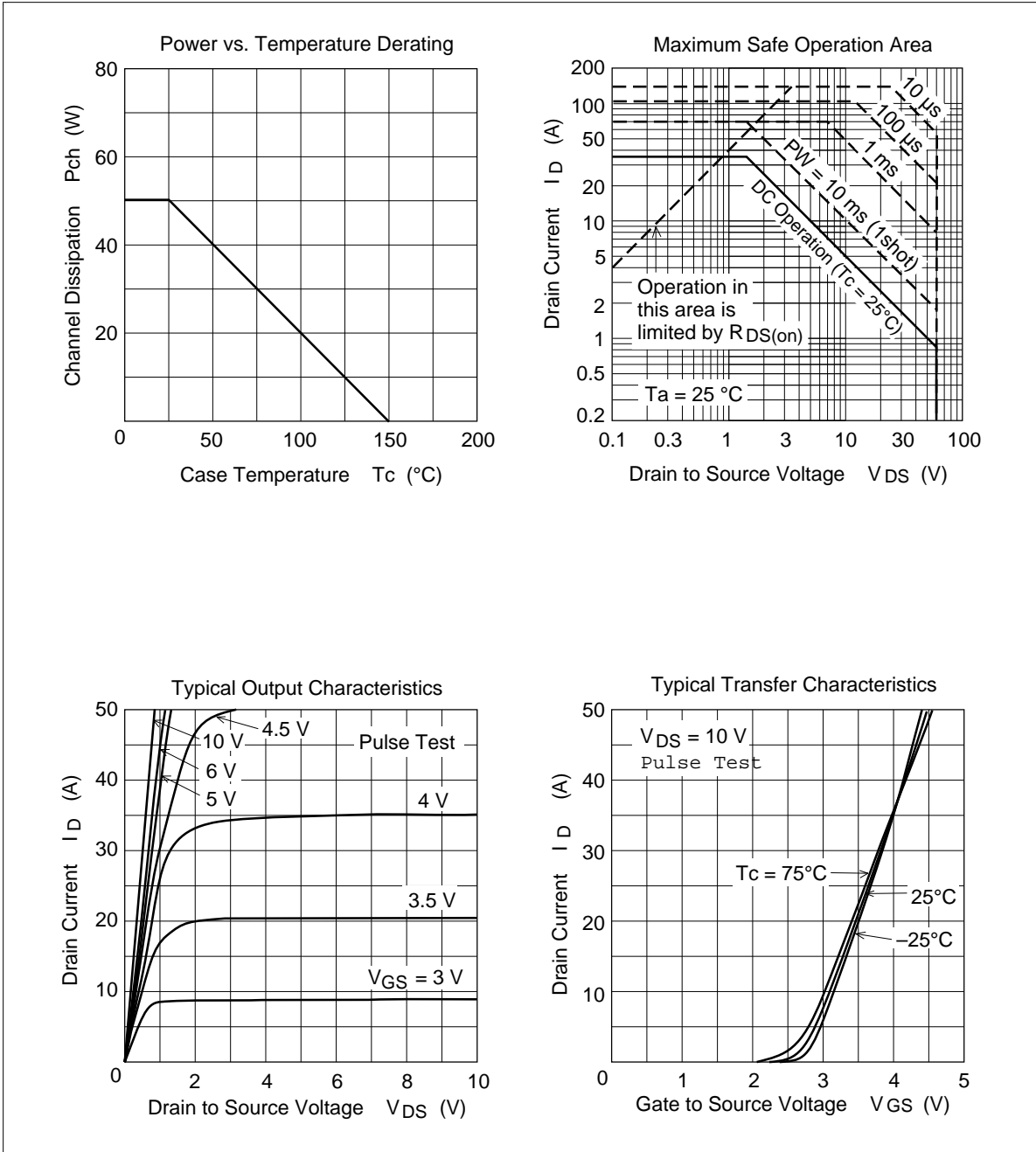
Electrical Characteristics (Ta = 25°C)

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 breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100\mu\text{A}$, $V_{DS} = 0$
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	$I_D = 1\text{mA}$, $V_{DS} = 10\text{V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.020	0.026	Ω	$I_D = 15\text{A}$, $V_{GS} = 10\text{V}$ ^{Note4}
	$R_{DS(on)}$	—	0.032	0.050	Ω	$I_D = 15\text{A}$, $V_{GS} = 4\text{V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	14	23	—	S	$I_D = 15\text{A}$, $V_{DS} = 10\text{V}$ ^{Note4}
Input capacitance	C_{iss}	—	1100	—	pF	$V_{DS} = 10\text{V}$
Output capacitance	C_{oss}	—	540	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	200	—	pF	$f = 1\text{MHz}$
Turn-on delay time	$t_{d(on)}$	—	15	—	ns	$I_D = 15\text{A}$, $V_{GS} = 10\text{V}$
Rise time	t_r	—	180	—	ns	$R_L = 2\Omega$
Turn-off delay time	$t_{d(off)}$	—	175	—	ns	
Fall time	t_f	—	195	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.95	—	V	$I_F = 35\text{A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	40	—	ns	$I_F = 35\text{A}$, $V_{GS} = 0$ $di_F/dt = 50\text{A}/\mu\text{s}$

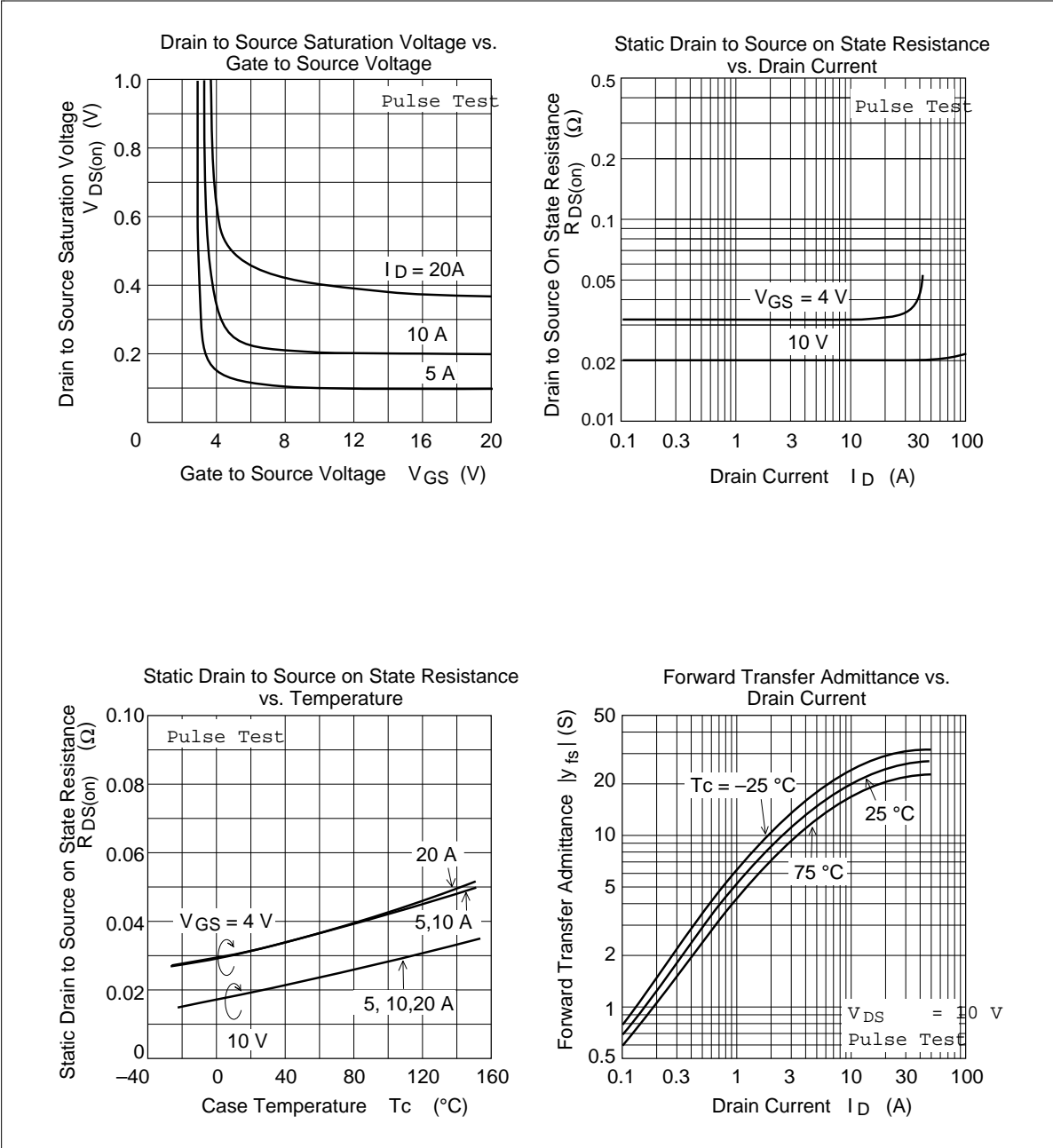
Note: 4. Pulse test

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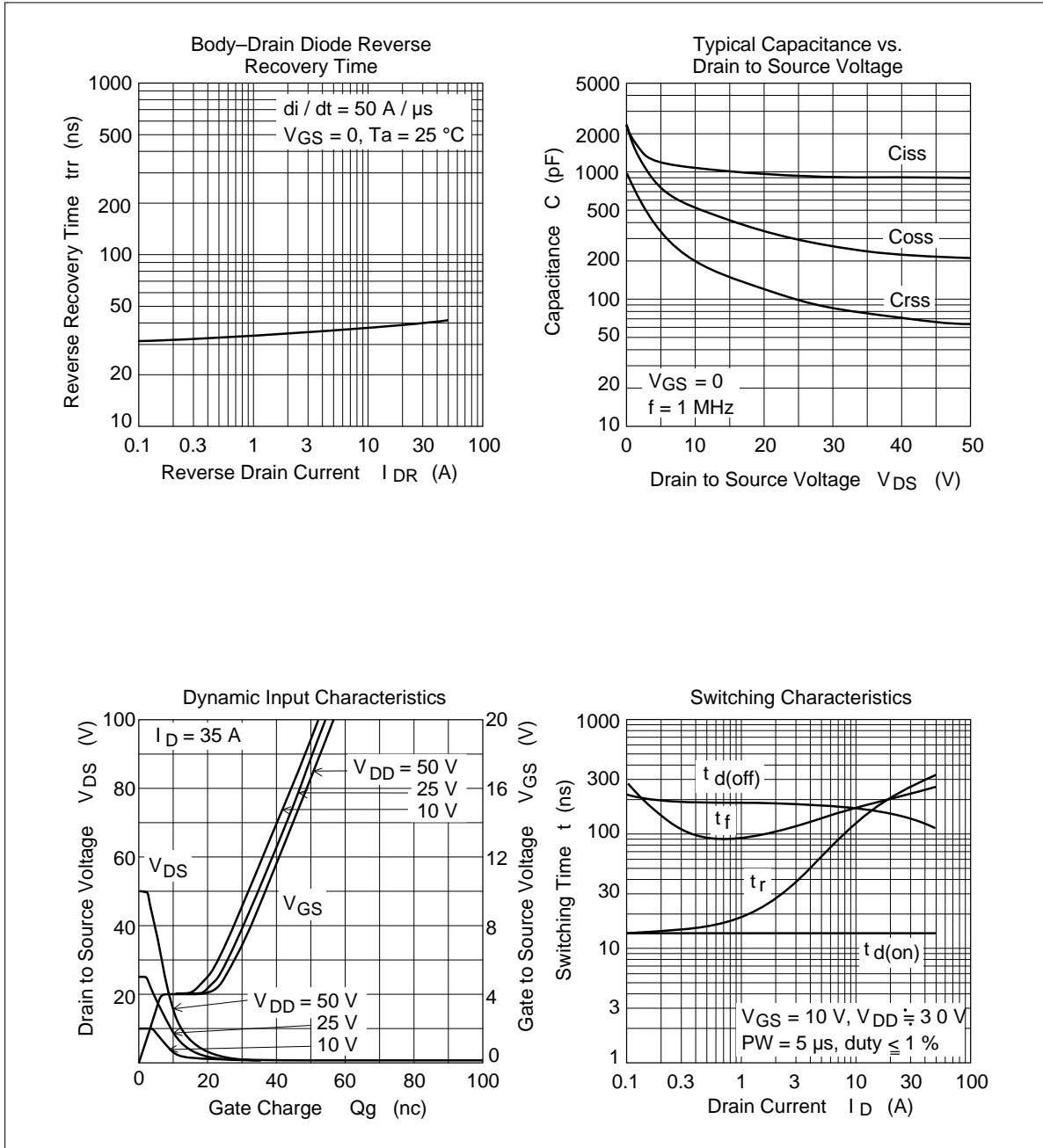
Main Characteristics

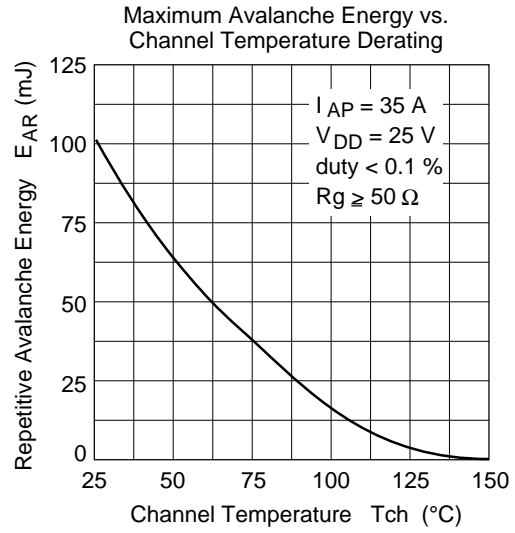
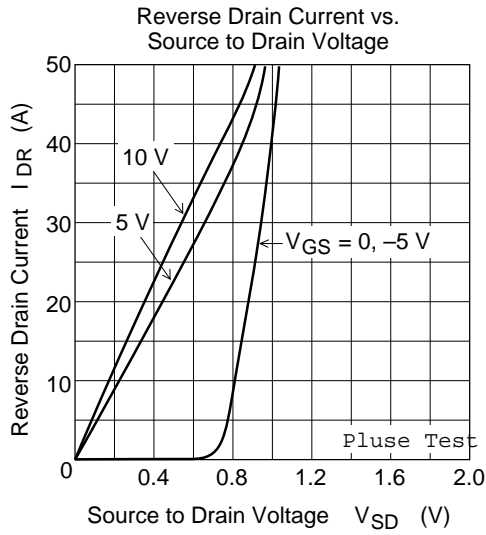


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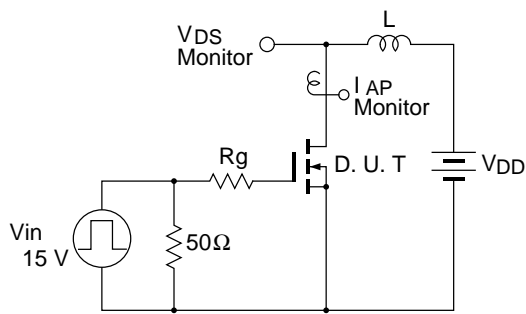


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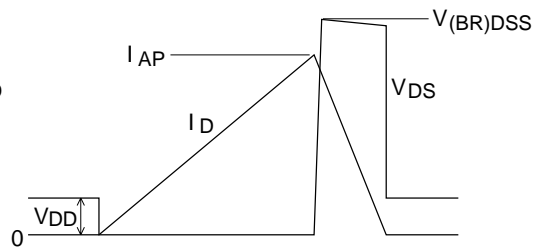


Avalanche Test Circuit

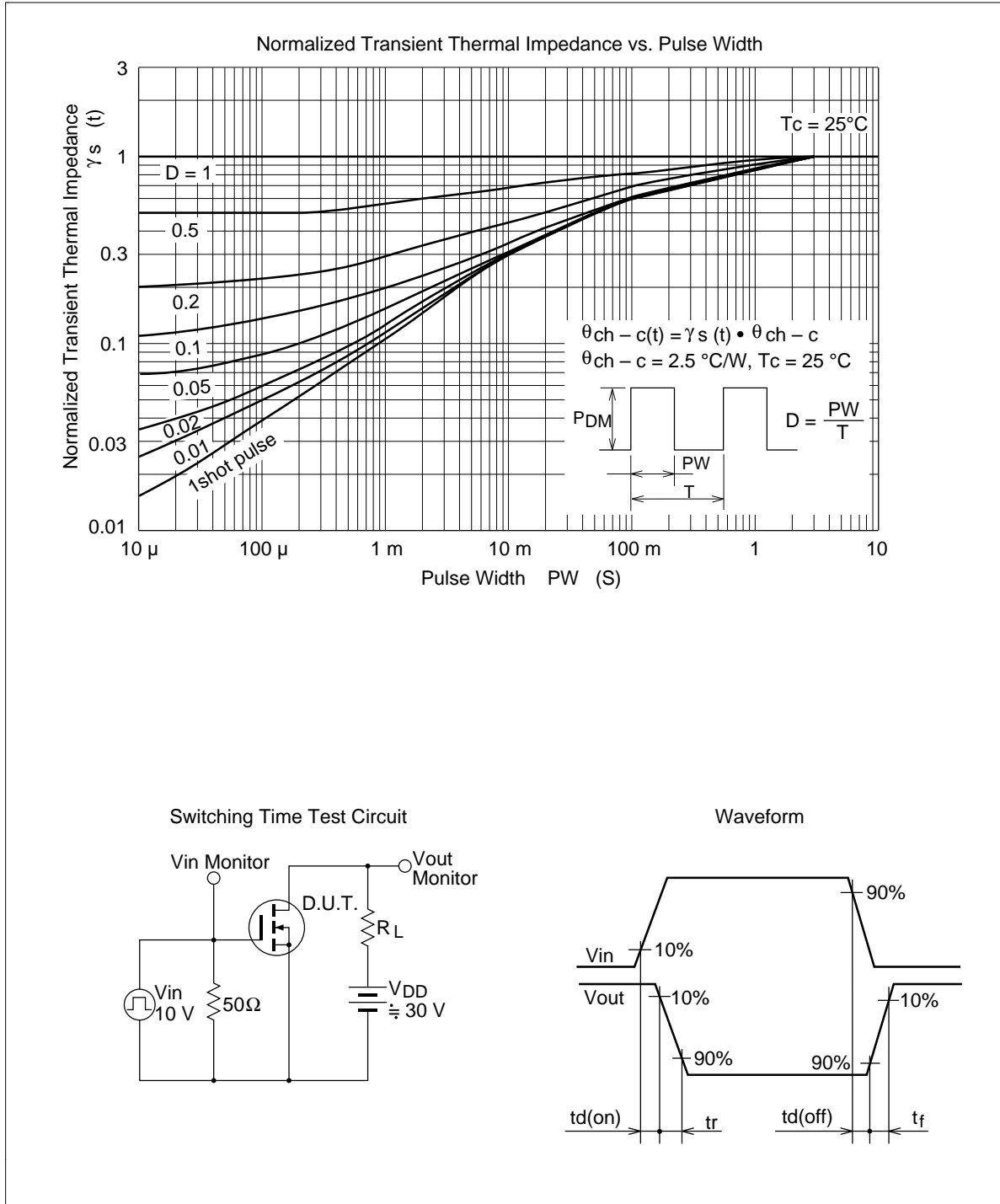


Avalanche Waveform

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

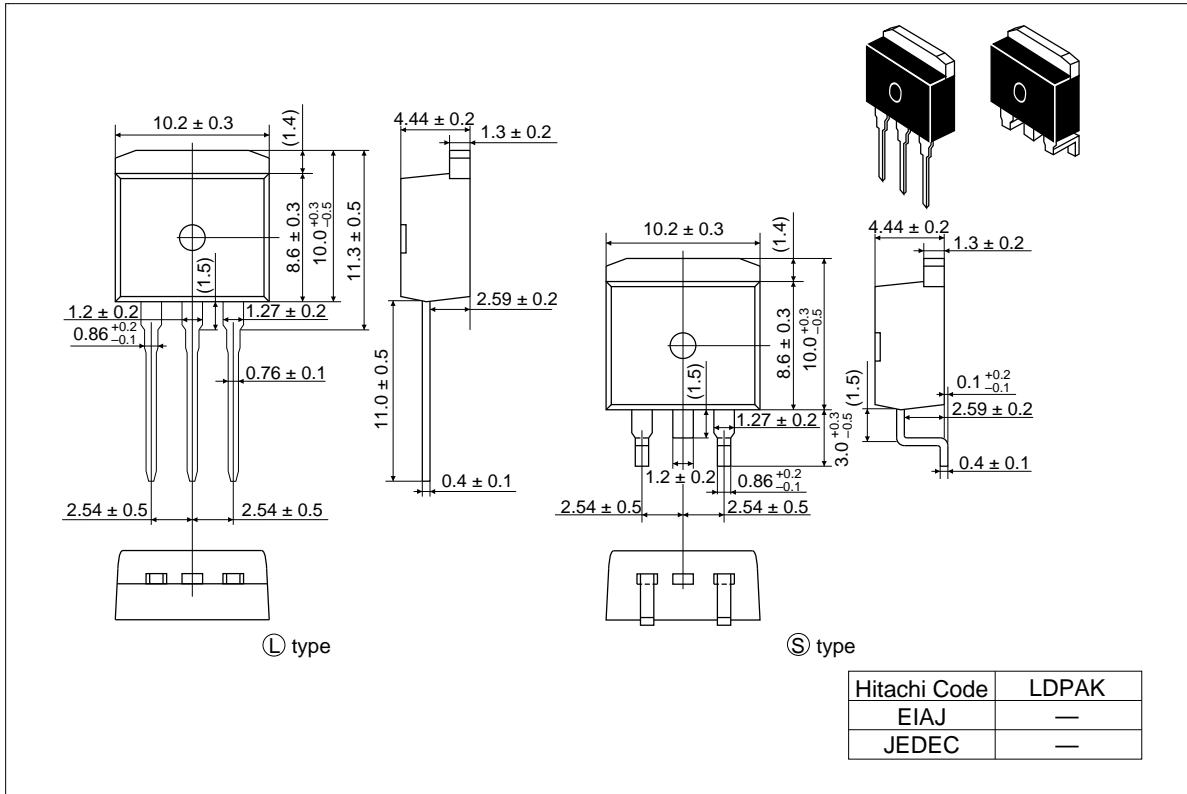


2SK2939(L), 2SK2939(S)



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Package Dimensions (Unit: mm)



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