

2SK2912(L), 2SK2912(S)

Silicon N Channel MOS FET
High Speed Power Switching

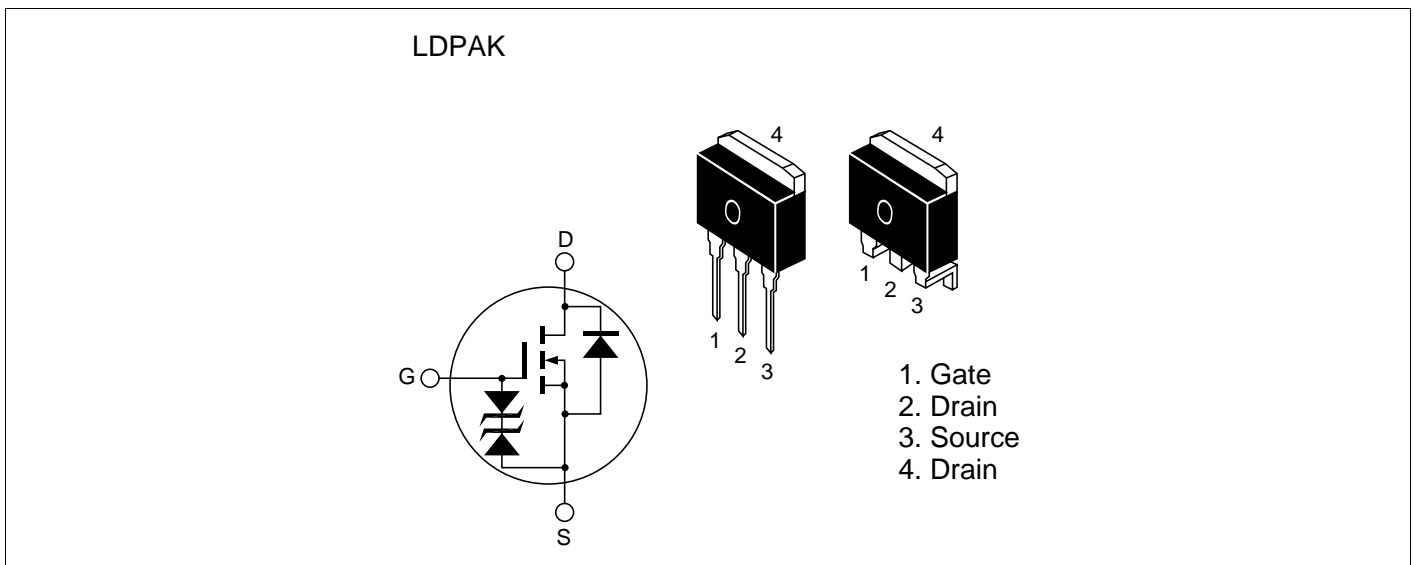
HITACHI

ADE-208-495
1st. Edition

Features

- Low on-resistance
 $R_{DS} = 15 \text{ m}\Omega$ typ.
- High speed switching
- 4V gate drive device can be driven from 5V source

Outline



2SK2912(L), 2SK2912(S)

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	40	A
Drain peak current	$I_{D(pulse)}^{*1}$	160	A
Body to drain diode reverse drain current	I_{DR}	40	A
Avalanche current	I_{AP}^{*3}	40	A
Avalanche Energy	E_{AR}^{*3}	137	mJ
Channel dissipation	Pch^{*2}	50	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

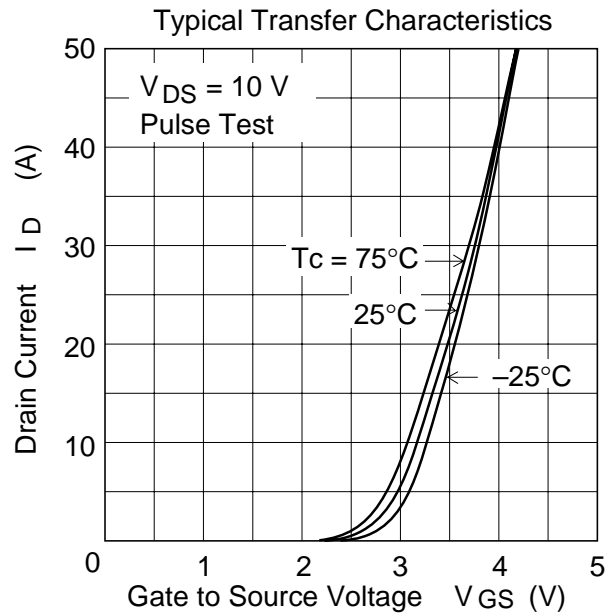
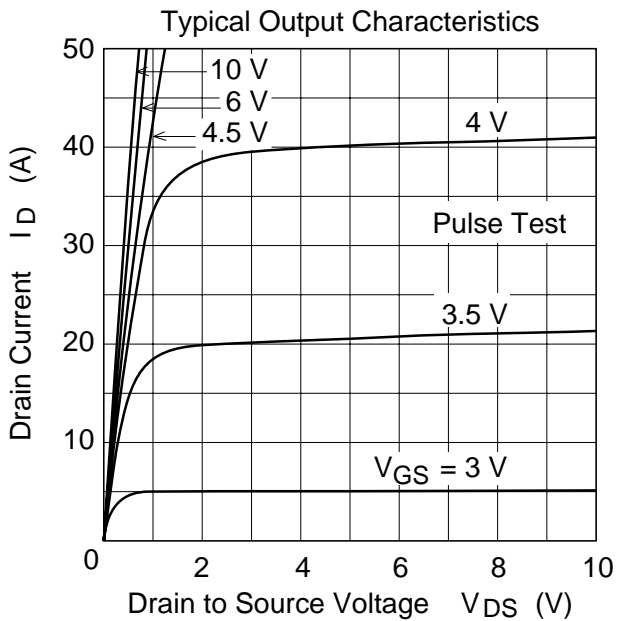
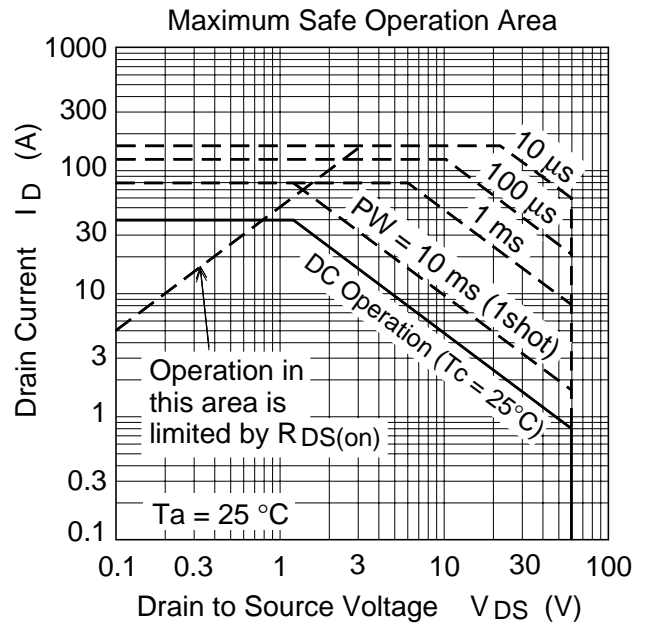
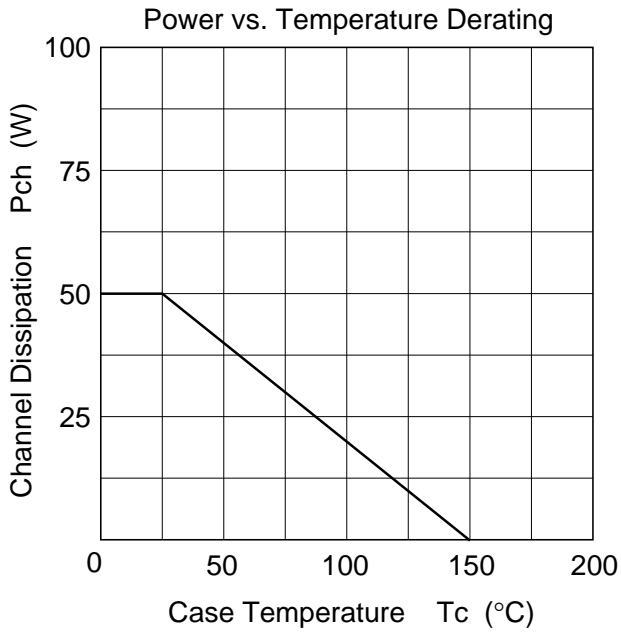
- Notes: 1. $PW \leq 10\mu s$, duty cycle $\leq 1\%$
2. Value at $T_c = 25^\circ C$
3. Value at $Tch = 25^\circ C$, $R_g \geq 50 \Omega$

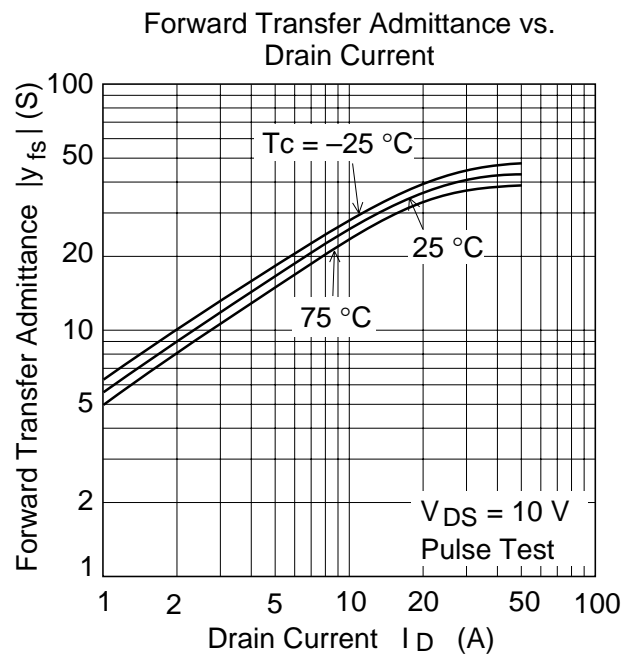
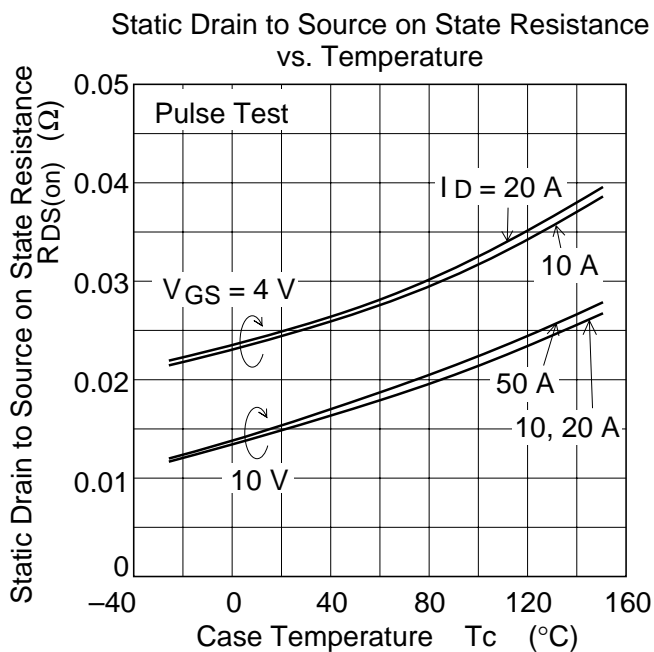
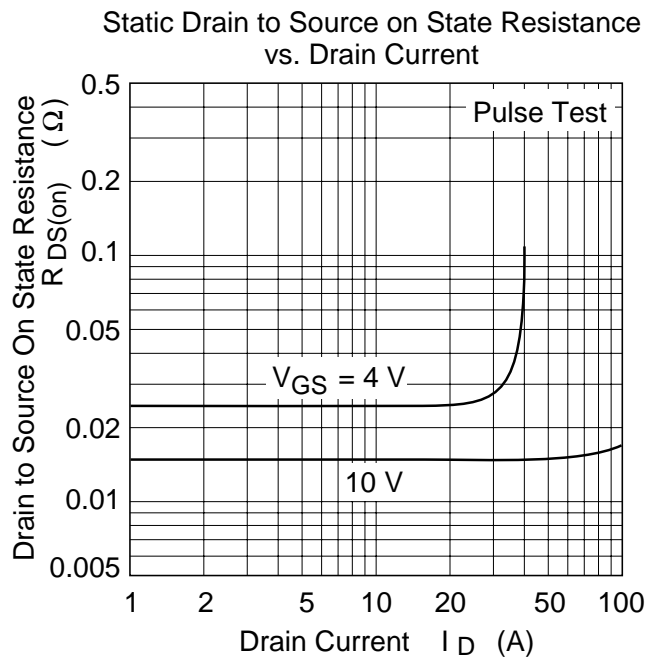
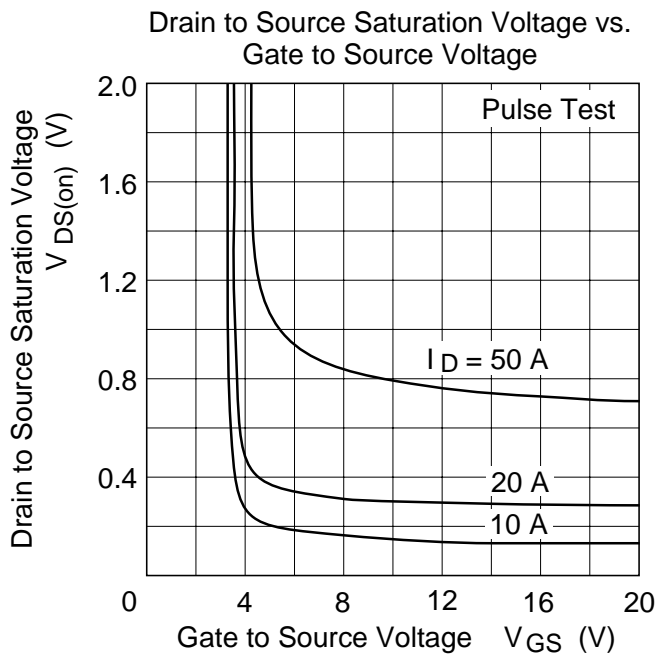
Electrical Characteristics (Ta = 25°C)

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	$R_{DS(on)}$	—	15	20	$\text{m}\Omega$	$I_D = 20\text{A}, V_{GS} = 10\text{V}^{*1}$
	$R_{DS(on)}$	—	25	40	$\text{m}\Omega$	$I_D = 20\text{A}, V_{GS} = 4\text{V}^{*1}$
Forward transfer admittance	$ y_{fs} $	20	35	—	S	$I_D = 20\text{A}, V_{DS} = 10\text{V}^{*1}$
Input capacitance	C_{iss}	—	1500	—	pF	$V_{DS} = 10\text{V}$
Output capacitance	C_{oss}	—	720	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	200	—	pF	$f = 1\text{MHz}$
Turn-on delay time	$t_{d(on)}$	—	20	—	ns	$I_D = 20\text{A}, V_{GS} = 10\text{V}$
Rise time	t_r	—	180	—	ns	$R_L = 1.5\Omega$
Turn-off delay time	$t_{d(off)}$	—	200	—	ns	
Fall time	t_f	—	200	—	ns	
Body to drain diode forward voltage	V_{DF}	—	0.95	—	V	$I_F = 40\text{A}, V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	70	—	V	$I_F = 40\text{A}, V_{GS} = 0$ $diF/dt = 50\text{A}/\mu\text{s}$

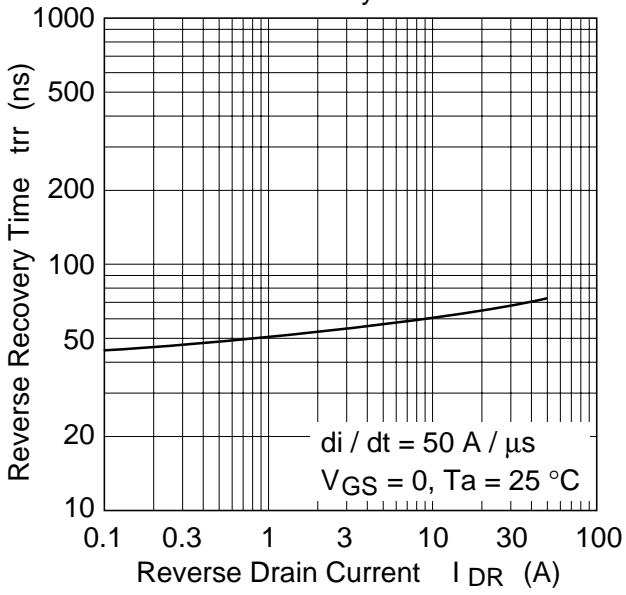
Note: 1. Pulse test

Main Characteristics

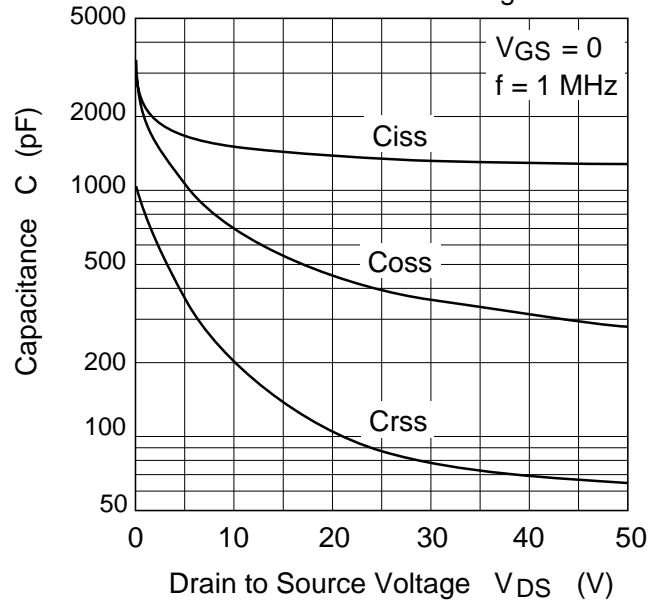




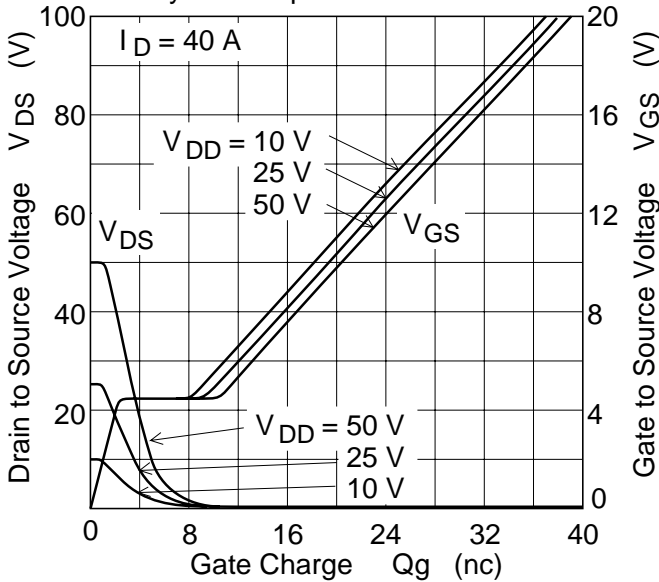
Body to Drain Diode Reverse Recovery Time



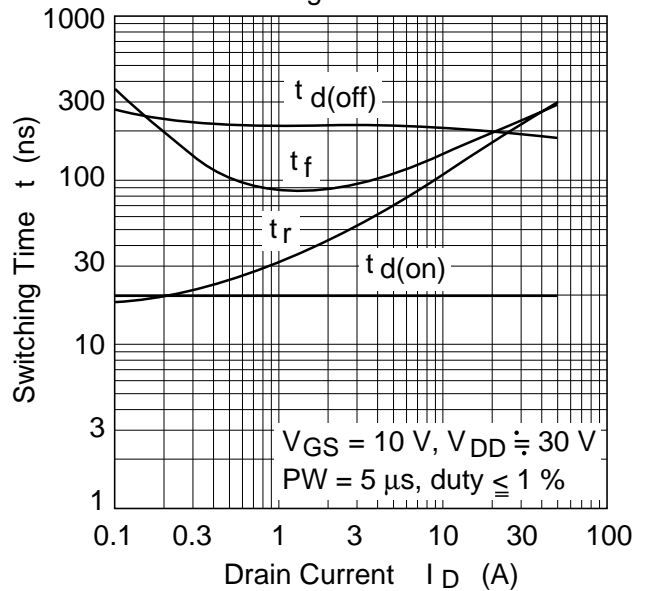
Typical Capacitance vs. Drain to Source Voltage

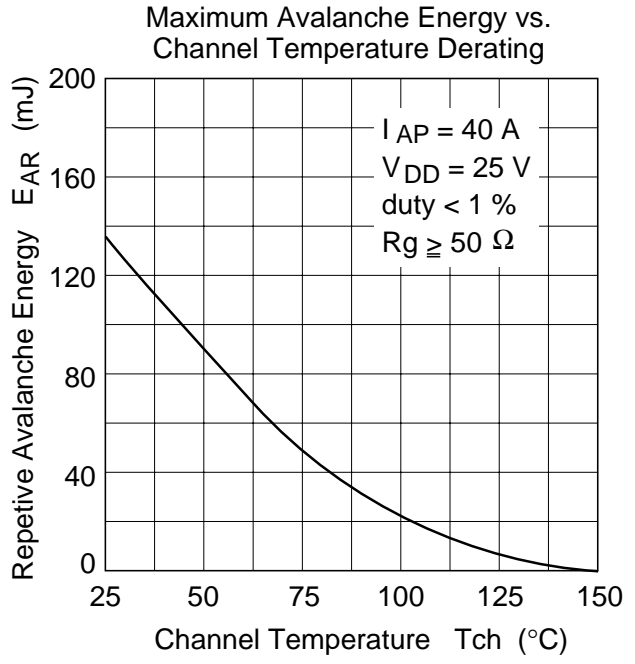
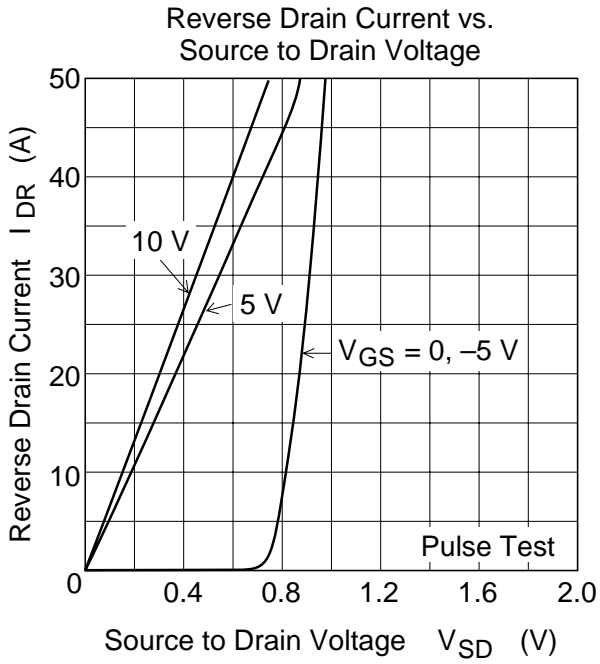


Dynamic Input Characteristics

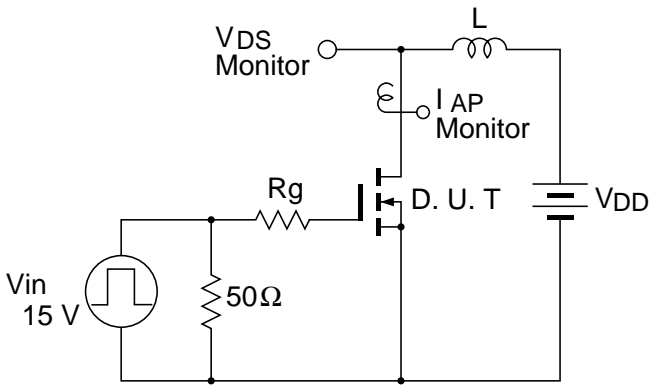


Switching Characteristics



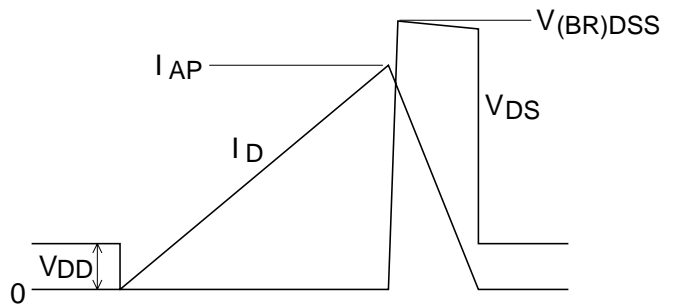


Avalanche Test Circuit

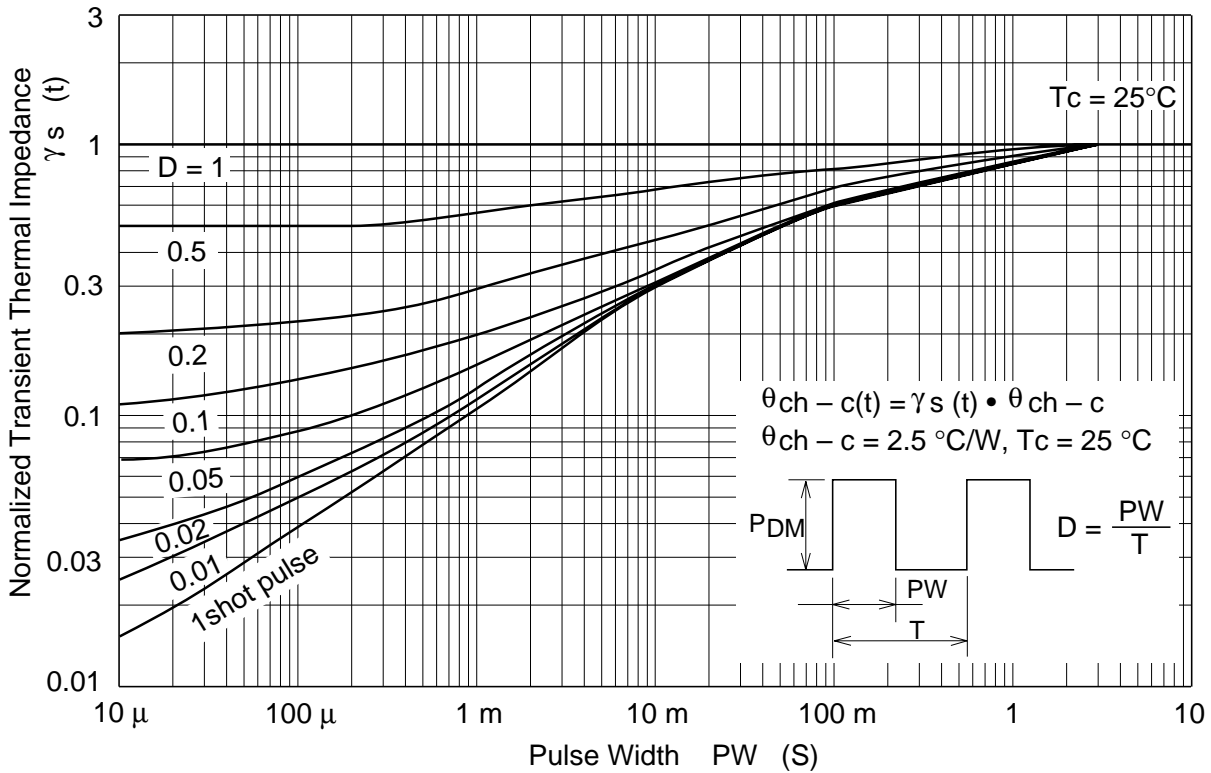


Avalanche Waveform

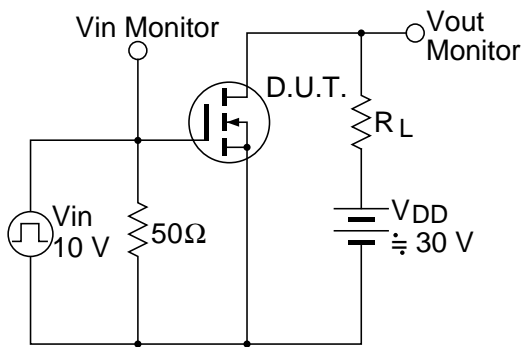
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



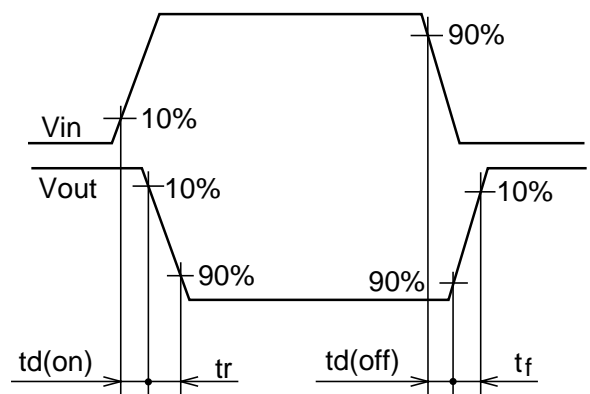
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

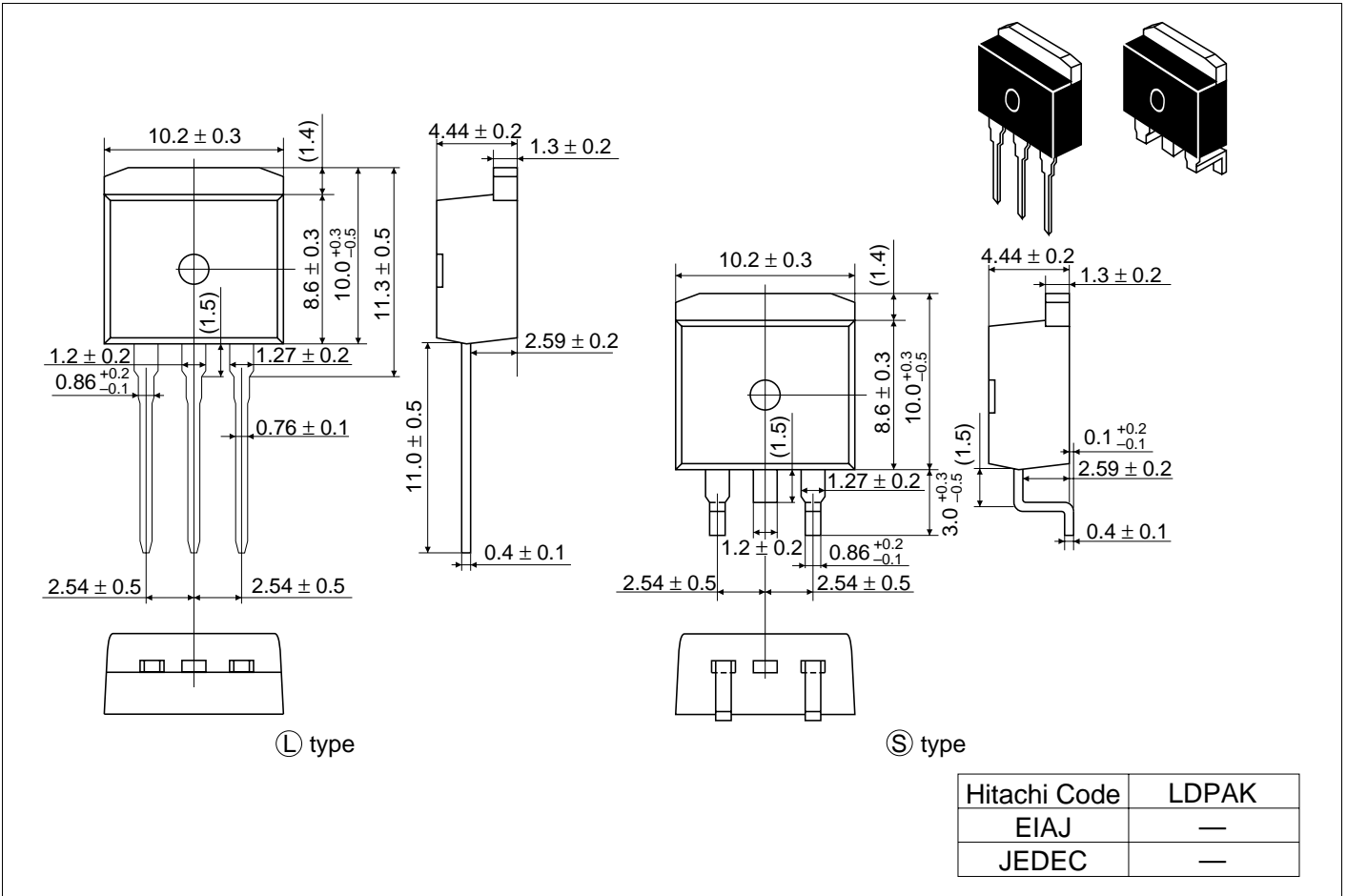


Switching Time Waveforms



Package Dimensions

Unit: mm



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