



HAF1008(L), HAF1008(S)

Silicon P Channel MOS FET Series Power Switching

REJ03G0027-0100Z

Rev.1.00

May.13.2003

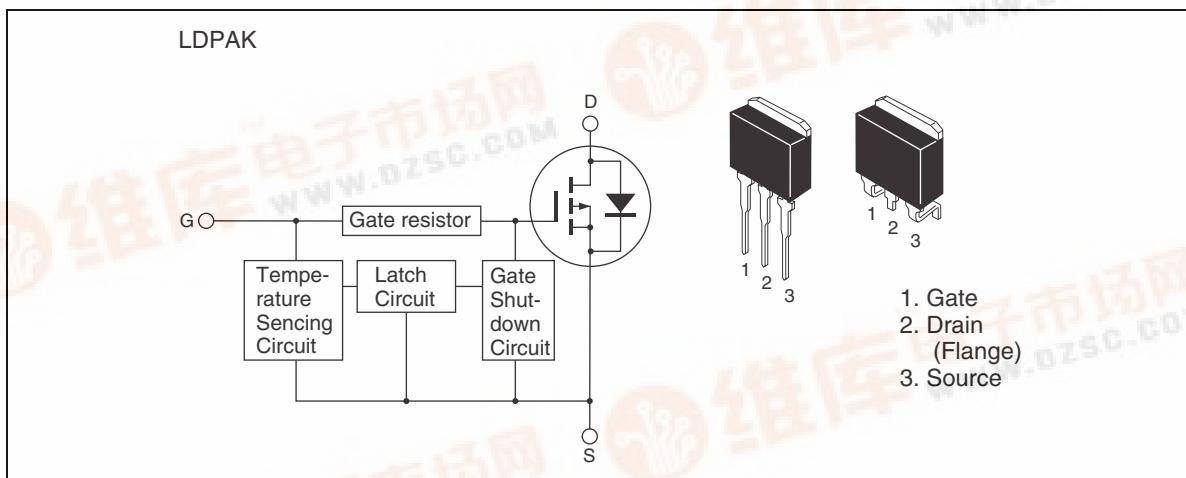
Description

This FET has the over temperature shut-down capability sensing to the junction temperature. This FET has the built-in over temperature shut-down circuit in the gate area. And this circuit operation to shut-down the gate voltage in case of high junction temperature like applying over power consumption, over current etc.

Features

- Logic level operation (-4 to -6 V Gate drive)
- High endurance capability against to the short circuit
- Built-in the over temperature shut-down circuit
- Latch type shut-down operation (Need 0 voltage recovery)

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}	-16	V
Gate to source voltage	V _{GSS}	2.5	V
Drain current	I _D	-20	A
Drain peak current	I _D (pulse) ^{Note1}	-40	A
Body-drain diode reverse drain current	I _{DR}	-20	A
Channel dissipation	P _{ch} ^{Note2}	50	W
Channel temperature	T _{ch}	150	°C
Storage temperature	T _{stg}	-55 to +150	°C

Notes: 1. PW ≤ 10μs, duty cycle ≤ 1 %

2. Value at T_c = 25°C

Typical Operation Characteristics

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Input voltage	V _{IH}	-3.5	—	—	V	
	V _{IL}	—	—	-1.2	V	
Input current (Gate non shut down)	I _{IIH1}	—	—	-100	μA	Vi = -8 V, V _{DS} = 0
	I _{IIH2}	—	—	-50	μA	Vi = -3.5 V, V _{DS} = 0
	I _{IL}	—	—	-1	μA	Vi = -1.2 V, V _{DS} = 0
Input current (Gate shut down)	I _{IIH(sd)1}	—	-0.8	—	mA	Vi = -8 V, V _{DS} = 0
	I _{IIH(sd)2}	—	-0.35	—	mA	Vi = -3.5 V, V _{DS} = 0
Shut down temperature	T _{sd}	—	175	—	°C	Channel temperature
Gate operation voltage	V _{op}	-3.5	—	-12	V	

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Electrical Characteristics

(Ta = 25°C)

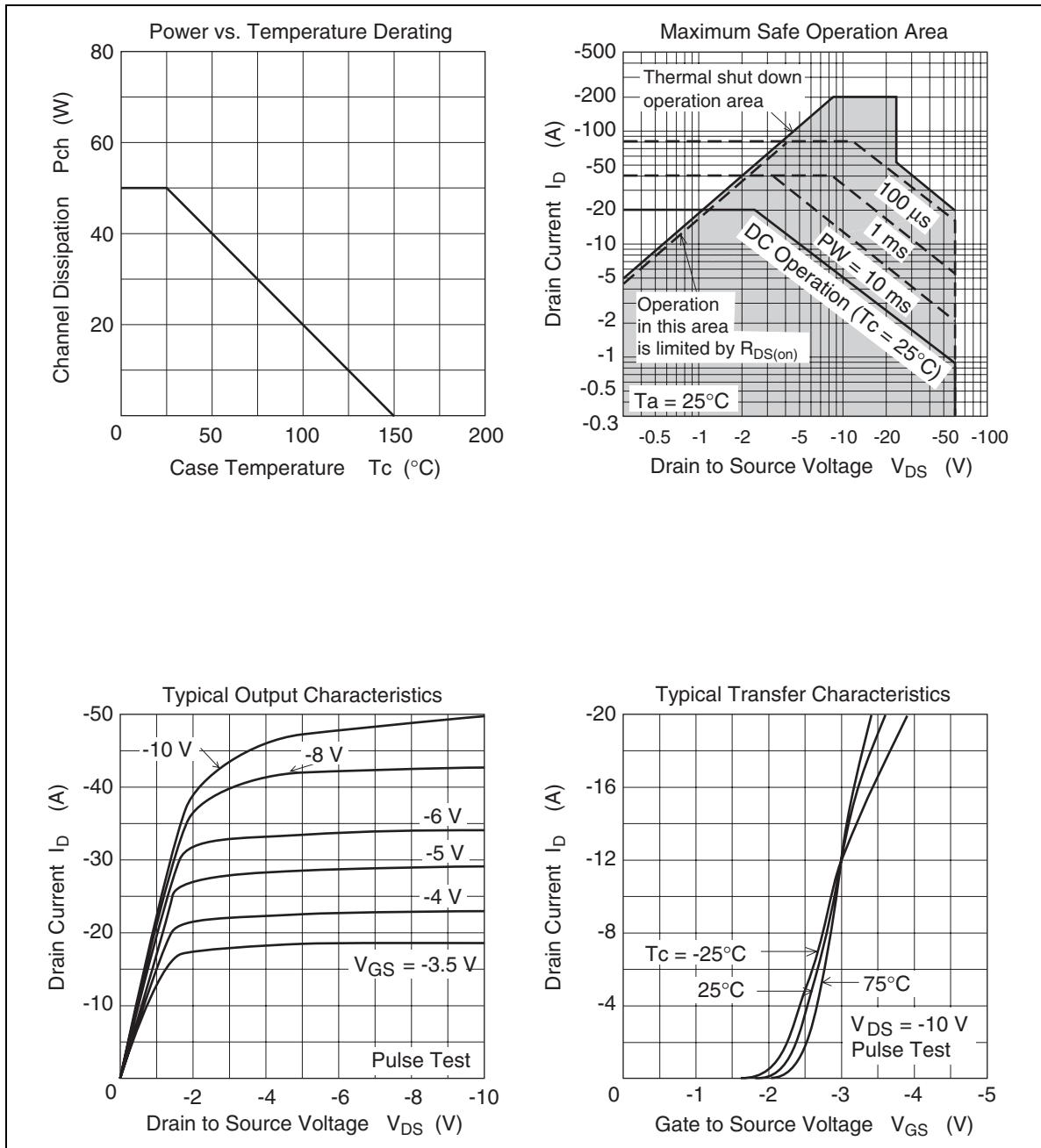
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain current	I _{D1}	-7	—	—	A	V _{GS} = -3.5 V, V _{DS} = -2 V
Drain current	I _{D2}	—	—	-10	mA	V _{GS} = -1.2 V, V _{DS} = -2 V
Drain to source breakdown voltage	V _{(BR)DSS}	-60	—	—	V	I _D = -10 mA, V _{GS} = 0
Gate to source breakdown voltage	V _{(BR)GSS}	-16	—	—	V	I _G = -800 μA, V _{DS} = 0
Gate to source breakdown voltage	V _{(BR)GSS}	2.5	—	—	V	I _G = 100 μA, V _{DS} = 0
Gate to source leak current	I _{GSS1}	—	—	-100	μA	V _{GS} = -8 V, V _{DS} = 0
	I _{GSS2}	—	—	-50	μA	V _{GS} = -3.5 V, V _{DS} = 0
	I _{GSS3}	—	—	-1	μA	V _{GS} = -1.2 V, V _{DS} = 0
	I _{GSS4}	—	—	100	μA	V _{GS} = 2.4 V, V _{DS} = 0
Input current (shut down)	I _{GS(OP)1}	—	-0.8	—	mA	V _{GS} = -8 V, V _{DS} = 0
	I _{GS(OP)2}	—	-0.35	—	mA	V _{GS} = -3.5 V, V _{DS} = 0
Zero gate voltage drain current	I _{DSS}	—	—	-10	μA	V _{DS} = -60 V, V _{GS} = 0
Gate to source cutoff voltage	V _{GS(off)}	-1.1	—	-2.15	V	V _{DS} = -10 V, I _D = -1 mA
Forward transfer admittance	y _{fs}	10	18.5	—	S	I _D = -10 A, V _{DS} = -10 V ^{Note3}
Static drain to source on state resistance	R _{DS(on)}	—	60	80	mΩ	I _D = -10 A, V _{GS} = -4 V ^{Note3}
	R _{DS(on)}	—	42	54	mΩ	I _D = -10 A, V _{GS} = -10 V ^{Note3}
Output capacitance	C _{oss}	—	865	—	pF	V _{DS} = -10 V, V _{GS} = 0, f = 1 MHz
Turn-on delay time	t _{d(on)}	—	5.7	—	μs	V _{GS} = -10 V, I _D = -10 A, R _L = 3 Ω
Rise time	t _r	—	26	—	μs	
Turn-off delay time	t _{d(off)}	—	6.5	—	μs	
Fall time	t _f	—	9	—	μs	
Body-drain diode forward voltage	V _{DF}	—	-0.9	—	V	I _F = -20 A, V _{GS} = 0
Body-drain diode reverse recovery time	t _{rr}	—	100	—	ns	I _F = -20 A, V _{GS} = 0 dI/dt = 50A/μs
Over load shut down operation time ^{Note4}	t _{los1}	—	1.84	—	ms	V _{GS} = -5 V, V _{DD} = -16 V
	t _{los2}	—	1	—	ms	V _{GS} = -5 V, V _{DD} = -24 V

Notes: 3. Pulse test

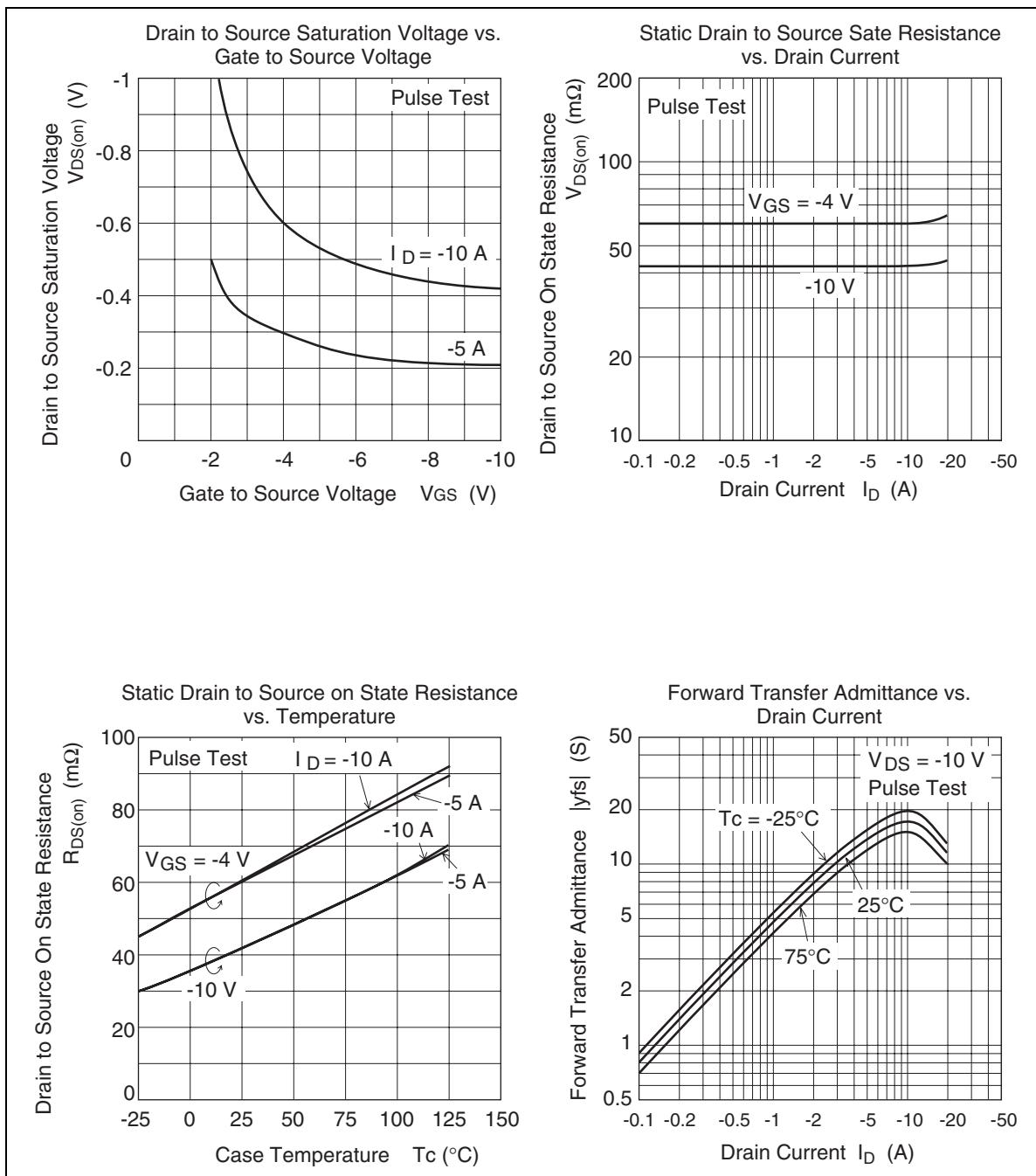
4. Include the time shift based on increasing of channel temperature when operate under over load condition.

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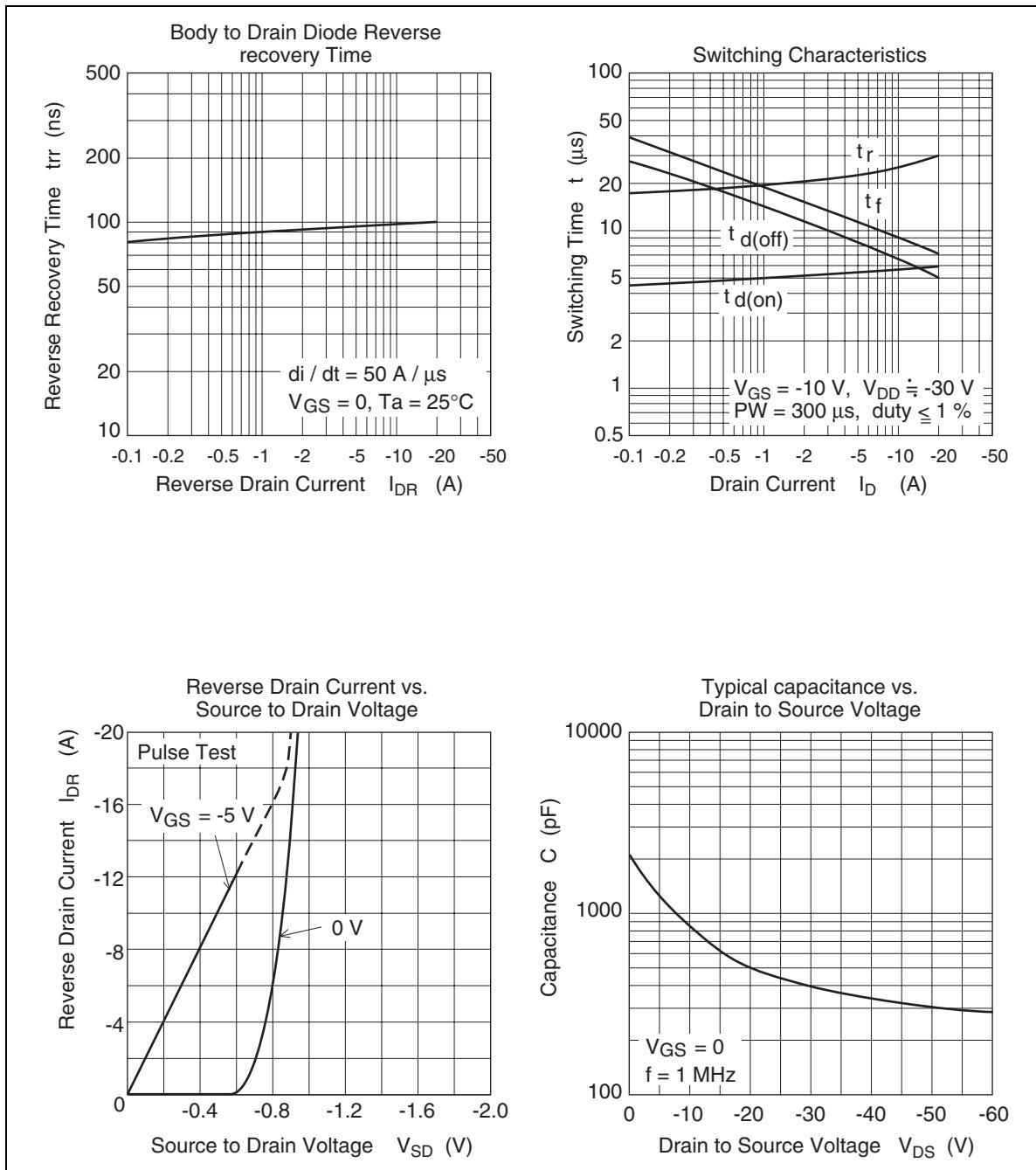
Main Characteristics



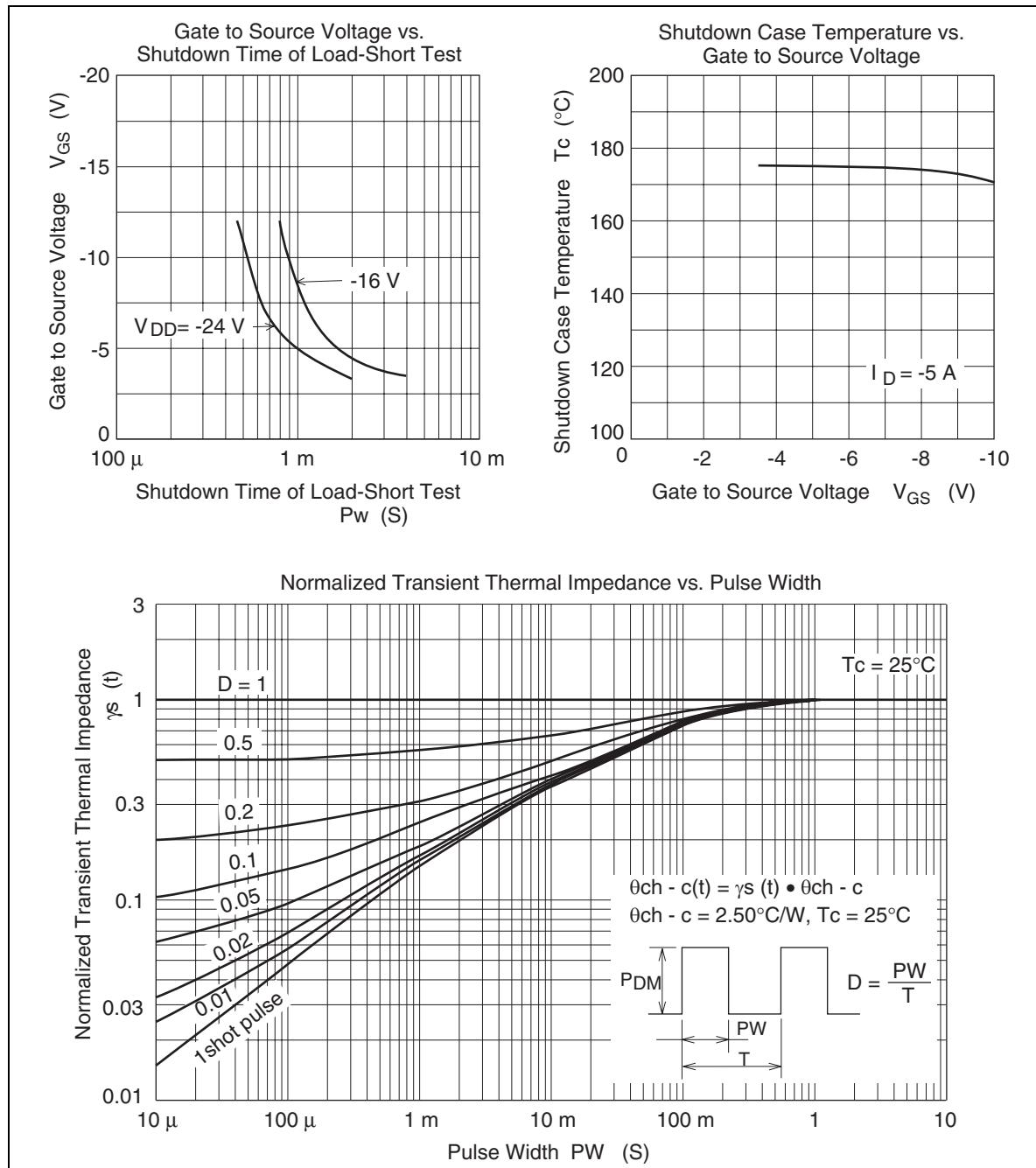
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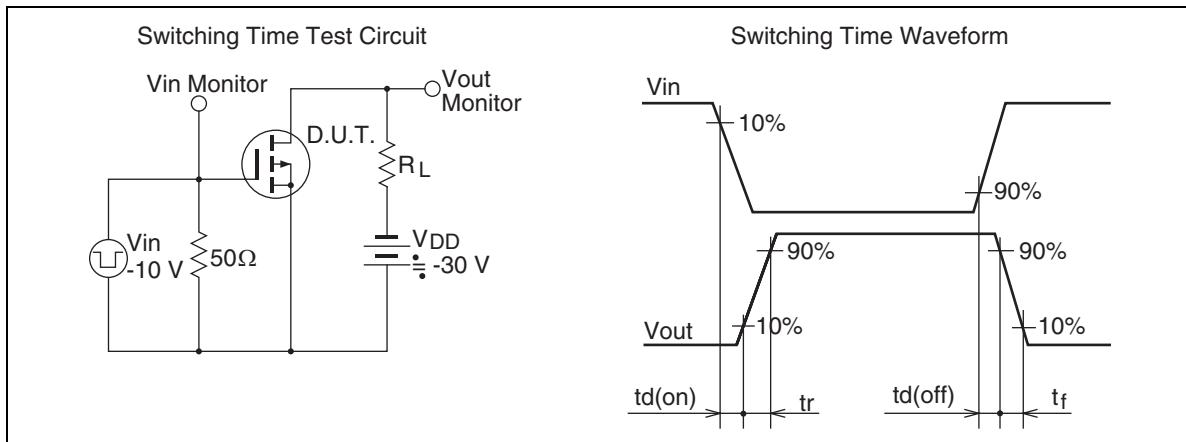
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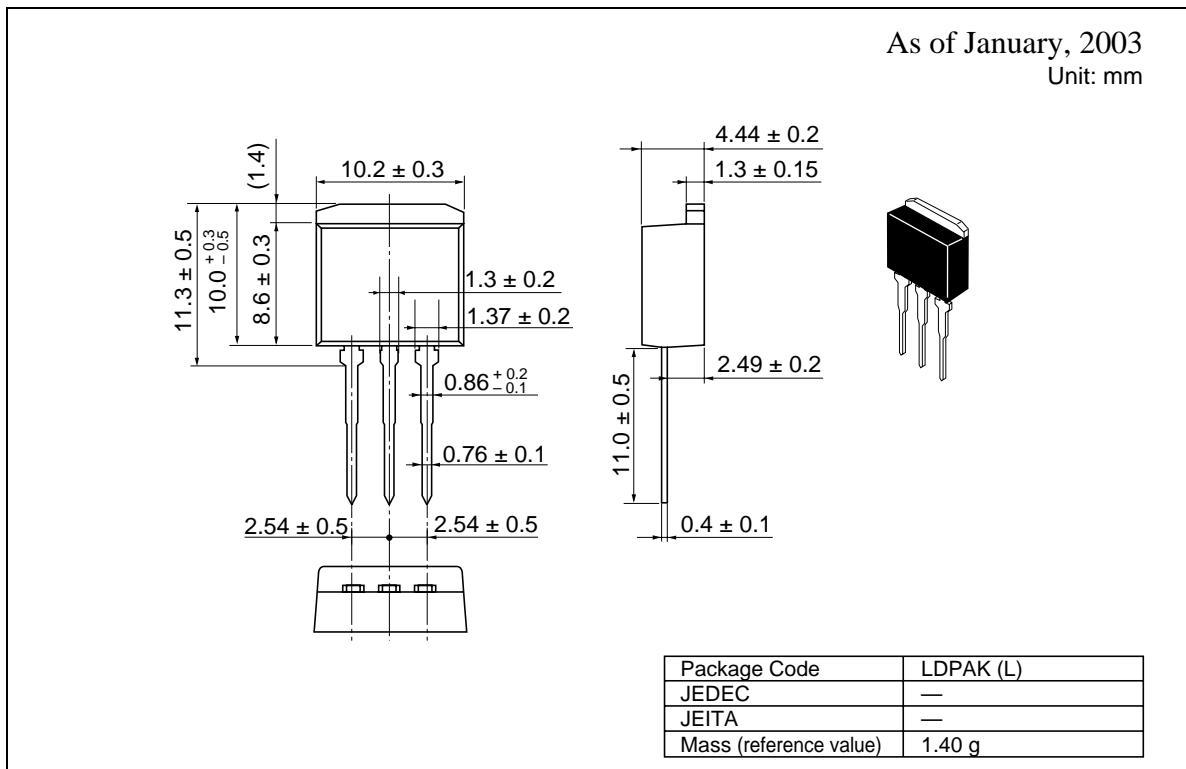


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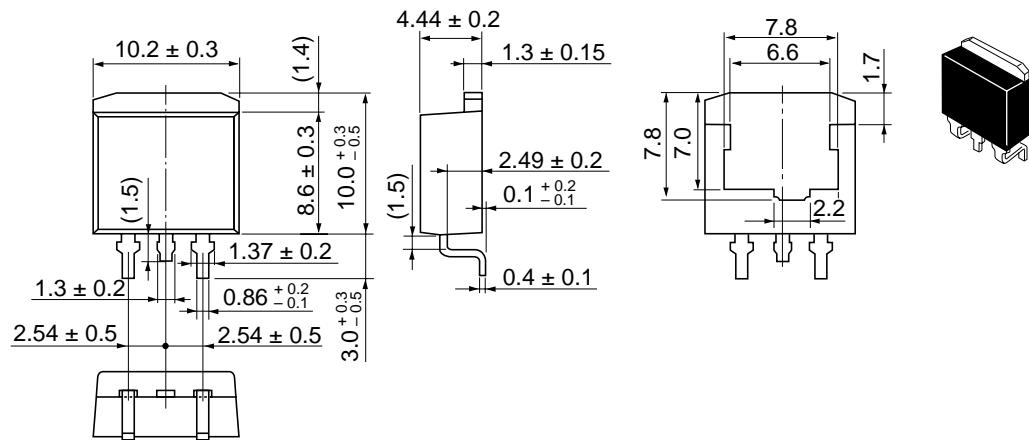
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Package Dimensions



HAF1008(L), HAF1008(S)

As of January, 2003
Unit: mm



Package Code	LDPAK (S)-(1)
JEDEC	—
JEITA	—
Mass (reference value)	1.30 g

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