

2SK3461(L), 2SK3461(S)

Silicon N Channel MOS FET
High Speed Power Switching

HITACHI

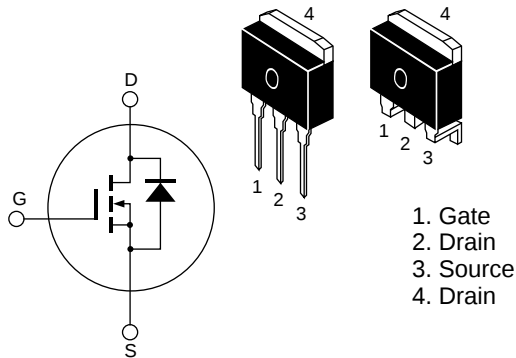
ADE-208-944 (Z)
1st. Edition
Mar. 2001

Features

- Low on-resistance
 $R_{DS(on)} = 4.3 \text{ m } \Omega$ typ.
- 4 V gate drive device
- High speed switching

Outline

LDBPAK



2SK3461(L), 2SK3461(S)

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V _{DSS}	60	V
Gate to source voltage	V _{GSS}	±20	V
Drain current	I _D	85	A
Drain peak current	I _{D (pulse)} ^{Note 1}	340	A
Body-drain diode reverse drain current	I _{DR}	85	A
Avalanche current	I _{AP} ^{Note 3}	60	A
Avalanche energy	E _{AR} ^{Note 3}	308	mJ
Channel dissipation	P _{ch} ^{Note 2}	110	W
Channel temperature	T _{ch}	150	°C
Storage temperature	T _{stg}	−55 to +150	°C

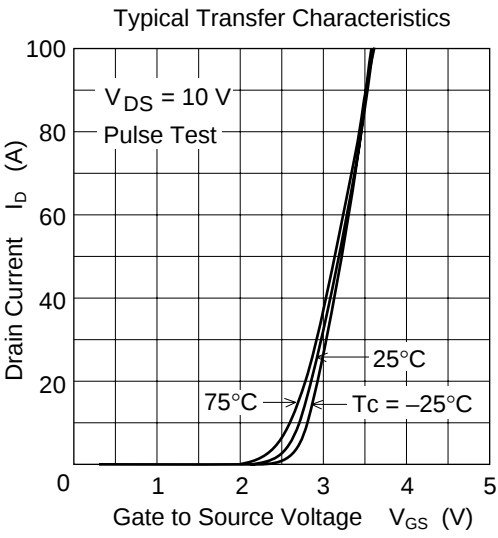
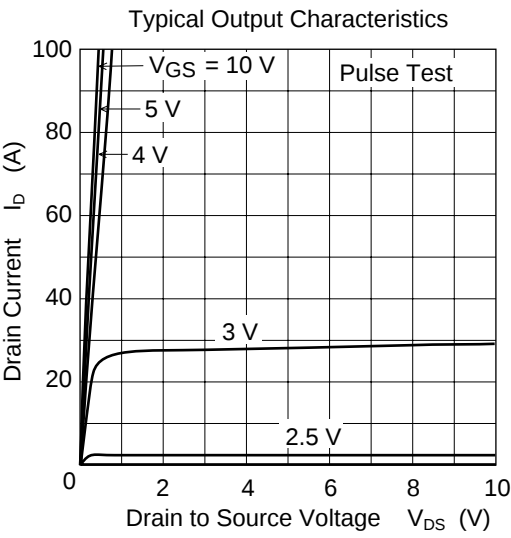
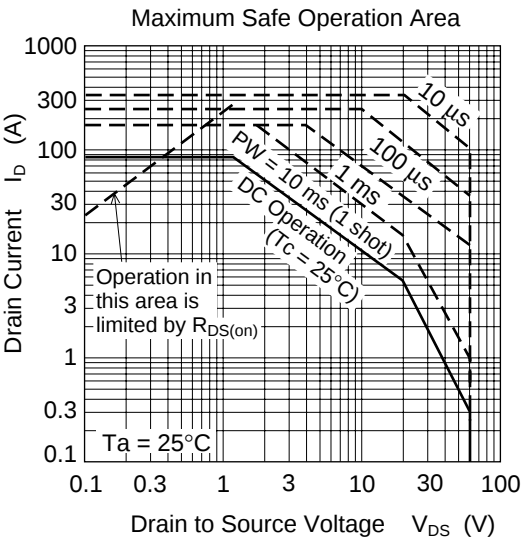
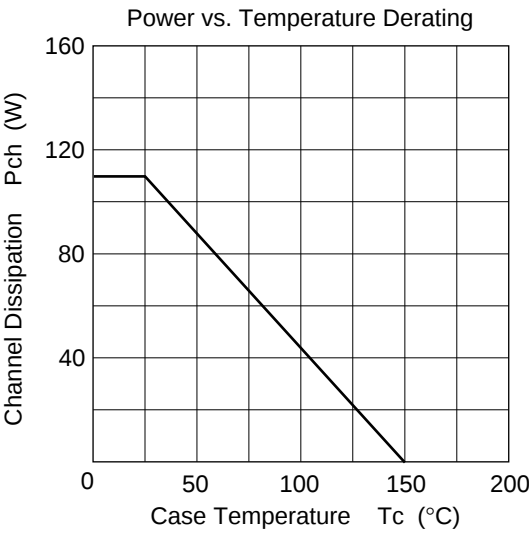
Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%
2. Value at Tc = 25°C
3. Value at Tch = 25°C: Rg ≥ 50 Ω

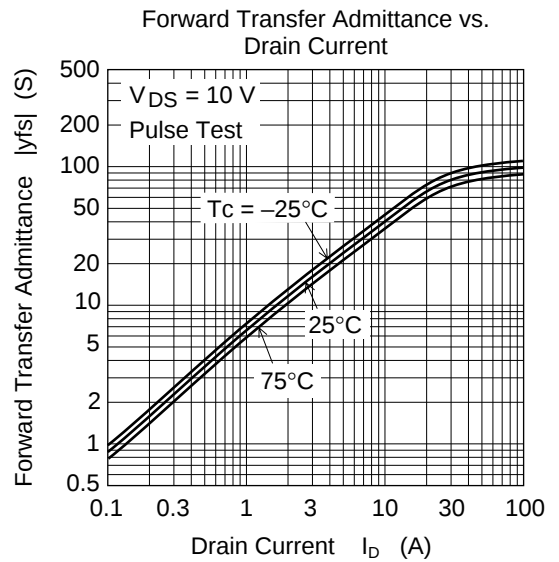
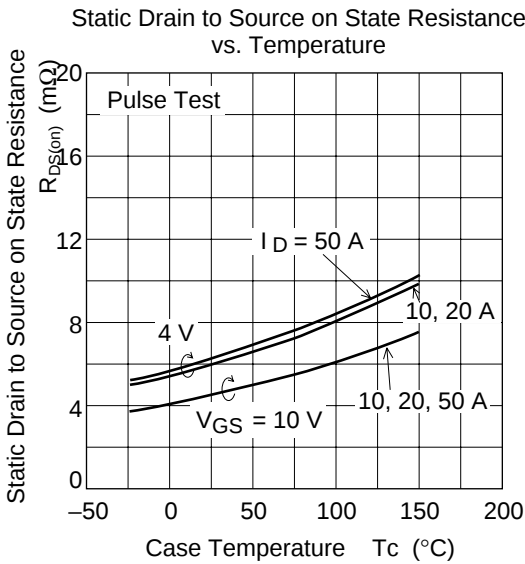
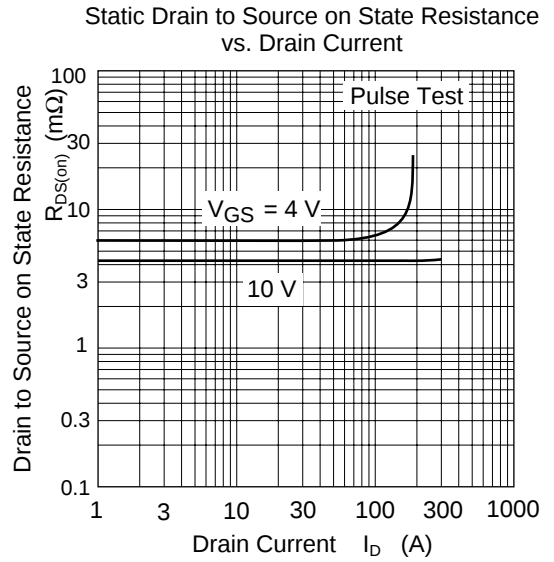
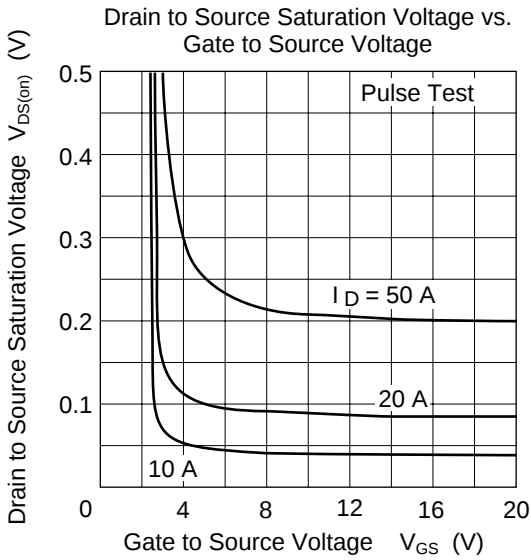
Electrical Characteristics (Ta = 25°C)

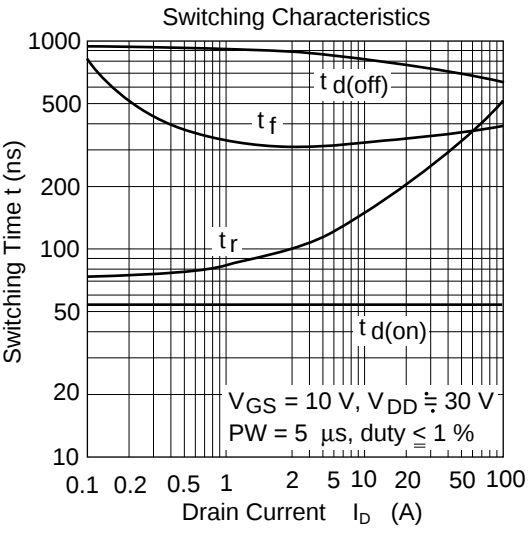
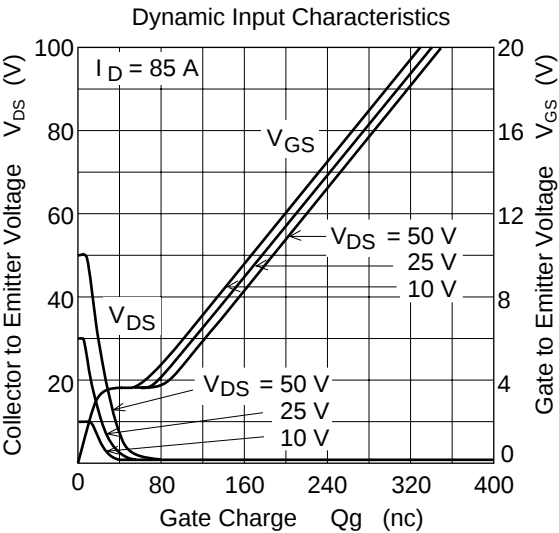
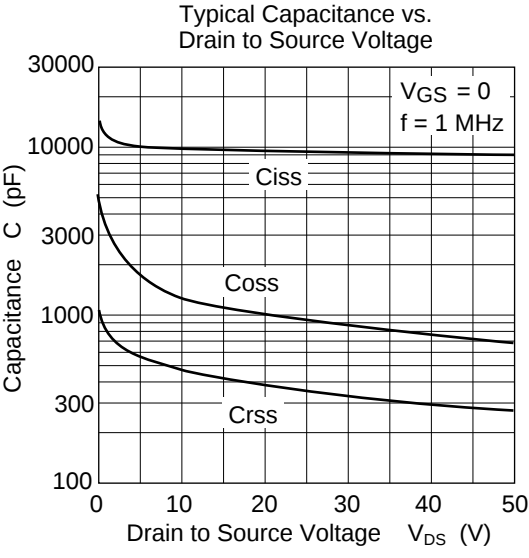
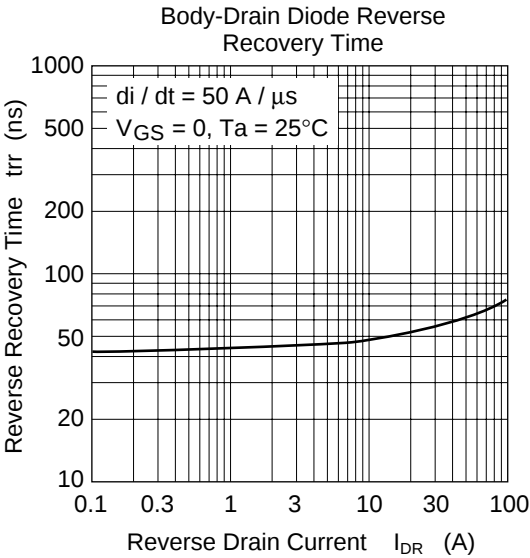
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{DSS}	—	—	10	μA	$V_{DS} = 60 \text{ V}$, $V_{GS} = 0$
Zero gate voltage drain current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$ ^{Note 1}
Forward transfer admittance	$ y_{fs} $	55	90	—	S	$I_D = 45 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 1}
Static drain to source on state resistance	$R_{DS(on)}$	—	4.3	5.5	$\text{m}\Omega$	$I_D = 45 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 1}
	$R_{DS(on)}$	—	6.0	9.0	$\text{m}\Omega$	$I_D = 45 \text{ A}$, $V_{GS} = 4 \text{ V}$ ^{Note 1}
Input capacitance	C_{iss}	—	9770	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	1340	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	470	—	pF	$f = 1 \text{ MHz}$
Total gate charge	Q_g	—	180	—	nc	$V_{DD} = 50 \text{ V}$
Gate to source charge	Q_{gs}	—	32	—	nc	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	36	—	nc	$I_D = 85 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	53	—	ns	$V_{GS} = 10 \text{ V}$
Rise time	t_r	—	320	—	ns	$I_D = 45 \text{ A}$
Turn-off delay time	$t_{d(off)}$	—	700	—	ns	$R_L = 0.67 \Omega$
Fall time	t_f	—	380	—	ns	
Body-drain diode forward voltage	V_{DF}	—	1.0	—	V	$I_F = 85 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	70	—	ns	$I_F = 85 \text{ A}$, $V_{GS} = 0$ $diF/dt = 50 \text{ A}/\mu\text{s}$

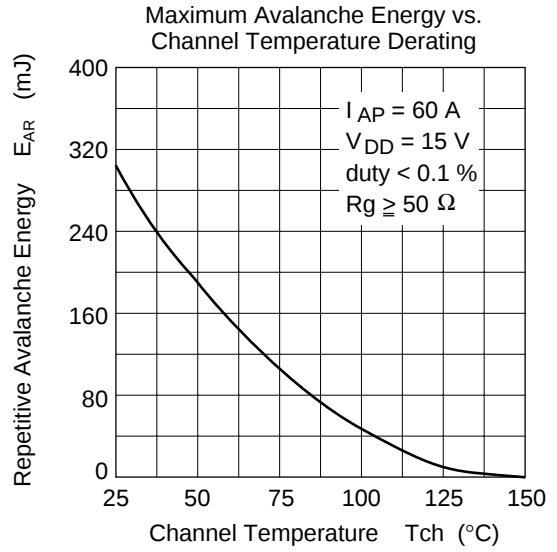
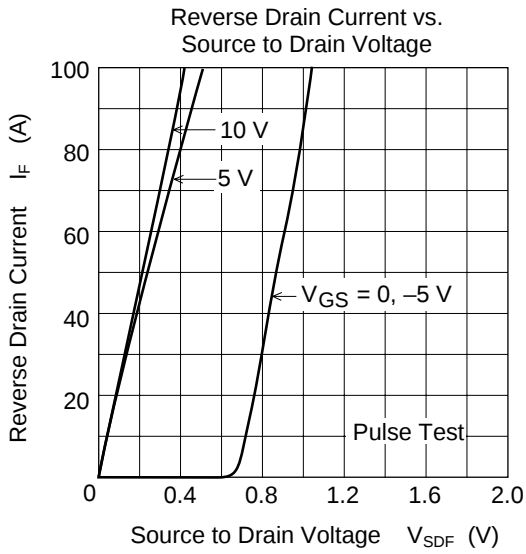
Note: 1. Pulse test

Main Characteristics

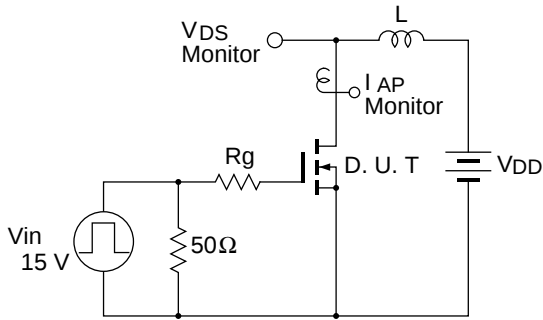






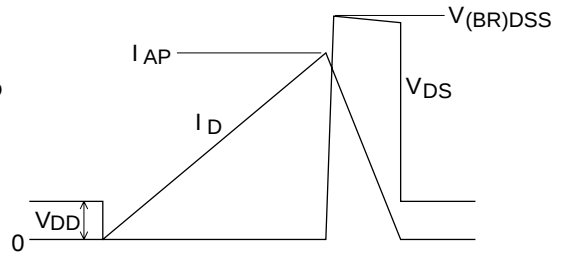


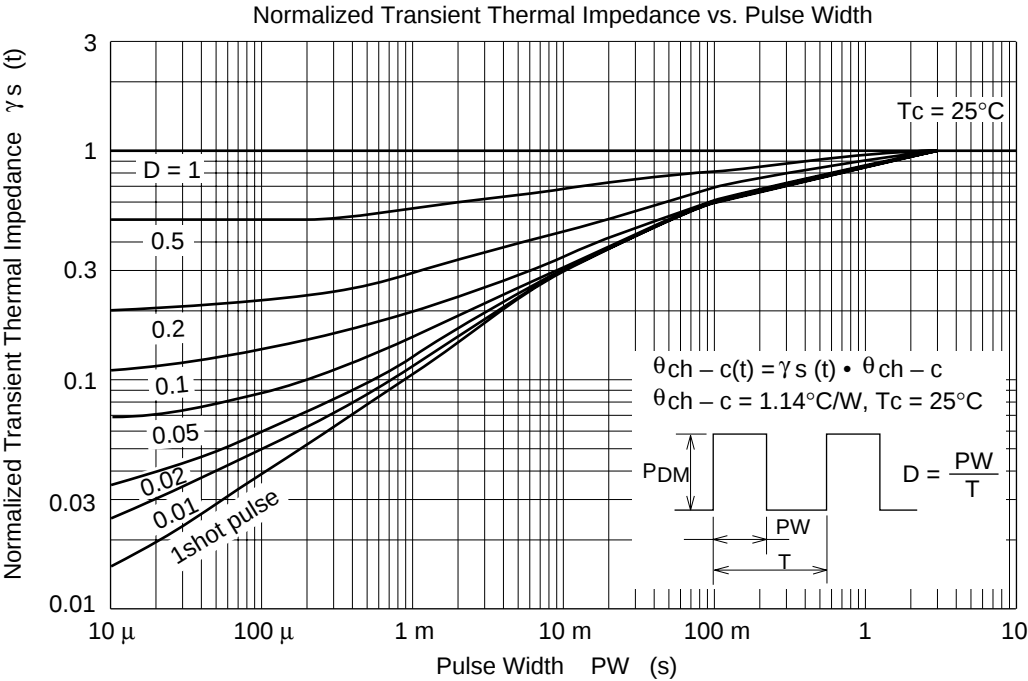
Avalanche Test Circuit



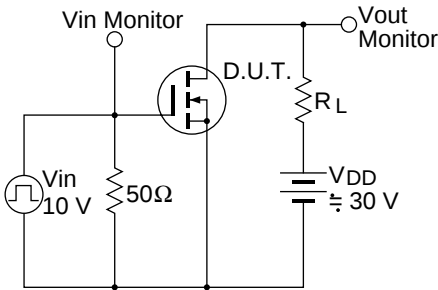
Avalanche Waveform

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

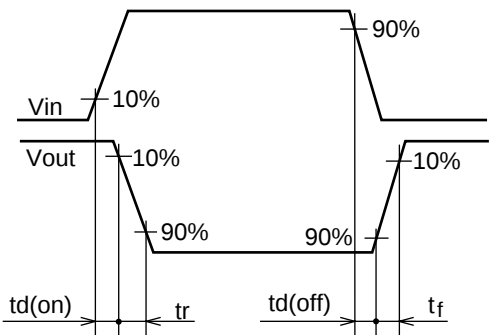




Switching Time Test Circuit

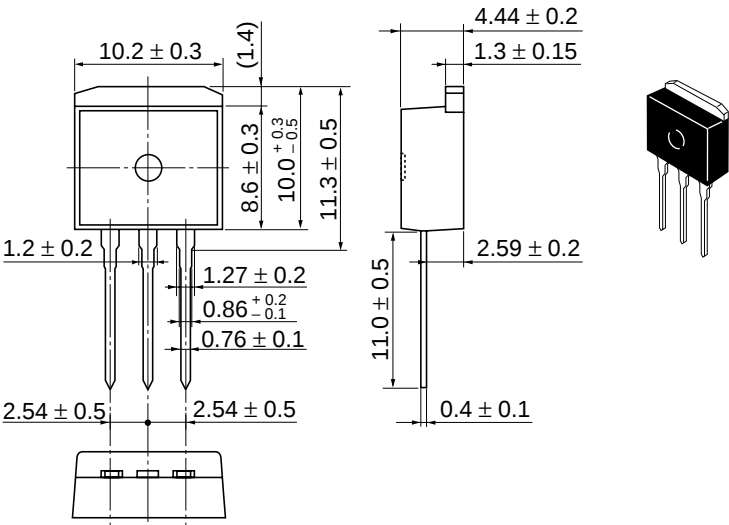


Waveform



Package Dimensions

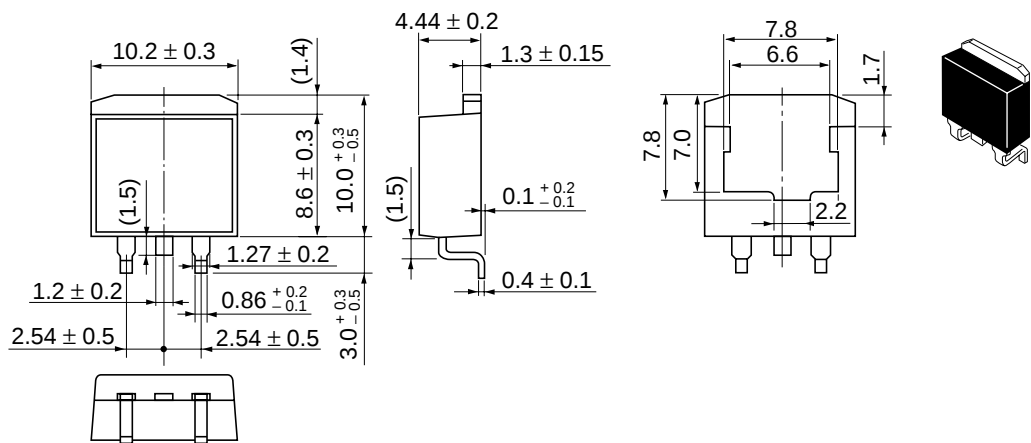
As of January, 2001
Unit: mm



Hitachi Code	LDPAK (L)
JEDEC	—
EIAJ	—
Mass (reference value)	1.4 g

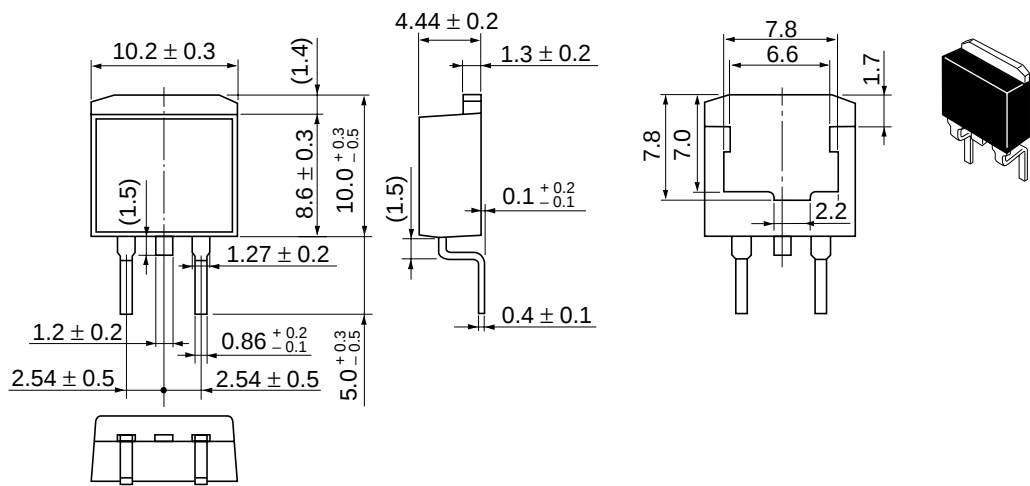
2SK3461(L), 2SK3461(S)

As of January, 2001
Unit: mm



Hitachi Code	LDPAK (S)-(1)
JEDEC	—
EIAJ	—
Mass (reference value)	1.3 g

As of January, 2001
Unit: mm



Hitachi Code	LDPAK (S)-(2)
JEDEC	—
EIAJ	—
Mass (reference value)	1.35 g

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