

2SK3161(L), 2SK3161(S)

Silicon N Channel MOS FET
High Speed Power Switching

HITACHI

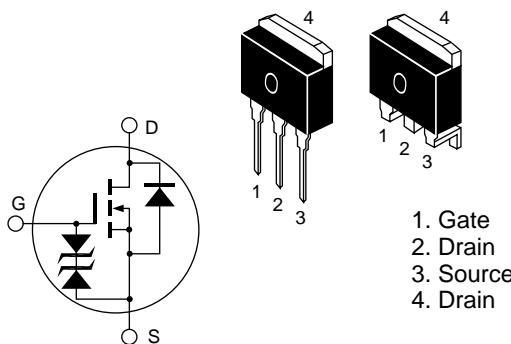
ADE-208-734A (Z)
2nd. Edition
February 1999

Features

- Low on-resistance
 $R_{DS} = 90 \text{ m}\Omega$ typ.
- High speed switching
- 4 V gate drive device can be driven from 5 V source

Outline

LDBPAK



2SK3161(L),2SK3161(S)

Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|--|---------------------------------|-------------|------|
| Drain to source voltage | V_{DSS} | 200 | V |
| Gate to source voltage | V_{GSS} | ±20 | V |
| Drain current | I_D | 15 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note1} | 60 | A |
| Body-drain diode reverse drain current | I_{DR} | 15 | A |
| Avalanche current | I_{AP} ^{Note3} | 15 | A |
| Avalanche energy | E_{AR} ^{Note3} | 15 | mJ |
| Channel dissipation | P_{ch} ^{Note2} | 75 | W |
| Channel temperature | T_{ch} | 150 | °C |
| Storage temperature | T_{stg} | -55 to +150 | °C |

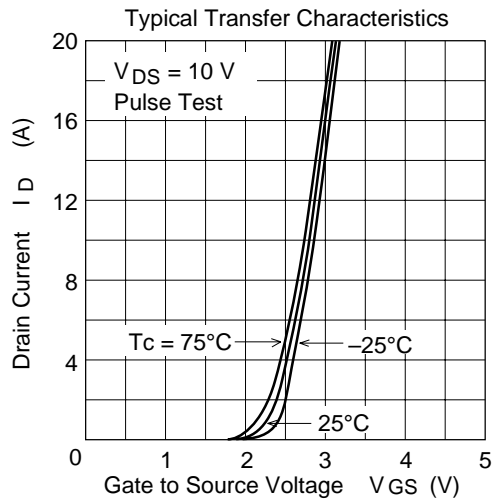
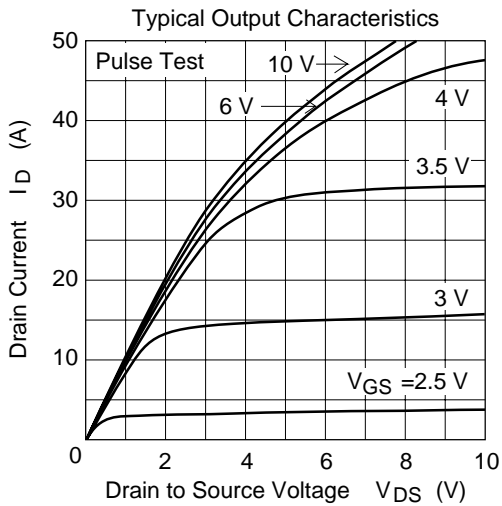
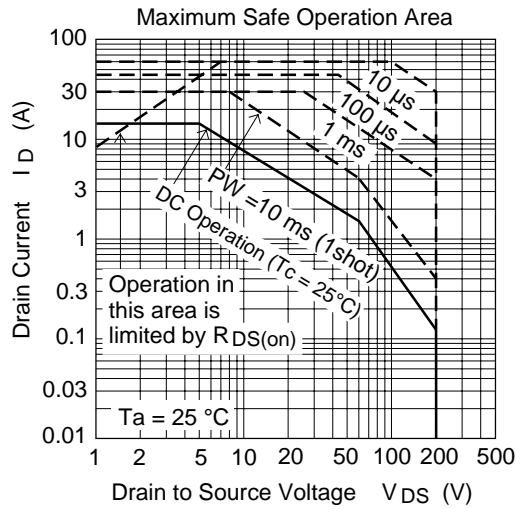
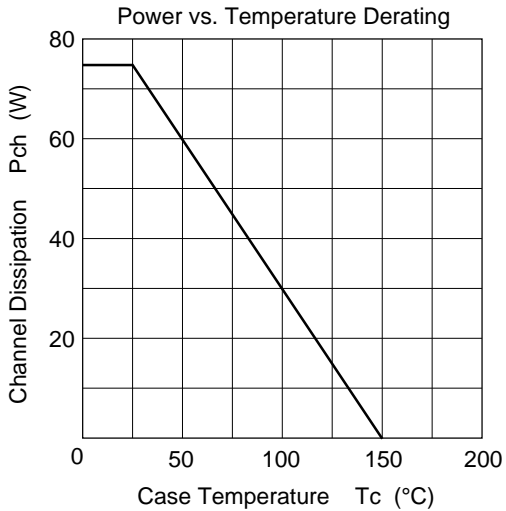
Note: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$
 2. Value at $T_c = 25^\circ C$
 3. Value at $T_{ch} = 25^\circ C$, $R_g \geq 50 \Omega$

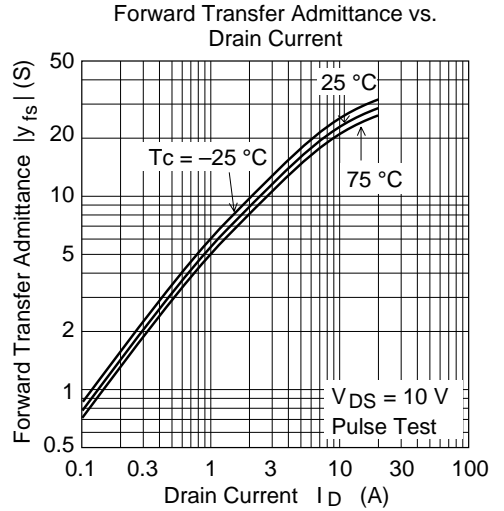
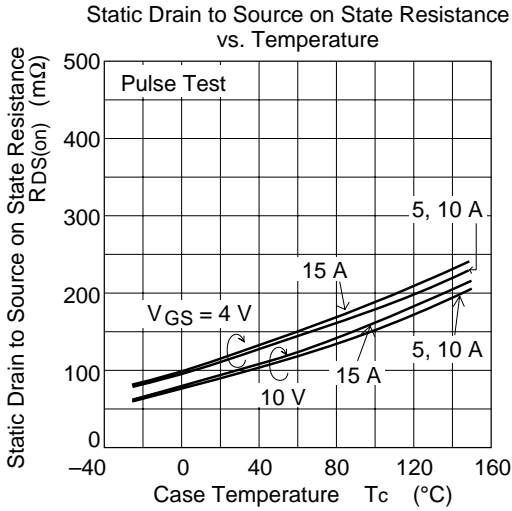
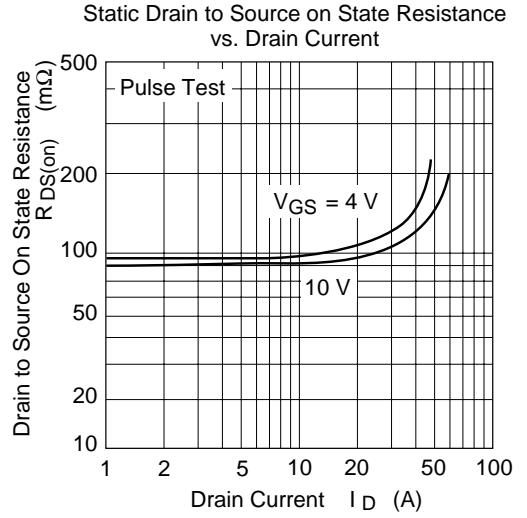
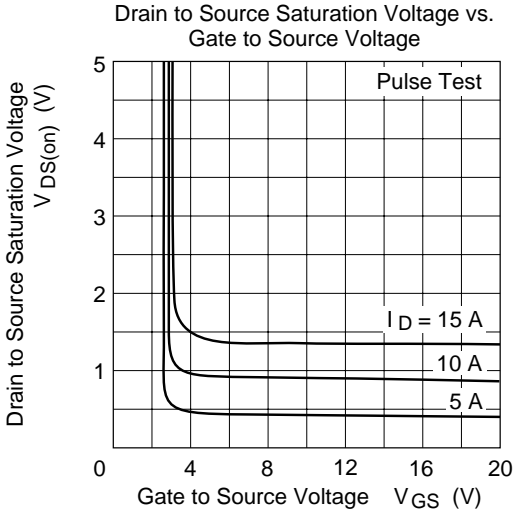
Electrical Characteristics (Ta = 25°C)

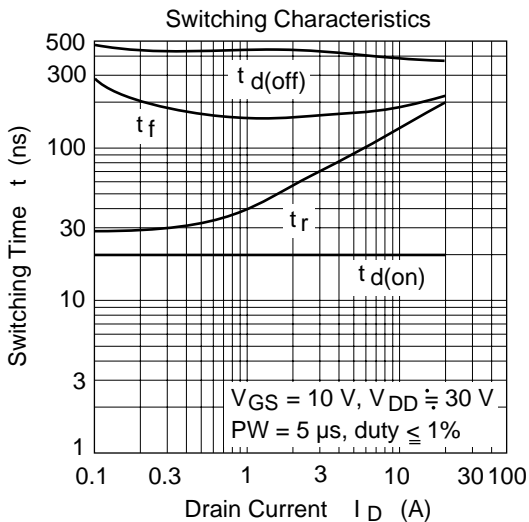
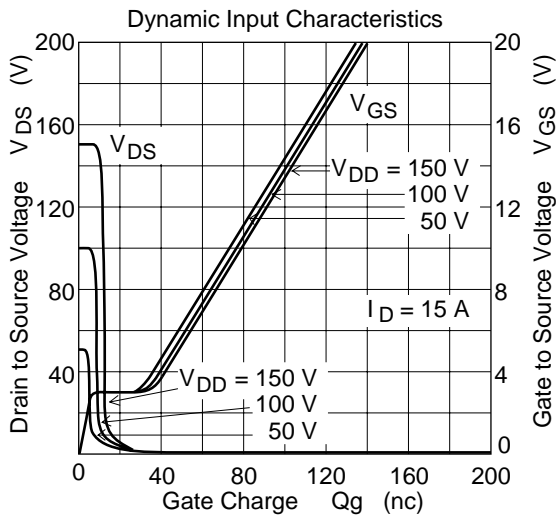
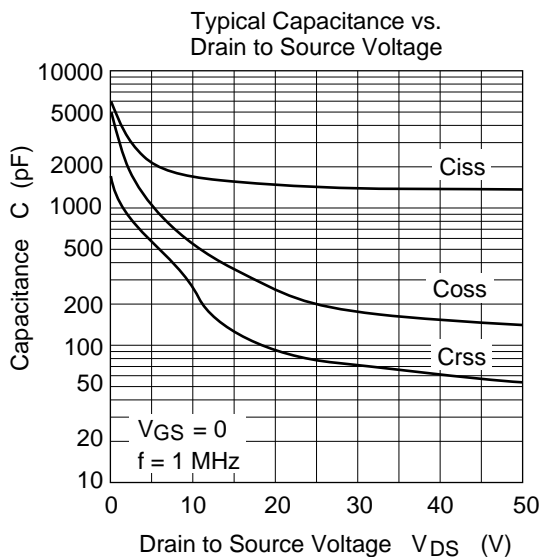
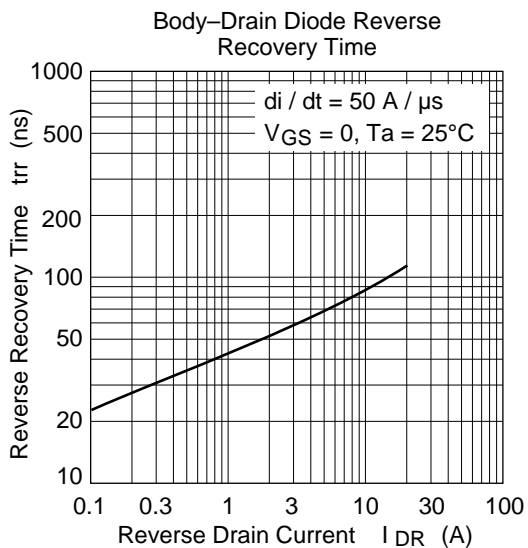
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|---------------|-----|------|-----|------|--|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 200 | — | — | V | $I_D = 10 \text{ mA}$, $V_{GS} = 0$ |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | ±20 | — | — | V | $I_G = \pm 100 \mu A$, $V_{DS} = 0$ |
| 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 | $V_{DS} = 200 \text{ V}$, $V_{GS} = 0$ |
| Gate to source cutoff voltage | $V_{GS(off)}$ | 1.0 | — | 2.5 | V | $I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$ |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 90 | 115 | mΩ | $I_D = 8 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4} |
| | $R_{DS(on)}$ | — | 95 | 125 | mΩ | $I_D = 8 \text{ A}$, $V_{GS} = 4 \text{ V}$ ^{Note4} |
| Forward transfer admittance | $ y_{fs} $ | 16 | 20 | — | S | $I_D = 8 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4} |
| Input capacitance | C_{iss} | — | 1600 | — | pF | $V_{DS} = 10 \text{ V}$ |
| Output capacitance | C_{oss} | — | 510 | — | pF | $V_{GS} = 0$ |
| Reverse transfer capacitance | C_{rss} | — | 250 | — | pF | $f = 1 \text{ MHz}$ |
| Turn-on delay time | $t_{d(on)}$ | — | 20 | — | ns | $I_D = 8 \text{ A}$, $V_{GS} = 10 \text{ V}$ |
| Rise time | t_r | — | 120 | — | ns | $R_L = 3.75 \Omega$ |
| Turn-off delay time | $t_{d(off)}$ | — | 400 | — | ns | |
| Fall time | t_f | — | 170 | — | ns | |
| Body-drain diode forward voltage | V_{DF} | — | 0.85 | — | V | $I_F = 15 \text{ A}$, $V_{GS} = 0$ |
| Body-drain diode reverse recovery time | t_{rr} | — | 100 | — | ns | $I_F = 15 \text{ A}$, $V_{GS} = 0$ $diF/dt = 50 \text{ A}/\mu s$ |

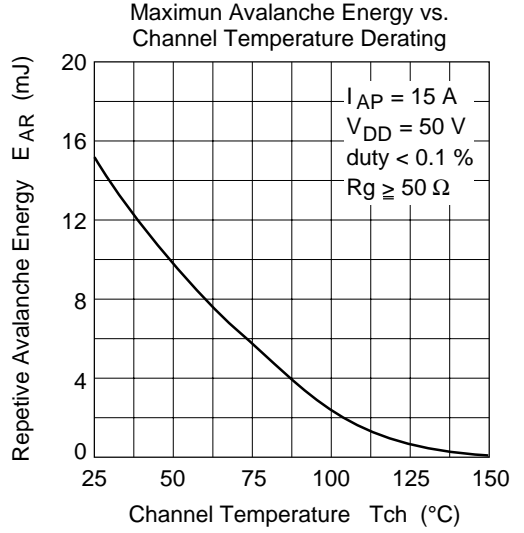
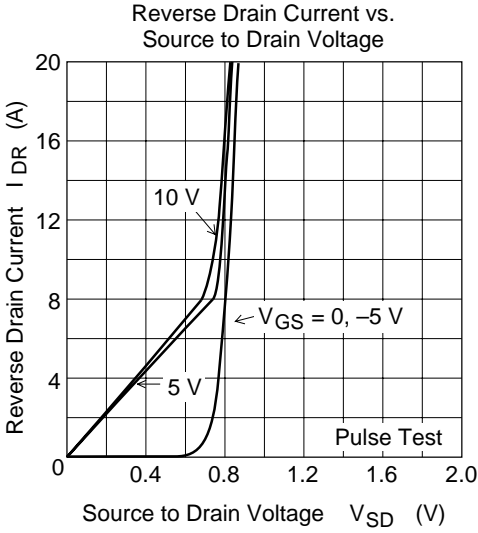
Note: 4. Pulse test

Main Characteristics

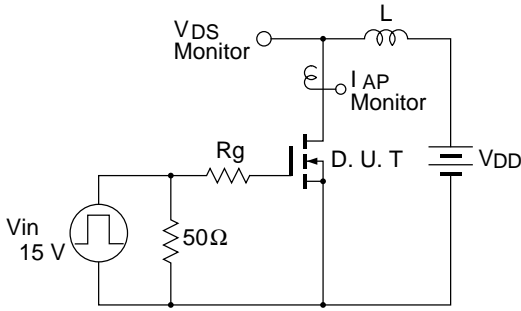






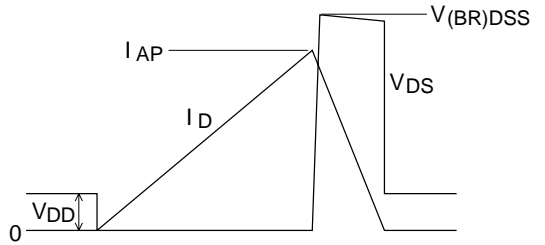


Avalanche Test Circuit

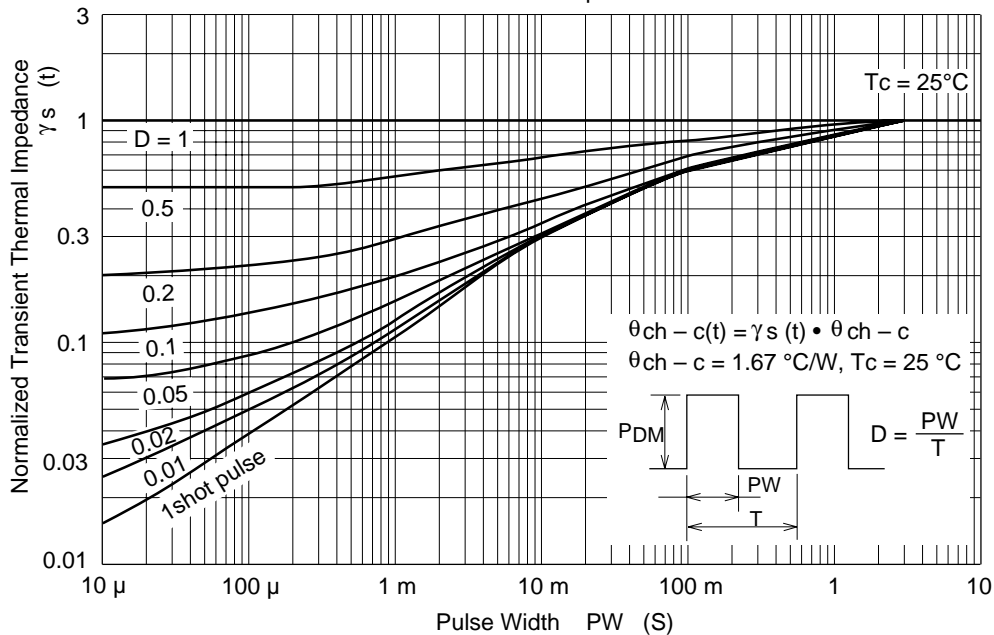


Avalanche Waveform

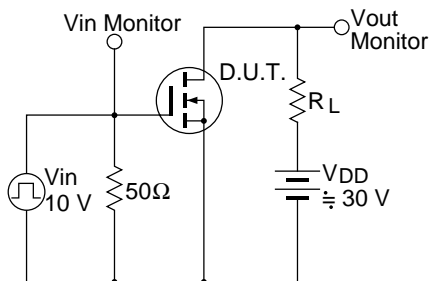
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



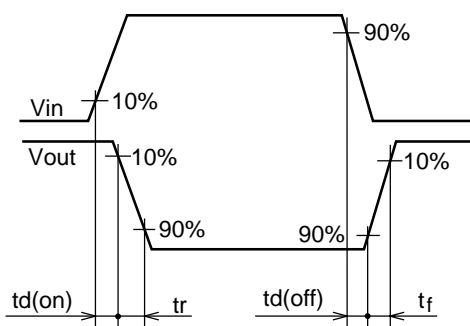
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



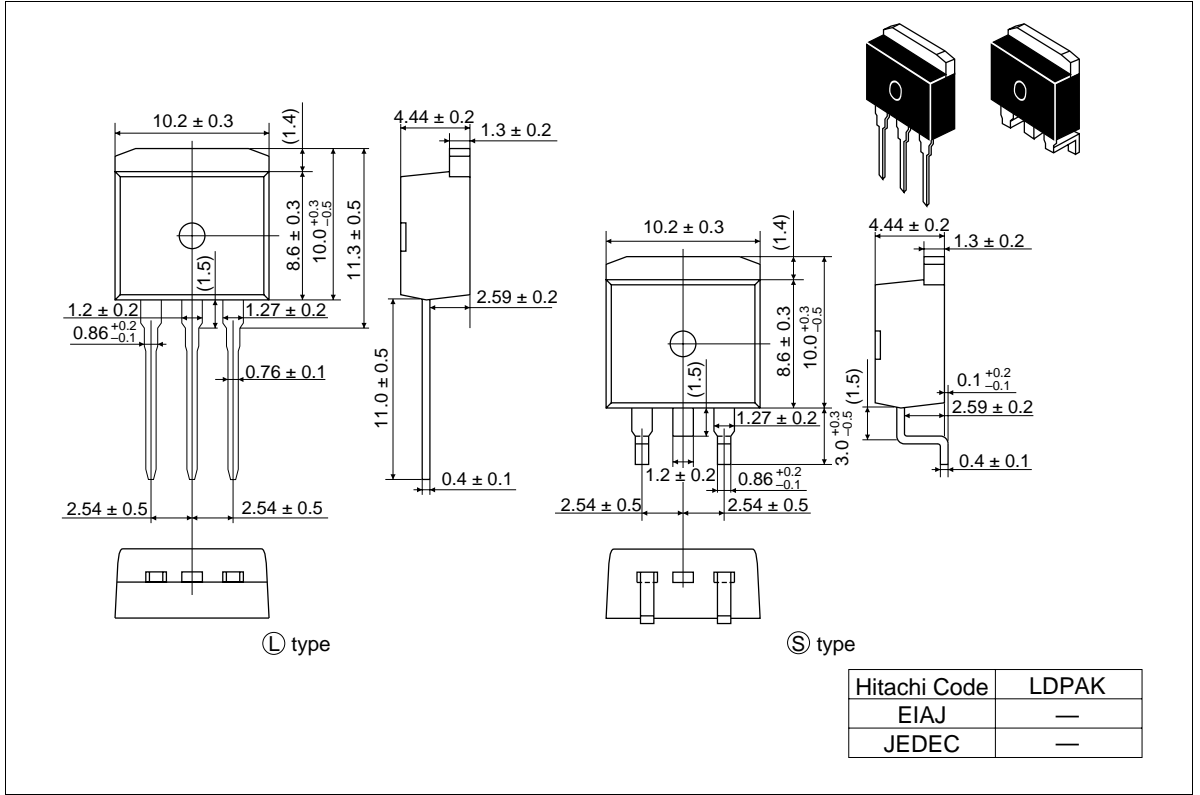
Waveform



2SK3161(L),2SK3161(S)

Package Dimensions

Unit: mm



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