

# 2SK1335(L), 2SK1335(S)

Silicon N-Channel MOS FET

# HITACHI

## Application

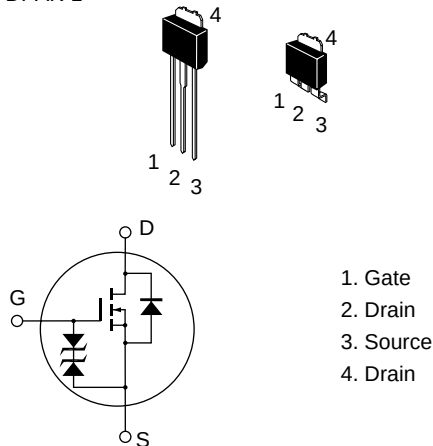
High speed power switching

## Features

- Low on-resistance
- High speed switching
- Low drive current
- No secondary breakdown
- Suitable for switching regulator and DC-DC converter

## Outline

DPAK-1



## 2SK1335(L), 2SK1335(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                             | $I_D$               | 3           | A    |
| Drain peak current                        | $I_{D(pulse)}^{*1}$ | 12          | A    |
| Body to drain diode reverse drain current | $I_{DR}$            | 3           | A    |
| Channel dissipation                       | $P_{ch}^{*2}$       | 20          | W    |
| Channel temperature                       | $T_{ch}$            | 150         | °C   |
| Storage temperature                       | $T_{stg}$           | −55 to +150 | °C   |

Notes: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$

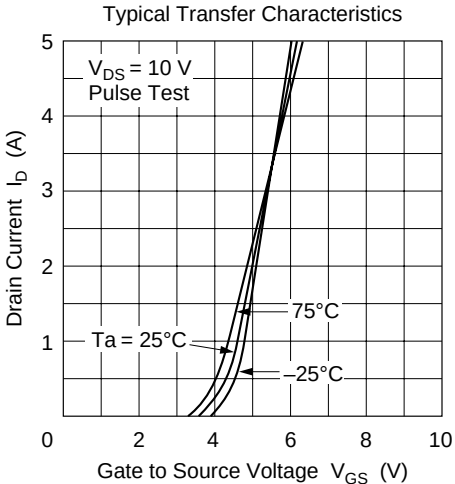
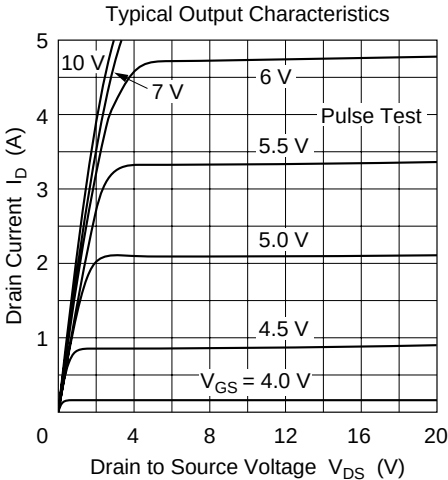
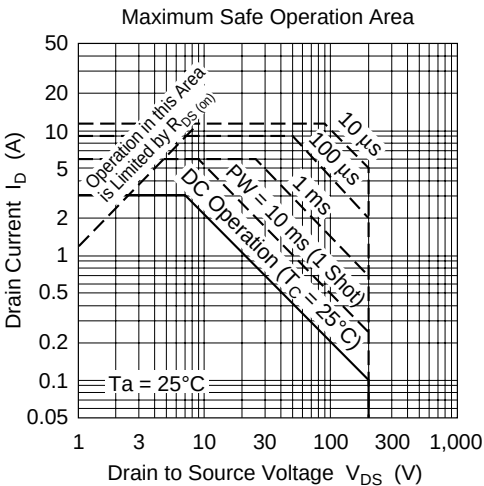
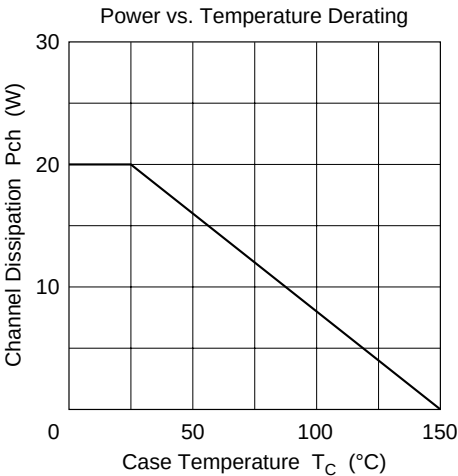
2. Value at  $T_C = 25^\circ C$

### Electrical Characteristics (Ta = 25°C)

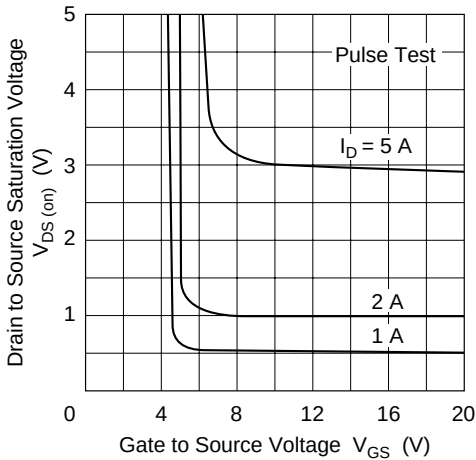
| Item                                       | Symbol        | Min | Typ | Max | Unit | Test conditions                                                        |
|--------------------------------------------|---------------|-----|-----|-----|------|------------------------------------------------------------------------|
| 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            | $I_{DSS}$     | —   | —   | 100 | μA   | $V_{DS} = 160 \text{ V}$ , $V_{GS} = 0$                                |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 2.0 | —   | 4.0 | V    | $I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$                         |
| Static drain to source on state resistance | $R_{DS(on)}$  | —   | 0.5 | 0.8 | Ω    | $I_D = 2 \text{ A}$ , $V_{GS} = 10 \text{ V}^{*1}$                     |
| Forward transfer admittance                | $ y_{fs} $    | 1.5 | 2.3 | —   | S    | $I_D = 2 \text{ A}$ , $V_{DS} = 10 \text{ V}^{*1}$                     |
| Input capacitance                          | $C_{iss}$     | —   | 380 | —   | pF   | $V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ ,<br>$f = 1 \text{ MHz}$        |
| Output capacitance                         | $C_{oss}$     | —   | 150 | —   | pF   |                                                                        |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 35  | —   | pF   |                                                                        |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 10  | —   | ns   | $I_D = 2 \text{ A}$ , $V_{GS} = 10 \text{ V}$ ,<br>$R_L = 15 \Omega$   |
| Rise time                                  | $t_r$         | —   | 27  | —   | ns   |                                                                        |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 30  | —   | ns   |                                                                        |
| Fall time                                  | $t_f$         | —   | 20  | —   | ns   |                                                                        |
| Body to drain diode forward voltage        | $V_{DF}$      | —   | 1.0 | —   | V    | $I_F = 3 \text{ A}$ , $V_{GS} = 0$                                     |
| Body to drain diode reverse recovery time  | $t_{rr}$      | —   | 120 | —   | ns   | $I_F = 3 \text{ A}$ , $V_{GS} = 0$ ,<br>$di_F/dt = 50 \text{ A}/\mu s$ |

Note: 1. Pulse test

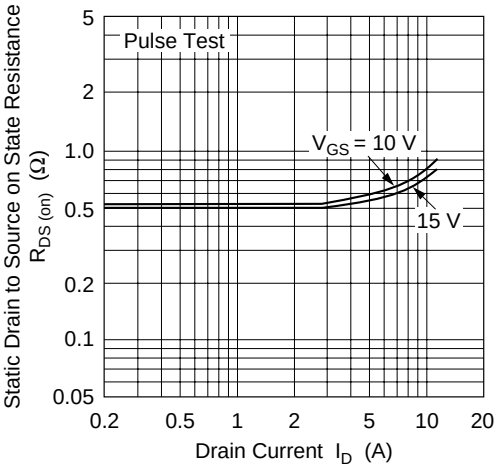
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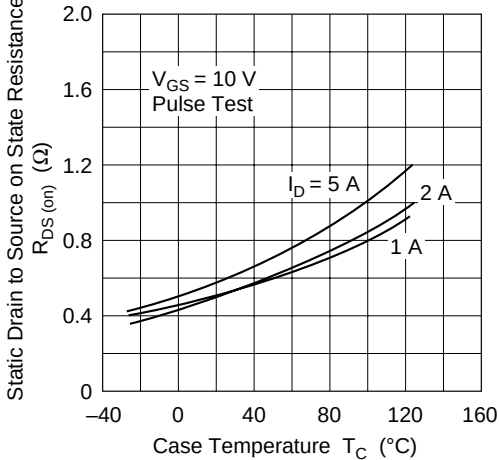
Drain to Source Saturation Voltage  
vs. Gate to Source Voltage



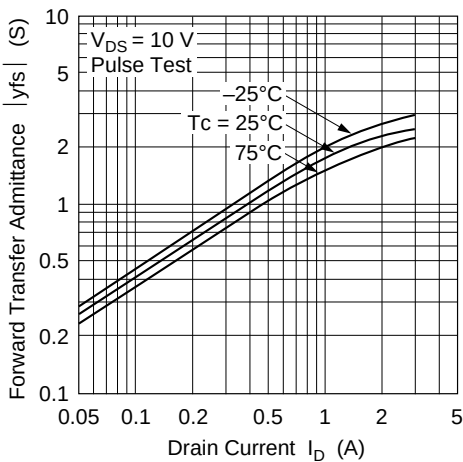
Static Drain to Source on State  
Resistance vs. Drain Current



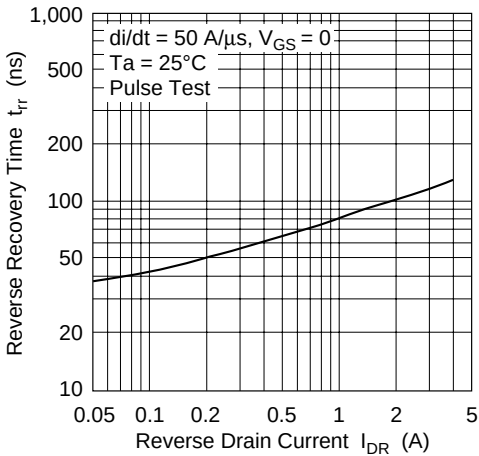
Static Drain to Source on State  
Resistance vs. Temperature



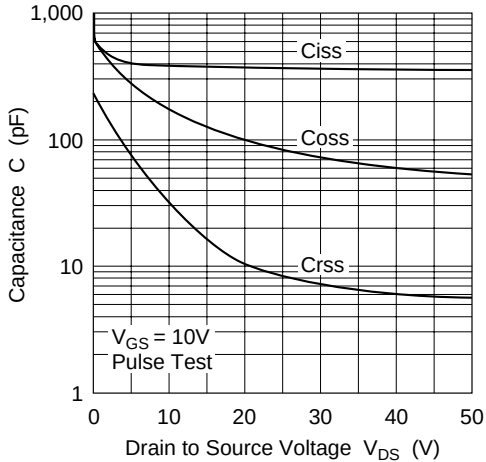
Forward Transfer Admittance  
vs. Drain Current



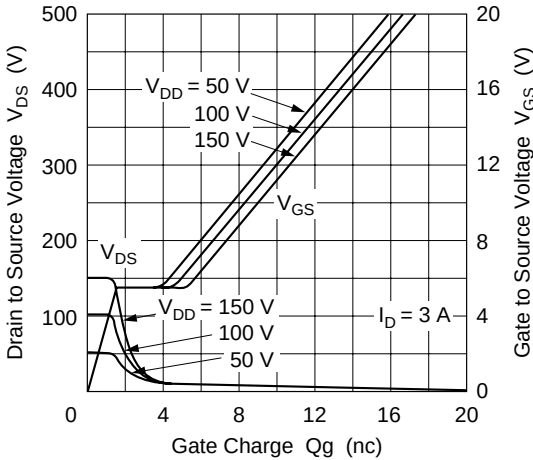
Body to Drain Diode Reverse Recovery Time



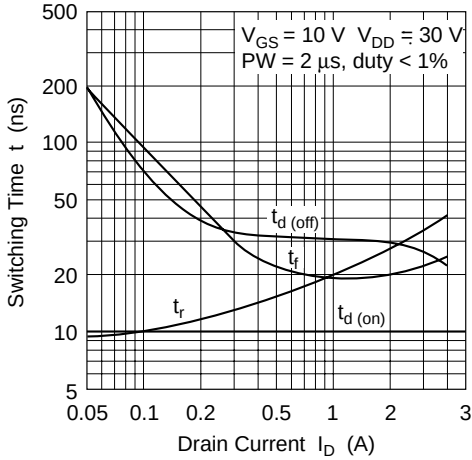
Typical Capacitance vs. Drain to Source Voltage

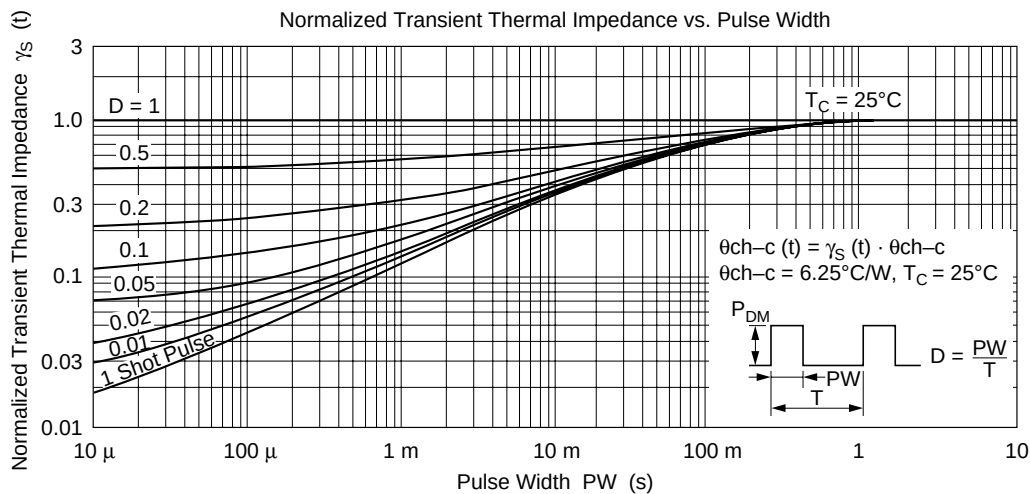
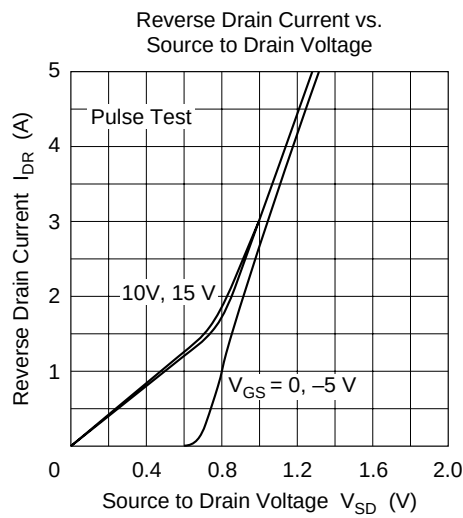


Dynamic Input Characteristics

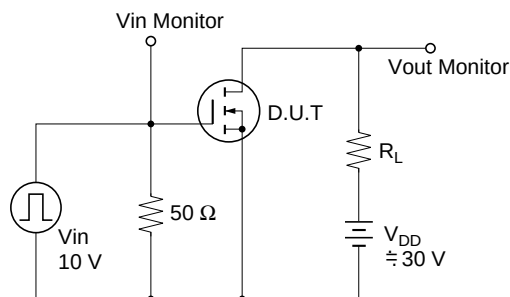


Switching Characteristics

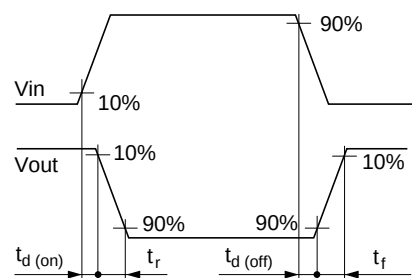


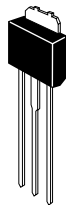
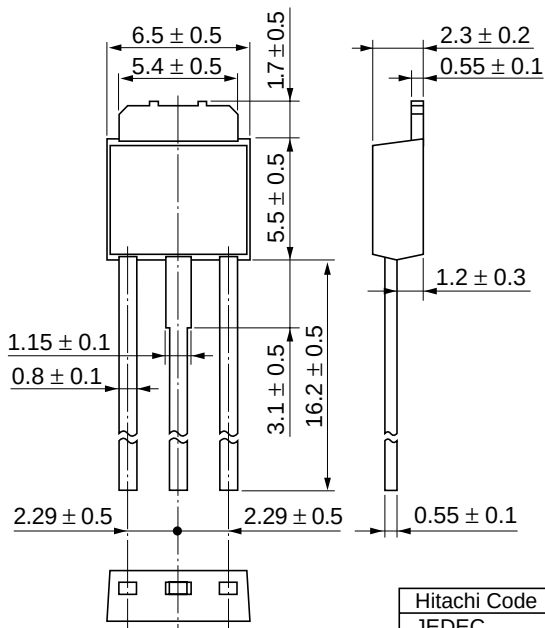


Switching Time Test Circuit



Waveforms





|                          |              |
|--------------------------|--------------|
| Hitachi Code             | DPAK (L)-(1) |
| JEDEC                    | —            |
| EIAJ                     | Conforms     |
| Weight (reference value) | 0.42 g       |

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