To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

MOS FIELD EFFECT TRANSISTOR

2SK2157

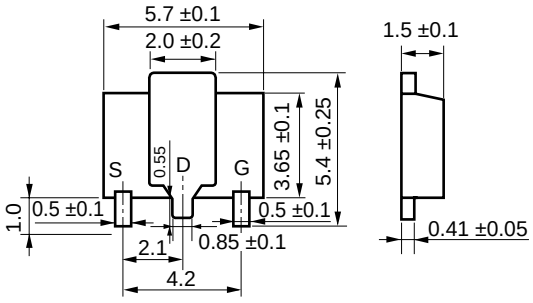
N-CHANNEL MOS FET
FOR HIGH-SPEED SWITCHING

The 2SK2157 is a N-channel MOS FET of a vertical type and is a switching element that can be directly driven by the output of an IC operating at 5 V. This product has a low ON resistance and superb switching characteristics and is ideal for driving the actuators and DC/DC converters.

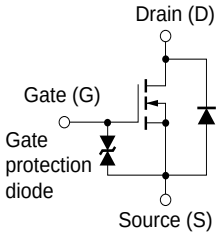
FEATURES

- New package intermediate between small-signal and power models
- Can be directly driven by output of 5-V IC
- Low ON resistance
  $R_{DS(on)} \leq 0.15\ \Omega$ @V_{GS} = 4 V, I_D = 2.5 A
  $R_{DS(on)} \leq 0.10\ \Omega$ @V_{GS} = 10 V, I_D = 2.5 A

PACKAGE DIMENSIONS (in mm)



EQUIVALENT CIRCUIT



PIN CONNECTIONS
S: Source
D: Drain
G: Gate

Marking: NA4

ABSOLUTE MAXIMUM RATINGS (T_A = 25 ˚C)

PARAMETER	SYMBOL	TEST CONDITIONS	RATING	UNIT
Drain to Source Voltage	V_{DSS}	V_{GS} = 0	30	V
Gate to Source Voltage	V_{GSS}	V_{DS} = 0	±20	V
Drain Current (DC)	$I_{D(DC)}$		±5.0	A
Drain Current (Pulse)	$I_{D(pulse)}$	PW ≤ 10 ms, Duty cycle ≤ 50 %	±10.0	A
Total Power Dissipation	P_T	7.5 $cm^2 \times 0.7$ mm, ceramic substrate used	2.0	W
Channel Temperature	T_{ch}		150	˚C
Storage Temperature	T_{stg}		–55 to +150	˚C

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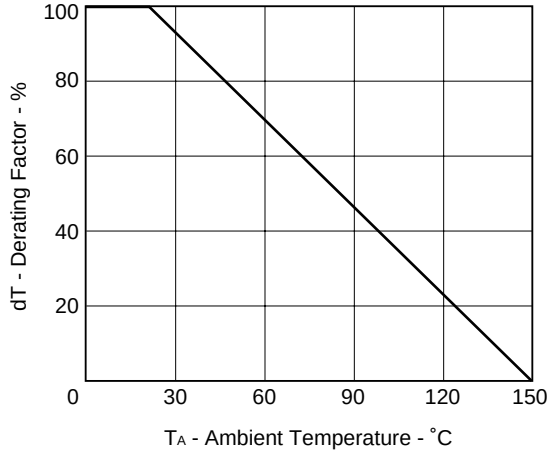
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

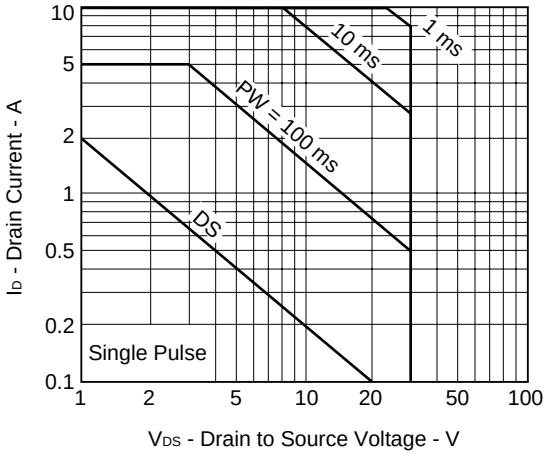
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-Off Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0			1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0			±10	μA
Gate Cut-Off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 mA	1.5	1.9	2.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 10 V, I_D = 2.5 A	2.0			S
Drain to Source On-State Resistance	$R_{DS(on)1}$	V_{GS} = 4 V, I_D =2.5 A		0.09	0.15	Ω
Drain to Source On-State Resistance	$R_{DS(on)2}$	V_{GS} = 10 V, I_D = 2.5 A		0.06	0.10	Ω
Input Capacitance	C_{iss}	V_{DS} = 10 V, V_{GS} = 0, f = 1.0 MHz		650		pF
Output Capacitance	C_{oss}			400		pF
Reverse Transfer Capacitance	C_{rss}			120		pF
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 10 V, I_D = 2.5 A $V_{GS(on)}$ = 10 V, R_G = 10 Ω R_L = 4 Ω		85		ns
Rise Time	t_r			450		ns
Turn-Off Delay Time	$t_{d(off)}$			285		ns
Fall Time	t_f			315		ns

TYPICAL CHARACTERISTICS (T_A = 25 ˚C)

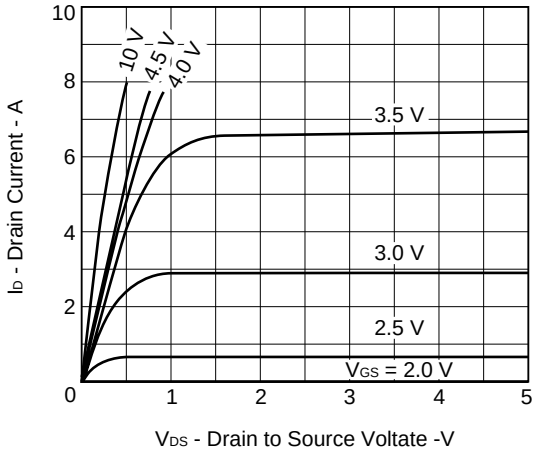
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



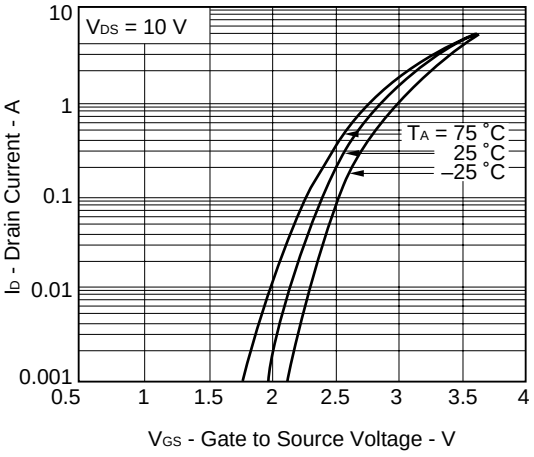
FORWARD BIAS SAFE OPERATING AREA



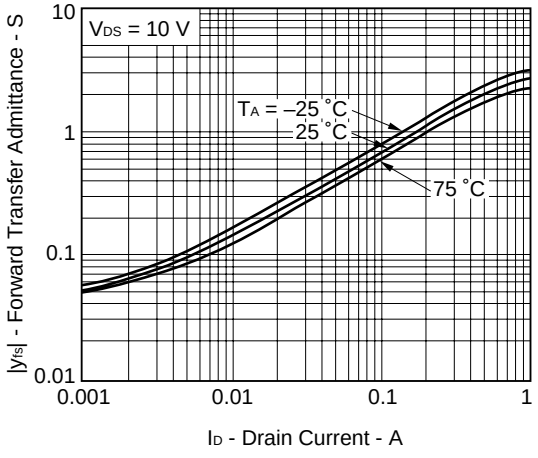
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



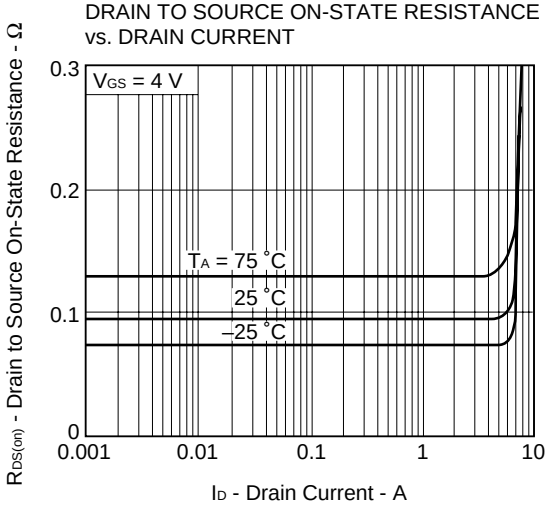
TRANSFER CHARACTERISTICS



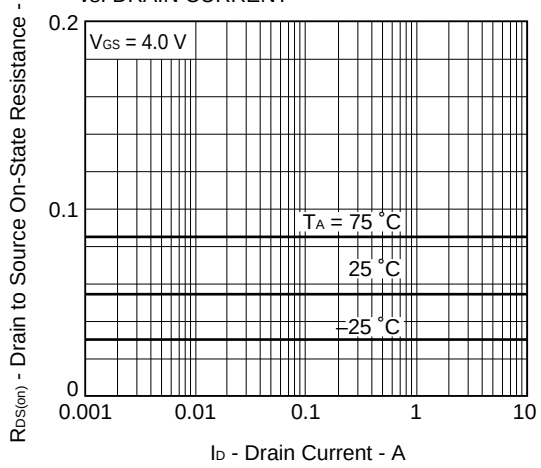
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



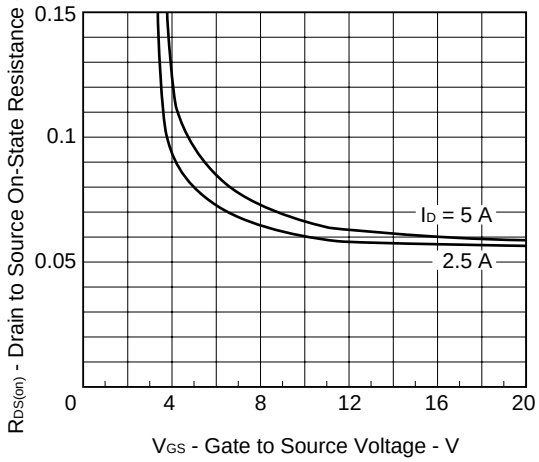
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



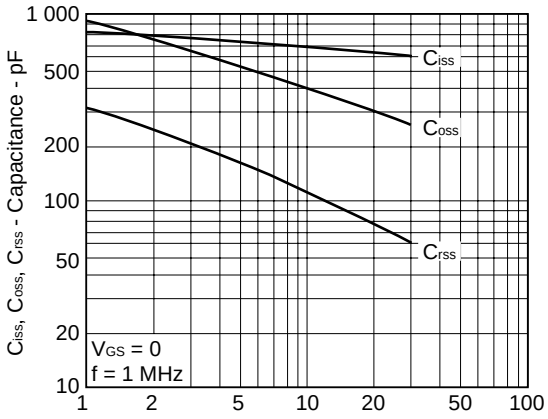
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. DRAIN CURRENT



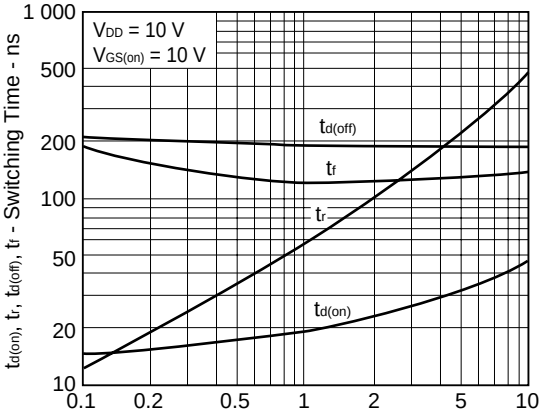
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. GATE TO SOURCE VOLTAGE



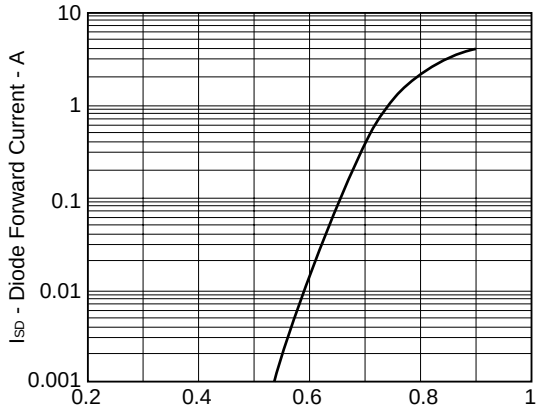
CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE
FORWARD VOLTAGE



REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system	TEI-1202
Quality grade on NEC semiconductor devices	IEI-1209
Semiconductor device mounting technology manual	C10535E
Guide to quality assurance for semiconductor devices	MEI-1202
Semiconductor selection guide	X10679E

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Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

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M4 94.11