RENESAS

MOS FIELD EFFECT TRANSISTOR

2SK2158

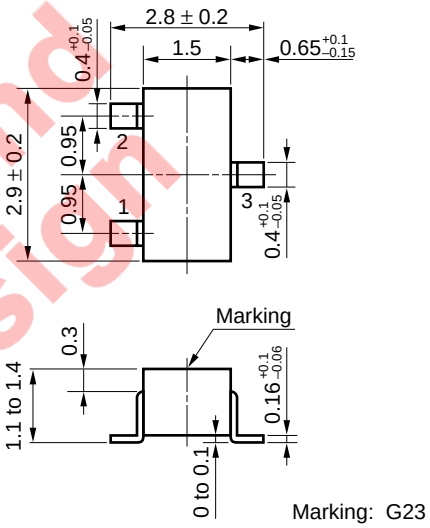
N-CHANNEL MOS FET
FOR HIGH-SPEED SWITCHING

The 2SK2158 is an N-channel vertical type MOS FET featuring an operating voltage as low as 1.5 V. Because it can be driven on a low voltage and it is not necessary to consider driving current, the 2SK2158 is suitable for use in low-voltage portable systems such as headphone stereo sets and camcorders.

FEATURES

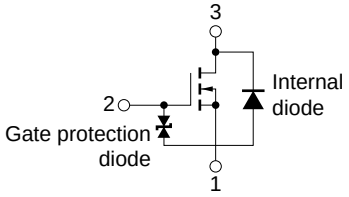
- Capable of drive gate with 1.5 V
- Because of high input impedance, there is no need to consider driving current.
- Bias resistance can be omitted, enabling reduction in total number of parts.

PACKAGE DIMENSIONS
(in millimeters)



Marking: G23

EQUIVALENT CIRCUIT



PIN CONNECTION
1. Source (S)
2. Gate (G)
3. Drain (D)

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Drain to Source Voltage	V_{DSS}	V_{GS} = 0	50	V
Gate to Source Voltage	V_{GSS}	V_{DS} = 0	±7.0	V
Drain Current (DC)	$I_{D(DC)}$		±0.1	A
Drain Current (pulse)	$I_{D(pulse)}$	PW ≤ 10 ms, Duty Cycle ≤ 50 %	±0.2	A
Total Power Dissipation	P_T		200	mW
Channel Temperature	T_{ch}		150	°C
Storage Temperature	T_{stg}		–55 to +150	°C

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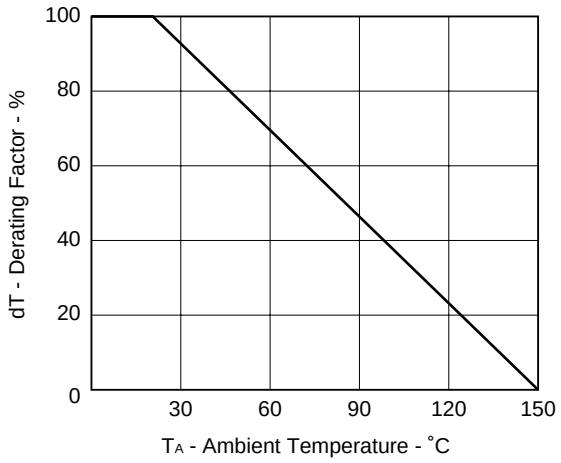
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

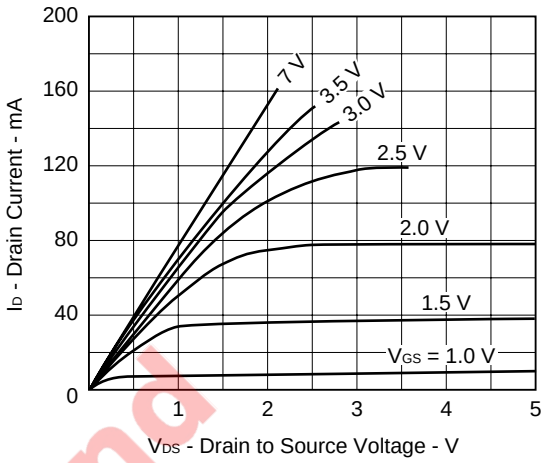
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I_{DSS}	V_{DS} = 50 V, V_{GS} = 0			1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±7.0 V, V_{DS} = 0			±3.0	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 3 V, I_D = 1.0 μA	0.5	0.7	1.1	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 3 V, I_D = 10 mA	20			mS
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 1.5 V, I_D = 1.0 mA		32	50	Ω
Drain to Source On-state Resistance	$R_{DS(on)2}$	V_{GS} = 2.5 V, I_D = 10 mA		16	20	Ω
Drain to Source On-state Resistance	$R_{DS(on)3}$	V_{GS} = 4.0 V, I_D = 10 mA		12	15	Ω
Input Capacitance	C_{iss}	V_{DS} = 3 V, V_{GS} = 0		6		pF
Output Capacitance	C_{oss}	f = 1.0 MHz		8		pF
Reverse Transfer Capacitance	C_{rss}			1		pF
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 3 V, I_D = 20 mA		9		ns
Rise Time	t_r	$V_{GS(on)}$ = 3 V, R_G = 10 Ω		48		ns
Turn-Off Delay Time	$t_{d(off)}$	R_L = 150 Ω		21		ns
Fall Time	t_f			31		ns

TYPICAL CHARACTERISTICS (T_A = 25 ˚C)

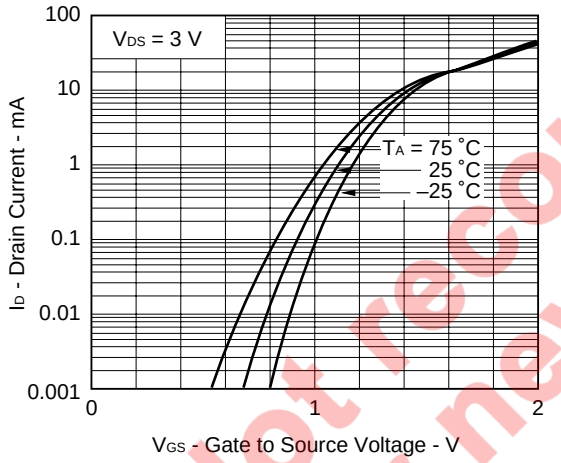
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



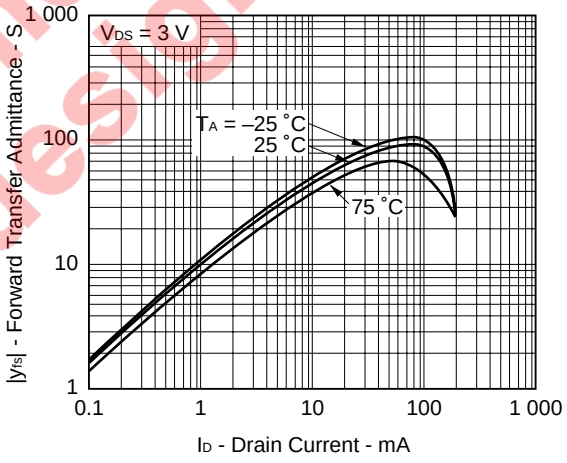
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



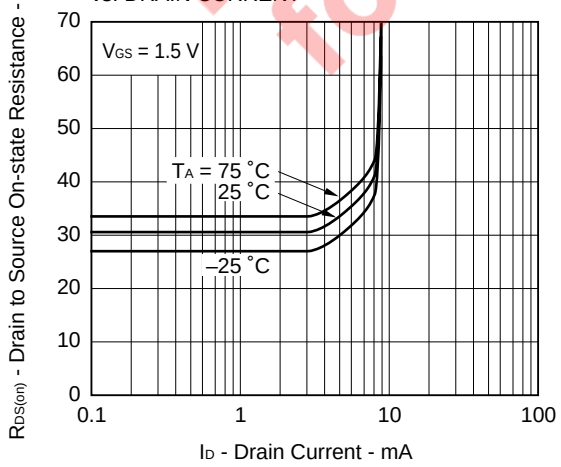
TRANSFER CHARACTERISITICS



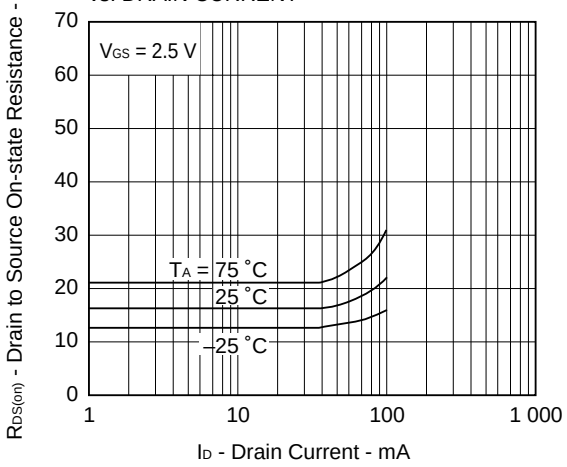
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



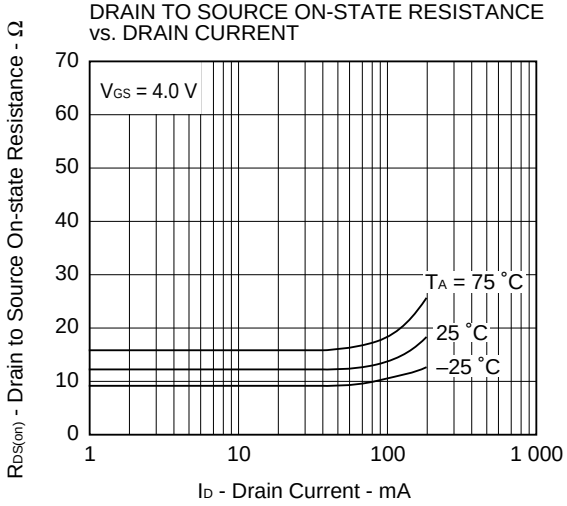
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



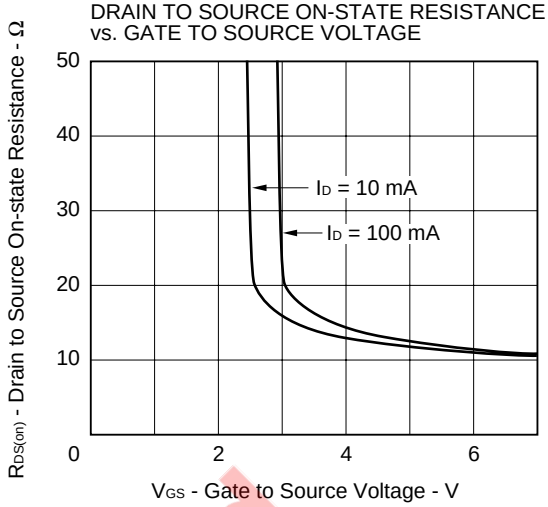
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



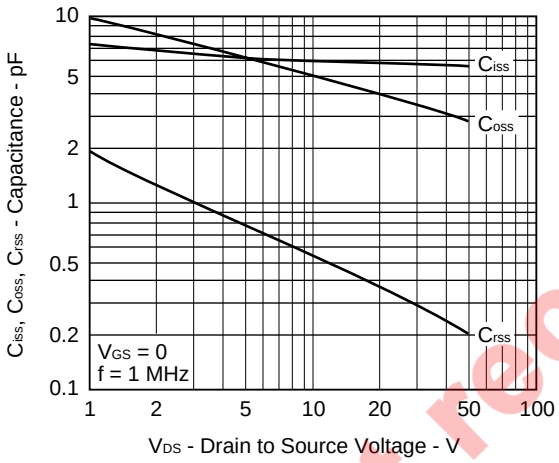
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. DRAIN CURRENT



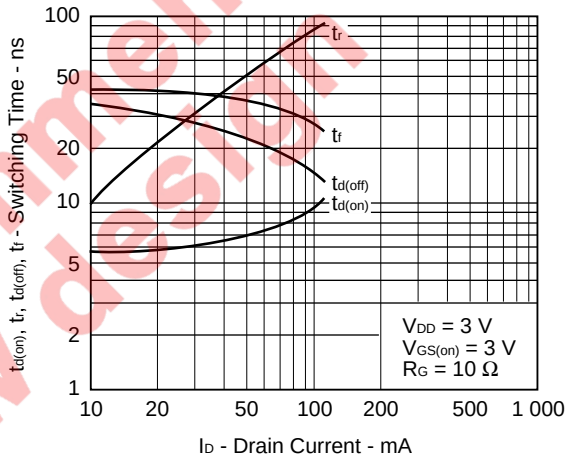
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. GATE TO SOURCE VOLTAGE



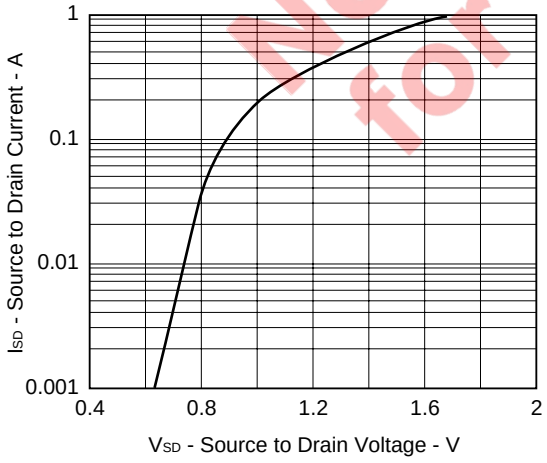
CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



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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