

N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR HIGH SPEED SWITCHING

DESCRIPTION

The 2SK2857 is a switching device which can be driven directly by a 5V power source.

The 2SK2857 features a low on-state resistance and excellent Switching Characteristics, and is suitable for applications such as actuator driver.

FEATURES

- Can be driven by a 5V power source.
- Low On-state resistance :

$R_{DS(on)1} = 220 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4 \text{ V, } I_D = 1.5 \text{ A)}$

$R_{DS(on)2} = 150 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 2.5 \text{ A)}$

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

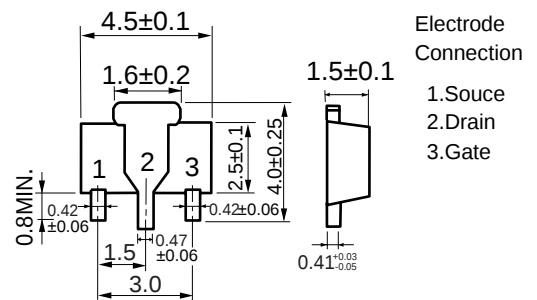
Drain to Source Voltage	V_{DSS}	60	V
Gate to Source Voltage	V_{GSS}	± 20	V
Drain Current (DC)	$I_{D(DC)}$	± 4	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 16	A
Total Power Dissipation ^{Note2}	P_T	2	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Notes1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1 \%$

2. Mounted on ceramic board of $16 \text{ cm}^2 \times 0.7 \text{ mm}$

Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device is actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

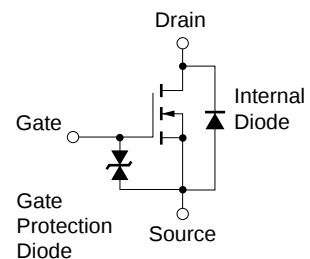
PACKAGE DRAWING (Unit : mm)



Electrode
Connection
1.Source
2.Drain
3.Gate

Marking : NX

EQUIVALENT CIRCUIT

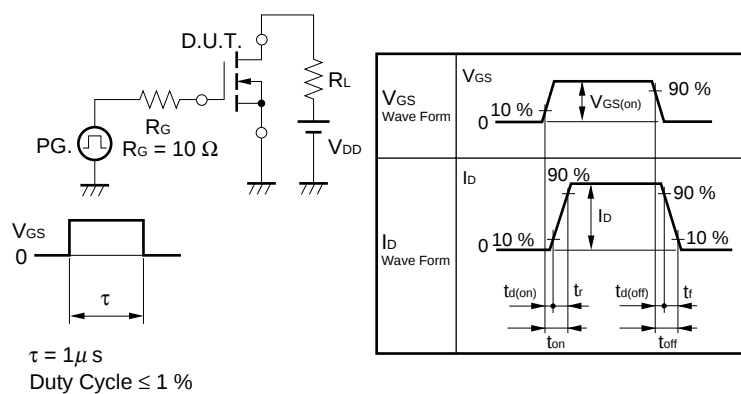


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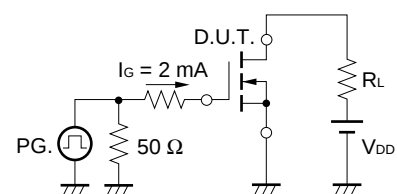
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V			10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.0	1.4	2.0	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 2 A	1			S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 4 V, I _D = 1.5 A		150	220	mΩ
	R _{DS(on)2}	V _{GS} = 10 V, I _D = 2.5 A		110	150	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V		265		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		125		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		56		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 25 V, I _D = 1 A		8		ns
Rise Time	t _r	V _{GS(on)} = 10 V, R _G = 10 Ω		11		ns
Turn-off Delay Time	t _{d(off)}	R _L = 25 Ω		52		ns
Fall Time	t _f			22		ns
Total Gate Charge	Q _G	V _{DS} = 48 V		10.6		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 10 V		0.7		nC
Gate to Drain Charge	Q _{GD}	I _D = 4 A		3.5		nC
Diode Forward Voltage	V _{F(S-D)}	I _F = 4 A, V _{GS} = 0 V		0.86		V
Reverse Recovery Time	t _{rr}	I _F = 4 A, V _{GS} = 0 V		49		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 50 A/μs		26.6		nC

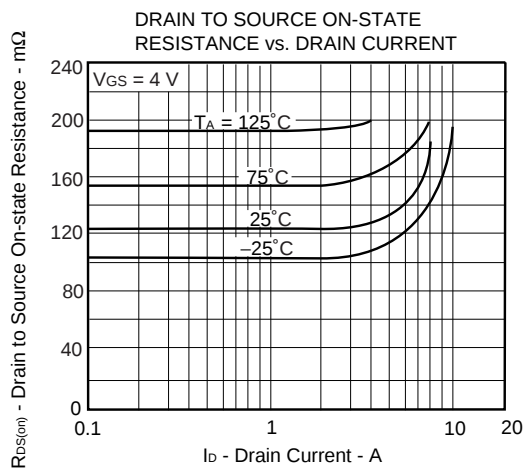
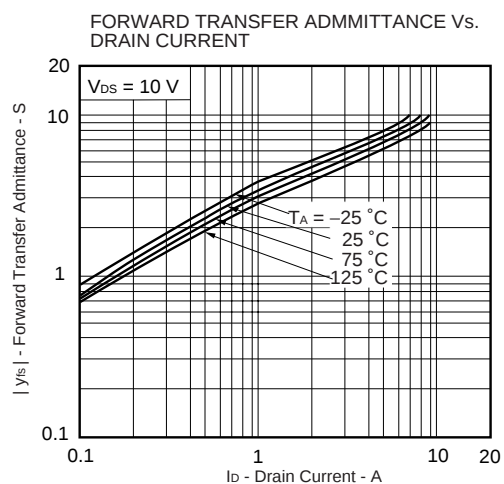
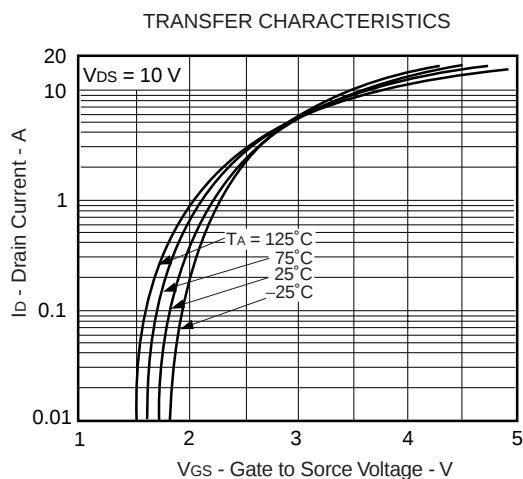
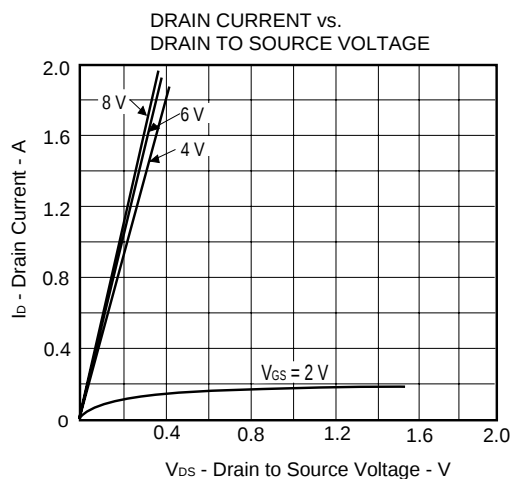
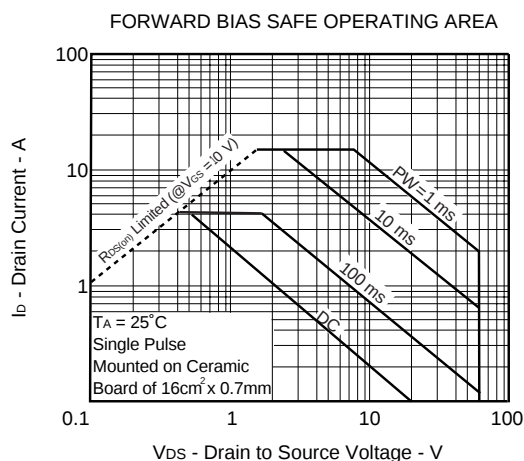
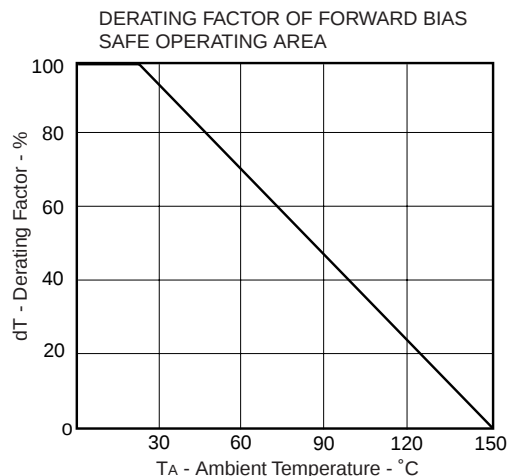
TEST CIRCUIT 1 SWITCHING TIME

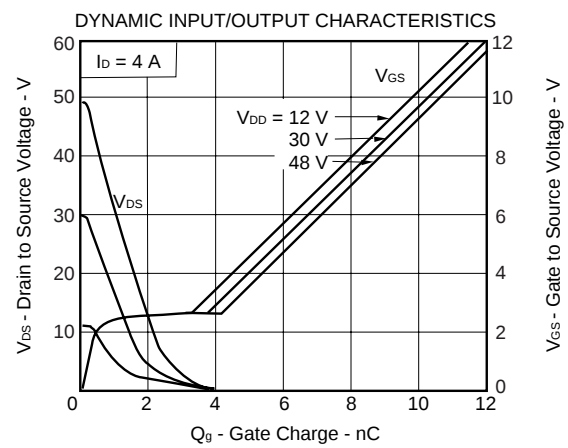
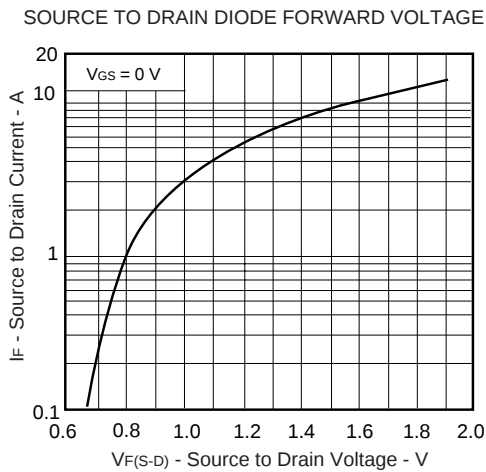
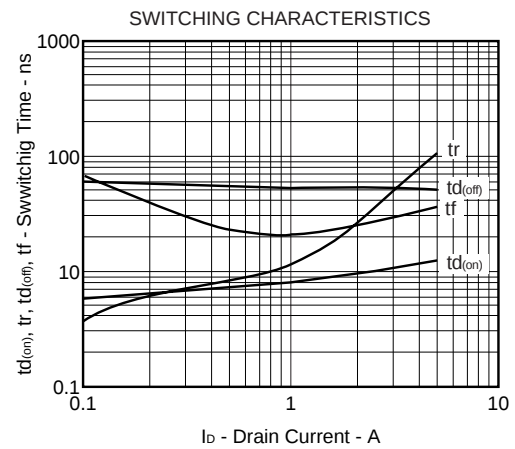
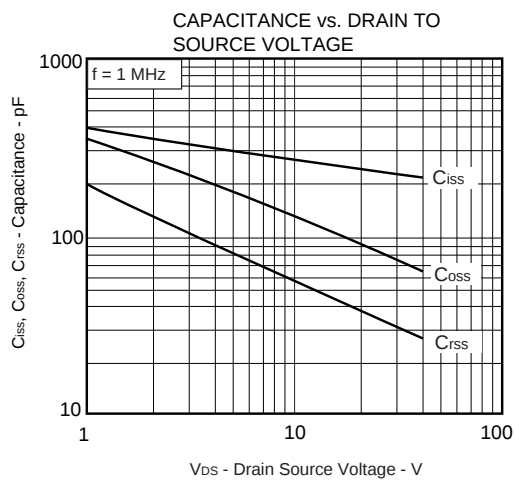
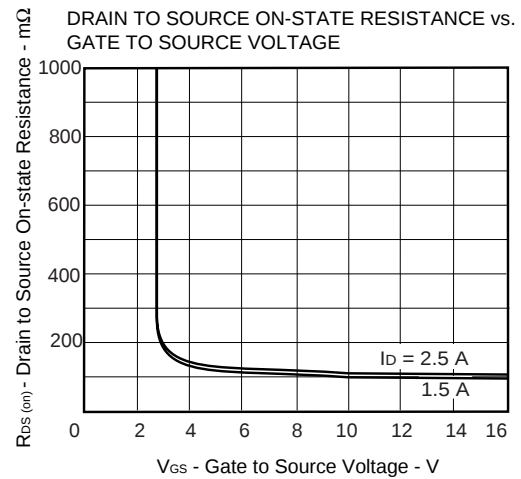
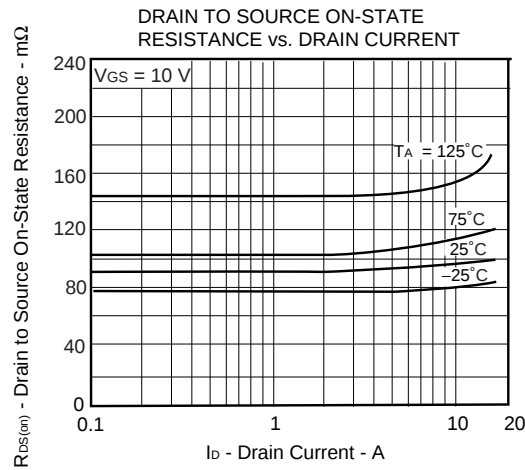


TEST CIRCUIT 2 GATE CHARGE



TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)





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