

2SK1946-01MR

FUJI POWER MOS-FET

N-CHANNEL SILICON POWER MOS-FET

FAP-III SERIES

■ Features

- High current
- Low on-resistance
- No secondary breakdown
- Low driving power
- High forward Transconductance
- Avalanche-proof

■ Applications

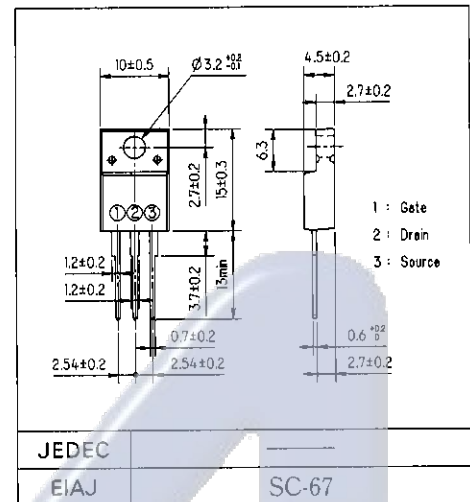
- Motor controllers
- General purpose power amplifier
- C-C-DC converters

■ Max. Ratings and Characteristics

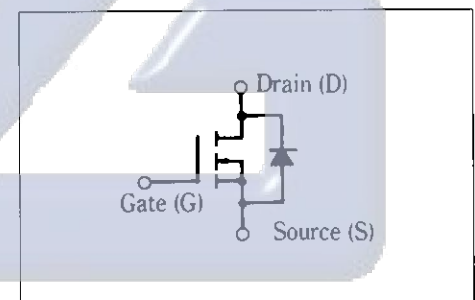
- Absolute Maximum Ratings($T_c=25^\circ\text{C}$)
(unless otherwise specified)

Items	Symbols	Ratings	Units
Drain-source voltage	V_{DS}	60	V
Drain-gate voltage ($R_{GS}=20K\Omega$)	V_{DGR}	60	V
Continuous drain current	I_D	45	A
Pulsed drain current	$I_{D(puls)}$	180	A
Gate-source voltage	V_{GS}	± 20	V
Max. power dissipation	P_D	50	W
Operating and storage temperature range	T_{ch} T_{stg}	150 -55 ~ +150	$^\circ\text{C}$

■ Outline Drawings



■ Equivalent Circuit Schematic



- Electrical Characteristics($T_c=25^\circ\text{C}$) (unless otherwise specified)

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D=1\text{mA}$ $V_{GS}=0\text{V}$	60			V
Gate threshold voltage	$V_{GS(th)}$	$I_D=1\text{mA}$ $V_{DS}=V_{GS}$	1.0	1.5	2.5	V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=60\text{V}$ $V_{GS}=0\text{V}$ $T_{ch}=25^\circ\text{C}$		10	500	μA
		$T_{ch}=125^\circ\text{C}$		0.2	1.0	mA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20\text{V}$ $V_{DS}=0\text{V}$		10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D=22.5\text{A}$ $V_{GS}=4\text{V}$		0.024	0.035	Ω
		$V_{GS}=10\text{V}$		0.015	0.022	Ω
Forward transconductance	g_{fs}	$I_D=22.5\text{A}$ $V_{DS}=25\text{V}$	15	30		S
Input capacitance	C_{iss}	$V_{DS}=25\text{V}$		2100	3150	pF
Output capacitance	C_{oss}	$V_{GS}=0\text{V}$		860	1290	
Reverse transfer capacitance	C_{rss}	$f=1\text{MHz}$		490	740	
Turn-on time t_{on} ($t_{on}=t_{d(on)}+t_r$)	$t_{d(on)}$	$V_{CC}=30\text{V}$ $I_D=45\text{A}$ $V_{GS}=10\text{V}$ $R_{GS}=25\Omega$		30	45	ns
	t_r			200	300	
Turn-off time t_{off} ($t_{off}=t_{d(off)}+t_f$)	$t_{d(off)}$			500	750	
	t_f			400	600	
Avalanche capability	I_{AV}	$L=100\mu\text{H}$ $T_{ch}=25^\circ\text{C}$	45			A
Continuous reverse drain current	I_{DR}				45	A
Pulsed reverse drain current	I_{DRM}				180	A
Diode forward on-voltage	V_{SD}	$I_F=2\times I_{DR}$ $V_{GS}=0\text{V}$ $T_{ch}=25^\circ\text{C}$		1.5	2.25	V
Reverse recovery time	t_{rr}	$I_F=I_{DR}$ $V_{GS}=0\text{V}$		100		ns
Reverse recovery charge	Q_{rr}	$-dI_F/dt=100\text{A}/\mu\text{s}$ $T_{ch}=25^\circ\text{C}$		0.5		μC

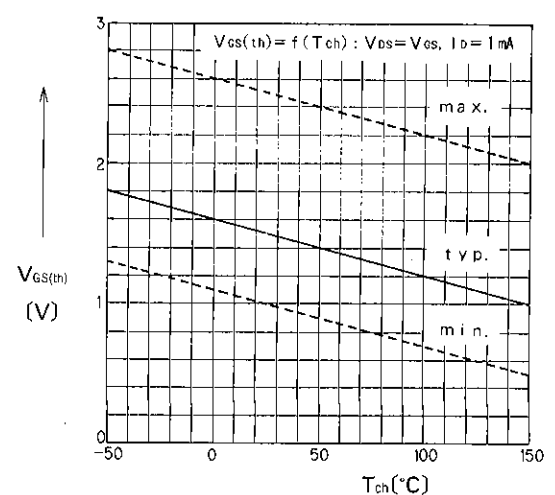
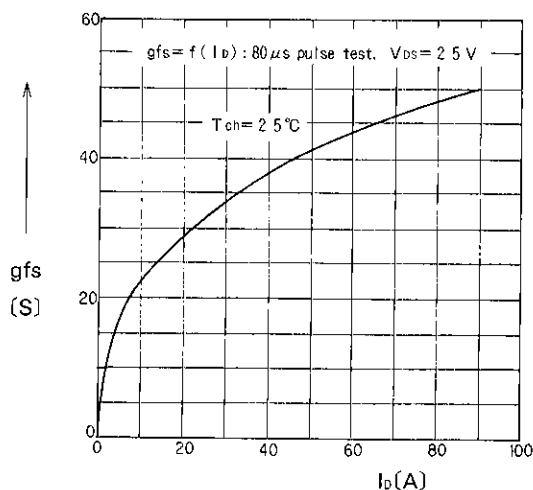
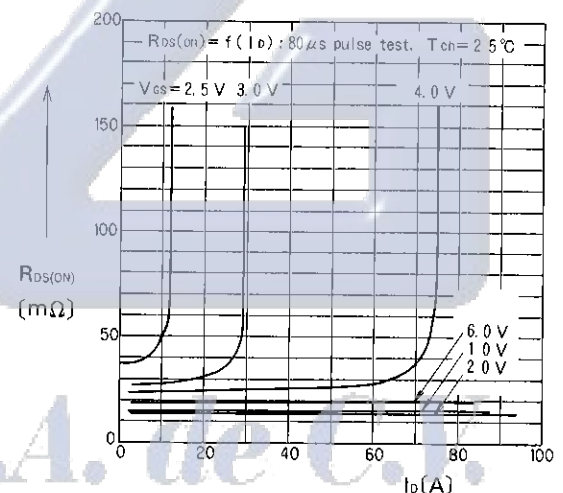
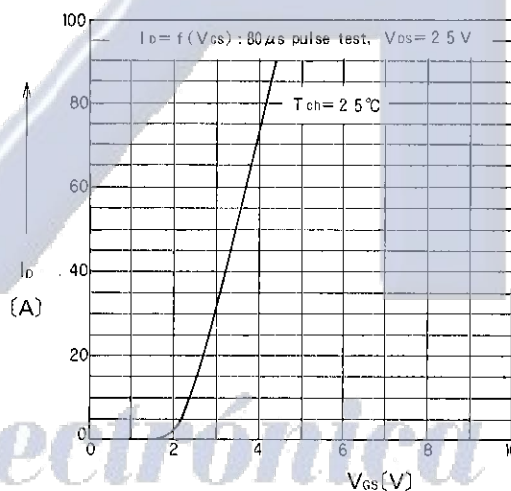
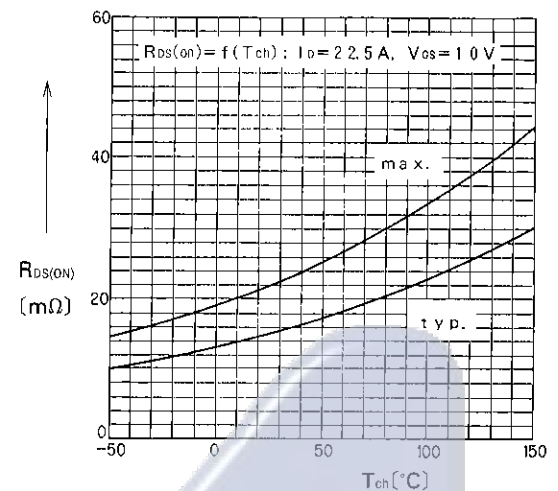
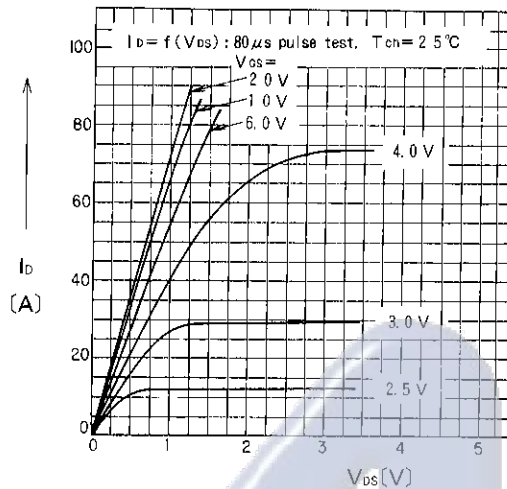
● Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-a)}$	channel to air			62.5	$^\circ\text{C}/\text{W}$
	$R_{th(ch-c)}$	channel to case			2.5	$^\circ\text{C}/\text{W}$

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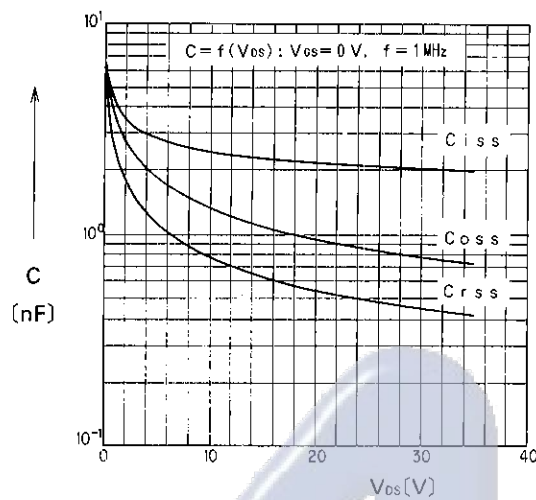
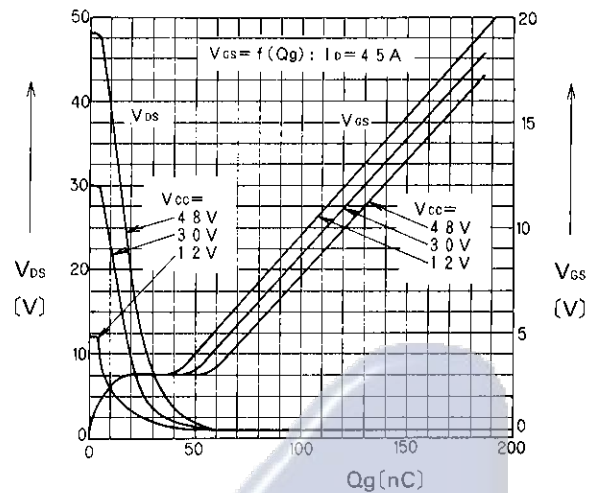
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■ Characteristics

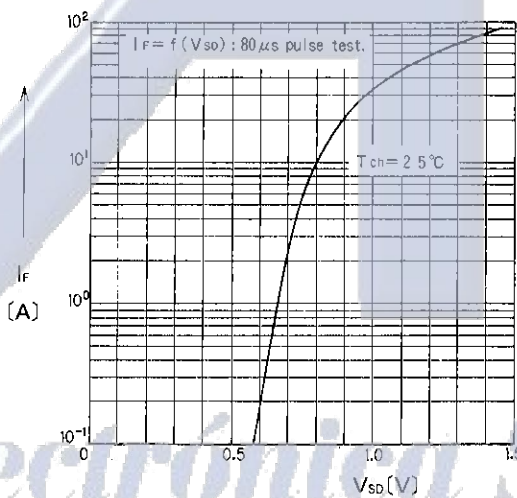


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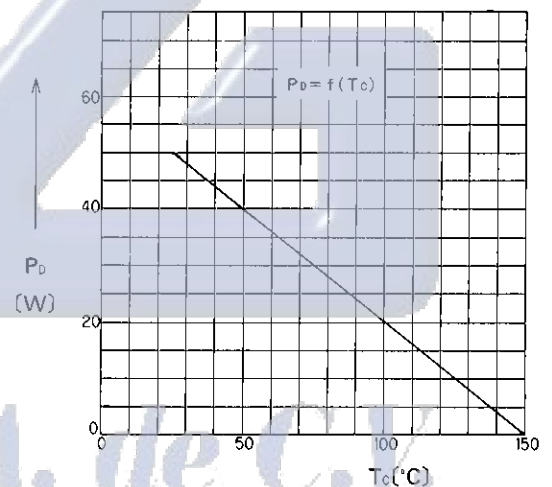
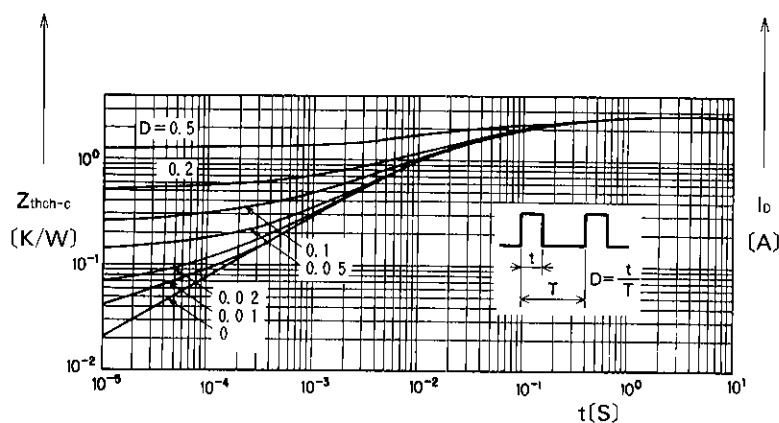
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Typical Capacitances vs. V_{DS} 

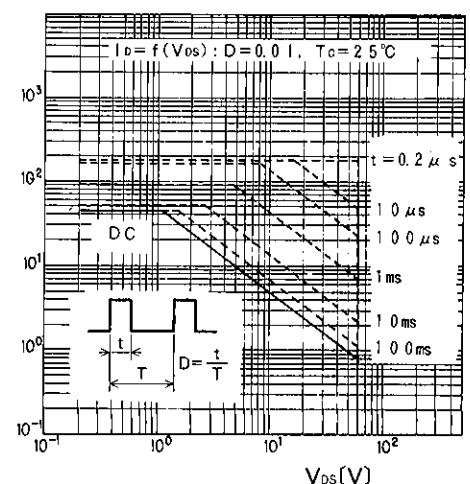
Typical Input Charge



Forward Characteristics of Reverse Diode

Power Dissipation vs. T_C 

Transient Thermal Impedance



Safe Operating Area