

## N-CHANNEL SILICON POWER MOS-FET

## F-I SERIES

### ■ Features

- High speed switching
- Low on-resistance
- No secondary breakdown
- Low driving power
- High voltage

### ■ Applications

- Switching regulators
- UPS
- DC-DC converters
- General purpose power amplifier

### ■ Max. Ratings and Characteristics

#### ● Absolute Maximum Ratings(Tc=25°C)

Items	Symbols	Ratings	Units
Drain-source voltage	$V_{DSS}$	800	V
Continuous drain current	$I_D$	3	A
Pulsed drain current	$I_{D(puls)}$	12	A
Continuous reverse drain current	$I_{DR}$	3	A
Gate-source peak voltage	$V_{GSS}$	$\pm 20$	V
Max. power dissipation	$P_D$	40	W
Operating and storage temperature range	$T_{ch}$	150	°C
	$T_{stg}$	-55 ~ +150	°C

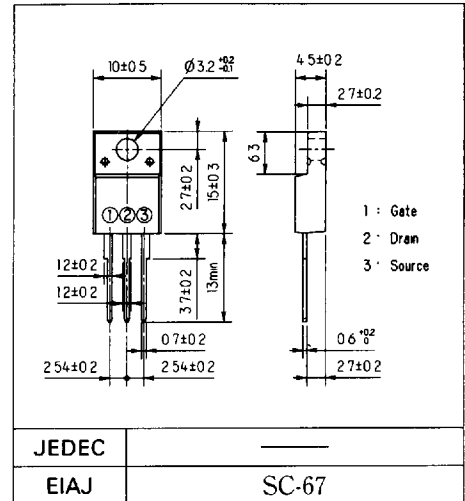
#### ● Electrical Characteristics(Tc=25°C)

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 1mA$ $V_{GS} = 0V$	800			V
Gate threshold voltage	$V_{GS(th)}$	$I_D = 10mA$ $V_{DS} = V_{GS}$	2.1	3.0	4.0	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 800V$ $V_{GS} = 0V$ $T_{ch} = 25^\circ C$		10	500	$\mu A$
Gate-source leakage current	$I_{GSS}$	$V_{GS} = \pm 20V$ $V_{DS} = 0V$		10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D = 1.5A$ $V_{GS} = 10V$		3.0	4.0	$\Omega$
Forward transconductance	$g_{fs}$	$I_D = 1.5A$ $V_{DS} = 25V$	2.0	4.0		S
Input capacitance	$C_{iss}$	$V_{DS} = 25V$		900	1400	pF
Output capacitance	$C_{oss}$	$V_{GS} = 0V$		90	140	
Reverse transfer capacitance	$C_{rss}$	$f = 1MHz$		35	60	
Switching time ( $t_{off} = t_{d(off)} + t_r$ )	$t_{on}$	$V_{CC} = 30V$ $R_G = 50\Omega$		60	90	ns
	$t_{d(off)}$	$I_D = 2.1A$		150	250	
	$t_r$	$V_{GS} = 10V$		60	90	
Diode forward on-voltage	$V_{SD}$	$I_F = 2 \times I_{DR}$ $V_{GS} = 0V$ $T_{ch} = 25^\circ C$		1.0	1.35	V
Reverse recovery time	$t_{rr}$	$I_F = I_{DR}$ $d_i/d_t = 100A/\mu s$ $T_{ch} = 25^\circ C$		400		ns

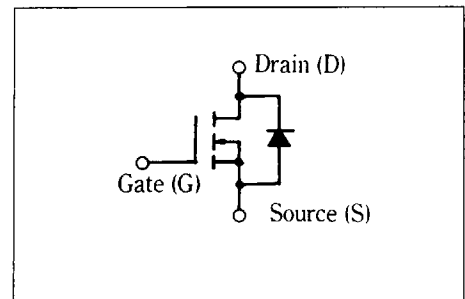
#### ● Thermal Characteristics

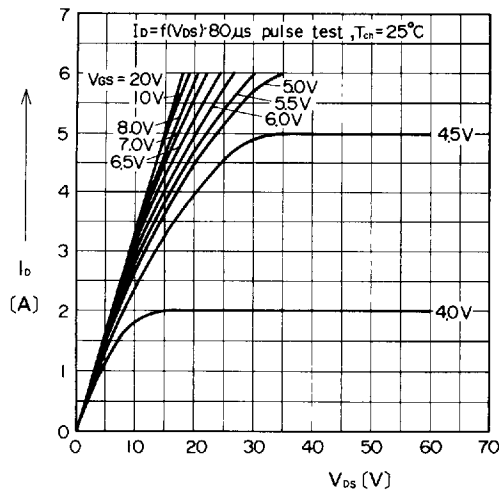
Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(ch-a)}$	channel to air			62.5	°C/W
	$R_{th(ch-c)}$	channel to case			3.125	°C/W

### ■ Outline Drawings

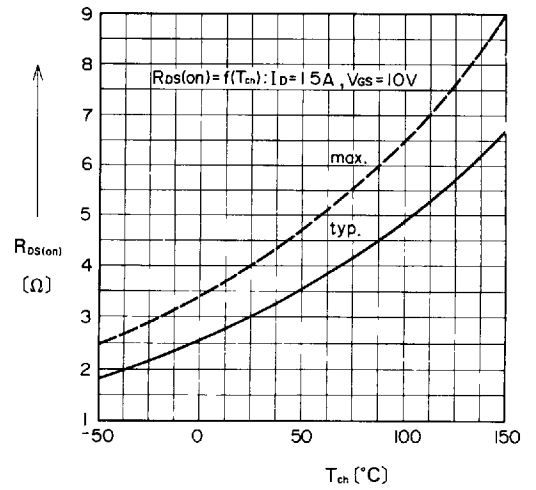


### ■ Equivalent Circuit Schematic

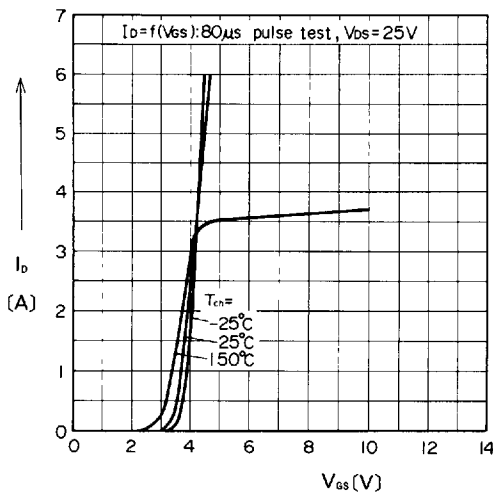




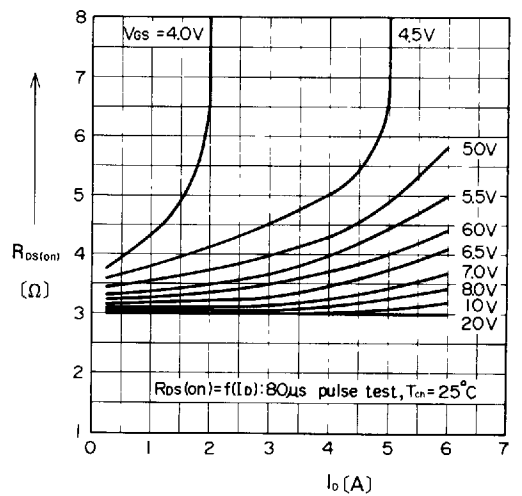
Typical Output Characteristics



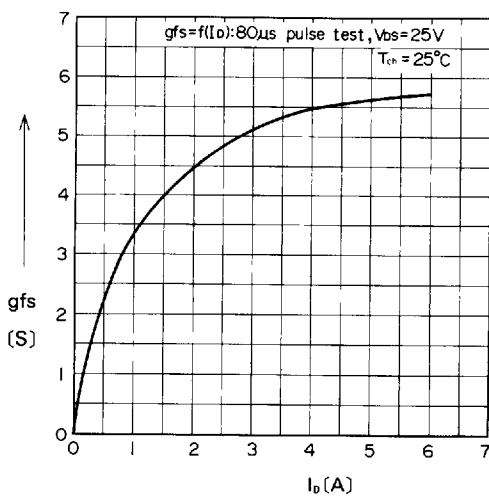
On State Resistance vs.  $T_{ch}$



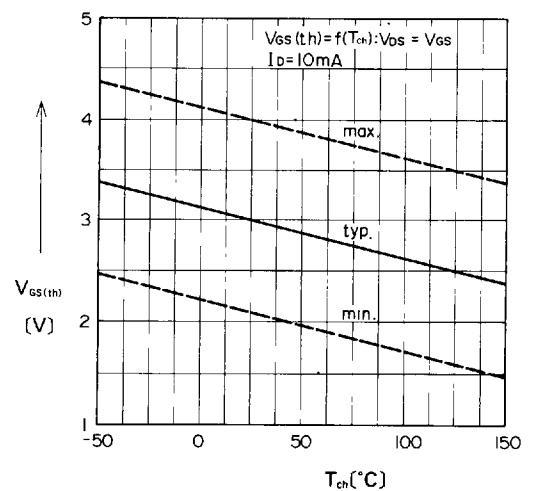
Typical Transfer Characteristic



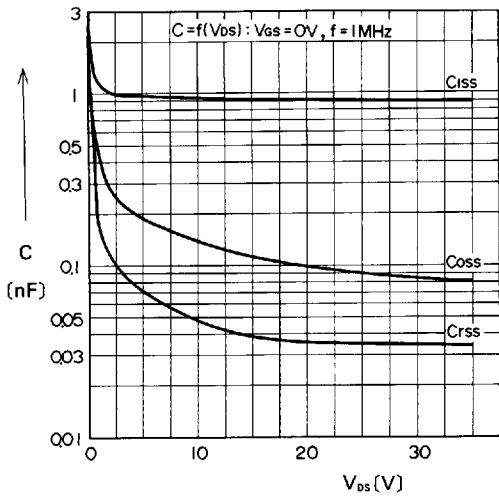
Typical Drain-Source on State Resistance vs.  $I_D$



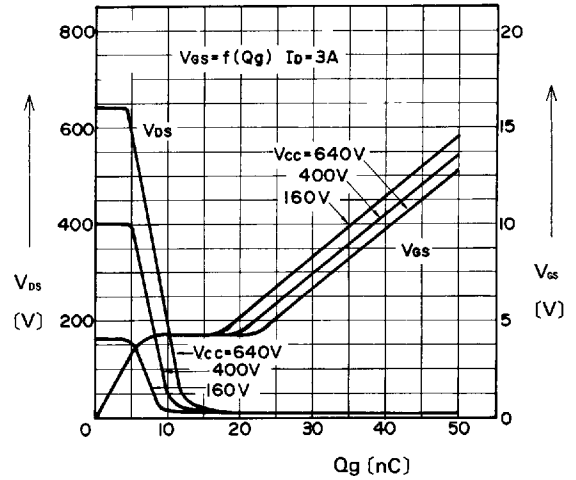
Typical Forward Transconductance vs.  $I_D$



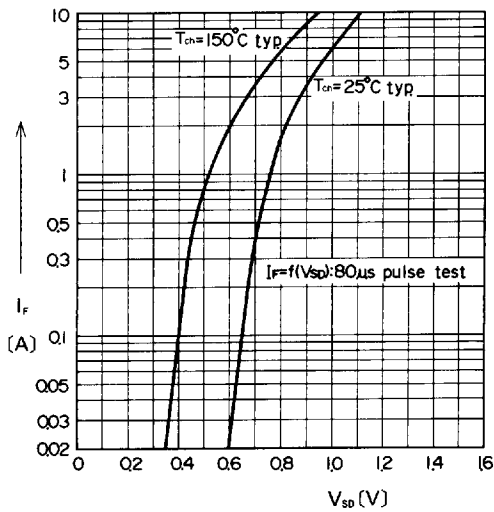
Gate Threshold Voltage vs  $T_{ch}$



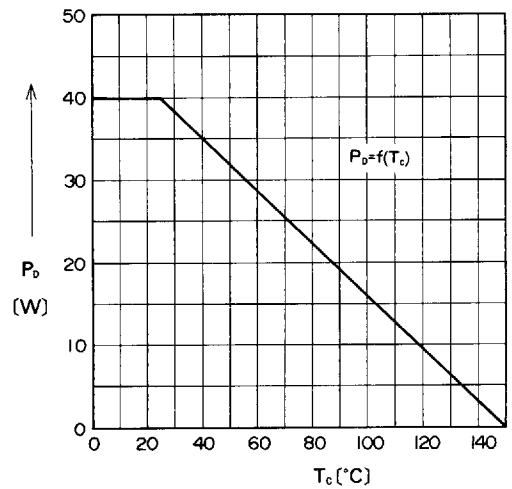
Typical Capacitance vs.  $V_{DS}$



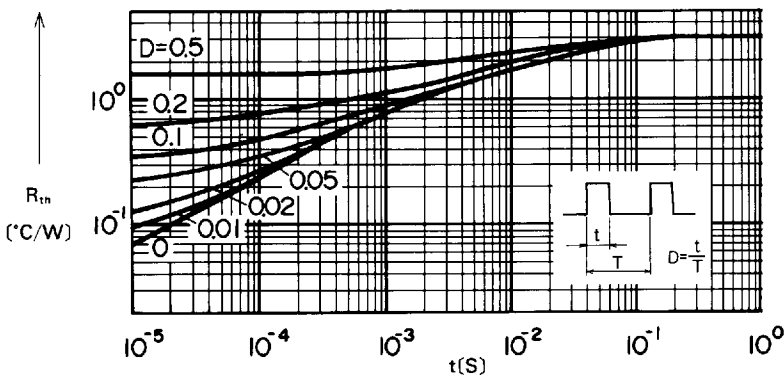
Typical Input Charge



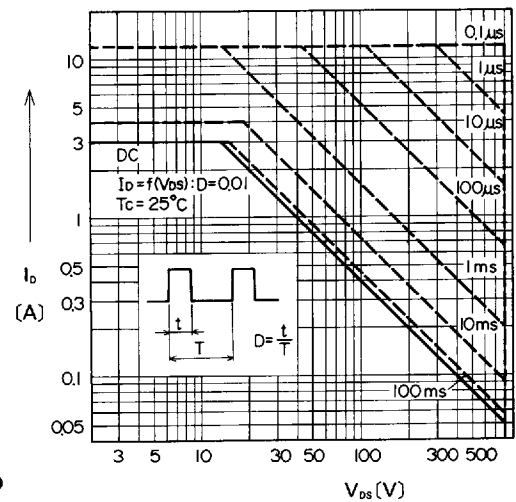
Forward Characteristics of Reverse Diode



Allowable Power Dissipation vs.  $T_C$



Transient Thermal Impedance



Safe Operating Area