

N-CHANNEL SILICON POWER MOS-FET

F-III SERIES

Features

- High current
- Low no-resistance
- No secondary breakdown
- Low driving power
- High forward Transconductance

Applications

- Motor controllers
- Genaral purpose power amplifier
- DC-DC converters

Max. Ratings and Characteristics

Absolute Maximum Ratings(Tc=25°C)

Items	Symbols	Ratings	Units
Drain-source voltage	V_{DSS}	60	V
Continuous drain current	I_D	35	A
Pulsed drain current	$I_{D(puls)}$	140	A
Continuous reverse drain current	I_{DR}	35	A
Gate-source peak voltage	V_{GSS}	± 20	V
Max. power dissipation	P_D	50	W
Operating and storage temperature range	T_{ch} T_{stg}	150 $-55 \sim +150$	$^{\circ}C$

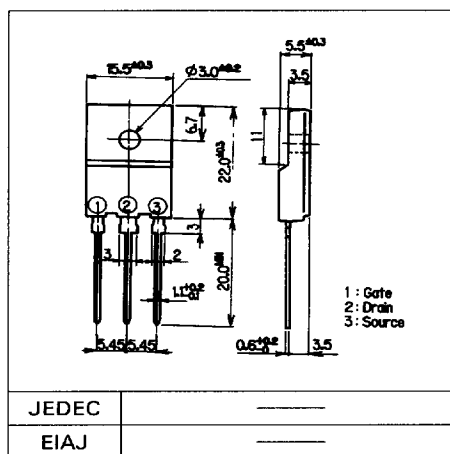
Electrical Characteristics(Tc=25°C)

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 1mA$ $V_{GS} = 0V$	60			V
Gate threshold voltage	$V_{GS(th)}$	$I_D = 1mA$ $V_{DS} = V_{GS}$	1.0	1.5	2.5	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 60V$ $V_{GS} = 0V$ $T_{ch} = 25^{\circ}C$		10	500	μA
		$T_{ch} = 125^{\circ}C$		0.2	1.0	mA
Gate-source leakage current	I_{GSS}	$V_{GS} = \pm 20V$ $V_{DS} = 0V$		10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D = 17.5A$ $V_{GS} = 4V$		37	56	m Ω
		$I_D = 17.5A$ $V_{GS} = 10V$		25	35	m Ω
Forward transconductance	g_{fs}	$I_D = 17.5A$ $V_{DS} = 25V$	10	18		S
Input capacitance	C_{iss}	$V_{DS} = 25V$		1800	2700	pF
Output capacitance	C_{oss}	$V_{GS} = 0V$		620	930	
Reverse transfer capacitance	C_{rss}	$f = 1MHz$		240	360	
Turn-on time t_{on} ($t_{on} = t_{d(on)} + t_r$)	$t_{d(on)}$	$V_{CC} = 30V$ $I_D = 35A$ $V_{GS} = 10V$ $R_G = 25\Omega$		6	9	ns
	t_r			60	90	
Turn-off time t_{off} ($t_{off} = t_{d(off)} + t_f$)	$t_{d(off)}$			350	530	
	t_f			150	230	
Diode forward on-voltage	V_{SD}	$I_F = 2 \times I_{DR}$ $V_{GS} = 0V$ $T_{ch} = 25^{\circ}C$		1.35	2.0	V
Reverse recovery time	t_{rr}	$I_F = I_{DR}$ $d_i/d_t = 100A/\mu s$ $T_{ch} = 25^{\circ}C$		60		ns

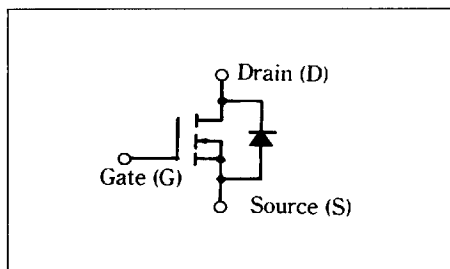
Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-a)}$	channel to air			30.0	$^{\circ}C/W$
	$R_{th(ch-c)}$	channel to case			3.125	$^{\circ}C/W$

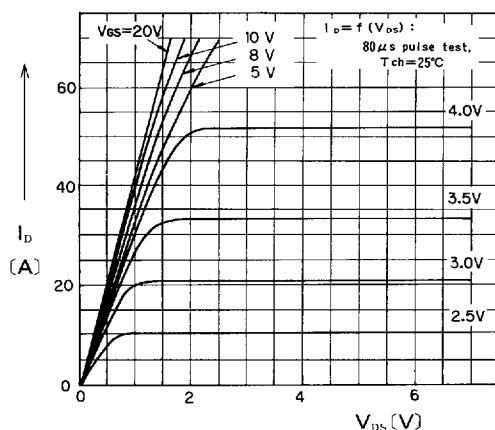
Outline Drawings



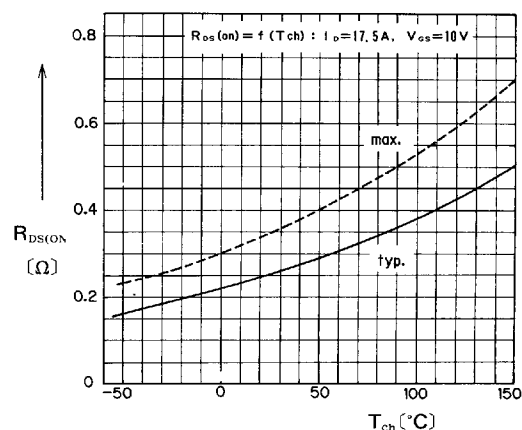
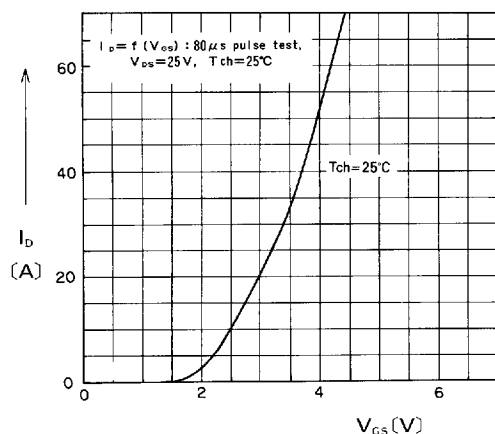
Equivalent Circuit Schematic



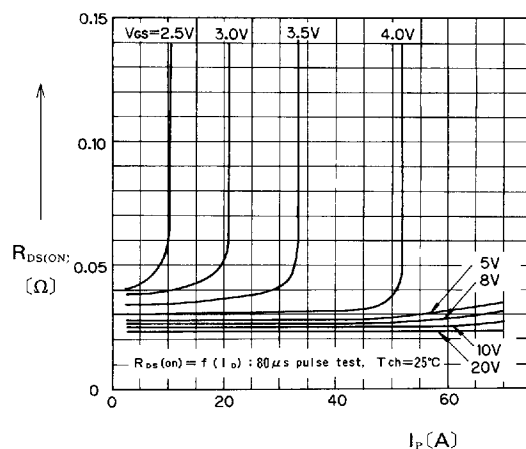
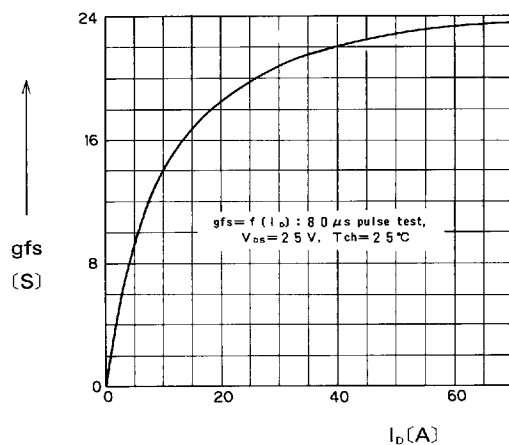
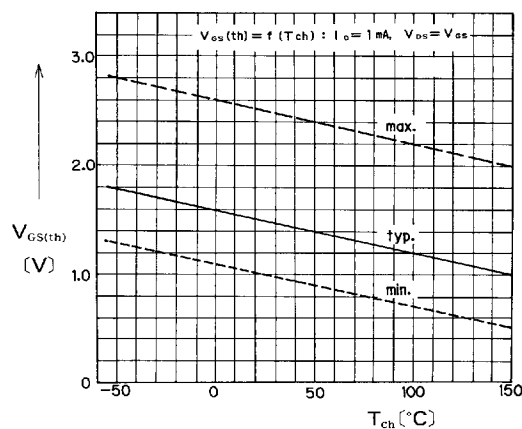
■ Characteristics

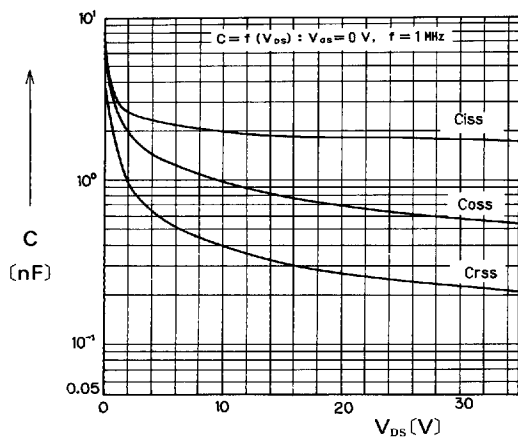
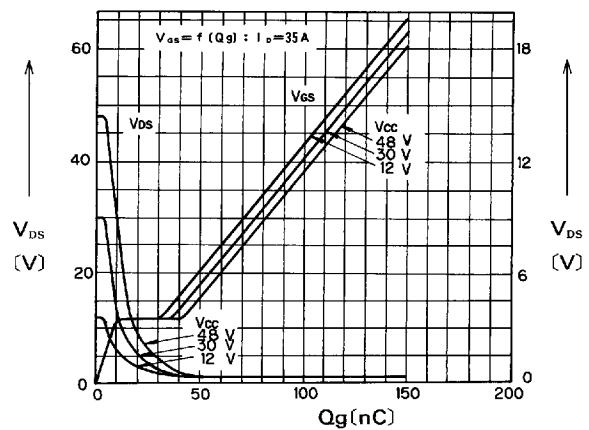


Typical Output Characteristics

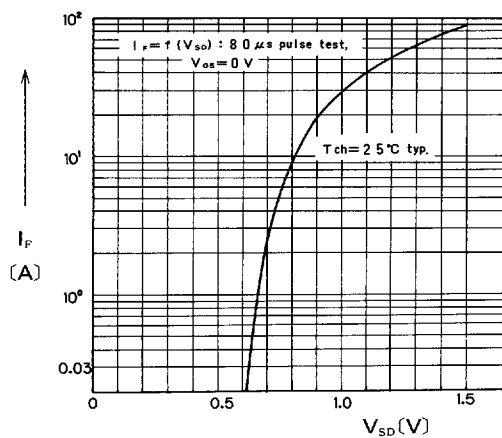
On State Resistance vs. T_{ch} 

Typical Transfer Characteristics

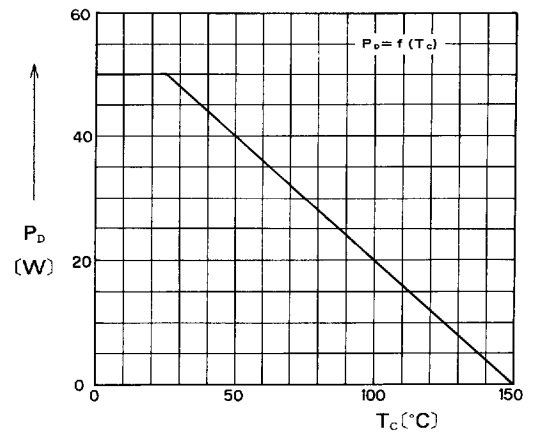
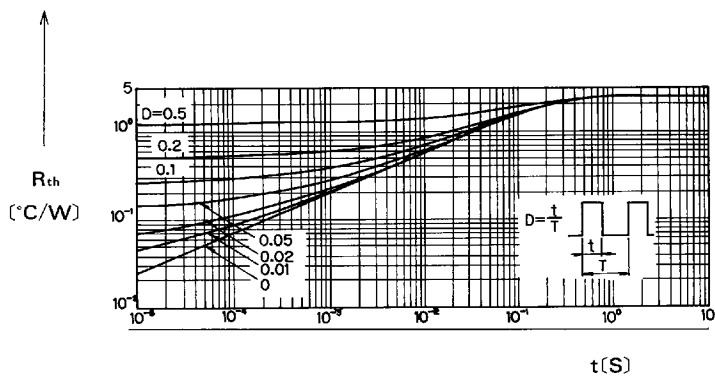
Typical Drain-Source on State Resistance vs. I_D Typical Forward Transconductance vs. I_D Gate Threshold Voltage vs. T_{ch}

Typical Capacitance vs. V_{DS} 

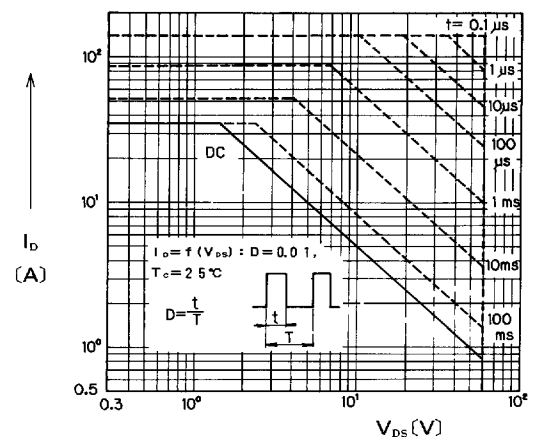
Typical Input Charge



Forward Characteristics of Reverse Diode

Allowable Power Dissipation vs. T_C 

Transient Thermal Impedance



Safe Operating Area