

N-CHANNEL ENHANCEMENT TYPE MOS-FET

F-V SERIES

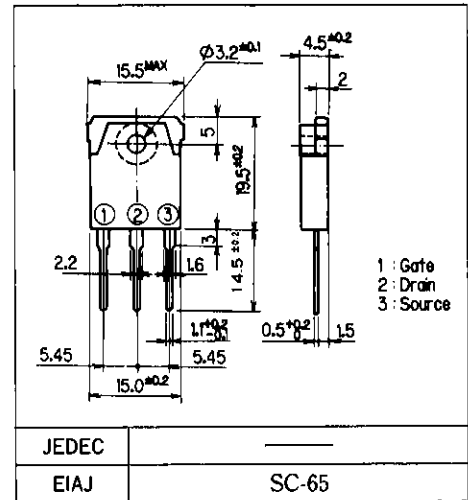
Features

- Include fast recovery diode
- High voltage
- Low driving power

Applications

- Motor controllers
- Inverters
- Choppers

Outline Drawings

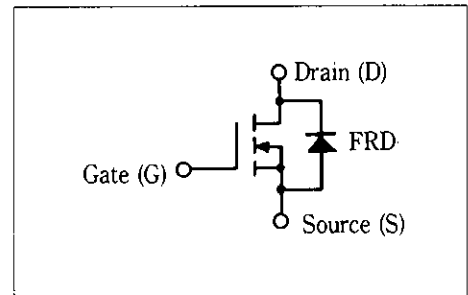


Max. Ratings and Characteristics

Absolute Maximum Ratings (T_c = 25°C)

Items	Symbols	Ratings	Units
Drain-source voltage	V _{DS}	250	V
Continuous drain current	I _D	30	A
Pulsed drain current	I _{D(puls)}	120	A
Continuous reverse drain current	I _{DR}	30	A
Gate-source peak voltage	V _{GSS}	±20	V
Max. power dissipation	P _D	150	W
Operating and storage temperature range	T _{ch}	150	°C
	T _{stg}	-55 ~ +150	°C

Equivalent Circuit Schematic



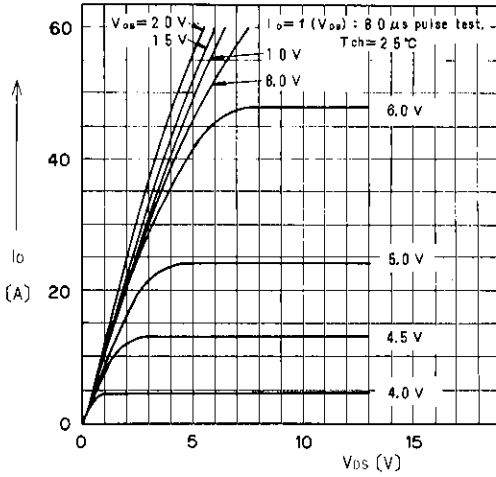
Electrical Characteristics (T_c = 25°C)

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	V _{(BR)DS}	I _D = 1mA V _{GS} = 0V	250			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} = 250V V _{GS} = 0V T _{ch} = 25°C		10	500	μA
Gate-source leakage current	I _{GSS}	V _{GS} = ±20V V _{DS} = 0V		10	100	nA
Drain-source on-state resistance	R _{DS(on)}	I _D = 15A V _{GS} = 10V		0.09	0.12	Ω
Forward transconductance	g _{fs}	I _D = 15A V _{DS} = 25V	10	20		S
Input capacitance	C _{iss}	V _{DS} = 25V		2400	3600	pF
Output capacitance	C _{oss}	V _{GS} = 0V		500	750	
Reverse transfer capacitance	C _{rss}	f = 1MHz		280	420	
Turn-on time t _{on} (t _{on} = t _{d(on)} + t _r)	t _{d(on)}	V _{CC} = 150V R _G = 25Ω I _D = 30A V _{GS} = 10V		35	50	ns
	t _r			140	210	
Turn-off time t _{off} (t _{off} = t _{d(off)} + t _f)	t _{d(off)}			420	630	
	t _f			180	270	
Diode forward on-voltage	V _{SD}	I _F = I _{DR} V _{GS} = 0V T _{ch} = 25°C		0.90	1.8	V
Reverse recovery time	t _{rr}	I _F = I _{DR} di/dt = 100A/μs T _{ch} = 25°C		100	150	ns

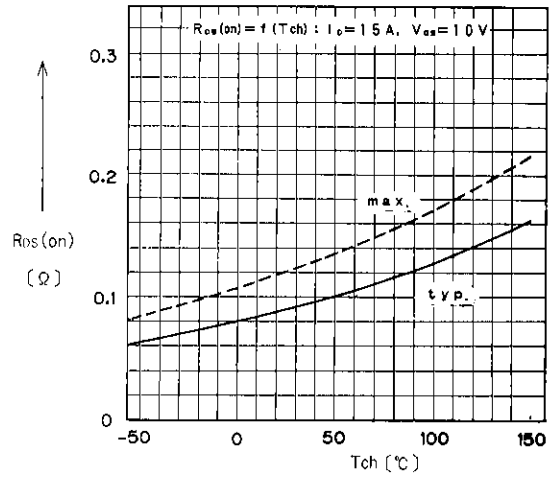
Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	R _{th(ch-a)}	channel to air			35.0	°C/W
	R _{th(ch-c)}	channel to case			0.83	°C/W

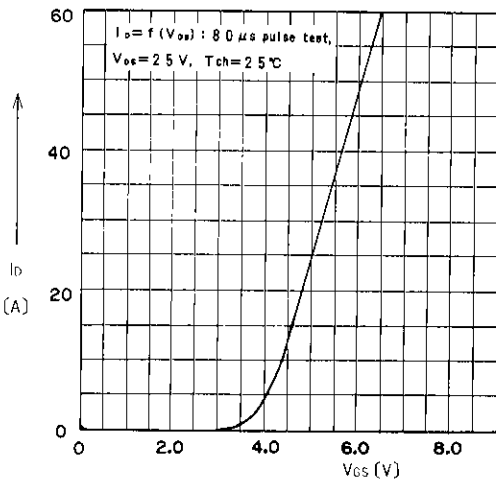
■ Characteristics



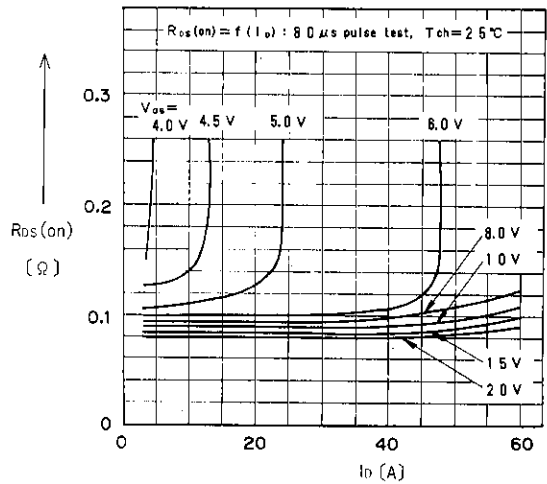
Typical Output Characteristics



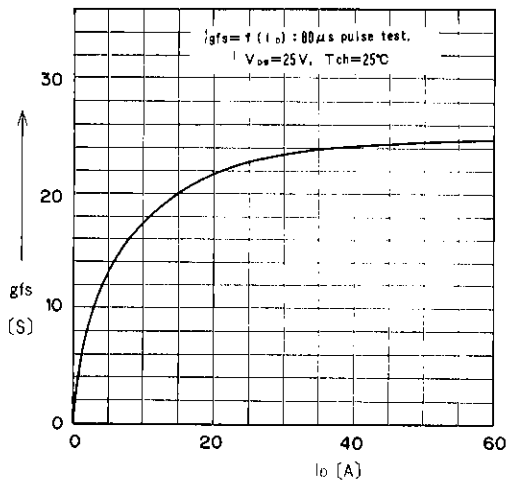
Drain-Source on State Resistance vs. Tch



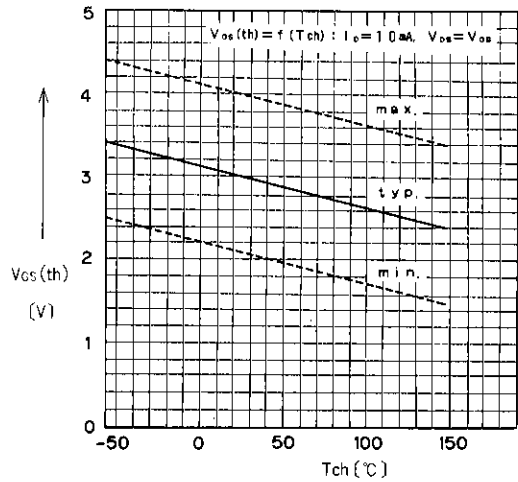
Typical Transfer Characteristic



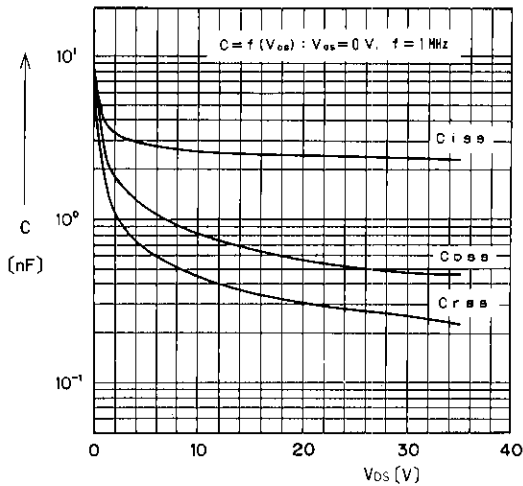
Typical Drain Source on State Resistance vs. Id



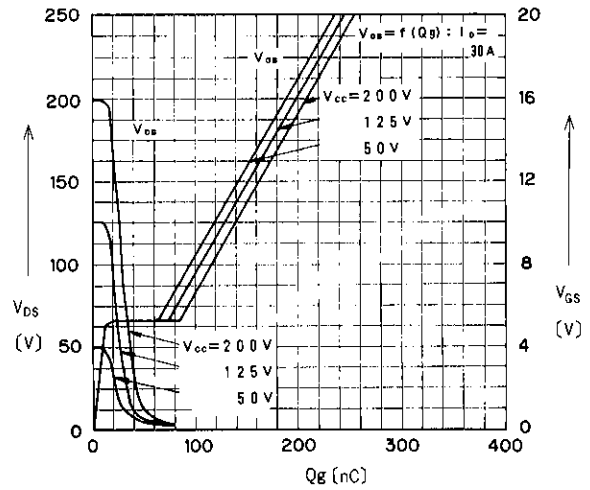
Typical Forward Transconductance vs. Id



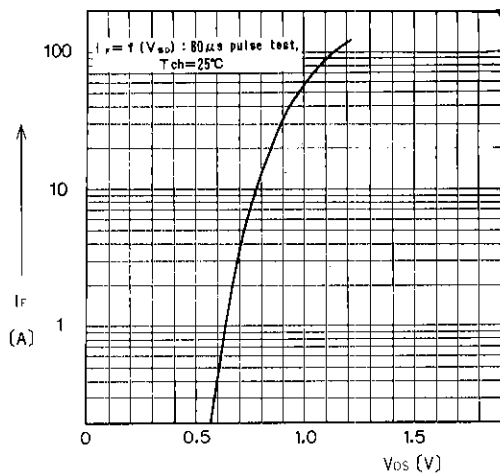
Gate Threshold Voltage vs. Tch



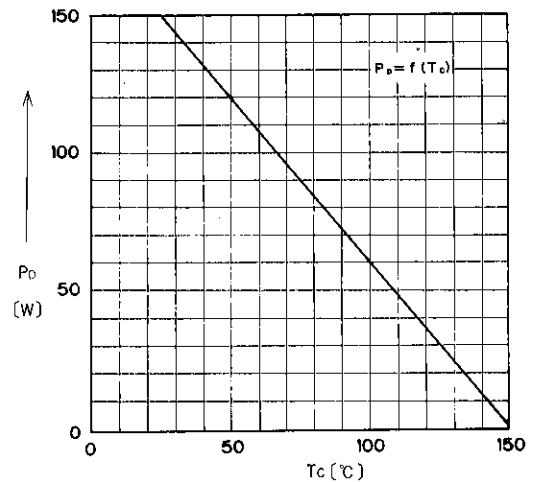
Typical Capacitance vs. V_{DS}



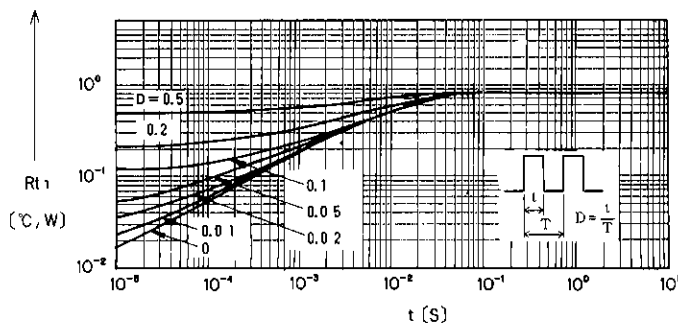
Dynamic Input Characteristics



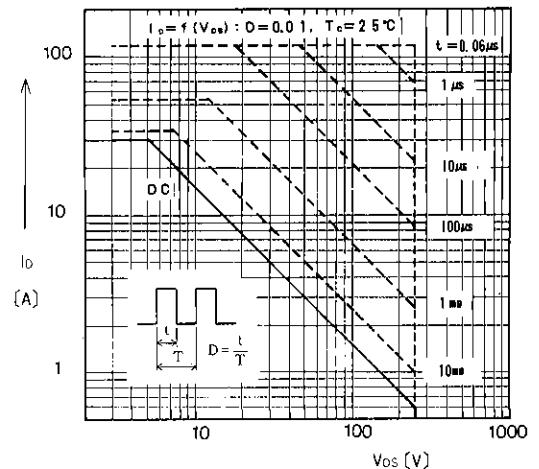
Forward Characteristics of Reverse Diode



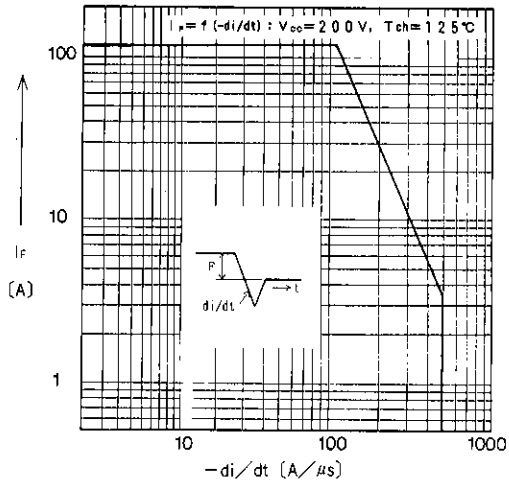
Power vs. Temperature Derating



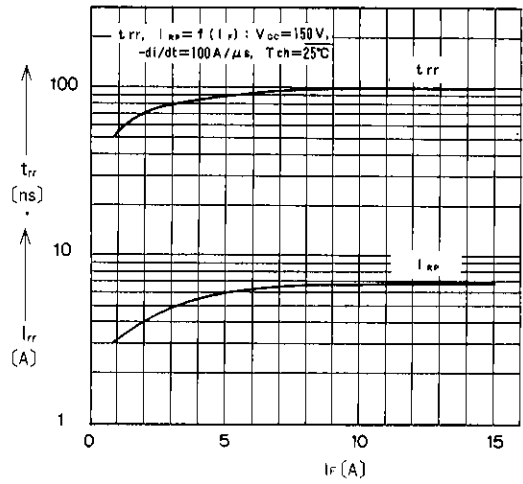
Transient Thermal Impedance



Safe Operating Area



IF-di/dt Characteristics of Reverse Diode



Reverse Recovery Characteristics