

## N-CHANNEL SILICON POWER MOSFET

## F- I SERIES

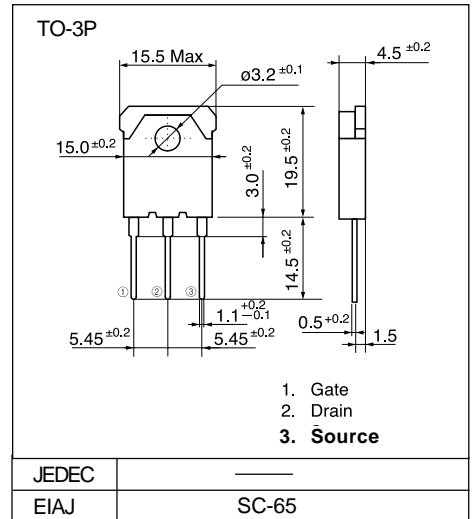
### ■ Features

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

### ■ Applications

- Switching regulators
- UPS (Uninterruptible Power Supply)
- DC-DC converters
- General purpose power amplifier

### ■ Outline Drawings

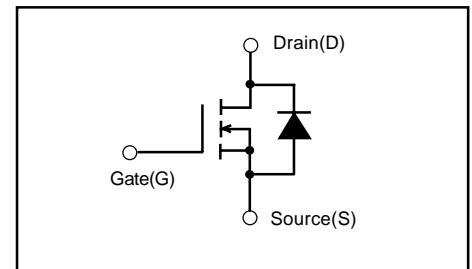


### ■ Maximum ratings and characteristics

#### ● Absolute maximum ratings (T<sub>c</sub>=25°C unless otherwise specified)

Item	Symbol	Rating	Unit
Drain-source voltage	V <sub>DS</sub>	500	V
Continuous drain current	I <sub>D</sub>	18	A
Pulsed drain current	I <sub>D(puls)</sub>	72	A
Continuous reverse drain current	I <sub>DR</sub>	18	A
Gate-source peak voltage	V <sub>GS</sub>	±20	V
Max. power dissipation	P <sub>D</sub>	125	W
Operating and storage temperature range	T <sub>ch</sub> T <sub>stg</sub>	+150 -55 to +150	°C

### ■ Equivalent circuit schematic



#### ● Electrical characteristics (T<sub>c</sub> =25°C unless otherwise specified)

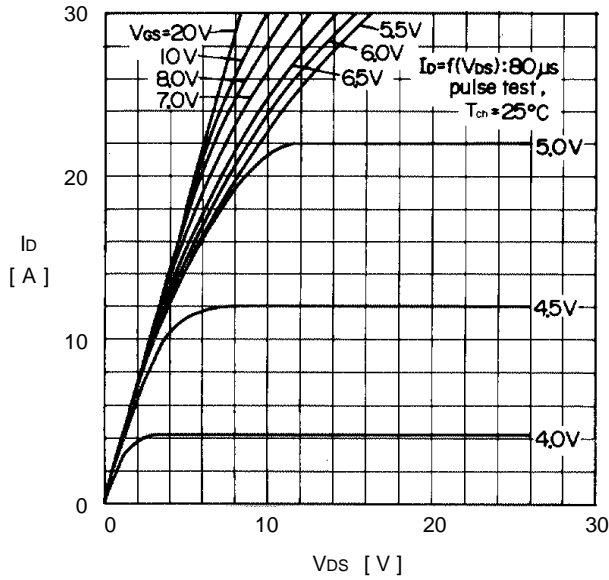
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> =1mA V <sub>GS</sub> =0V	500			V
Gate threshold voltage	V <sub>GS(th)</sub>	I <sub>D</sub> =10mA V <sub>DS</sub> =V <sub>GS</sub>	2.1	3.0	4.0	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =500V V <sub>GS</sub> =0V T <sub>ch</sub> =25°C		10	500	μA
Gate-source leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V V <sub>DS</sub> =0V		10	100	nA
Drain-source on-state resistance	R <sub>DS(on)</sub>	I <sub>D</sub> =8A V <sub>GS</sub> =10V		0.28	0.33	Ω
Forward transconductance	g <sub>fs</sub>	I <sub>D</sub> =8A V <sub>DS</sub> =25V	8.0	16.0		S
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V		2600	4000	pF
Output capacitance	C <sub>oss</sub>	V <sub>GS</sub> =0V		330	500	pF
Reverse transfer capacitance	C <sub>rss</sub>	f=1MHz		130	200	pF
Switching time (t <sub>off</sub> =t <sub>d(off)</sub> +t <sub>r</sub> )	t <sub>on</sub> t <sub>d(off)</sub> t <sub>r</sub>	V <sub>CC</sub> =30V R <sub>G</sub> =50 Ω I <sub>D</sub> =2.8A V <sub>GS</sub> =10V		130 330 110	195 430 140	ns
Diode forward on-voltage	V <sub>SD</sub>	I <sub>F</sub> =2×I <sub>DR</sub> V <sub>GS</sub> =0V T <sub>ch</sub> =25°C		1.0	1.7	V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =I <sub>DR</sub> di/dt=100A/μs T <sub>ch</sub> =25°C		600		ns

#### ● Thermal characteristics

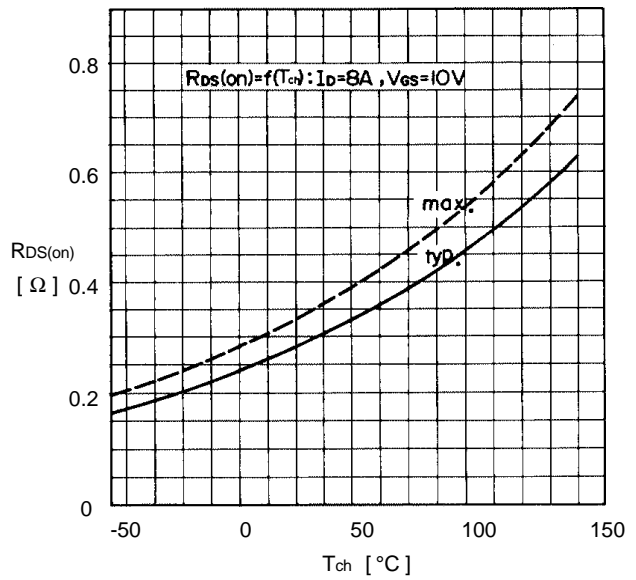
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	R <sub>th(ch-a)</sub>	channel to ambient			35	°C/W
	R <sub>th(ch-c)</sub>	channel to case			1.0	°C/W

Characteristics

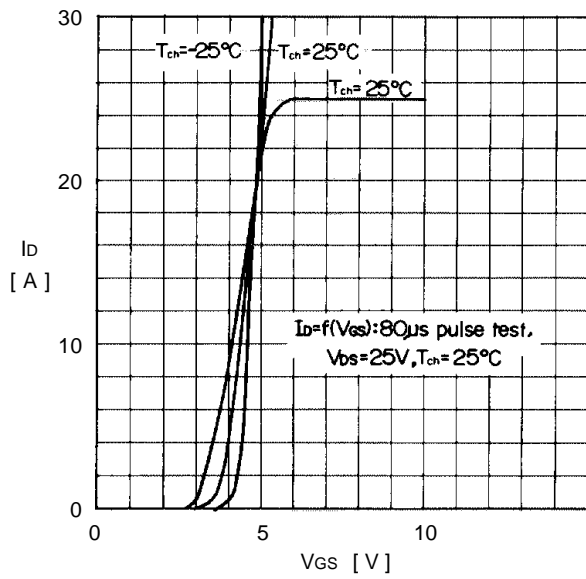
Typical output characteristics



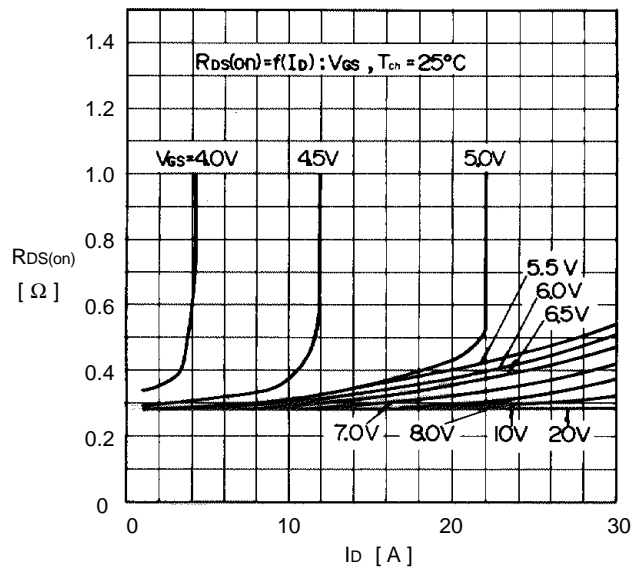
On state resistance vs.  $T_{ch}$



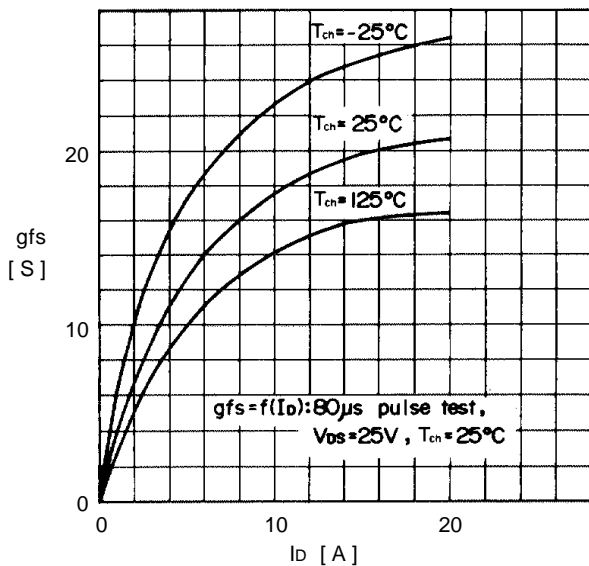
Typical transfer characteristics



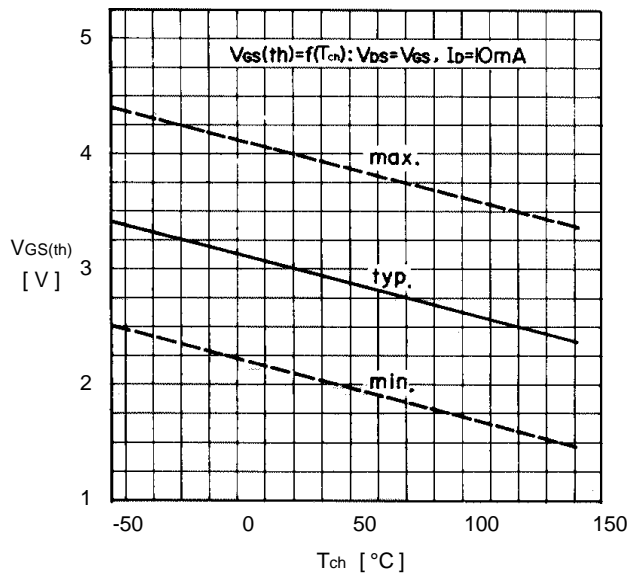
Typical Drain-Source on state resistance vs.  $I_D$



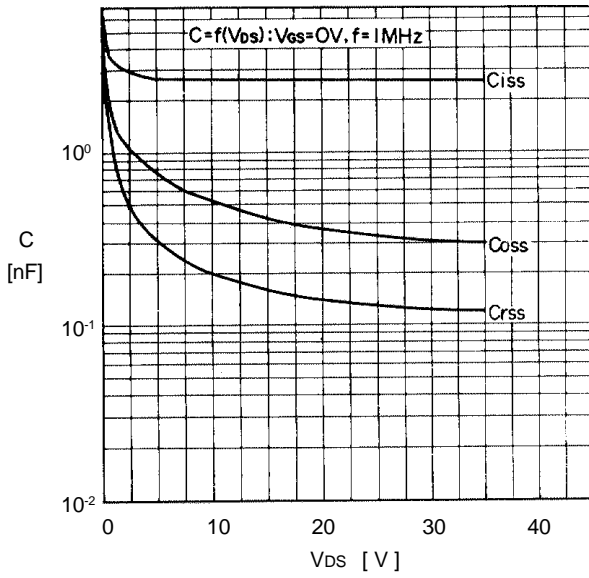
Typical forward transconductance vs.  $I_D$



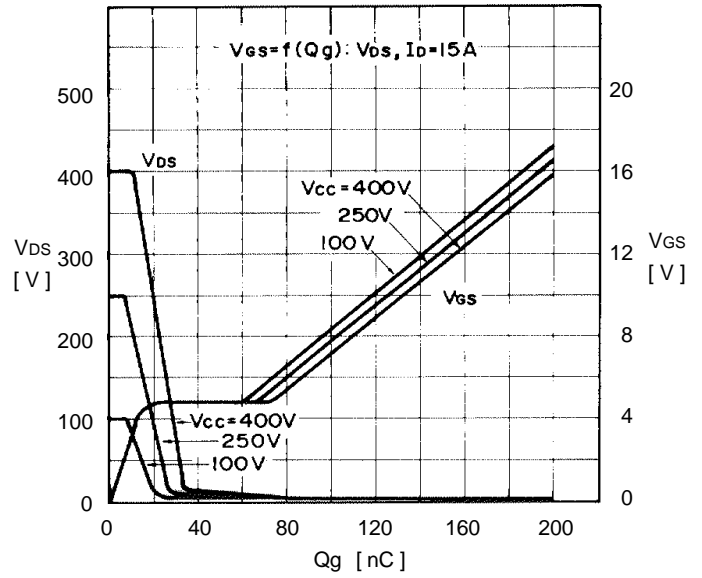
Gate threshold voltage vs.  $T_{ch}$



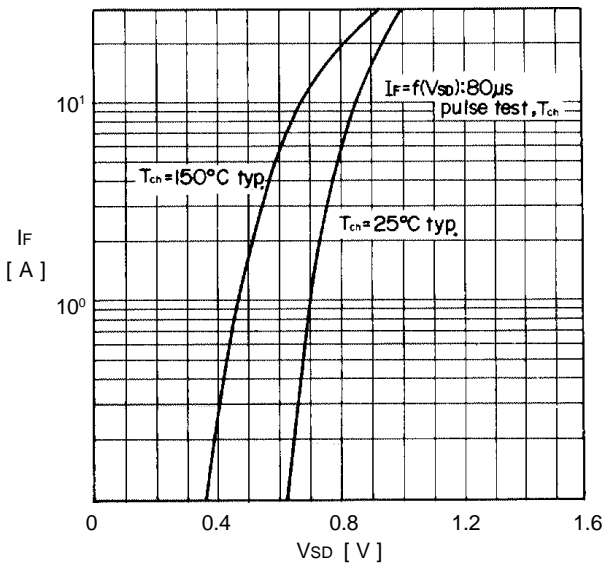
Typical capacitance vs.  $V_{DS}$



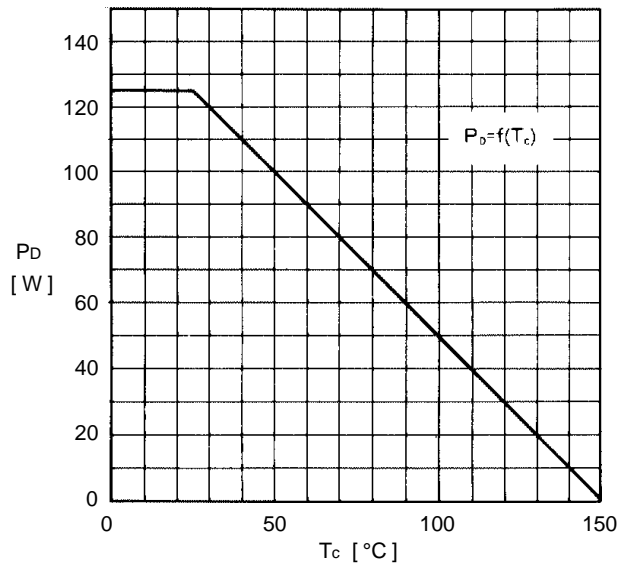
Typical input charge



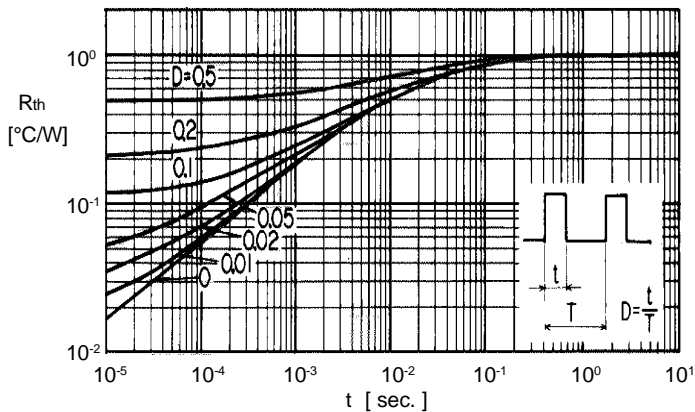
Forward characteristics of reverse diode



Allowable power dissipation vs.  $T_c$



Transient thermal impedance



Safe operating area

