

> Features

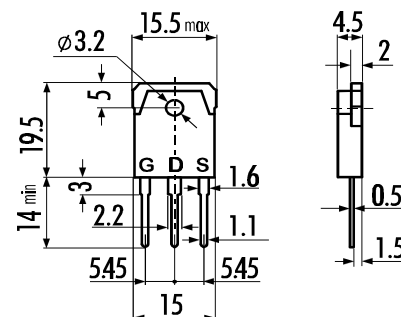
- High Current
- Low On-Resistance
- No Secondary Breakdown
- Low Driving Power
- Avalanche Rated

> Applications

- Motor Control
- General Purpose Power Amplifier
- DC-DC converters

> Outline Drawing

TO-3P



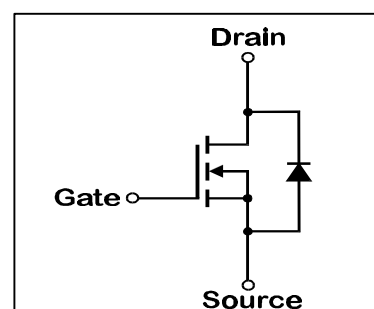
> Maximum Ratings and Characteristics

- Absolute Maximum Ratings (Tc=25°C), unless otherwise specified

Item	Symbol	Rating	Unit
Drain-Source-Voltage	V_{DS}	60	V
Continuous Drain Current	I_D	± 100	A
Pulsed Drain Current	$I_{D(puls)}$	± 400	A
Gate-Source-Voltage	V_{GS}	+30 /-20	V
Maximum Avalanche Energy	E_{AV}	490.4	mJ*
Max. Power Dissipation	P_D	155	W
Operating and Storage Temperature Range	T_{ch}	150	°C
	T_{sta}	-55 ~ +150	°C

* $L=0,65.4\mu H$, $V_{CC}=24V$

> Equivalent Circuit



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

Item	Symbol	Test conditions		Min.	Typ.	Max.	Unit
Drain-Source Breakdown-Voltage	V_{DSS}	$I_D=1mA$	$V_{GS}=0V$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$I_D=10mA$	$V_{DS}=V_{GS}$	2,5	3,0	3,5	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V$	$T_{ch}=25^{\circ}C$		1,0	100,0	μA
		$V_{GS}=0V$	$T_{ch}=125^{\circ}C$		10,0	500,0	μA
Gate Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V$	$V_{DS}=0V$		10	100	nA
Drain Source On-State Resistance	$R_{DS(on)}$	$I_D=40A$	$V_{GS}=40V$		5,0	6,5	m Ω
Forward Transconductance	g_{fs}	$I_D=40A$	$V_{DS}=10V$	25	50		S
Input Capacitance	C_{iss}	$V_{DS}=25V$			9000		pF
Output Capacitance	C_{oss}	$V_{GS}=0V$			1250		pF
Reverse Transfer Capacitance	C_{rss}	$f=1MHz$			700		pF
Turn-On-Time t_{on} ($t_{on}=t_{d(on)}+t_r$)	$t_{d(on)}$	$V_{CC}=30V$			50		ns
	t_r	$V_{GS}=10V$			200		ns
Turn-Off-Time t_{off} ($t_{on}=t_{d(off)}+t_f$)	$t_{d(off)}$	$ID=80A$			150		ns
	t_f	$R_{GS}=10\ \Omega$			135		ns
Avalanche Capability	I_{AV}	$L = 100\mu H$	$T_{ch}=25^{\circ}C$	100			A
Diode Forward On-Voltage	V_{SD}	$I_F=80A\ V_{GS}=0V\ T_{ch}=25^{\circ}C$			1,0	1,5	V
Reverse Recovery Time	t_{rr}	$I_F=50A\ V_{GS}=0V$			85		ns
Reverse Recovery Charge	Q_{rr}	$-di_F/dt=100A/\mu s\ T_{ch}=25^{\circ}C$			0,25		μC

- Thermal Characteristics

Item	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Thermal Resistance	$R_{th(ch-a)}$	channel to ambient			35,0	°C/W
	$R_{th(ch-c)}$	channel to case			0,806	°C/W

N-channel MOS-FET			
60V	6,5mΩ	±80A	135W

2SK3271-01

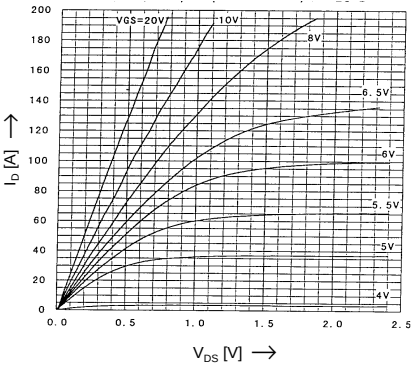
Trench Gate MOSFET



> Characteristics

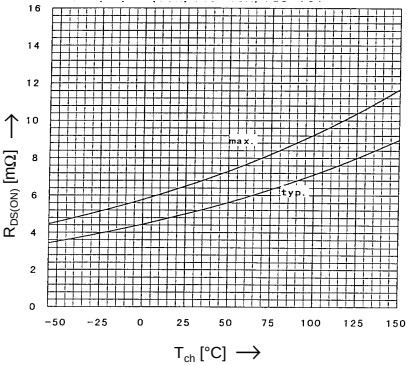
Typical Output Characteristics

$I_D=f(V_{DS})$; 80μs pulse test; $T_C=25^{\circ}\text{C}$



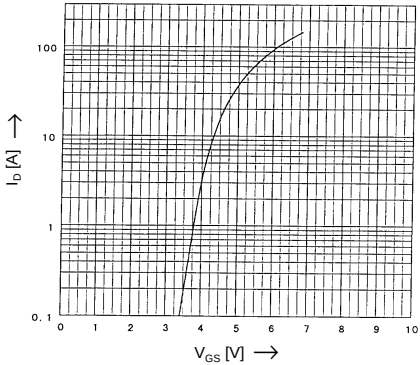
Drain-Source On-State Resistance vs. T_{ch}

$R_{DS(on)} = f(T_{ch})$; $I_D=25\text{A}$; $V_{GS}=10\text{V}$



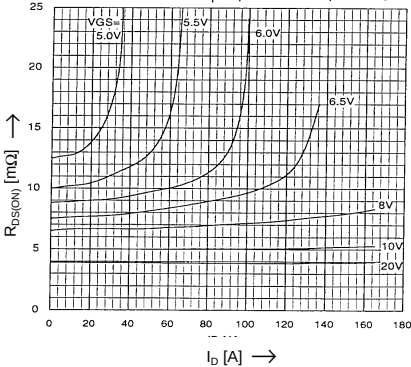
Typical Transfer Characteristics

$I_D=f(V_{GS})$; 80μs pulse test; $V_{DS}=25\text{V}$; $T_{ch}=25^{\circ}\text{C}$



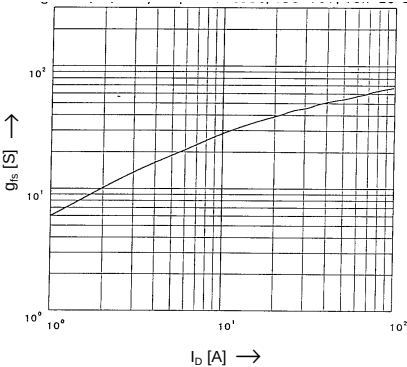
Typical Drain-Source On-State-Resistance vs. I_D

$R_{DS(on)}=f(I_D)$; 80μs pulse test; $T_C=25^{\circ}\text{C}$



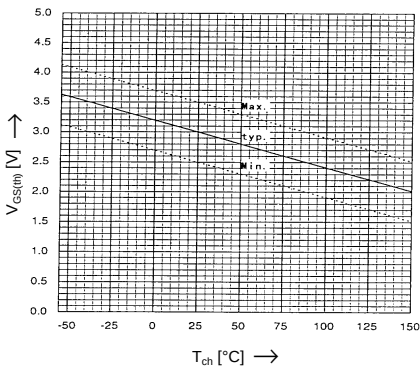
Typical Forward Transconductance vs. I_D

$g_{fs}=f(I_D)$; 80μs pulse test; $V_{DS}=25\text{V}$; $T_{ch}=25^{\circ}\text{C}$



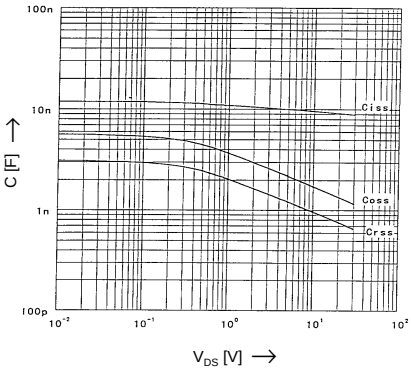
Gate Threshold Voltage vs. T_{ch}

$V_{GS(th)}=f(T_{ch})$; $I_D=1\text{mA}$; $V_{DS}=V_{GS}$



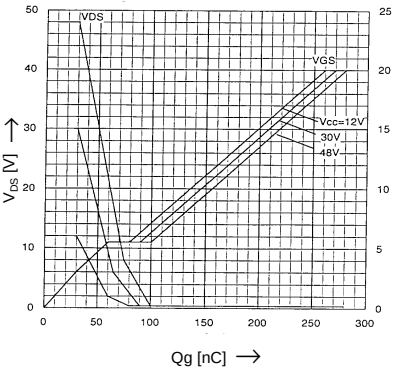
Typical Capacitances vs. V_{DS}

$C=f(V_{DS})$; $V_{GS}=0\text{V}$; $f=1\text{MHz}$



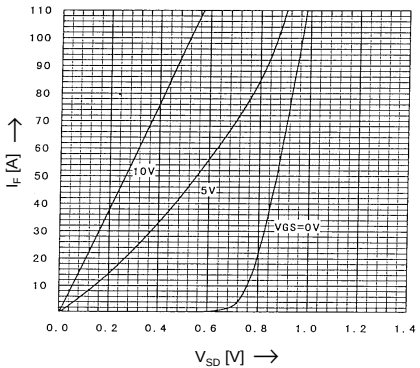
Typical Gate Charge Characteristic

$V_{GS}=f(Q_g)$; $I_D=80\text{A}$; $T_{ch}=25^{\circ}\text{C}$



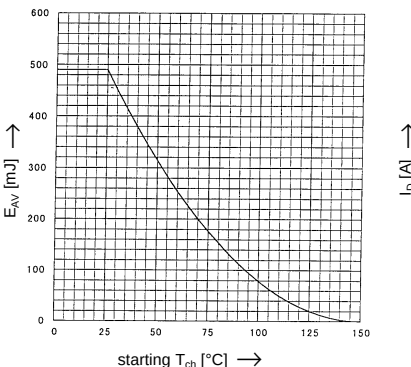
Forward Characteristics of Reverse Diode

$I_F=f(V_{SD})$; 80μs pulse test; $T_{ch}=25^{\circ}\text{C}$



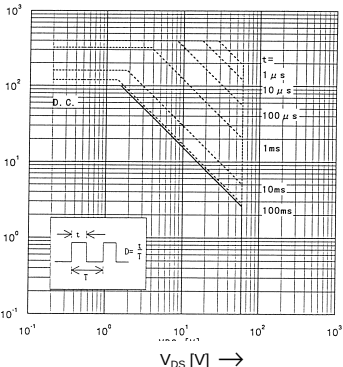
Maximum Avalanche Energy vs. starting T_{ch}

$E_{AV}=f(\text{starting } T_{ch})$; $V_{CC}=24\text{V}$; $I_{AV}\leq 80\text{A}$



Safe Operation Area

$I_D=f(V_{DS})$; $D=0.01$; $T_C=25^{\circ}\text{C}$



$Z_{th(ch-c)}$ [K/W] ↑

Transient Thermal impedance

$Z_{th(ch)}=f(t)$ parameter: $D=t/T$

