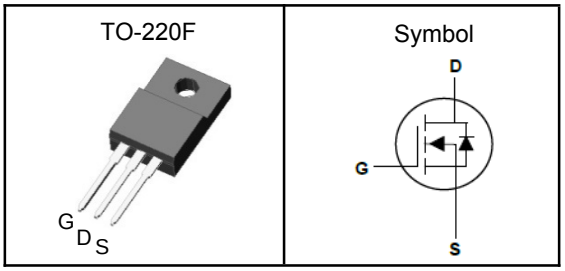
800V N Channel Super Junction MOSFET

Feature

- Very Low FOM ($R_{DS(on)}$ X Qg)
- Extremely low switching los
- Excellent stability and uniformity
- 100% Avalanche Tested

Pin Description



Applications

- Switch Mode Power Supply
- Uninterruptible Power Supply
- Power Factor Correction
- TV power

V_{DSS}	800	V
$R_{DS(ON)-Typ}$	460	mΩ
I_D	11	A

Absolute Maximum Ratings(T_J=25℃, Unless Otherwise Noted)

Symbol	Parameter		N-Channel	Unit
V_{DSS}	Drain-Source Voltage		800	V
V_{GSS}	Gate-Source Voltage		±30	V
T_J	Maximum Junction Temperature		-55 to 150	℃
T_{STG}	Storage Temperature Range		-55 to 150	℃
E_{AS}	Single Pulse Avalanche Energy[3]		132	mJ
I_{DM}[①]	Pulse Drain Current Tested		30	A
I_D	Continuous Drain Current	T_C=25°C	11	A
P_D	Maximum Power Dissipation	T_C=25°C	31	W

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	80	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	4	℃/W

Note ①: Max. current is limited by bonding wire.

Note ②: UIS tested and pulse width are limited by maximum junction temperature 150℃.

Note ③: Surface Mounted on 1in^2 FR-4 board with 1oz.

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Electrical Characteristics (T_J=25℃, Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	800	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=800V, V_{GS}=0V	---	---	1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=250uA	2.5	---	4.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±30V, V_{DS}=0V	---	---	±100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=10V , I_D=5.5A	---	460	500	mΩ
Dynamic Characteristics⑤						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, Freq.=1MHz	---	680	---	pF
C_{oss}	Output Capacitance		---	140	---	
C_{rss}	Reverse Transfer Capacitance		---	5	---	
$T_{d(on)}$	Turn-on Delay Time	V_{DD}=400V , R_G=25Ω, I_D=5.5A	---	26	---	nS
T_r	Turn-on Rise Time		---	60		
$T_{d(off)}$	Turn-off Delay Time		---	75	---	
T_f	Turn-off Fall Time		---	44	---	
R_g	Gate Resistance	f = 1.0MHz, open drain	---	---	---	Ω
Q_g	Total Gate Charge	V_{DS}=640V , V_{GS}=10V , I_D=11A	---	38	---	nC
Q_{gs}	Gate-Source Charge		---	4	---	
Q_{gd}	Gate-Drain Charge		---	4.4	---	
Source-Drain Characteristics （T_J=25℃）						
V_{SD}④	Diode Forward Voltage	I_S=11A, V_{GS}=0V	---	---	1.5	V
trr	Reverse Recovery Time	V_{GS}=0V, I_F=11 A, di/dt=100A/μs，T_J=25℃	---	270	---	nS
Qrr	Reverse Recovery Charge		---	3.3	---	nC

Note ④： Pulse test (pulse width≤300us, duty cycle≤2%).

Note ⑤：Guaranteed by design, not subject to production testing.

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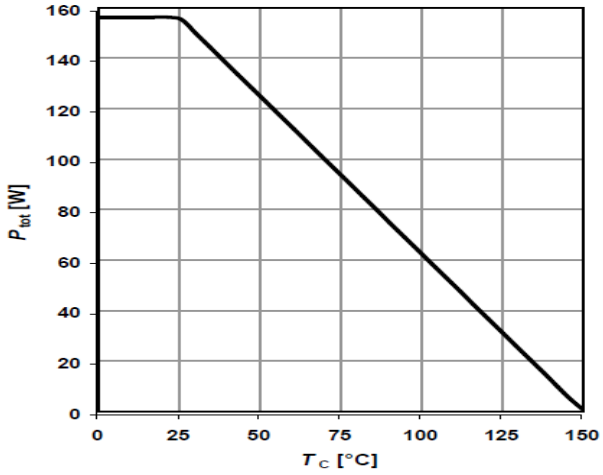
Typical Characteristics

1 Power dissipation

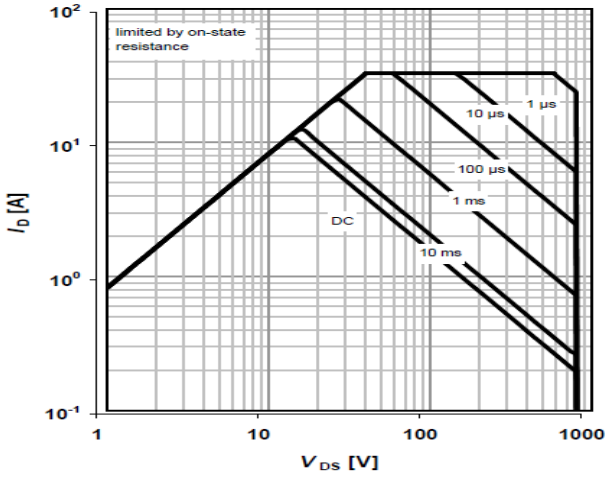
$P_{tot}=f(T_C)$



2 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$

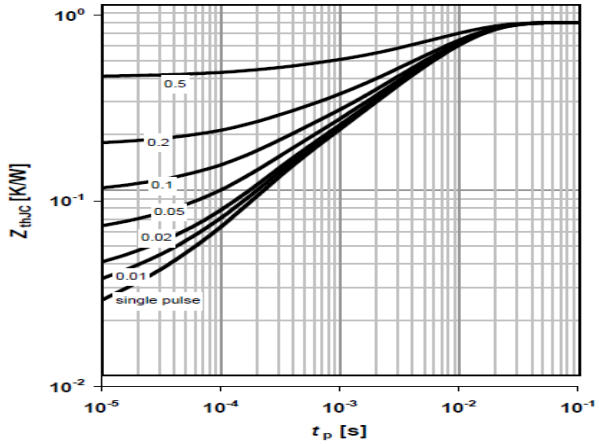
parameter: t_p



3 Max. transient thermal impedance

$Z_{thJC}=f(t_P)$

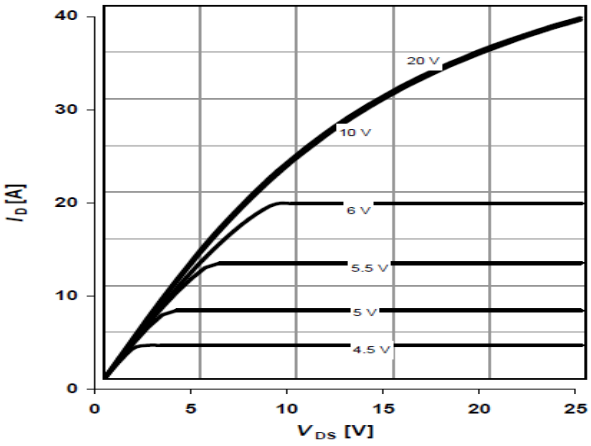
parameter: $D=t_p/T$



4 Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=25$ °C; $t_p=10$ µs

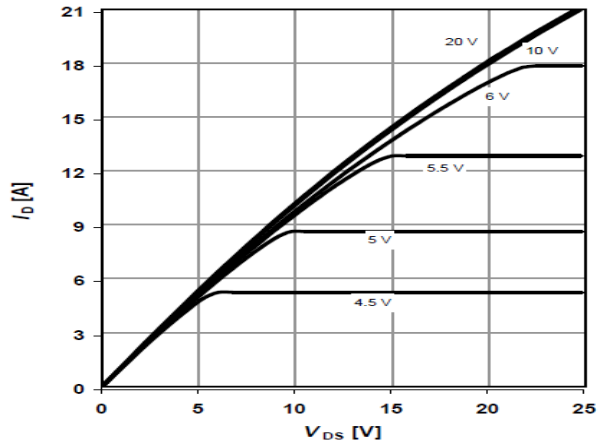
parameter: V_{GS}



5 Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=150$ °C; $t_p=10$ µs

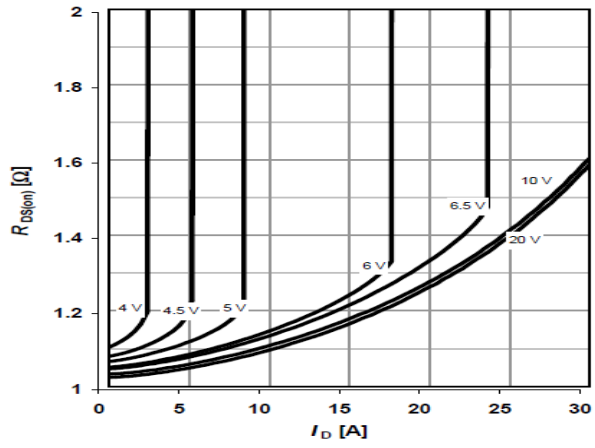
parameter: V_{GS}



6 Typ. drain-source on-state resistance

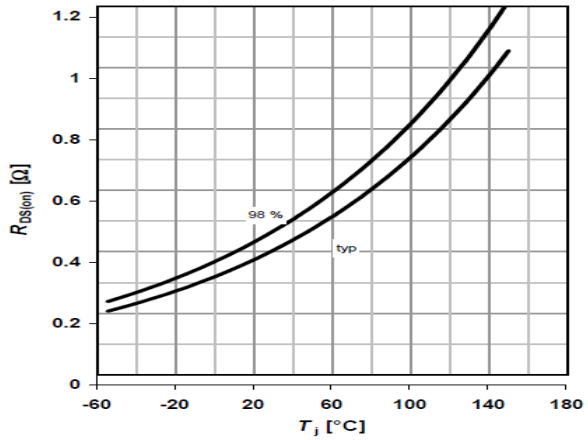
$R_{DS(on)}=f(I_D)$; $T_j=150$ °C

parameter: V_{GS}



7 Drain-source on-state resistance

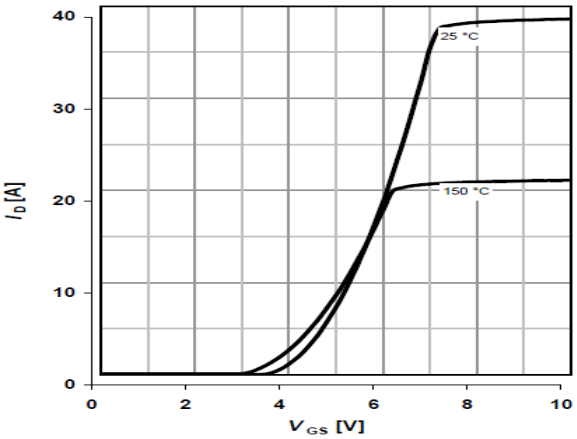
$R_{DS(on)}=f(T_j)$; $I_D=7.1$ A; $V_{GS}=10$ V



8 Typ. transfer characteristics

$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(on)max}$; $t_p=10$ µs

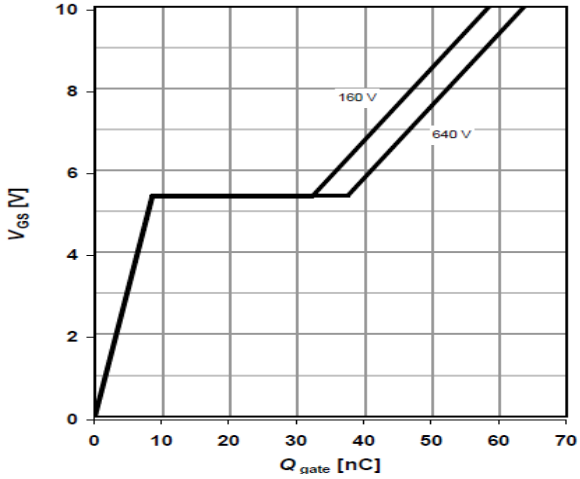
parameter: T_j



9 Typ. gate charge

$V_{GS}=f(Q_{gate})$; $I_D=11$ A pulsed

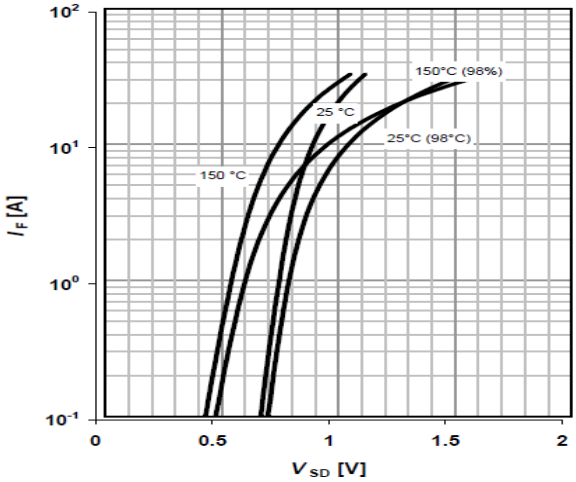
parameter: V_{DD}



10 Forward characteristics of reverse diode

$I_F=f(V_{SD})$; $t_p=10$ µs

parameter: T_j



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TO-220F Package Outline Data