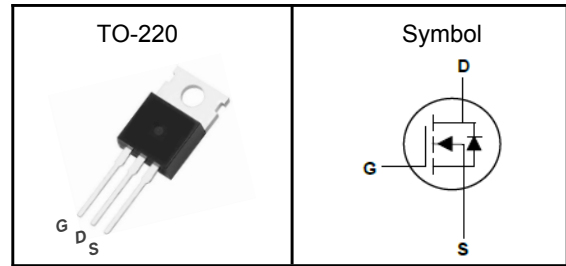


500V N Channel Super Junction MOSFET
Feature

- Very Low FOM ($R_{DS(on)} \times Q_g$)
- Extremely low switching loss
- Excellent stability and uniformity
- 100% Avalanche Tested

Applications

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

Pin Description


V_{DSS}	500	V
$R_{DS(ON)-Typ}$	0.32	Ω
I_D	11	A

Absolute Maximum Ratings ($T_J=25^\circ\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	N-Channel	Unit
V_{DSS}	Drain-Source Voltage	500	V
V_{GSS}	Gate-Source Voltage	± 30	V
T_J	Maximum Junction Temperature	-55 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
E_{AS}	Single Pulse Avalanche Energy ^③	220	mJ
$I_{DM}^{①}$	Pulse Drain Current Tested	33	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	W

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62.5	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ^①	1.5	$^\circ\text{C}/\text{W}$

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

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

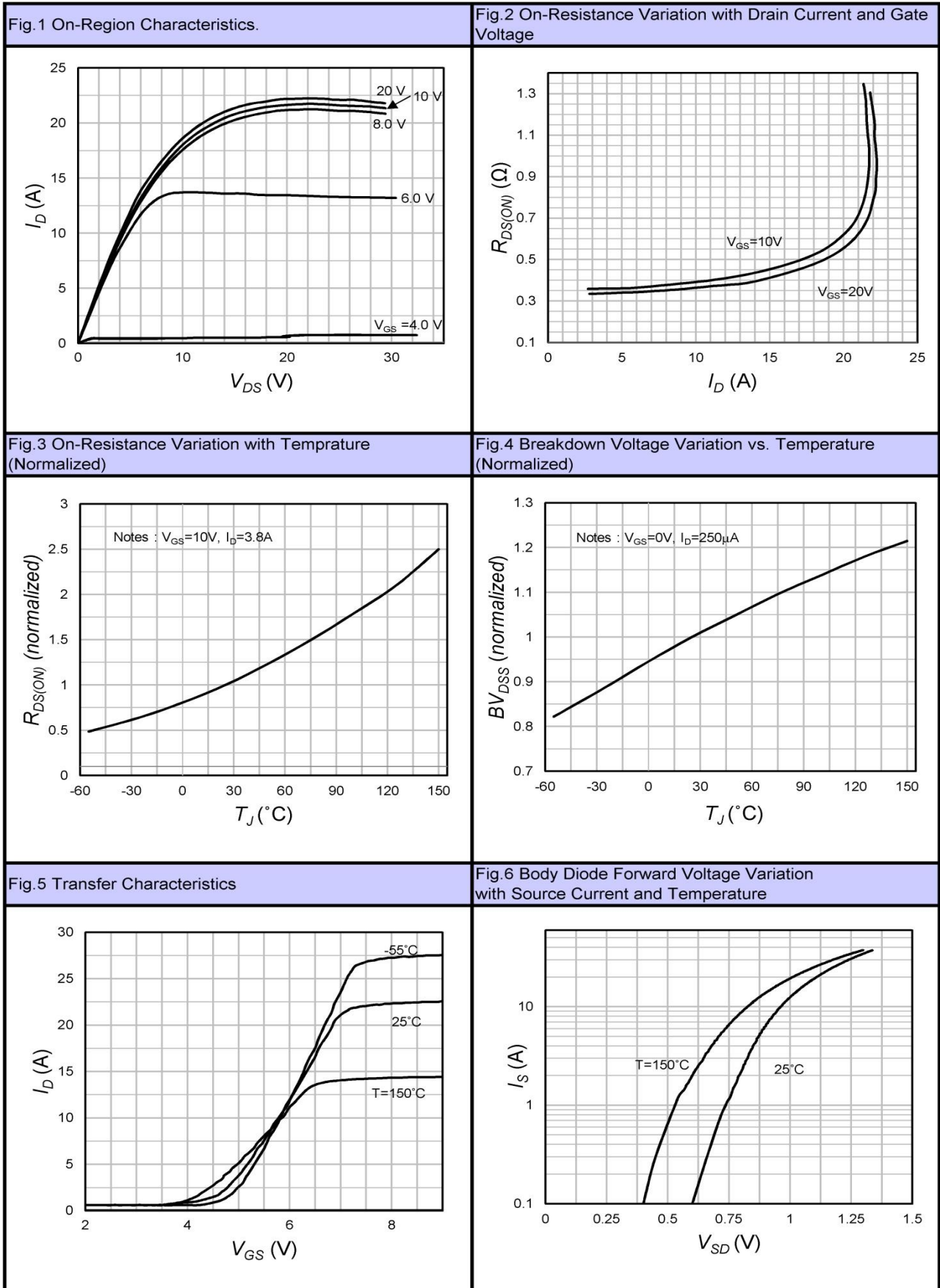
Note ③ : Surface Mounted on 1in^2 FR-4 board with 1oz.

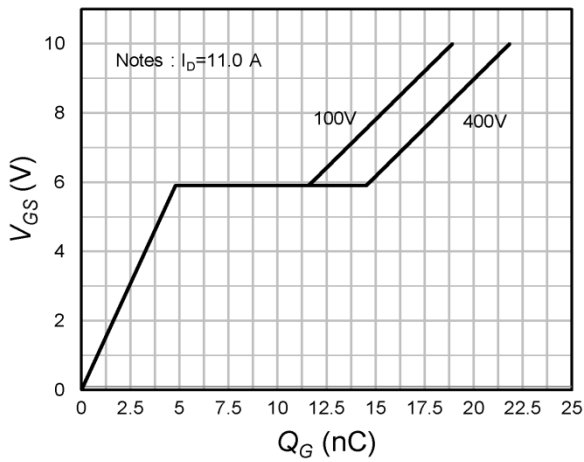
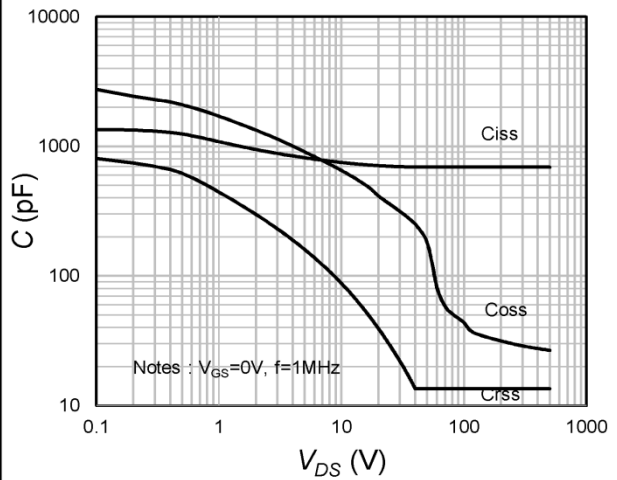
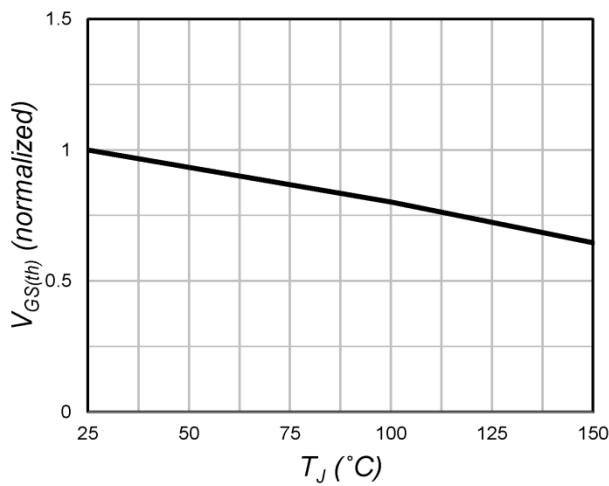
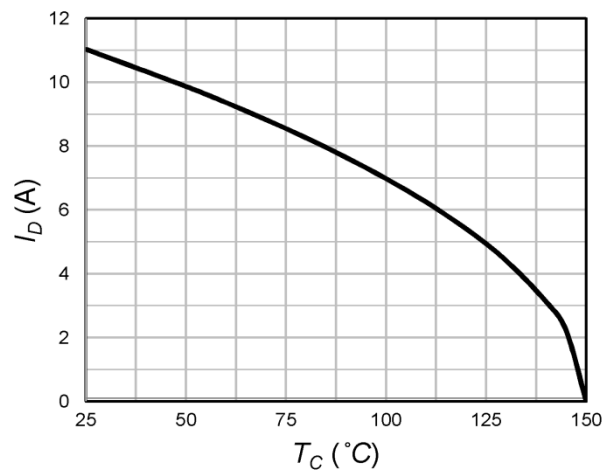
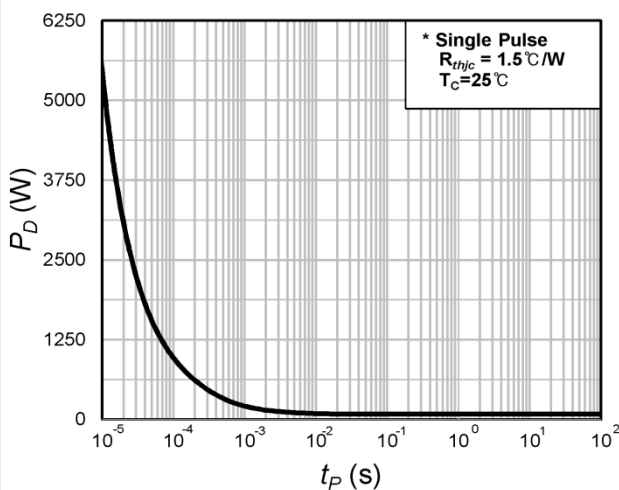
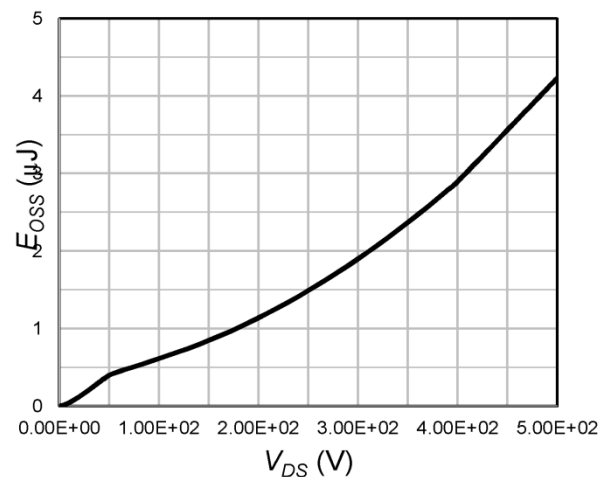
**500V N Channel Super Junction MOSFET****Electrical Characteristics** ($T_J=25^\circ\text{C}$, Unless Otherwise Noted)

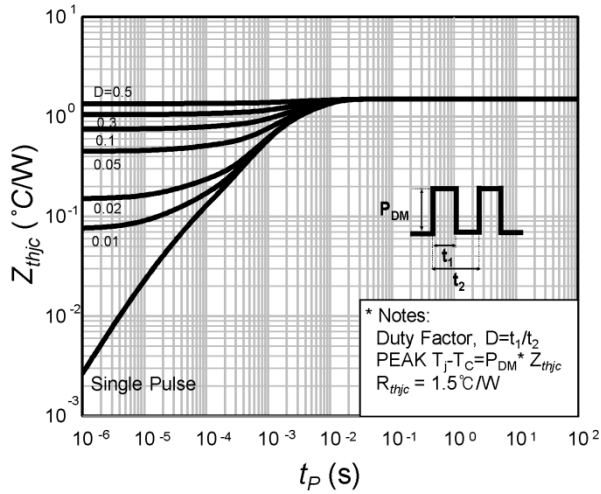
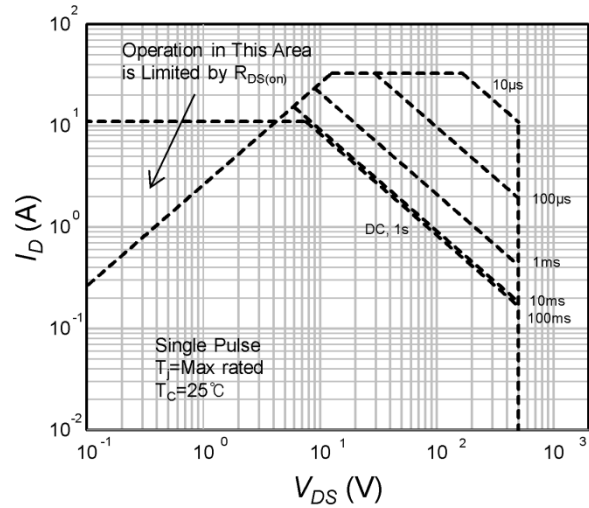
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=0.25mA$	500	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=500V, V_{GS}=0V$	---	---	1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=0.25mA$	2.5	3.0	3.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	± 100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=3.8A$	---	0.32	0.38	Ω
Dynamic Characteristics ^⑤						
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ Freq.=1MHz	---	702	---	pF
C_{oss}	Output Capacitance		---	357	---	
C_{rss}	Reverse Transfer Capacitance		---	33.7	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=250V, R_G=25\Omega,$ $I_D=11A$	---	15.2	---	nS
T_r	Turn-on Rise Time		---	32	---	
$T_{d(off)}$	Turn-off Delay Time		---	59.6	---	
T_f	Turn-off Fall Time		---	28.4	---	
R_g	Gate Resistance	$f = 1.0MHz, V_{GS}=0V$	---	3	---	Ω
Q_g	Total Gate Charge	$V_{DS}=400V,$ $V_{GS}=10V, I_D=11A$	---	21.8	---	nC
Q_{gs}	Gate-Source Charge		---	4.8	---	
Q_{gd}	Gate-Drain Charge		---	9.7	---	
Source-Drain Characteristics ($T_J=25^\circ\text{C}$)						
V_{SD} ^④	Diode Forward Voltage	$I_S=11A, V_{GS}=0V$	---	---	1.4	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V, I_F=11A,$ $di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	256	---	nS
Q_{rr}	Reverse Recovery Charge		---	2.3	---	nC

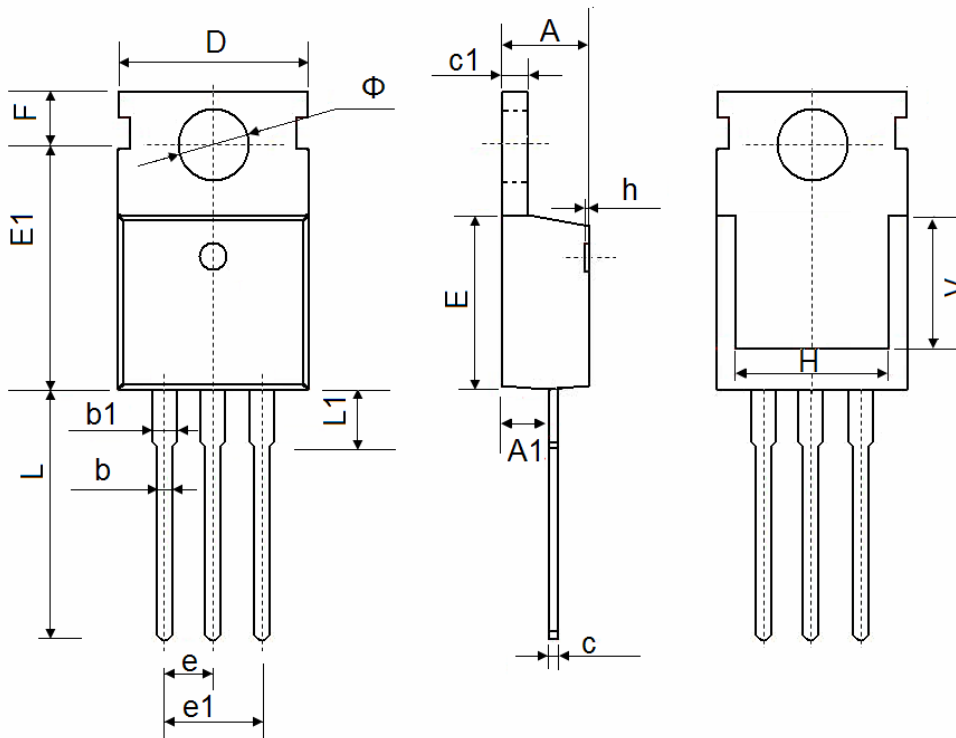
Note ④ : Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).

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

500V N Channel Super Junction MOSFET
Typical Characteristics


500V N Channel Super Junction MOSFET
Fig.7 Gate Charge Characteristics

Fig.8 Capacitance Characteristics

Fig.9 $V_{GS(th)}$ Variation with Temperature (Normalized)

Fig.10 Maximum Drain Current vs. Case Temperature

Fig.11 Single Pulse Maximum Power Dissipation

Fig.12 Output Capacitance Stored Energy


500V N Channel Super Junction MOSFET
Fig.13 Transient Thermal Response Curve

Fig.14 Maximum Safe Operating Area


500V N Channel Super Junction MOSFET
TO-220 Package Outline Data


Symbol	Dimensions In Millimeters	
	Min.	Max.
A	4.350	4.650
A1	2.250	2.550
b	0.710	0.910
b1	1.170	1.400
c	0.330	0.650
c1	1.200	1.400
D	9.910	10.250
E	8.9500	9.750
E1	12.650	12.950
e	2.540 TYP.	
e1	4.980	5.180
F	2.650	2.950
H	7.900	8.100
h	0.000	0.300
L	12.700	13.500
L1	2.850	3.250
V	7.500 REF.	
Φ	3.400	3.800