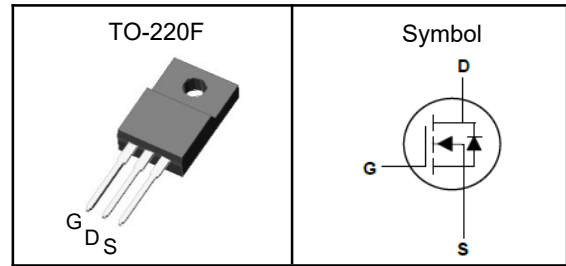


**700V Super Junction Power MOSFET**
**Features**

- Low drain-source on-resistance:  $R_{DS(ON)}=0.33\Omega(\text{typ})$
- Easy to control gate switching
- Enhancement mode:  $V_{th} = 2.5$  to  $4.5V$
- 100% avalanche tested
- RoHS compliant

**Applications**

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- Charger, Lighting

**Pin Description**


$V_{DSS}$	700	V
$R_{DS(ON)-Typ}$	330	m $\Omega$
$I_D$	11	A

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

Symbol	Parameter	N-Channel	Unit
$V_{DSS}$	Drain-Source Voltage	700	V
$V_{GSS}$	Gate-Source Voltage	$\pm 30$	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 <sup>3</sup>	140	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-Ambient <sup>1</sup>	62.5	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	4.1	$^\circ\text{C}/\text{W}$

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

Note ② : UIS tested and pulse width are limited by maximum junction temperature  $150^\circ\text{C}$ .

Note ③ : Surface Mounted on  $1\text{in}^2$  FR-4 board with 1oz.



**700V Super Junction Power MOSFET**

**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=1mA$	700	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=700V, V_{GS}=0V$	---	---	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=370\mu A$	2.5	---	4.5	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=3.4A$	---	330	380	m $\Omega$
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=100V,$ Freq.=1MHz	---	990	---	pF
$C_{oss}$	Output Capacitance		---	40	---	
$C_{rss}$	Reverse Transfer Capacitance		---	2.3	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=325V, R_G=25\Omega,$ $I_D=4.8A$	---	30	---	nS
$T_r$	Turn-on Rise Time		---	23	---	
$T_{d(off)}$	Turn-off Delay Time		---	190	---	
$T_f$	Turn-off Fall Time		---	20	---	
$Q_g$	Total Gate Charge	$V_{DD}=520V, V_{GS}=10V,$ $I_D=4.8A$	---	22.6	---	nC
$Q_{gs}$	Gate-Source Charge		---	4.6	---	
$Q_{gd}$	Gate-Drain Charge		---	6.4	---	
<b>Source-Drain Characteristics</b> ( $T_J=25^{\circ}\text{C}$ )						
$V_{SD}$	Diode Forward Voltage <sub>z</sub>	$V_{GS}=0V,$ $I_S=4.8A, T_J=25^{\circ}\text{C}$	---	---	1.3	V
$t_{rr}$	Reverse Recovery Time	$V_G=0V, I_S=4.8A,$ $di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	240	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	2.1	---	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.

**700V Super Junction Power MOSFET**

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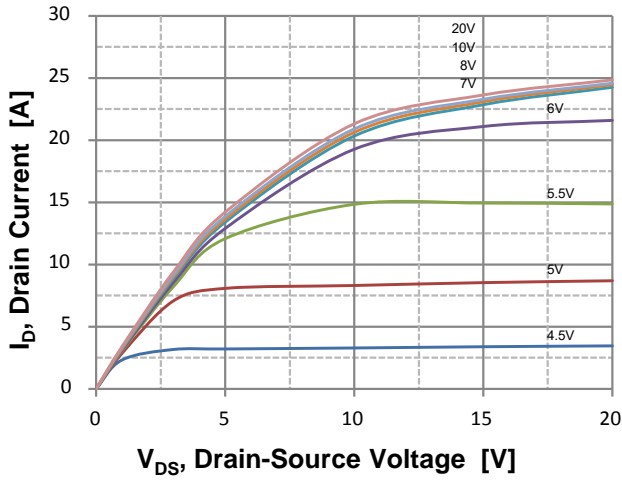


Figure 1. On Region Characteristics

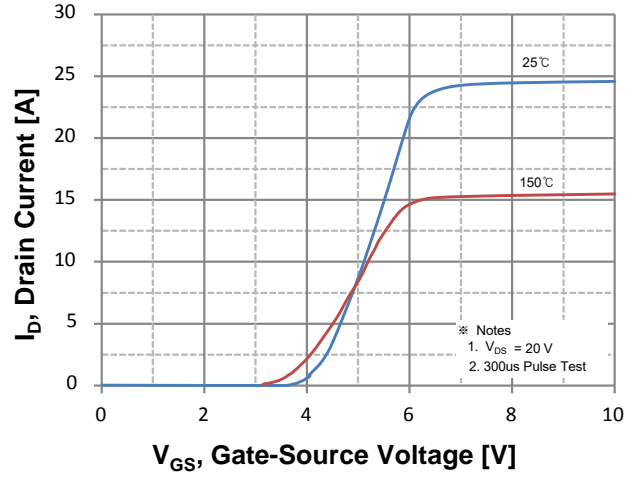


Figure 2. Transfer Characteristics

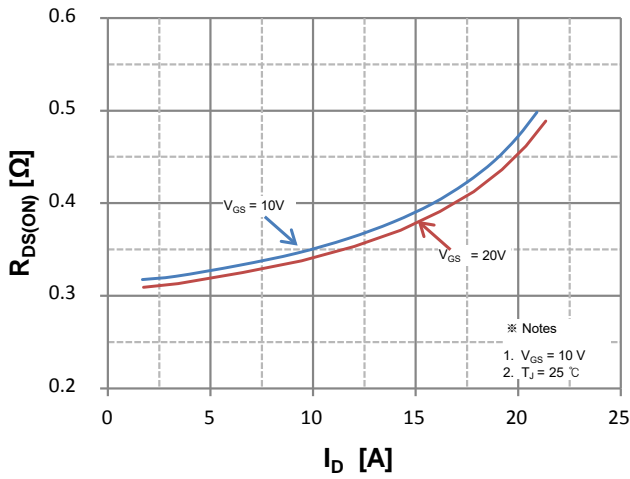


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

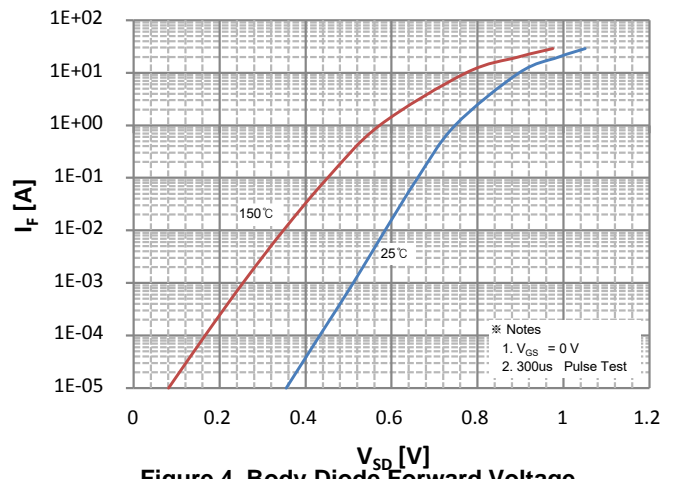


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

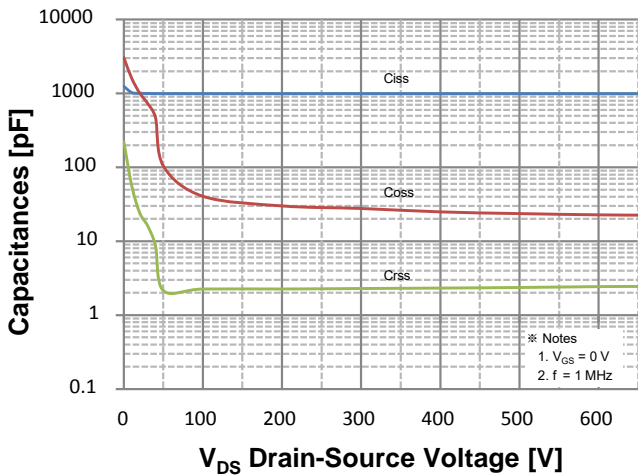


Figure 5. Capacitance Characteristics

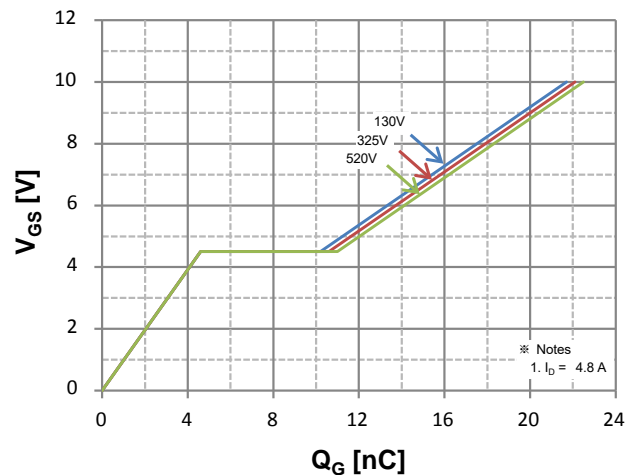
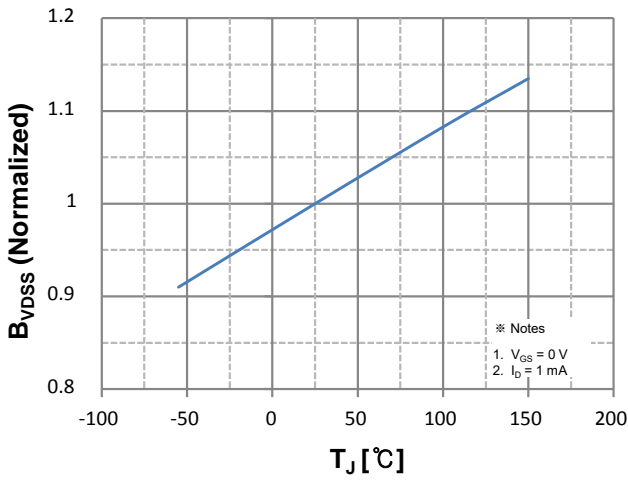
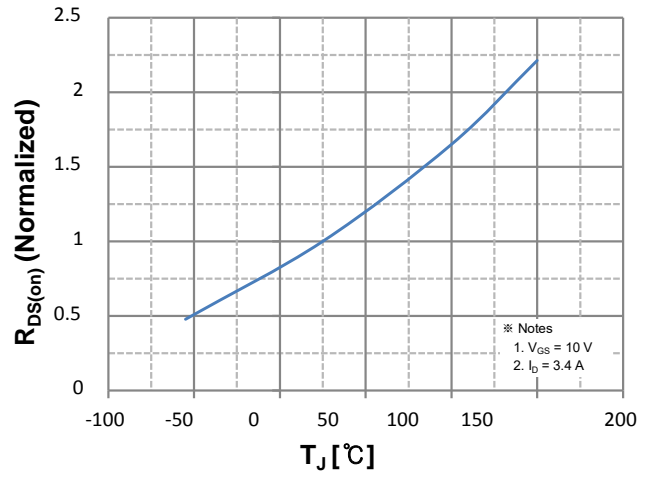
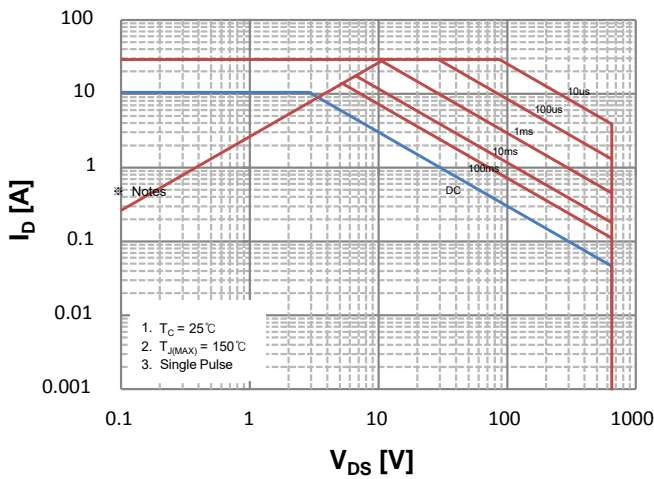
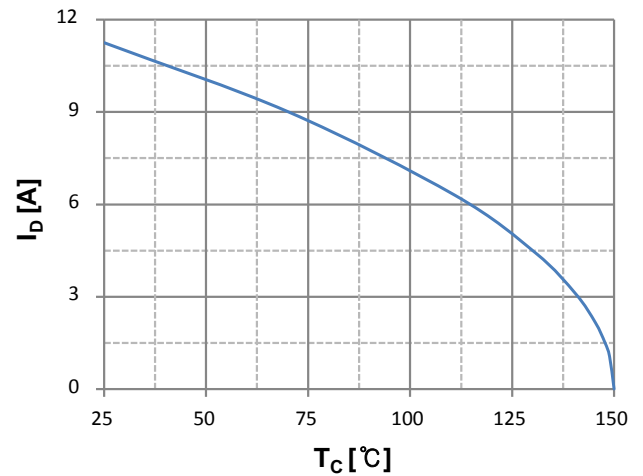
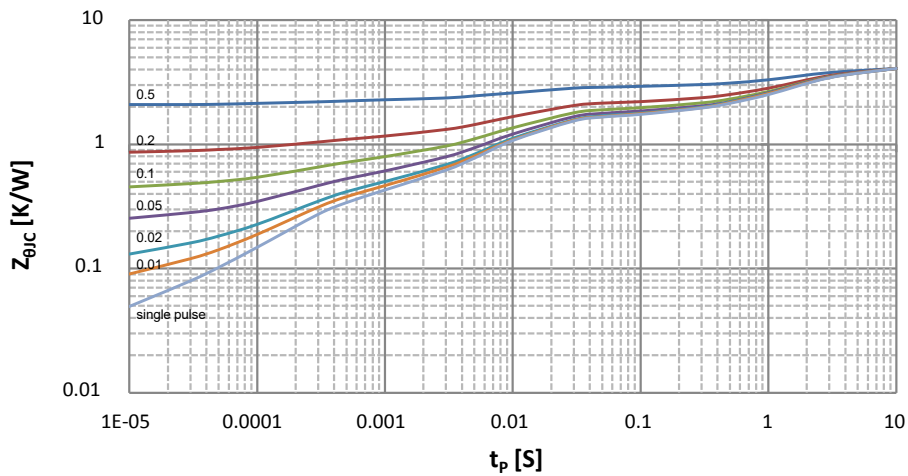


Figure 6. Gate Charge Characteristics

**700V Super Junction Power MOSFET**

**Figure 7. Breakdown Voltage Variation vs. Temperature**

**Figure 8. On-Resistance Variation vs. Temperature**

**Figure 9. Maximum Safe Operating Area**

**Figure 10. Maximum Drain Current vs. Case Temperature**

**Figure 11. Transient Thermal Response Curve**

**700V Super Junction Power MOSFET**
**TO-220F Package Outline Data**
