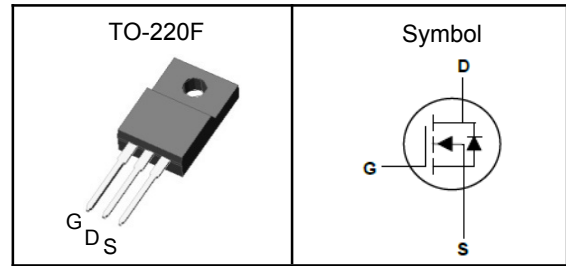


**650 Super Junction Power MOSFET**
**Features**

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant
- 100% UIS and Rg Tested

**Applications**

- Switch Mode Power Supply (SMPS)
- TV power & LED Lighting Power
- AC to DC Converters
- Telecom

**Pin Description**


$V_{DSS}$	650	V
$R_{DS(ON)-Typ}$	100	m $\Omega$
$I_D$	25	A

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

Symbol	Parameter	N-Channel	Unit
$V_{DSS}$	Drain-Source Voltage	650	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	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>	454	mJ
$I_{DM}^{①}$	Pulse Drain Current Tested	75	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> (Max)	80	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	3.65	$^\circ\text{C}/\text{W}$

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 1in<sup>2</sup> FR-4 board with 1oz.



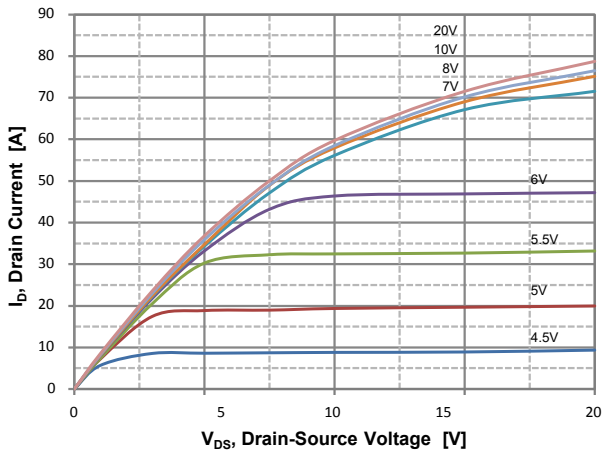
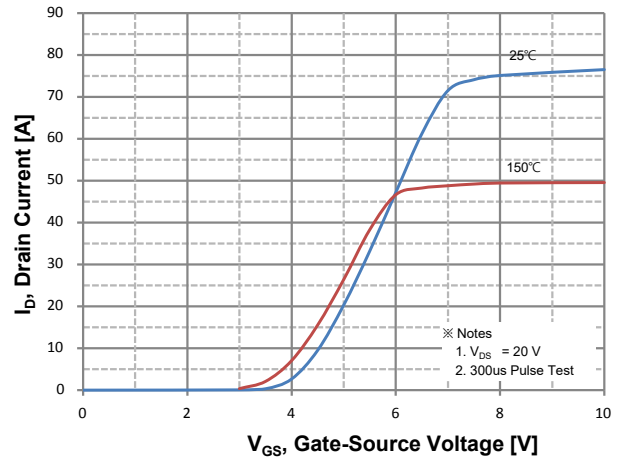
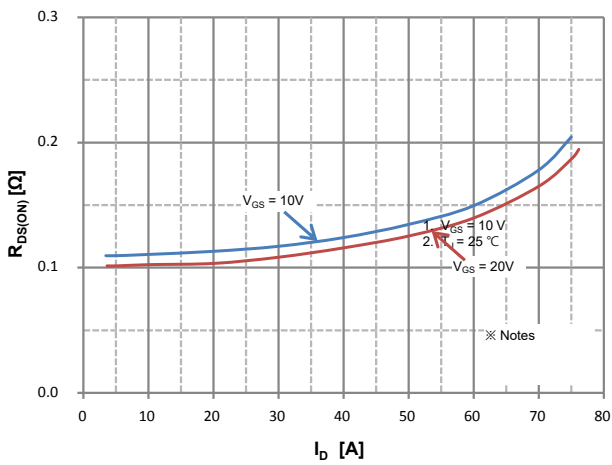
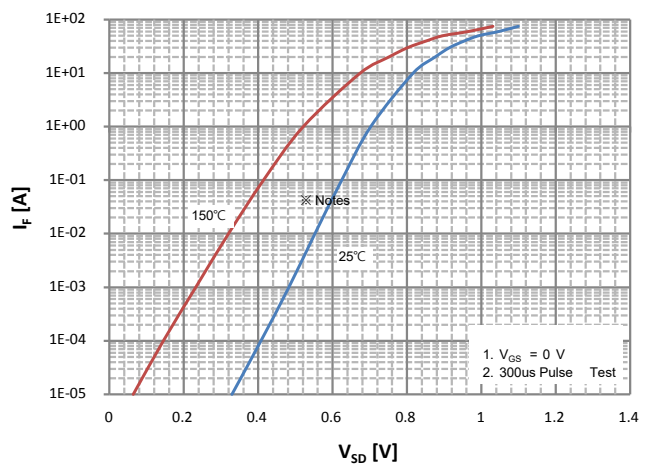
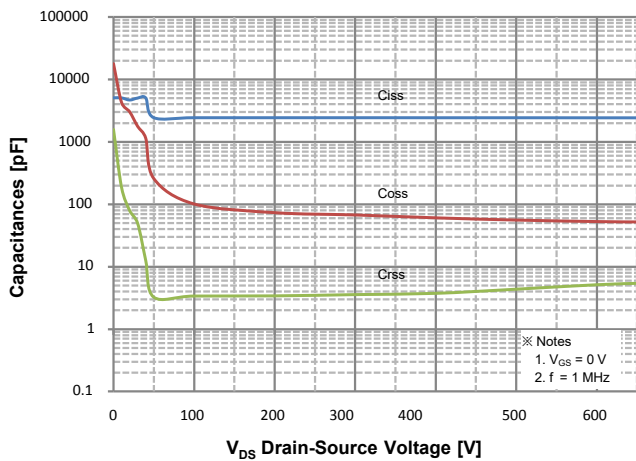
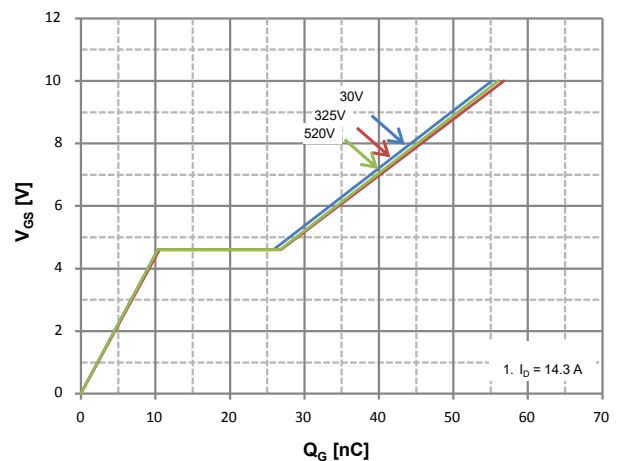
**650 Super Junction Power MOSFET**

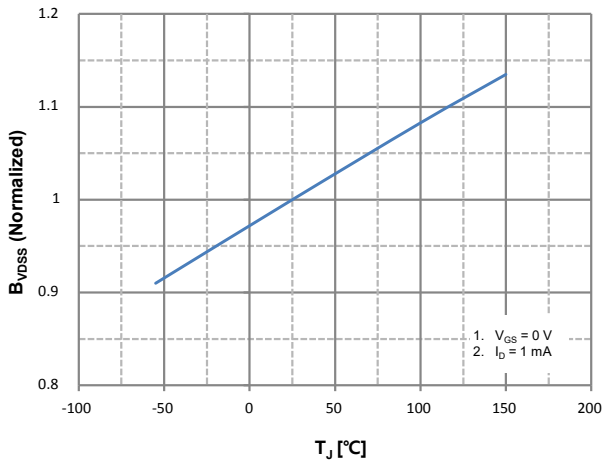
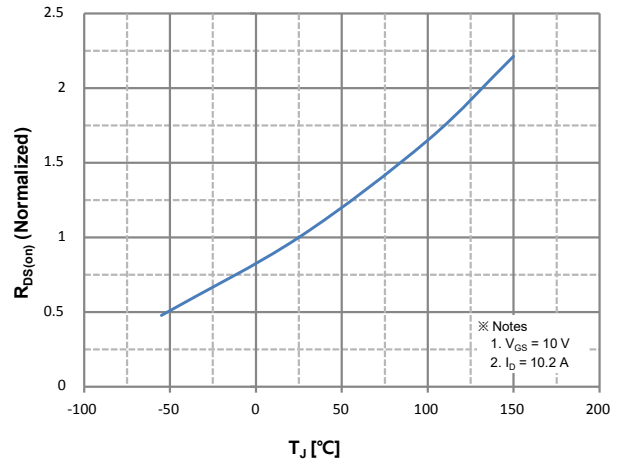
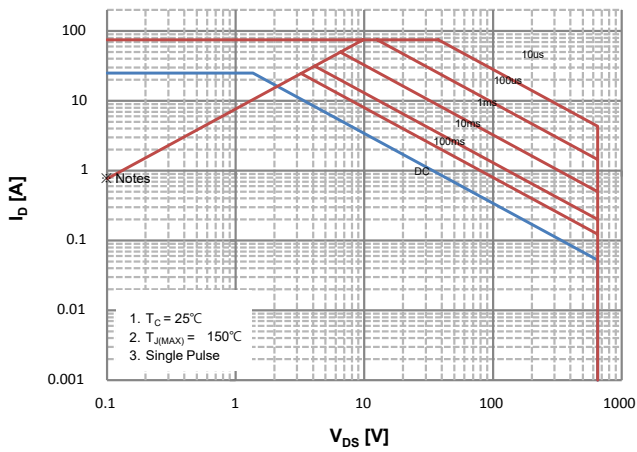
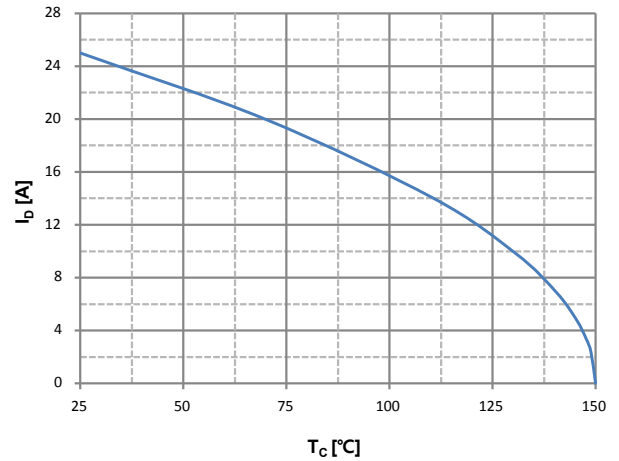
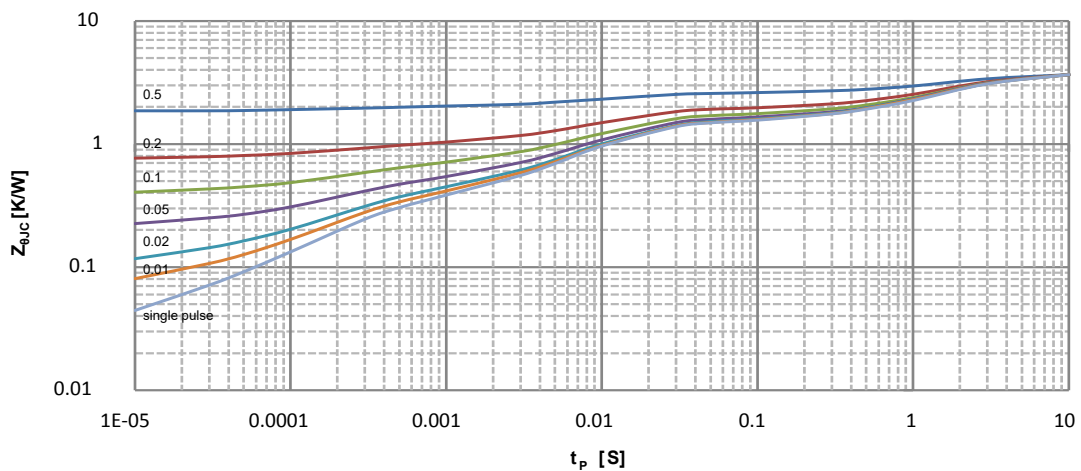
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=1mA$	650	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=650V, V_{GS}=0V$	---	---	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=1.1mA$	2	---	4	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 1$	$\mu A$
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=10.2A$	---	100	130	$m\Omega$
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=400V,$ Freq.=1MHz	---	2240	---	pF
$C_{oss}$	Output Capacitance		---	60	---	
$C_{rss}$	Reverse Transfer Capacitance		---	3.8	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=325V, R_G=25\Omega,$ $I_D=14.3A$	---	56	---	nS
$T_r$	Turn-on Rise Time		---	31	---	
$T_{d(off)}$	Turn-off Delay Time		---	250	---	
$T_f$	Turn-off Fall Time		---	20	---	
$Q_g$	Total Gate Charge	$V_{DD}=520V,$ $V_{GS}=10V, I_D=14.3A$	---	55	---	nC
$Q_{gs}$	Gate-Source Charge		---	12	---	
$Q_{gd}$	Gate-Drain Charge		---	19	---	
<b>Source-Drain Characteristics</b> ( $T_J=25^{\circ}\text{C}$ )						
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=14.3A, T_J=25^{\circ}\text{C}$	---	---	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_F=14.3A, V_R=400V$ $di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	450	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	7.8	---	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.

**650 Super Junction Power MOSFET**
**Handwritten text: Hnd]WU 7\ UFUWYf]gh]Vg**

**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**

**650 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**

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