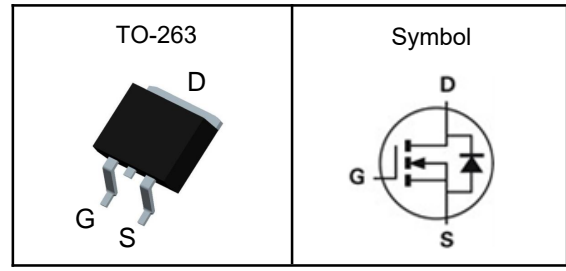


650V Super Junction Power MOSFET
Features

- Low drain-source on-resistance: $R_{DS(ON)}=0.14\Omega(\text{typ})$
- Easy to control gate switching
- Enhancement mode: $V_{th} = 2.5$ to $3.5V$
- 100% avalanche tested
- RoHS compliant

Applications

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

Pin Description


V_{DSS}	600	V
$R_{DS(ON)-Typ}$	140	m Ω
I_D	20	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	± 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	480	mJ
$I_{DM}^{①}$	Pulse Drain Current Tested	60	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$ 20	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 150	W

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ^①	0.83	$^\circ\text{C}/\text{W}$

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.



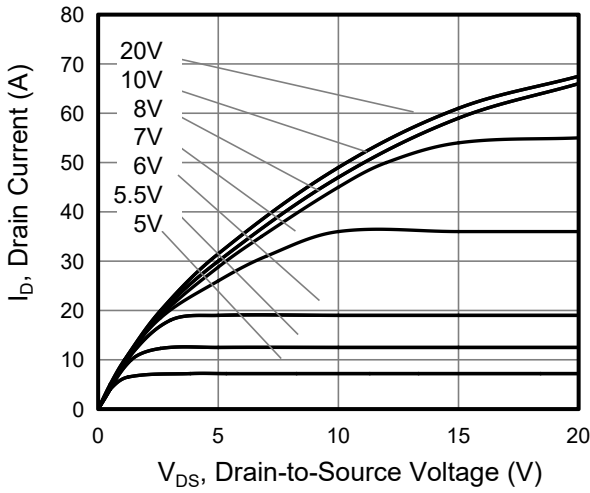
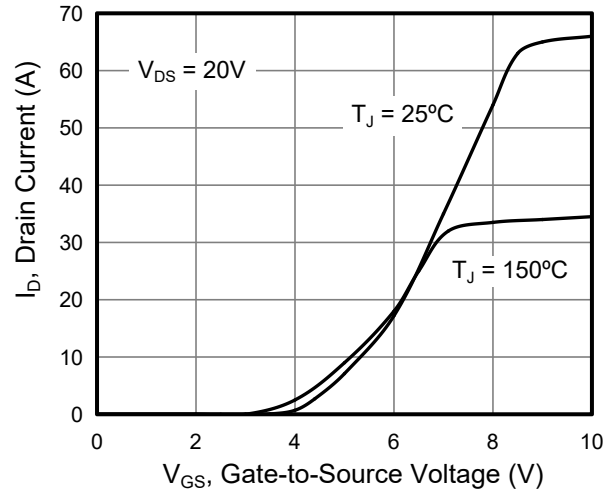
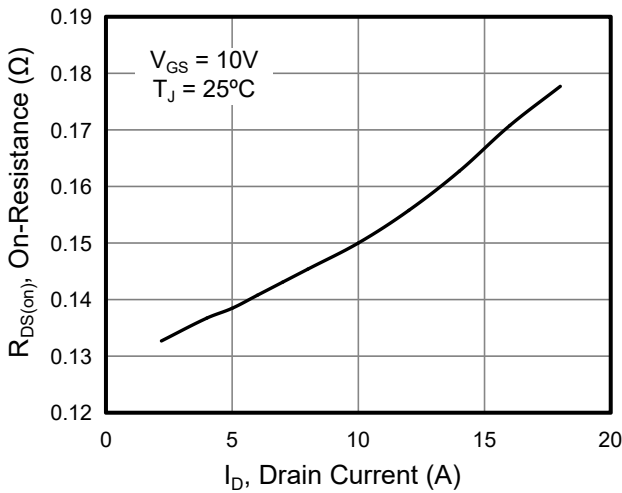
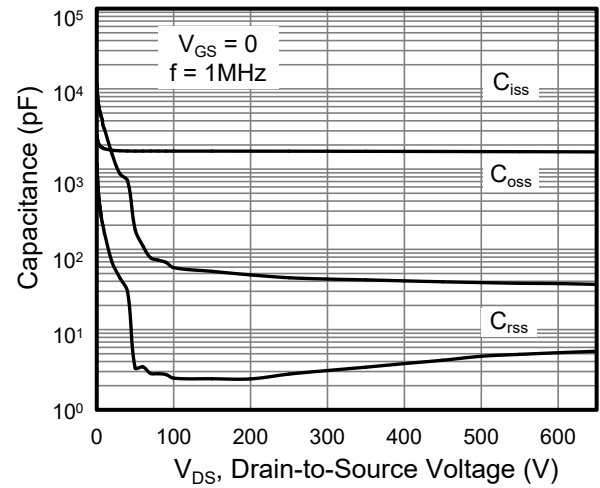
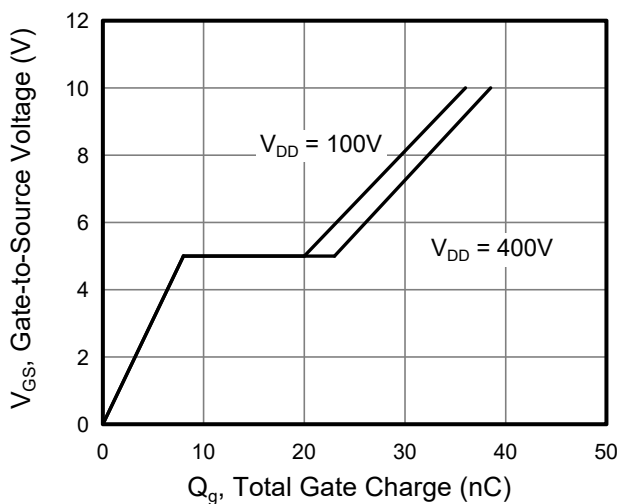
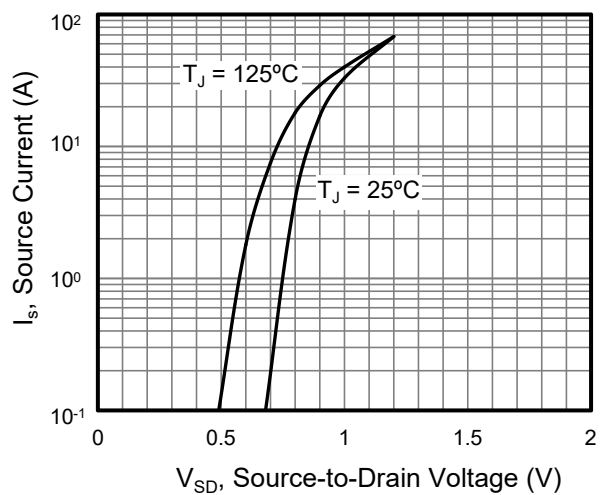
650V Super Junction Power MOSFET

Electrical Characteristics (T_J=25°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 =250uA	650	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =650V, V _{GS} =0V	---	---	1	uA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	2.5	---	3.5	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 =10A	---	140	170	mΩ
Dynamic Characteristics ^⑤						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =100V, Freq.=1MHz	---	1724	---	pF
C _{oss}	Output Capacitance		---	72	---	
C _{rss}	Reverse Transfer Capacitance		---	6	---	
T _{d(on)}	Turn-on Delay Time	V _{DD} =400V, V _{GS} =10V, R _G =25Ω, I _D =20A	---	25	---	nS
T _r	Turn-on Rise Time		---	59	---	
T _{d(off)}	Turn-off Delay Time		---	121	---	
T _f	Turn-off Fall Time		---	44	---	
R _g	Gate Resistance	f = 1.0MHz, open drain	---	8	---	Ω
Q _g	Total Gate Charge	V _{DS} =400V, V _{GS} =10V, I _D =20A	---	38.5	---	nC
Q _{gs}	Gate-Source Charge		---	8	---	
Q _{gd}	Gate-Drain Charge		---	15	---	
Source-Drain Characteristics (T _J =25°C)						
V _{SD} ^④	Diode Forward Voltage	I _S =20A, V _{GS} =0V	---	0.9	1.2	V
t _{rr}	Reverse Recovery Time	V _R =400V, I _F =20 A, di/dt=100A/μs, T _J =25°C	---	453	---	nS
Q _{rr}	Reverse Recovery Charge		---	5.1	---	nC

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

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

650V Super Junction Power MOSFET
Typical Characteristics

Figure 1. Output Characteristics

Figure 2. Transfer Characteristics

Figure 3. On-Resistance vs. Drain Current

Figure 4. Capacitance

Figure 5. Gate Charge

Figure 6. Body Diode Forward Voltage

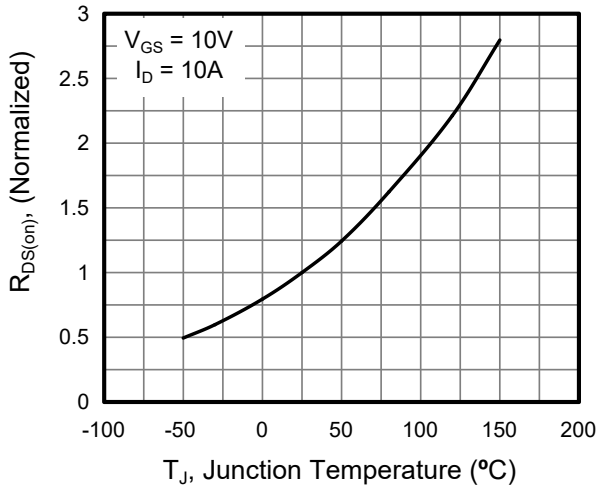
650V Super Junction Power MOSFET


Figure 7. On-Resistance vs. Junction Temperature

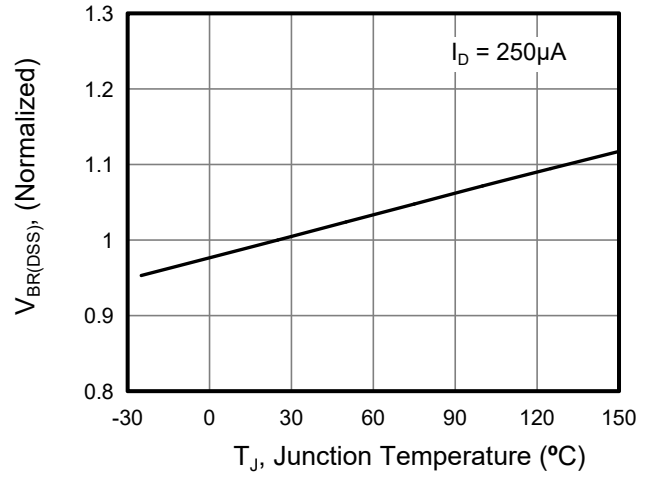


Figure 8. Breakdown voltage vs. Junction Temperature

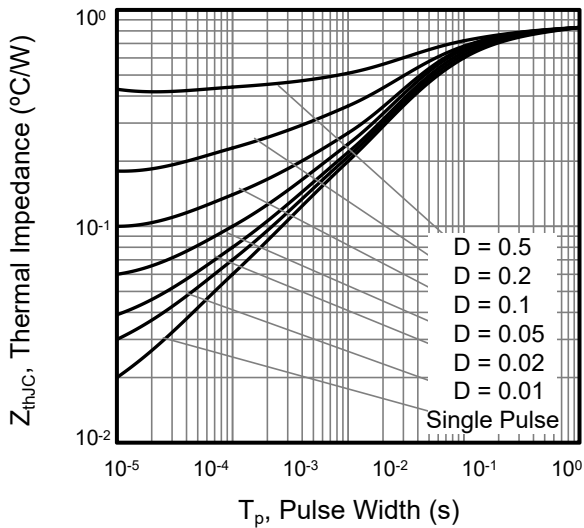


Figure 9. Transient Thermal Impedance TO-220/TO-263

650V Super Junction Power MOSFET
TO-263 Package Outline Data
