

650V N-Channel Super Junction MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	520mΩ@10V	8A

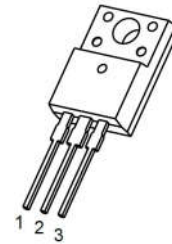
Features

- Super Junction MOSFET
- Fast Switching
- Easy to Drive/Use

Applications

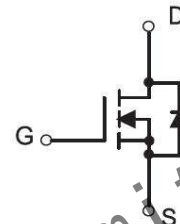
- SMPS
- DC/DC Converter
- Charger/Power Supply

TO-220F



PIN1:GATE
PIN2:DRAIN
PIN3:SOURCE

Schematic diagram



Marking



J65R550A : Device Code
YY : Year Code
WW : Week Code

Absolute Maximum rating ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain - Source Voltage	V_{DS}	650	V
Gate - Source Voltage	V_{GS}	± 30	V
Continuous Drain Current	I_D	8	A
Pulsed Drain Current	I_{DM}	24	A
Single pulsed avalanche ¹	E_{AS}	61.25	mJ
Power Dissipation	P_D	28	W
$T_C = 25^\circ\text{C}$			
Thermal Resistance from Junction to Case	$R_{\theta JC}$	4.5	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55~ +150	$^\circ\text{C}$

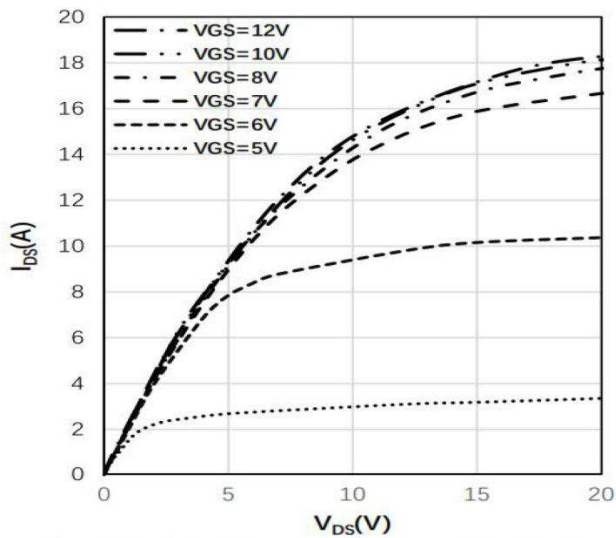
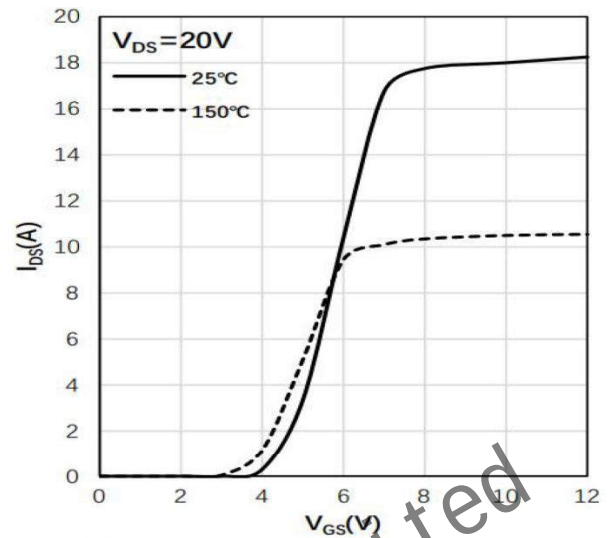
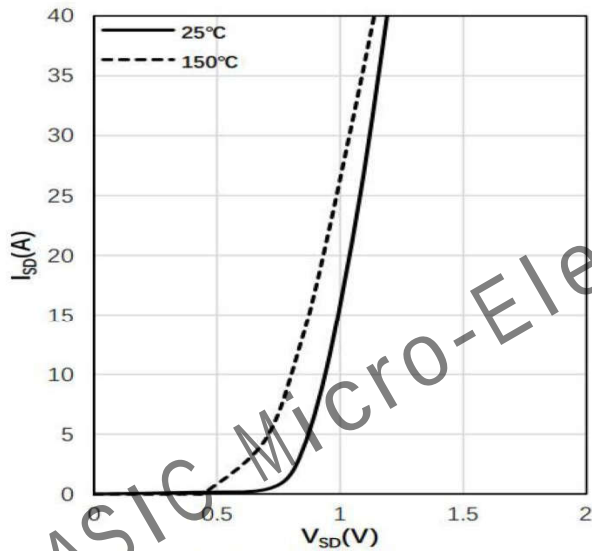
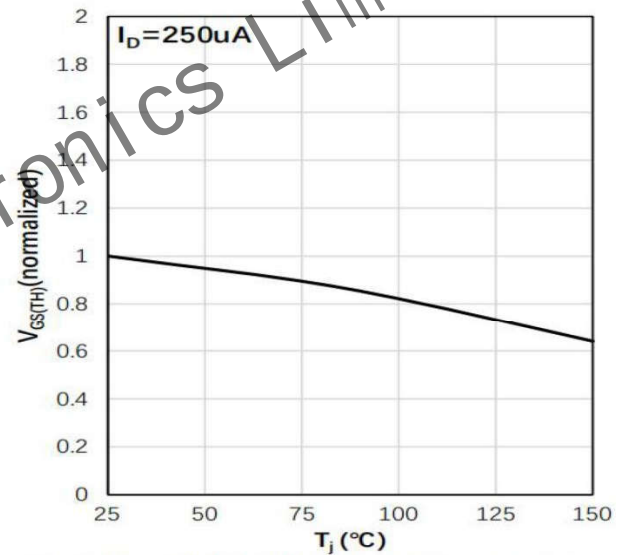
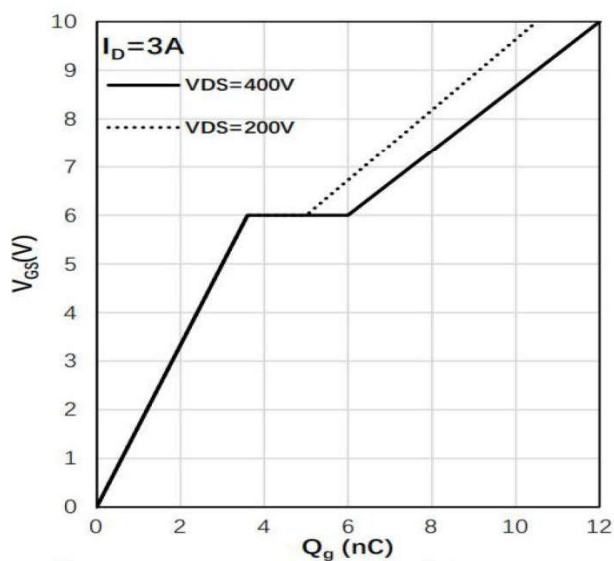
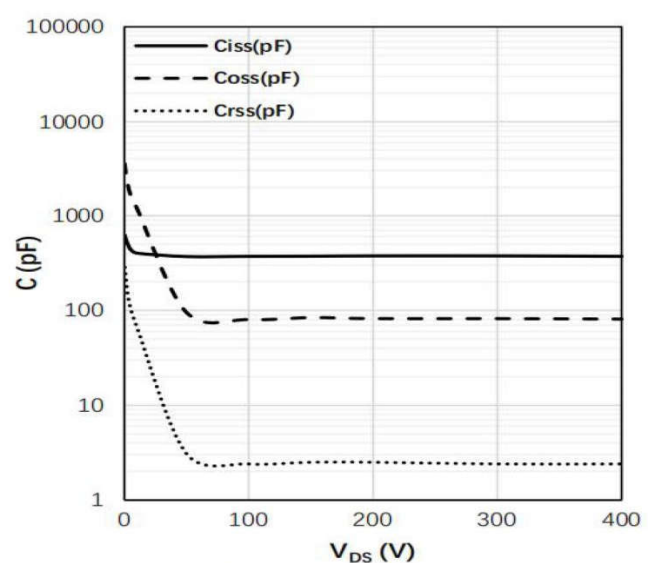
Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain - Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	650			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 650V, V _{GS} = 0V			1	μA
Gate - Body Leakage Current	I _{GSS}	V _{GS} = ±30V, V _{DS} = 0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	3	3.5	4	V
Drain-source On-resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 2.0A		520	600	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 50V,V _{GS} = 0V, f= 1MHz		360		pF
Output Capacitance	C _{oss}			85		
Reverse Transfer Capacitance	C _{rss}			4.5		
Switching Characteristics						
Total Gate Charge	Q _g	V _{DS} = 400V, V _{GS} = 10V, I _D = 3A		11.5		nC
Gate-source Charge	Q _{gs}			3.5		
Gate-drain Charge	Q _{gd}			2.5		
Turn-on Delay Time	t _{d(on)}	V _{DD} = 400V, I _D = 3A, V _{GS} = 10V, R _G =25Ω		23		ns
Turn-on Rise Time	t _r			6		
Turn-off Delay Time	t _{d(off)}			45		
Turn-off Fall Time	t _f			6.5		
Source - Drain Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _S = 3A			1.3	V
Reverse Recovery Time	t _{rr}	V _{DD} = 400 V, I _S = 3A,		215		ns
Reverse Recovery Charge	Q _{rr}	dI _F /dt= 100A/us		1.6		uC

Note:

- Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 100V$, $R_G = 25\Omega$, $L = 10mH$

Typical Characteristic


Fig.1 Typical Output Characteristics (25°C)

Fig.2 Typical Transfer Characteristics

Fig.3 Typical Diode V_{SD} vs. I_{SD} Characteristic

Fig.4 Threshold Voltage vs Temperature

Fig.5 Gate Charge Characteristics

Fig.6 Typical Capacitance

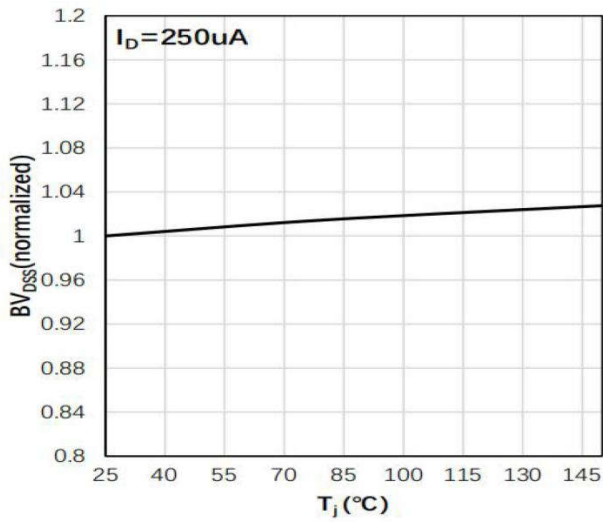


Fig.7 Breakdown Voltage vs. Temperature Characteristic

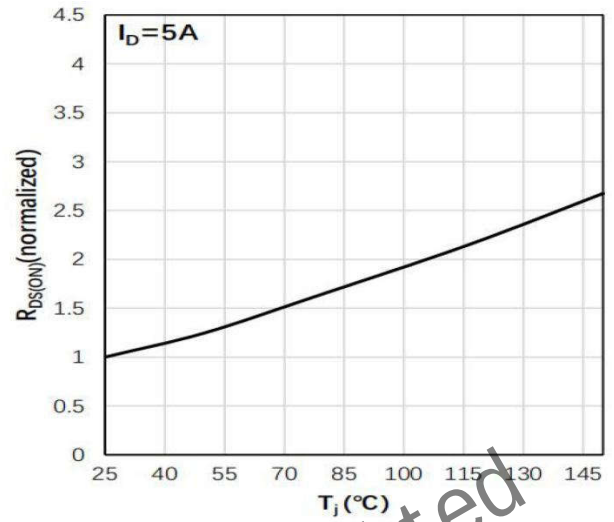


Fig.8 On Resistance vs. Temperature Characteristic

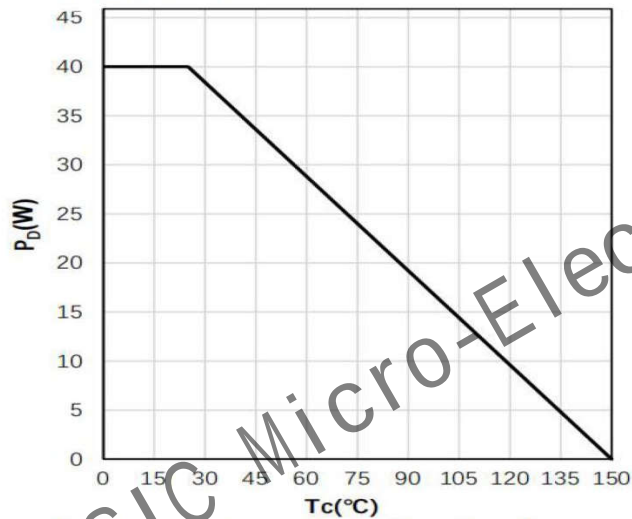


Fig.9 Power Dissipation Characteristic

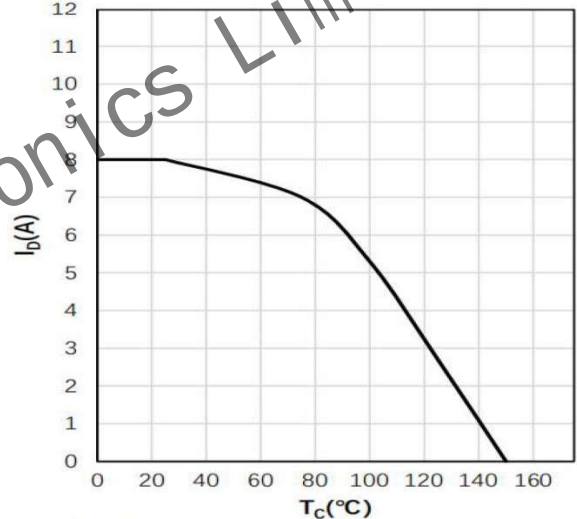


Fig.10 Drain Current vs. Temperature Characteristic

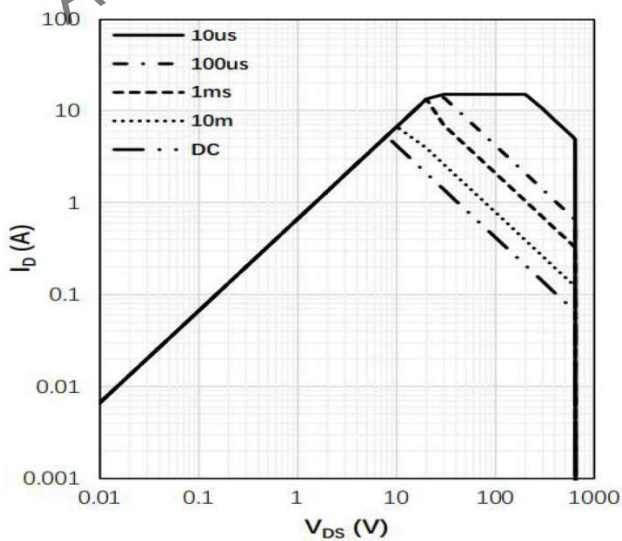


Fig.11 Safe Operating Area

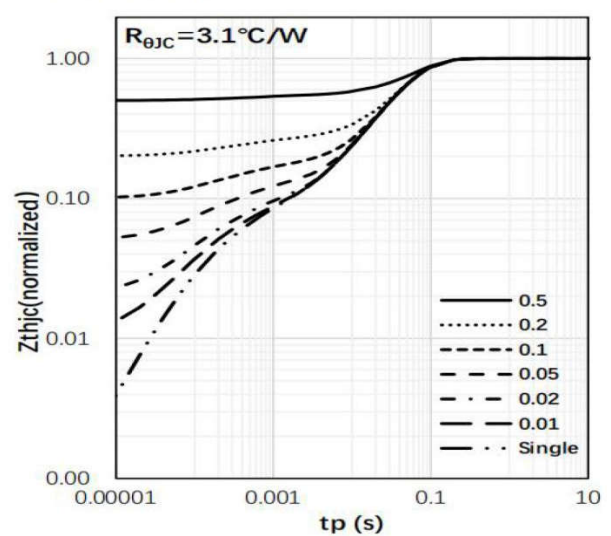
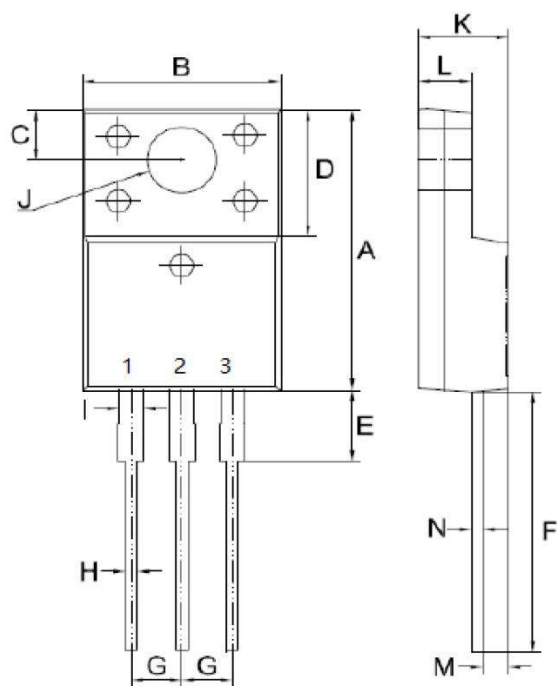


Fig.12 Transient Thermal Impedance

Dimension

TO-220F



Symbol	Millimeters	
	Min.	Max.
A	15.37	16.37
B	9.66	10.66
C	2.50	2.90
D	6.20	7.20
E	3.30	4.30
F	12.00	14.00
G	2.35	2.75
H	0.51	0.90
I	0.90	1.50
J	3.20	3.80
K	4.50	4.90
L	2.34	2.74
M	1.09	1.49
N	0.45	0.55