AT65R091G

650V Super Junction Power MOSFET

Features

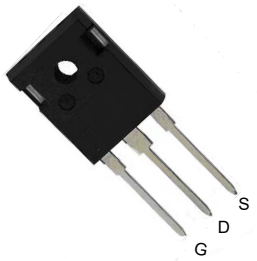
- Low drain-source on-resistance:$R_{DS(ON)}$=0.082Ω（typ)
- Very Low FOM ($R_{DS(on)}$ X Q_g)
- Extremely low switching loss
- 100% avalanche tested
- RoHS compliant

Key Performance Parameters

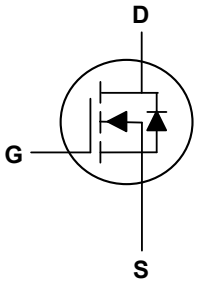
Parameter	Value	Unit
V_{DS} @ $T_{j,max}$	650	V
$R_{DS(ON),max}$	91	mΩ
I_D	47	A
$Q_{g,typ}$	72	nC
I_{DM}	141	A

Applications

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



TO-247 Top View



Absolute Maximum Ratings(T_C=25℃, unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current[1]	I_D	47	A
Pulsed Drain Current[2]	I_{DM}	141	A
Single Pulse Avalanche Energy[4]	EAS	1280	mJ
Avalanche Current	I_{AS}	10.5	A
Repetitive Avalanche Energy	E_{AR}	1.7	mJ
MOSFET dv/dt ruggedness, V_{DS} = 0...400V	dv/dt	50	V/ns
Reverse diode dv/dt[3] V_{DS}=0...400V, I_{SD}≤I_D		50	
Total Power Dissipation （T_C=25℃）	P_D	391	W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-Ambient (Max)	$R_{\theta JA}$	62	℃/W
Thermal Resistance Junction-Case (Max)	$R_{\theta JC}$	0.32	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	650	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V , I_D=23.5A	---	82	91	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =1.24mA	3.0	---	4.0	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=650V , V_{GS}=0V, T_J=25℃	---	---	1	uA
		V_{DS}=650V, V_{GS}=0V,T_J=150℃	---	---	100	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA
Gate Resistance	R_g	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.95	---	Ω
Total Gate Charge	Q_g	V_{DD}=480V , V_{GS}=10V , I_D=47A	---	72	---	nC
Gate-Source Charge	Q_{gs}		---	14	---	
Gate-Drain Charge	Q_{gd}		---	24	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=400V , R_G=1.9Ω, I_D=25.8A , V_{GS}=13V	---	15	---	ns
Rise Time	T_r		---	12	---	
Turn-Off Delay Time	$T_{d(off)}$		---	80	---	
Fall Time	T_f		---	6	---	
Input Capacitance	C_{iss}	V_{DS}=50V , V_{GS}=0V , f=1MHz	---	3680	---	pF
Output Capacitance	C_{oss}		---	390	---	
Reverse Transfer Capacitance	C_{rss}		---	15	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current	I_S	T_C=25℃	---	---	47	A
Pulsed Source Current	I_{SM}		---	---	141	A
Diode Forward Voltage	V_{SD}	V_G=0V , I_S=47A ,T_J=25℃	---	0.9	1.2	V
Reverse Recovery Time	t_{rr}	V_R=400V, I_F=25.8 A, di_F/dt=100A/μs	---	518	---	ns
Reverse Recovery Charge	Q_{rr}		---	8	---	uC
Peak Reverse Recovery Current	I_{rrm}		---	26	---	A

Note:

1. Limited by $T_{j,max.}$ Maximum Duty Cycle D = 0.50
2. Pulse width t_p limited by $T_{j,max}$
3. Identical low side and high side switch with identical R_G
4. V_{DD}=50V,R_G=25Ω,I_{AS}=10.5A, Starting T_J=25℃

Typical Characteristics

Figure 1. Output Characteristics

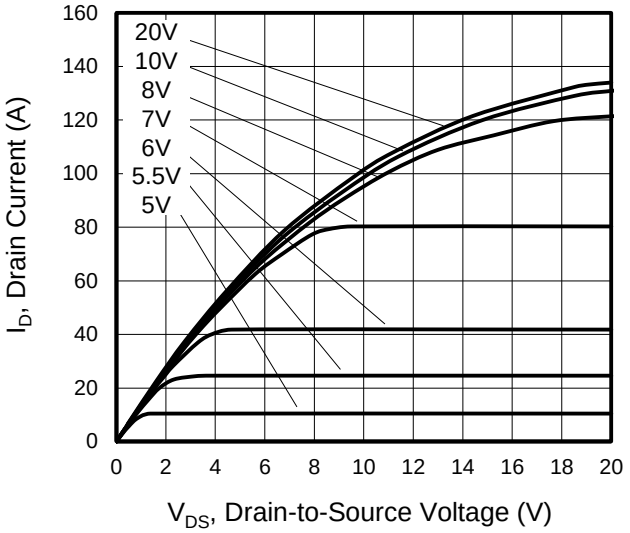


Figure 2. Transfer Characteristics

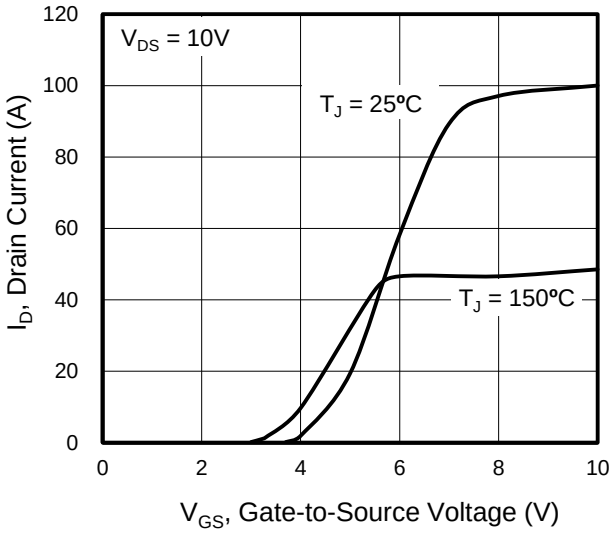


Figure 3. On-Resistance vs. Drain Current

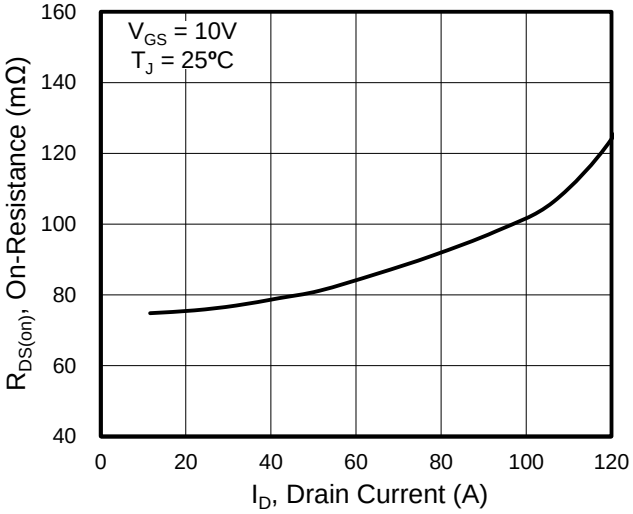


Figure 4. Capacitance

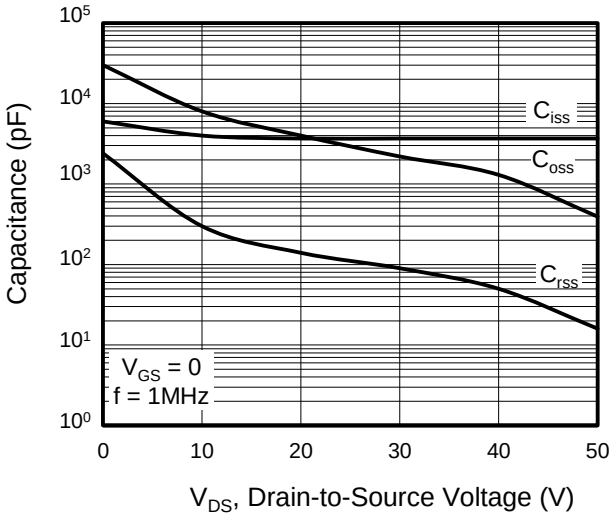


Figure 5. Gate Charge

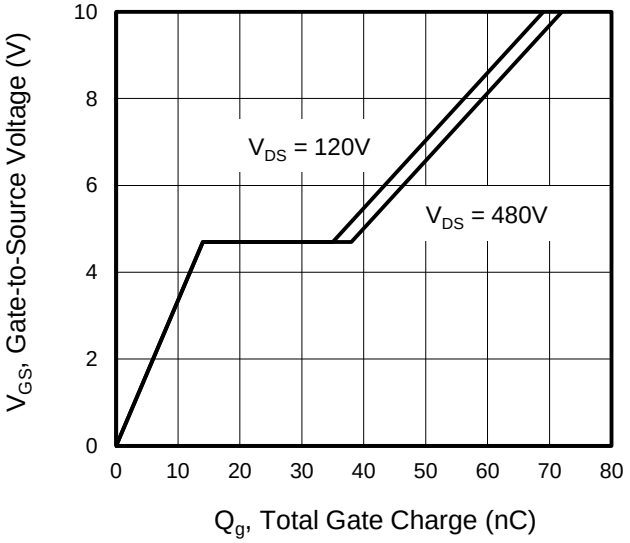


Figure 6. Body Diode Forward Voltage

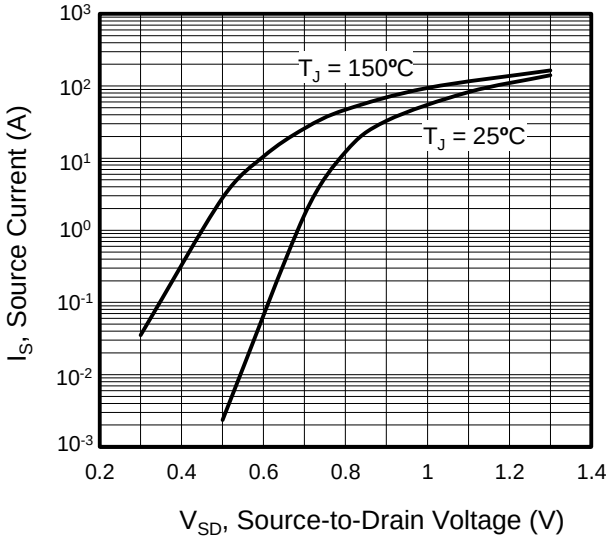


Figure 7. On-Resistance vs. Temperature

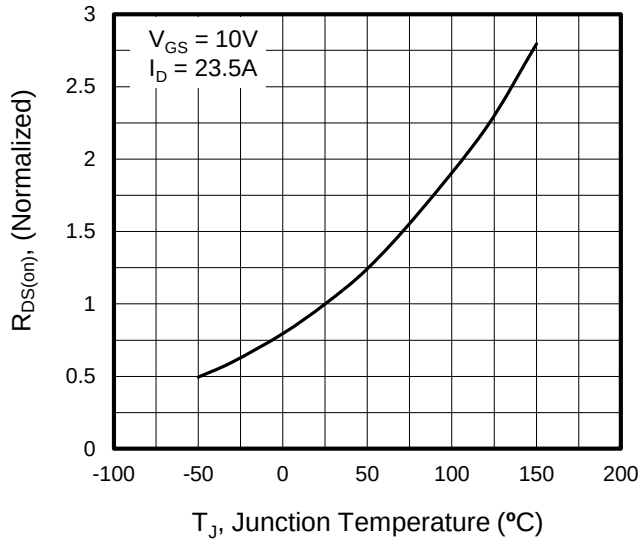


Figure 8. Threshold Voltage vs. Temperature

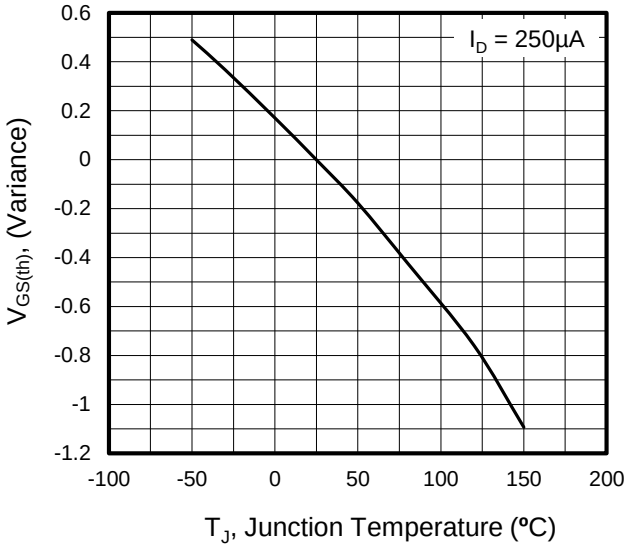
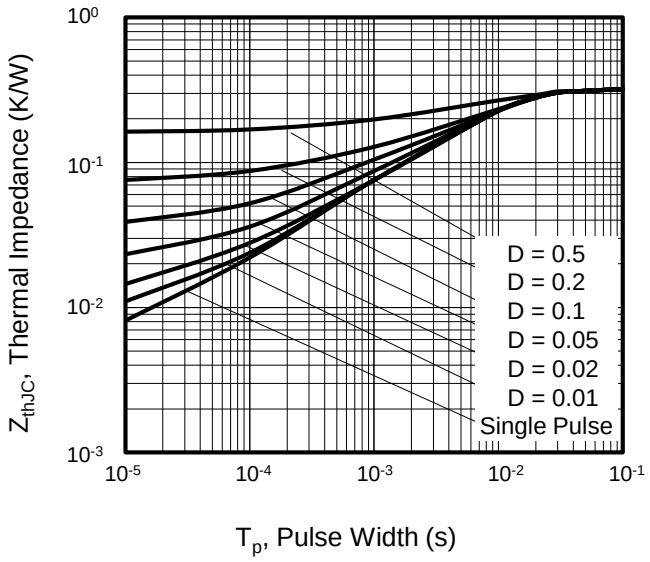
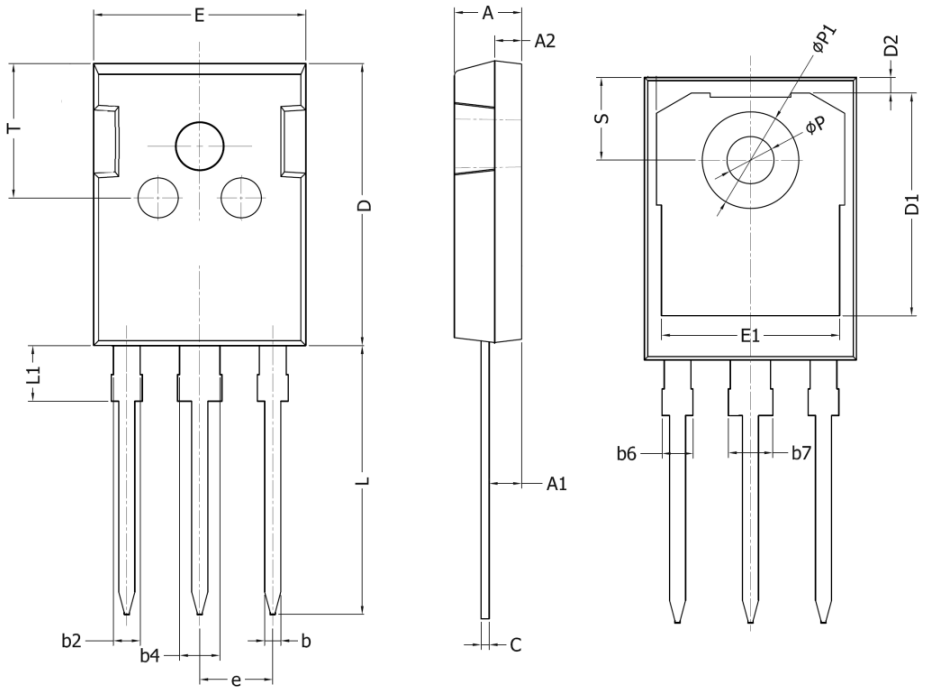


Figure 9. Transient Thermal Impedance



TO-247 Package Outline Dimensions



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	4.90	5.20
A1	2.31	2.51
A2	1.9	2.1
b	1.16	1.26
b2	1.96	2.06
b4	2.96	3.06
b6	-	2.25
b7	-	3.25
C	0.59	0.66
D	20.90	21.20
D1	16.25	16.85
D2	1.05	1.35
E	15.75	16.10
E1	13.00	13.60
e	5.436 BSC	
L	19.80	20.20
L1	-	4.30
P	3.40	3.60
P1	7.00	7.40
S	6.05	6.25
T	9.80	10.20