AT65R100P

650V Super Junction Power MOSFET

Features

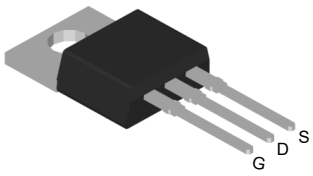
- Low drain-source on-resistance:$R_{DS(ON)}$=0.090Ω(typ)
- Easy to control gate switching
- Enhancement mode: V_{th} = 2.5 to 4.2V
- 100% avalanche tested
- RoHS compliant

Key Performance Parameters

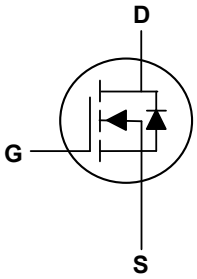
Parameter	Value	Unit
V_{DS} @ $T_{j,max}$	650	V
$R_{DS(ON),max}$	100	mΩ
I_D	30	A
$Q_{g,typ}$	52	nC
I_{DM}	90	A

Applications

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



TO-220 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}	±20	V
Continuous Drain Current[1]	I_D@T_C=25℃	30	A
Continuous Drain Current[1]	I_D@T_C=100℃	18.6	A
Pulsed Drain Current[2]	I_{DM}	90	A
Single Pulse Avalanche Energy[4]	EAS	720	mJ
Avalanche Current	I_{AS}	12	A
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		15	
Total Power Dissipation （T_C=25℃）	P_D	277	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)	$R_{\theta JA}$	60	℃/W
Thermal Resistance Junction-Case (Max)	$R_{\theta JC}$	0.85	℃/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=14A	---	90	100	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D=250uA	2.5	---	4.2	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}=±20V , V_{DS}=0V	---	---	±1	uA
Total Gate Charge	Q_g	V_{DD}=520V , V_{GS}=10V , I_D=16.7A	---	52	---	nC
Gate-Source Charge	Q_{gs}		---	10	---	
Gate-Drain Charge	Q_{gd}		---	20	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=325V , R_G=25Ω, I_D=16.7A	---	23	---	ns
Rise Time	T_r		---	28	---	
Turn-Off Delay Time	$T_{d(off)}$		---	110	---	
Fall Time	T_f		---	22	---	
Input Capacitance	C_{iss}	V_{DS}=400V , V_{GS}=0V , f=1MHz	---	2480	---	pF
Output Capacitance	C_{oss}		---	220	---	
Reverse Transfer Capacitance	C_{rss}		---	6.7	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current	I_S	T_C=25℃	---	---	30	A
Pulsed Source Current	I_{SM}		---	---	90	A
Diode Forward Voltage	V_{SD}	V_G=0V , I_S=16.7A ,T_J=25℃	---	---	1.3	V
Reverse Recovery Time	t_{rr}	V_R=400V, I_F=16.7 A, di_F/dt=100A/μs	---	195	---	ns
Reverse Recovery Charge	Q_{rr}		---	3.1	---	uC

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}=100V,R_G=25Ω,I_{AS}=3.4A

Typical Characteristics

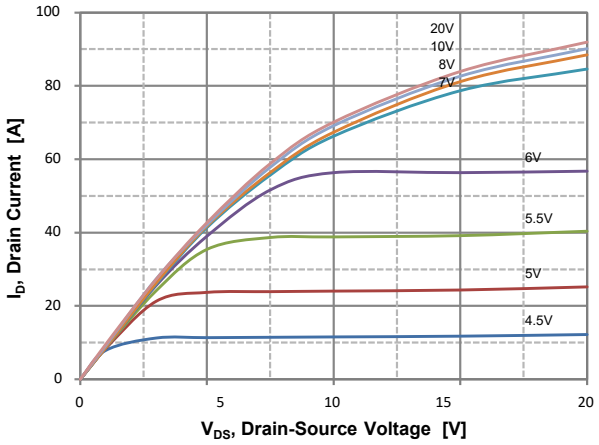


Figure 1. On Region Characteristics

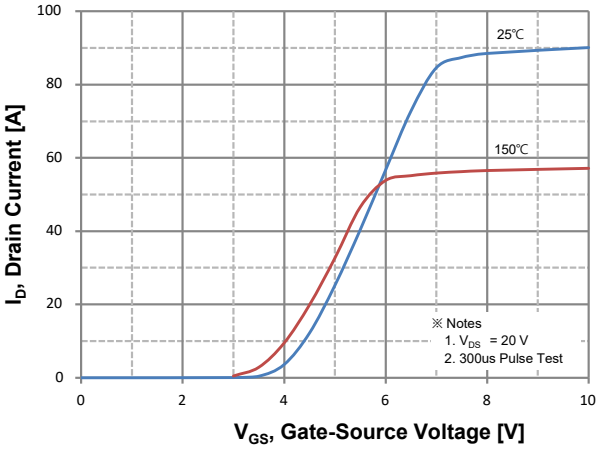


Figure 2. Transfer Characteristics

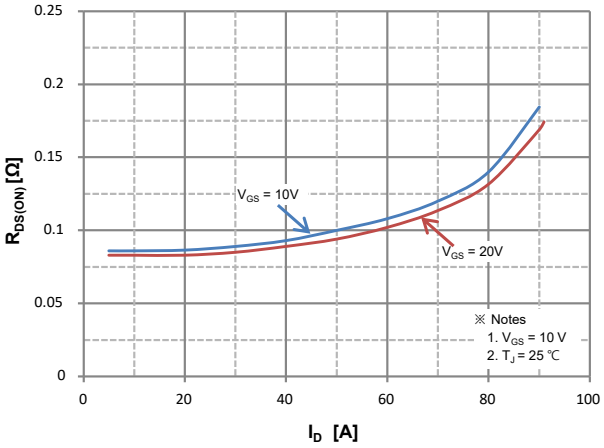


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

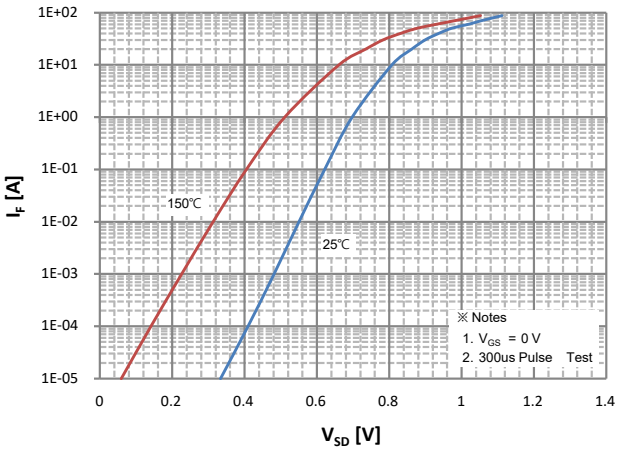


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

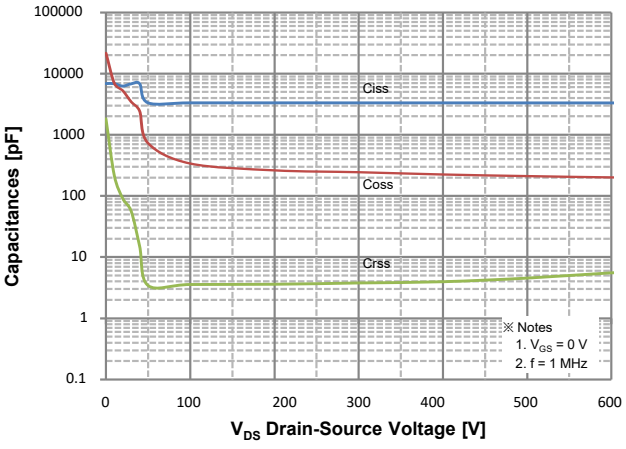


Figure 5. Capacitance Characteristics

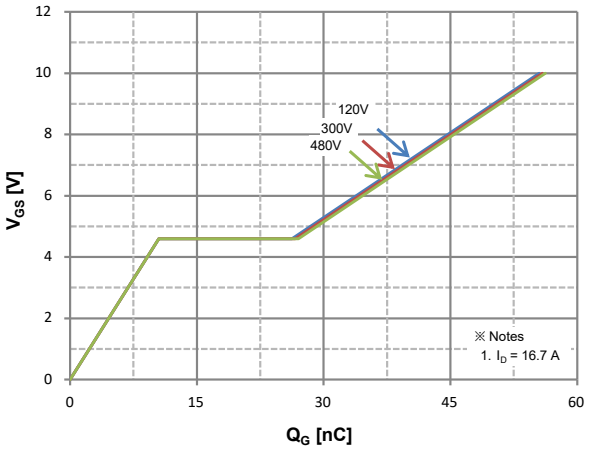


Figure 6. Gate Charge Characteristics

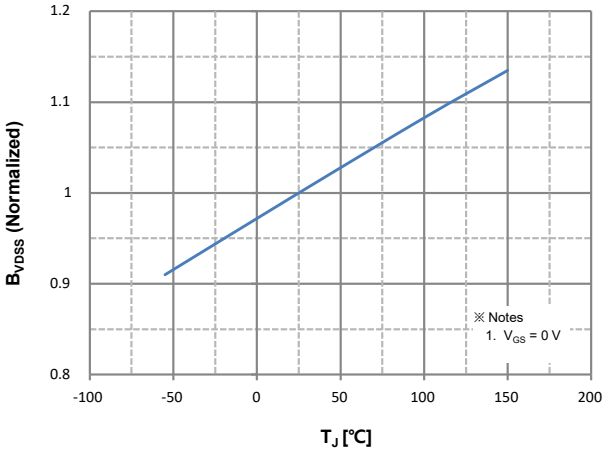


Figure 7. Breakdown Voltage Variation vs. Temperature

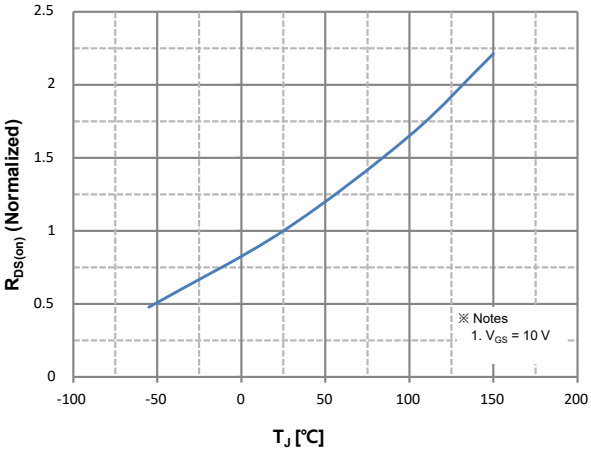


Figure 8. On-Resistance Variation vs. Temperature

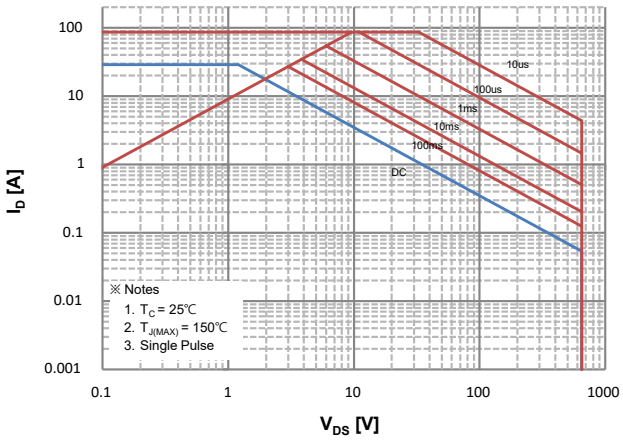


Figure 9. Maximum Safe Operating Area

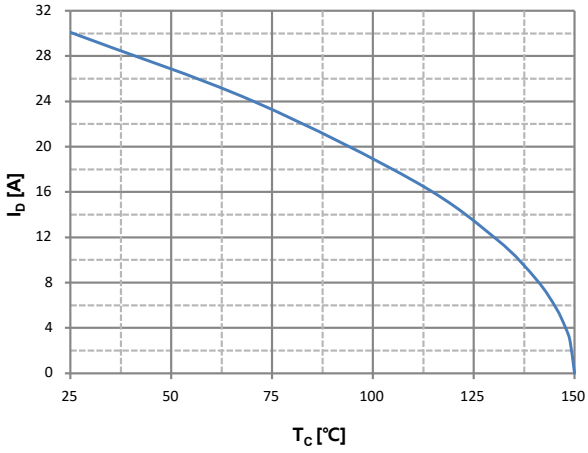


Figure 10. Maximum Drain Current vs. Case Temperature

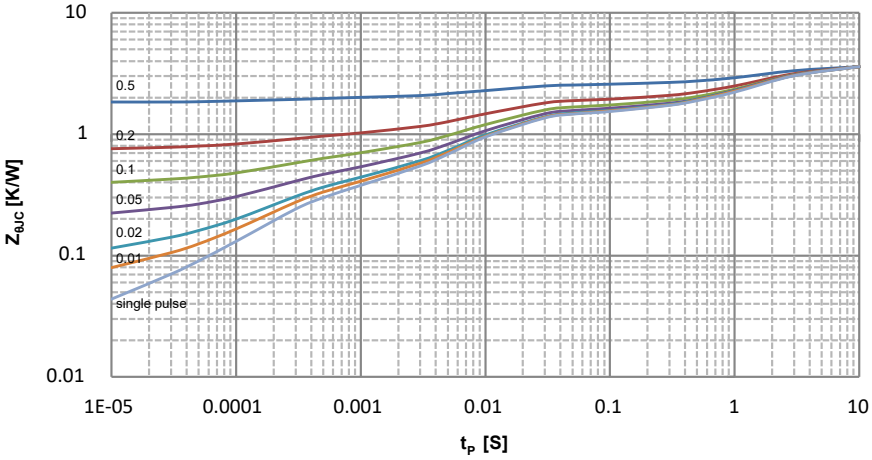
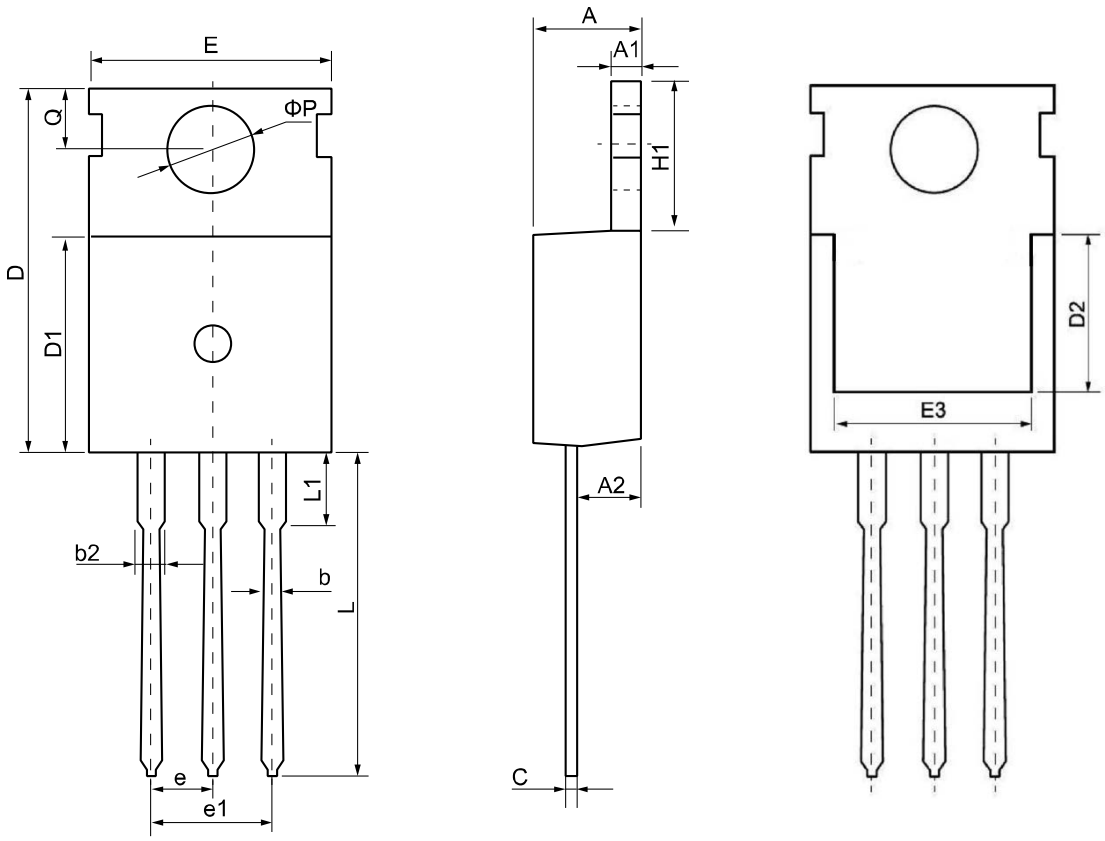


Figure 11. Transient Thermal Response Curve

TO-220 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	4.30	4.55	4.75	**E**	9.65	10.00	10.25
A1	1.15	1.30	1.45	**E3**	7.00	--	--
A2	2.20	2.40	2.60	**e**	2.54 BSC		
b	0.70	0.80	0.95	**e1**	5.08 BSC		
b2	1.17	1.27	1.47	**H1**	6.30	6.50	6.80
c	0.40	0.50	0.65	**L**	12.70	13.50	14.10
D	15.30	15.60	15.90	**L1**	--	3.20	3.95
D1	8.90	9.10	9.35	**ϕ P**	3.40	3.60	3.80
D2	5.50	--	--	**Q**	2.60	2.80	3.00