AT60R099G

600V Super Junction Power MOSFET

Features

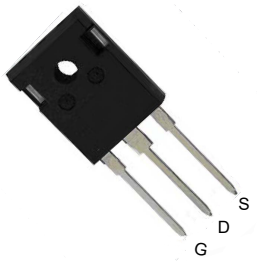
- Low drain-source on-resistance:$R_{DS(ON)}$=0.078Ω(typ)
- Very Low FOM ($R_{DS(on)}$ X Q_g)
- Extremely low switching loss
- 100% avalanche tested
- RoHS compliant

Key Performance Parameters

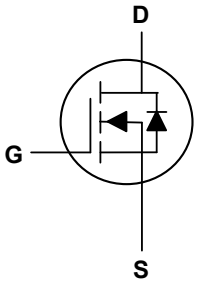
Parameter	Value	Unit
V_{DS} @ $T_{j,max}$	600	V
$R_{DS(ON),max}$	99	mΩ
I_D	38	A
$Q_{g,typ}$	52	nC
I_{DM}	96	A

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}	600	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current[1]	I_D	38	A
Pulsed Drain Current[2]	I_{DM}	96	A
Single Pulse Avalanche Energy[4]	EAS	199	mJ
Avalanche Current	I_{AS}	5.6	A
Repetitive Avalanche Energy	E_{AR}	2.6	mJ
MOSFET dv/dt ruggedness, V_{DS} = 0...400V	dv/dt	20	V/ns
Reverse diode dv/dt[3] V_{DS}=0...400V, I_{SD}≤I_D		100	
Total Power Dissipation （T_C=25℃）	P_D	260	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)	$R_{\theta JA}$	62.5	℃/W
Thermal Resistance Junction-Case (Max)	$R_{\theta JC}$	2.9	℃/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	600	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V , I_D=15.3A	---	78	99	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D=1.7MA	2.5	---	4.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=600V , V_{GS}=0V, T_J=25℃	---	---	1	uA
		V_{DS}=480V, V_{GS}=0V,T_J=150℃	---	2	---	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	---	1.2	---	Ω
Total Gate Charge	Q_g	V_{DS}=400V , V_{GS}=10V , I_D=10A	---	52	---	nC
Gate-Source Charge	Q_{gs}		---	12.7	---	
Gate-Drain Charge	Q_{gd}		---	22.4	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DS}=400V , R_G=10Ω, I_D=15.3A , V_{GS}=10V	---	17	---	ns
Rise Time	T_r		---	10	---	
Turn-Off Delay Time	$T_{d(off)}$		---	86	---	
Fall Time	T_f		---	11	---	
Input Capacitance	C_{iss}	V_{DS}=400V , V_{GS}=0V , f=1MHz	---	2270	---	pF
Output Capacitance	C_{oss}		---	58	---	
Reverse Transfer Capacitance	C_{rss}		---	2	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current	I_S	T_C=25℃	---	---	38	A
Pulsed Source Current	I_{SM}		---	---	96	A
Diode Forward Voltage	V_{SD}	V_G=0V , I_S=15.3A ,T_J=25℃	---	---	1.2	V
Reverse Recovery Time	t_{rr}	V_{DD}=400V, I_S=15.3 A, di_F/dt=100A/μs	---	346	---	ns
Reverse Recovery Charge	Q_{rr}		---	5.1	---	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}=50V,R_G=25Ω,I_{AS}=5.6A, Starting T_J=25℃

Typical Characteristics

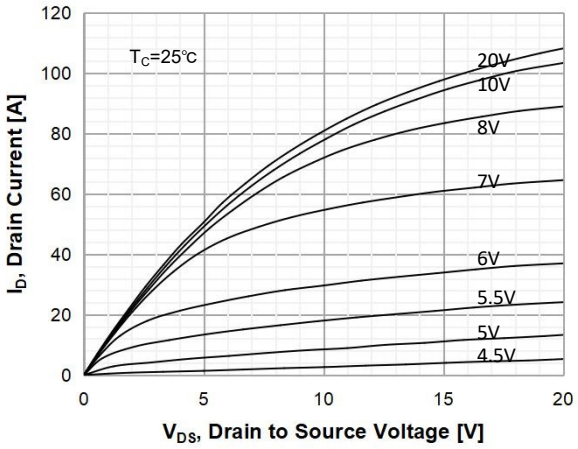


Figure 1. On-Region Characteristics

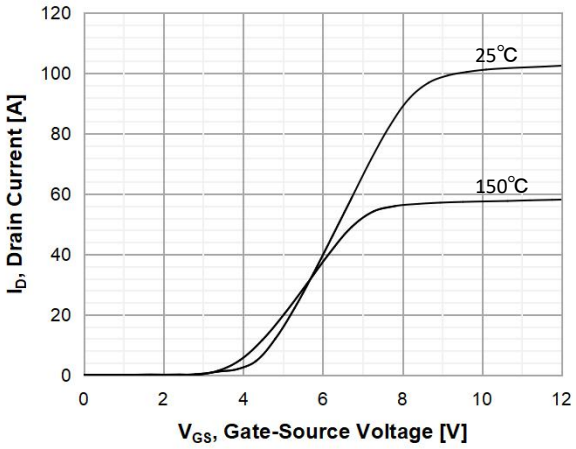


Figure 2. Transfer Characteristics

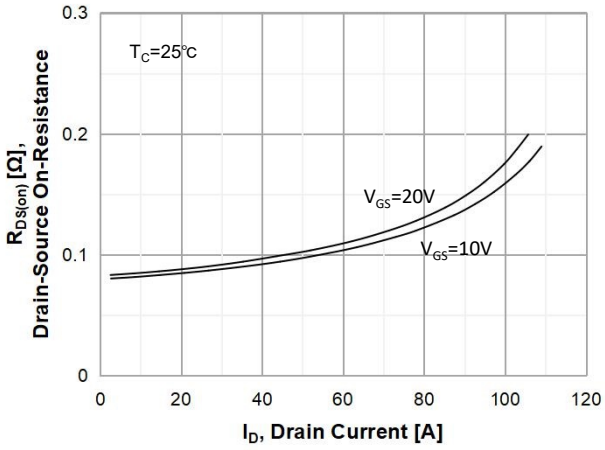


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

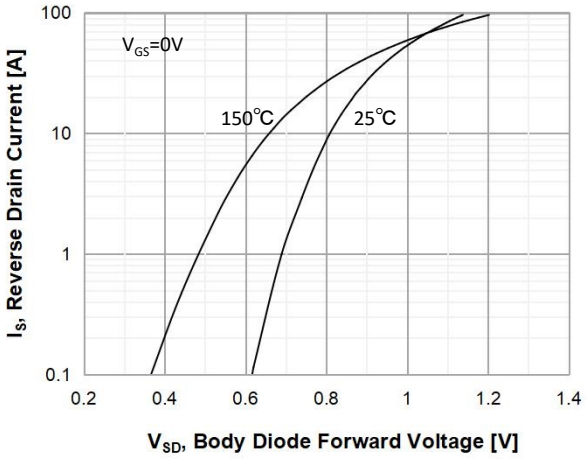


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

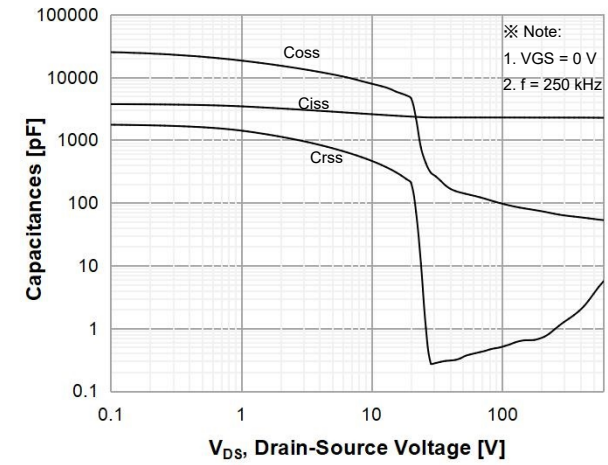


Figure 5. Capacitance Characteristics

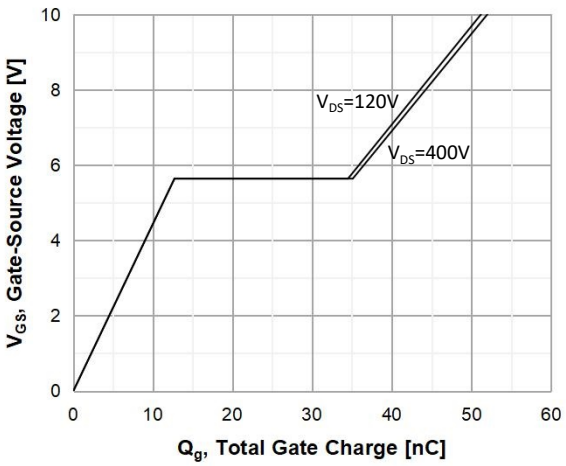


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

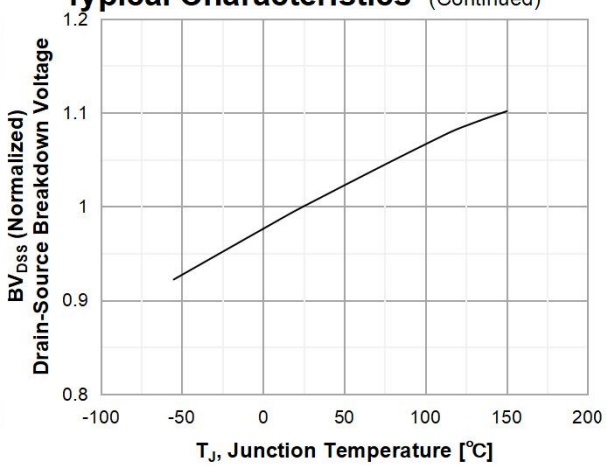


Figure 7. Breakdown Voltage Variation vs Temperature

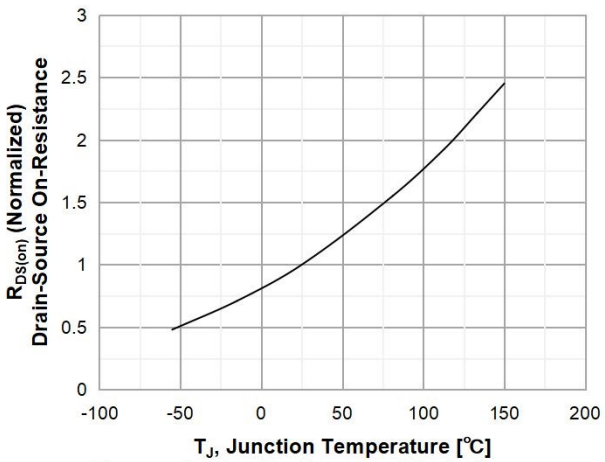


Figure 8. On-Resistance Variation vs Temperature

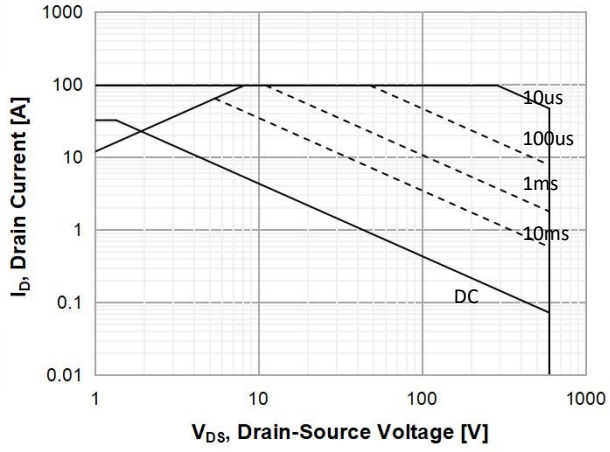


Figure 9. Maximum Safe Operating Area

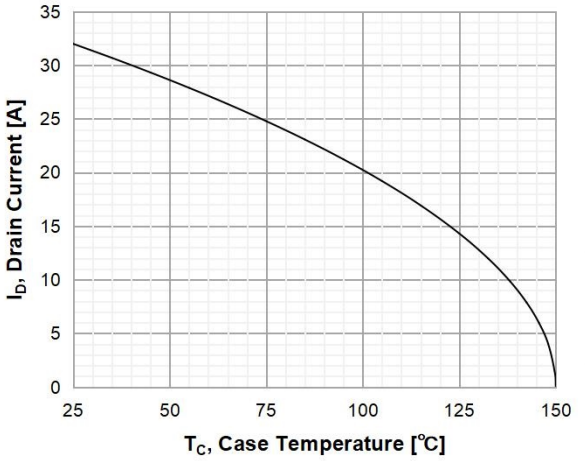


Figure 10. Maximum Drain Current vs. Case Temperature

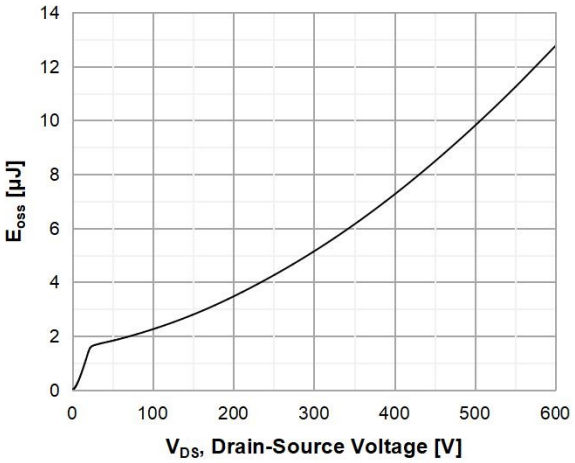


Figure 11.E_{oss} vs. Drain to Source Voltage

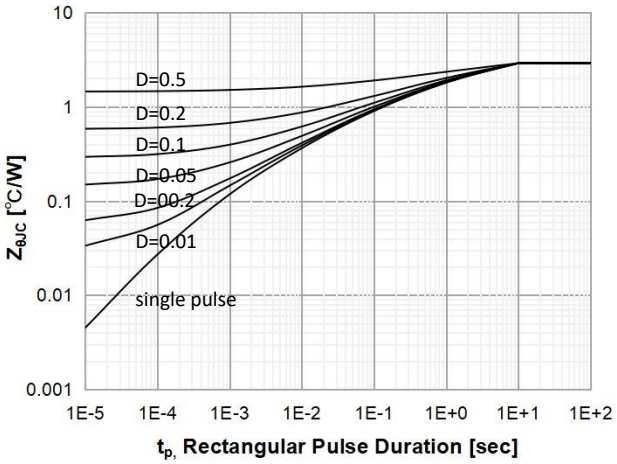
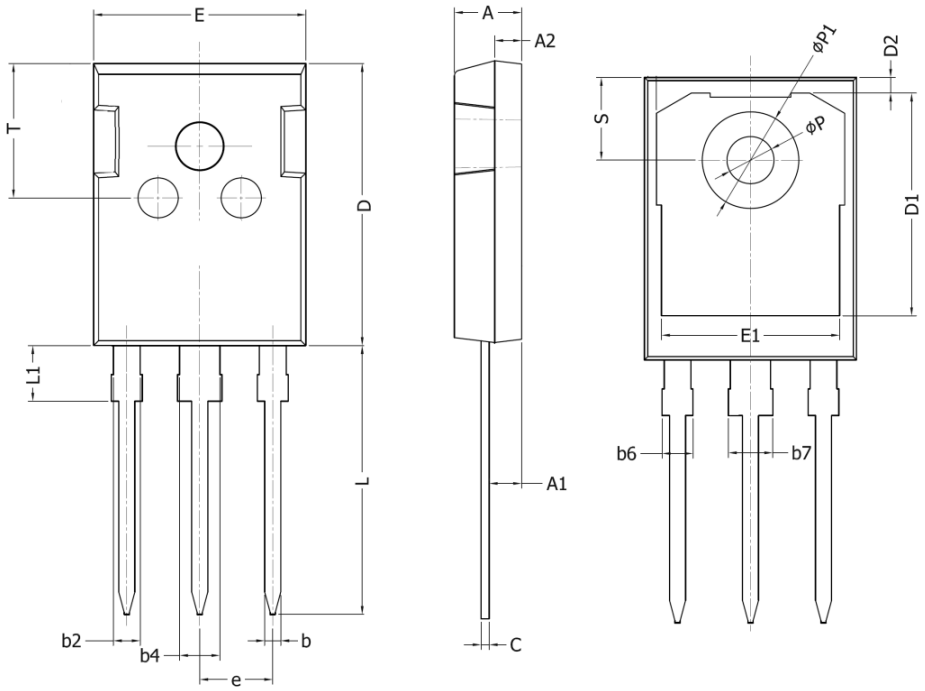


Figure 12.Transient Thermal Response Curve

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