AT60R160W

600V Super Junction Power MOSFET

Features

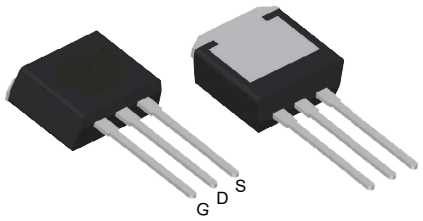
- Low drain-source on-resistance:$R_{DS(ON)}$=0.14Ω(typ)
- Easy to control gate switching
- Enhancement mode: V_{th} = 2.5 to 3.5V
- 100% avalanche tested
- RoHS compliant

Key Performance Parameters

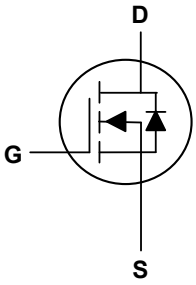
Parameter	Value	Unit
V_{DS} @ $T_{j,max}$	600	V
$R_{DS(ON),max}$	160	mΩ
I_D	20	A
$Q_{g,typ}$	38.5	nC
I_{DM}	60	A

Applications

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



TO-262 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	20	A
Pulsed Drain Current[2]	I_{DM}	60	A
Single Pulse Avalanche Energy[4]	EAS	480	mJ
Avalanche Current	I_{AS}	3.5	A
Repetitive Avalanche energy,t_{AR} limited by T_{Jmax}	E_{AR}	0.7	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	150	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	$R_{\theta JA}$	62	℃/W
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.83	℃/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=10A	---	140	160	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	2.5	---	4.0	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=600V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=600V, V_{GS}=0V, T_J=150℃	---	---	100	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA
Gate Resistance	R_G	f = 1.0MHz, open drain	---	8	---	Ω
Total Gate Charge	Q_g	V_{DD}=400V , V_{GS}=10V , I_D=20A	---	38.5	---	nC
Gate-Source Charge	Q_{gs}		---	8	---	
Gate-Drain Charge	Q_{gd}		---	15	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=400V , V_{GS}=10V , R_G=25Ω, I_D=20A	---	25	---	ns
Rise Time	T_r		---	59	---	
Turn-Off Delay Time	$T_{d(off)}$		---	121	---	
Fall Time	T_f		---	44	---	
Input Capacitance	C_{iss}	V_{DS}=100V , V_{GS}=0V , f=1MHz	---	1724	---	pF
Output Capacitance	C_{oss}		---	72	---	
Reverse Transfer Capacitance	C_{rss}		---	6	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current	I_S	T_C=25℃	---	---	20	A
Pulsed Source Current	I_{SM}		---	---	60	A
Diode Forward Voltage	V_{SD}	V_G=0V , I_S=20A ,T_J=25℃	---	0.9	1.2	V
Reverse Recovery Time	t_{rr}	V_R=400V, I_F=20 A, di_F/dt=100A/μs	---	453	---	ns
Reverse Recovery Charge	Q_{rr}		---	5.1	---	uC
Peak Reverse Recovery Current	I_{rrm}		---	22	---	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}=3.5A

Typical Characteristics

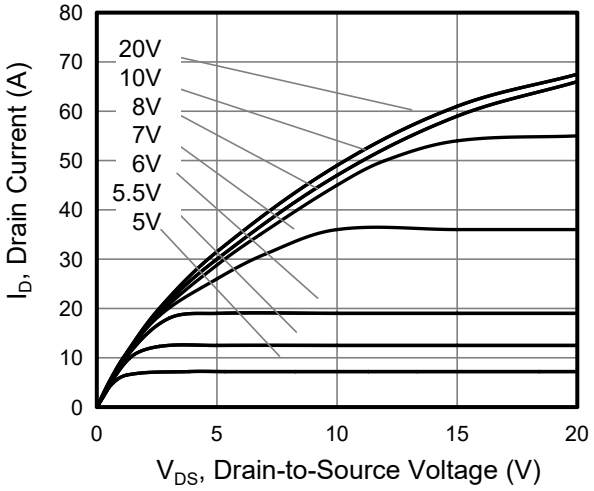


Figure 1. Output Characteristics

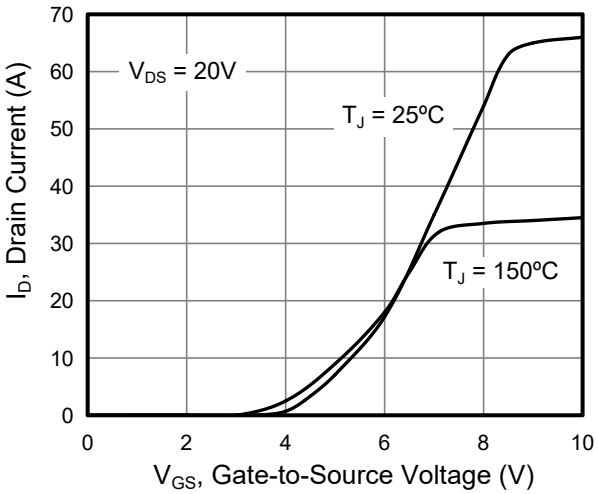


Figure 2. Transfer Characteristics

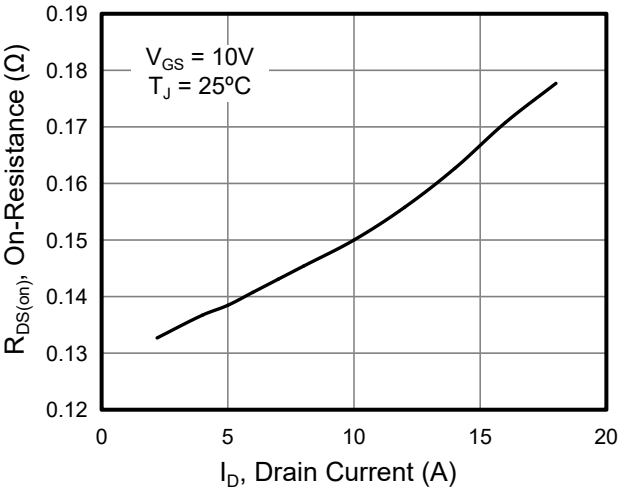


Figure 3. On-Resistance vs. Drain Current

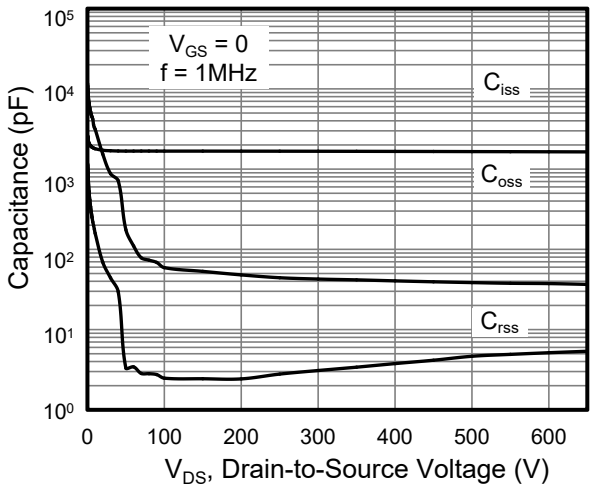


Figure 4. Capacitance

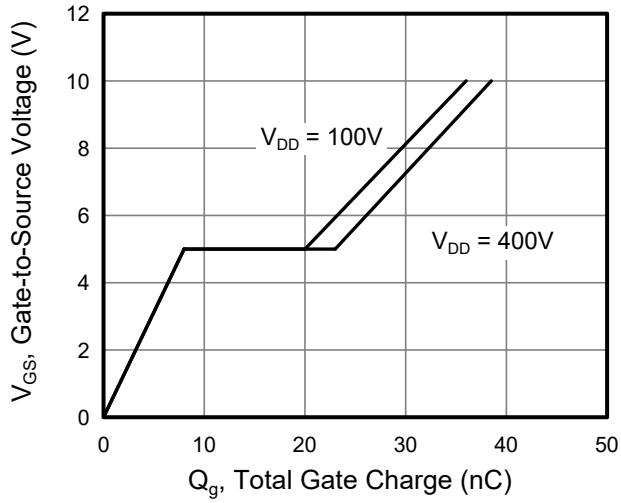


Figure 5. Gate Charge

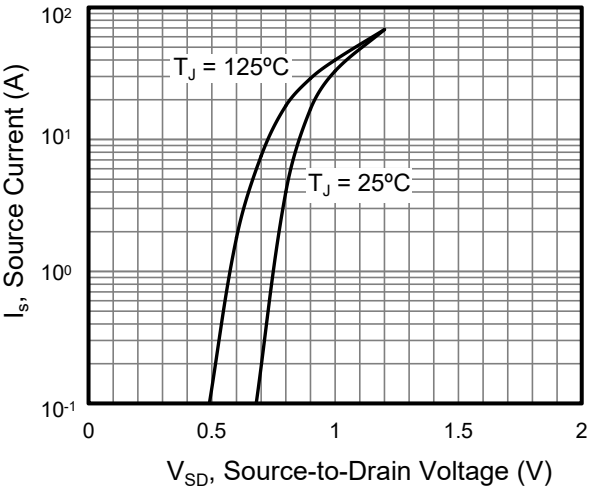


Figure 6. Body Diode Forward Voltage

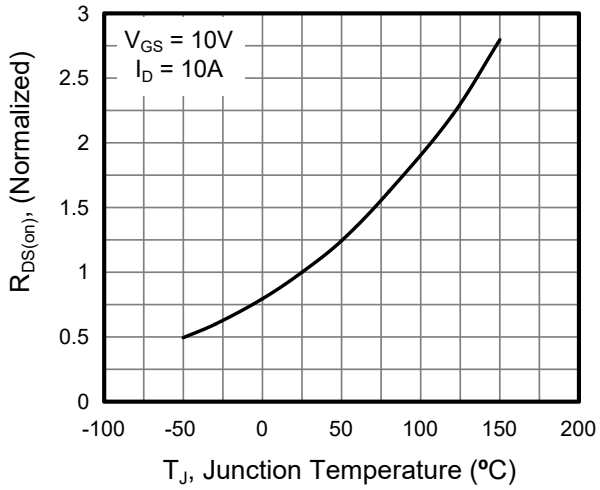


Figure 7. On-Resistance vs. Junction Temperature

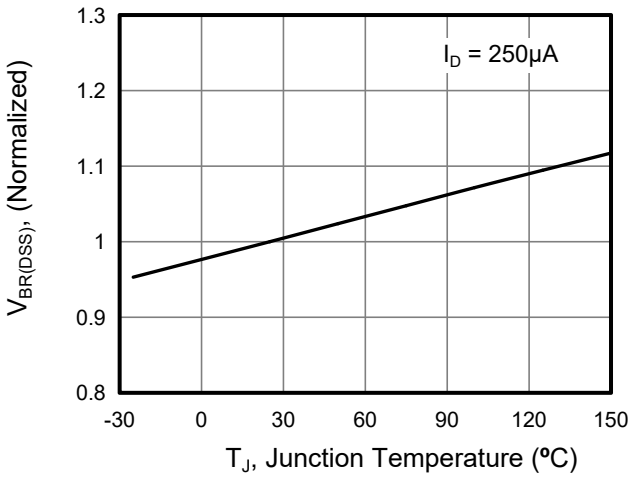


Figure 8. Breakdown voltage vs. Junction Temperature

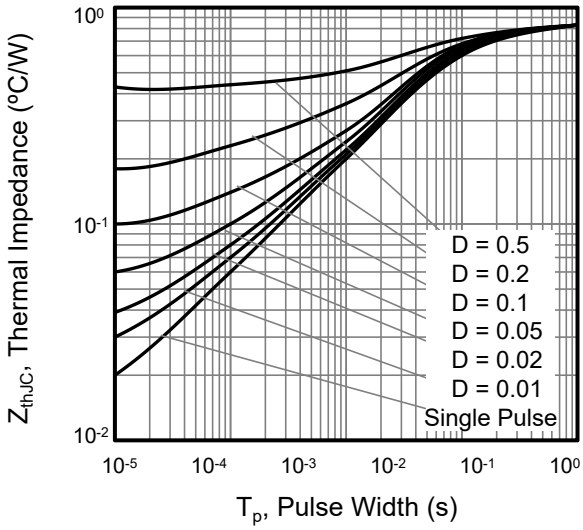
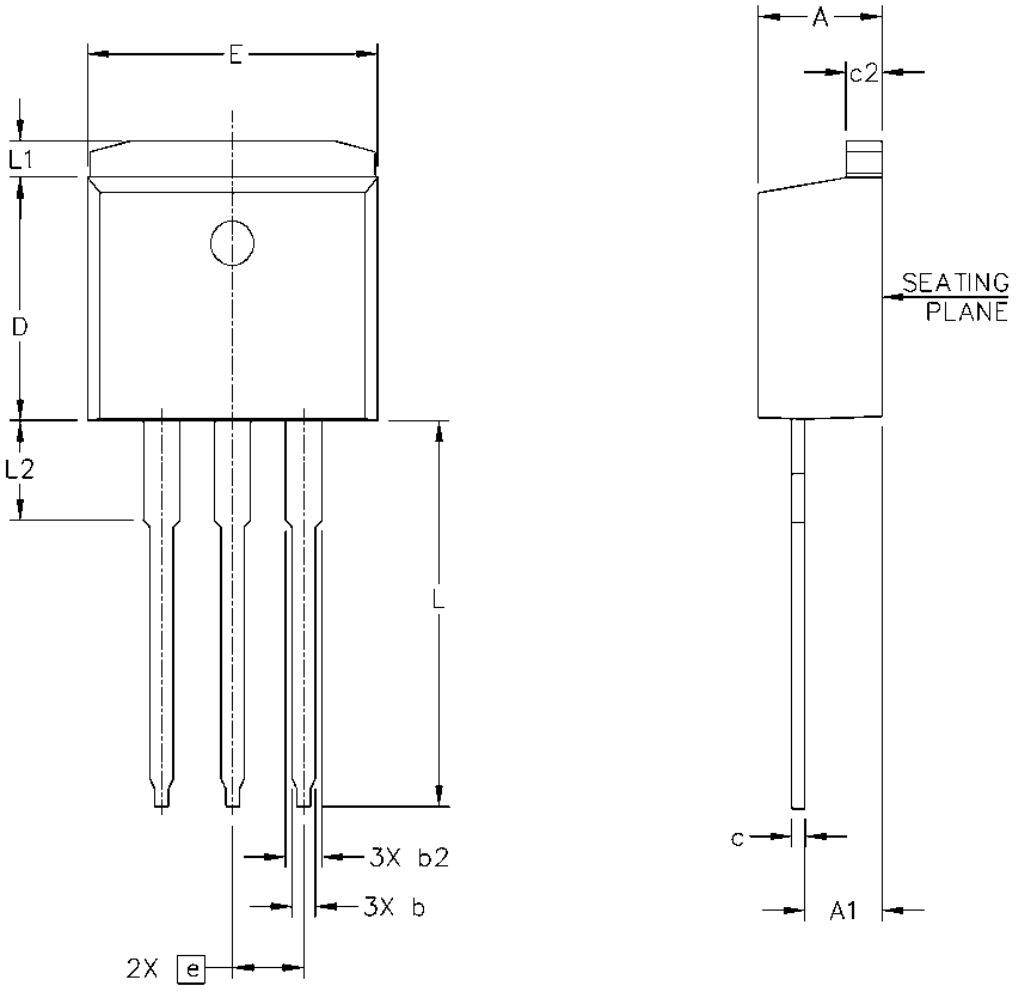


Figure 9. Transient Thermal Impedance

TO-262 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	4.10	4.47	4.83	**D**	8.80	9.10	9.40
A1	2.10	2.40	2.70	**E**	9.70	10.00	10.29
b	0.70	0.85	0.99	**e**	2.54 REF		
b2	1.20	1.30	1.40	**L**	12.20	13.20	14.20
c	0.45	0.55	0.65	**L1**	1.00	1.20	1.40
c2	1.15	1.28	1.40	**L2**	2.90	3.10	3.30