AT60R280K/AT60R280F

600V Super Junction Power MOSFET

Features

- Low drain-source on-resistance:$R_{DS(ON)}$=0.257Ω（typ)
- Easy to control gate switching
- Enhancement mode: V_{th} = 2.8 to 4.2V
- 100% avalanche tested
- RoHS compliant

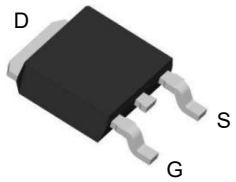
Key Performance Parameters

Parameter	Value	Unit
V_{DS} @ $T_{j,max}$	600	V
$R_{DS(ON),max}$	280	mΩ
I_D	15	A
$Q_{g,typ}$	23	nC
I_{DM}	45	A

Applications

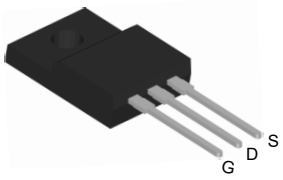
- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- Charger,Lighting.

TO-252 Top View

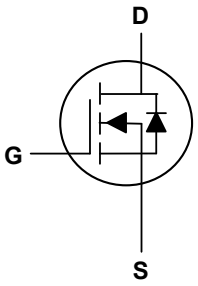


AT60R280K

TO-220F Top View



AT60R280F



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

Parameter	Symbol	TO-252	TO-220F	Unit
Drain-Source Voltage	V_{DS}	600		V
Gate-Source Voltage	V_{GS}	±30		V
Continuous Drain Current[1]	I_D@T_C=25℃	15		A
Pulsed Drain Current[2]	I_{DM}	45		A
Single Pulse Avalanche Energy	EAS	405		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}<=48A, T_j=25℃		15		
Total Power Dissipation （T_C=25℃）	P_D	118	32	W
Storage Temperature Range	T_{STG}	-55 to 150		℃
Operating Junction Temperature Range	T_J	-55 to 150		℃

Thermal Characteristics

Parameter	Symbol	TO-252	TO-220F	Unit
		Max	Max	
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	62	80	℃/W
Thermal Resistance Junction-Case	$R_{\theta JC}$	1.06	3.9	℃/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=10mA	605	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V , I_D=7.5A	---	240	280	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℃	---	---	100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA
Gate Resistance	R_G	f = 1.0MHz, open drain	---	5.3	---	Ω
Total Gate Charge	Q_g	V_{DD}=400V , V_{GS}=10V , I_D=3.8A	---	23	---	nC
Gate-Source Charge	Q_{gs}		---	5.7	---	
Gate-Drain Charge	Q_{gd}		---	17	---	
Gate Plateau Voltage	$V_{plateau}$		---	5.4	---	V
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=400V , V_{GS}=10V , R_G=10Ω, I_D=3.8A	---	8.4	---	ns
Rise Time	T_r		---	21.2	---	
Turn-Off Delay Time	$T_{d(off)}$		---	32.2	---	
Fall Time	T_f		---	20.8	---	
Input Capacitance	C_{iss}	V_{DS}=50V , V_{GS}=0V , f=1MHz	---	820	---	pF
Output Capacitance	C_{oss}		---	58	---	
Reverse Transfer Capacitance	C_{rss}		---	3.1	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode Forward Voltage	V_{SD}	V_G=0V , I_F=1A ,T_J=25℃	---	0.74	---	V
Reverse Recovery Time	t_{rr}	V_R=400V, I_F=2 A, di_F/dt=100A/μs	---	216	---	ns
Reverse Recovery Charge	Q_{rr}		---	1.3	---	uC
Peak Reverse Recovery Current	I_{rrm}		---	16.6	---	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

Typical Characteristics

Figure 1. Output Characteristics

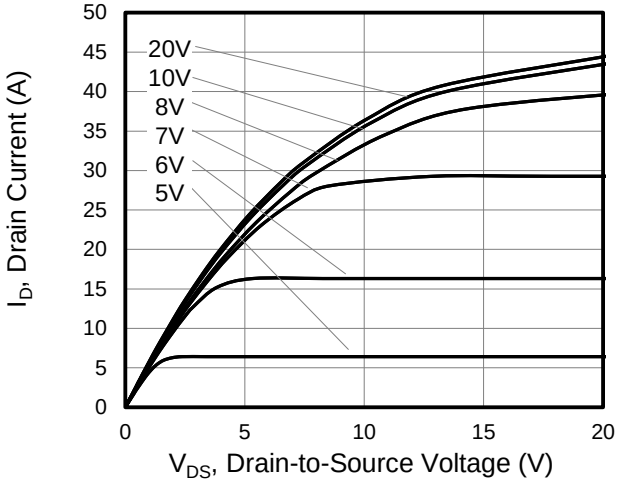


Figure 2. Transfer Characteristics

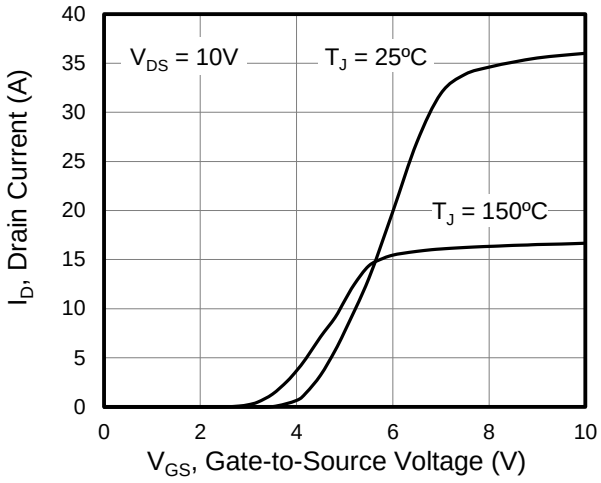


Figure 3. On-Resistance vs. Drain Current

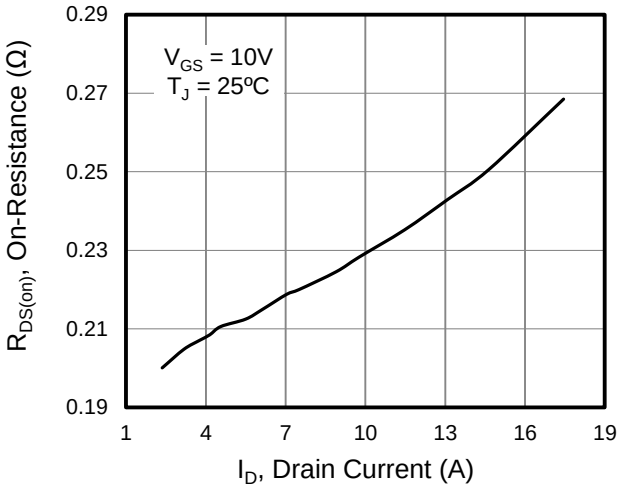


Figure 4. Capacitance

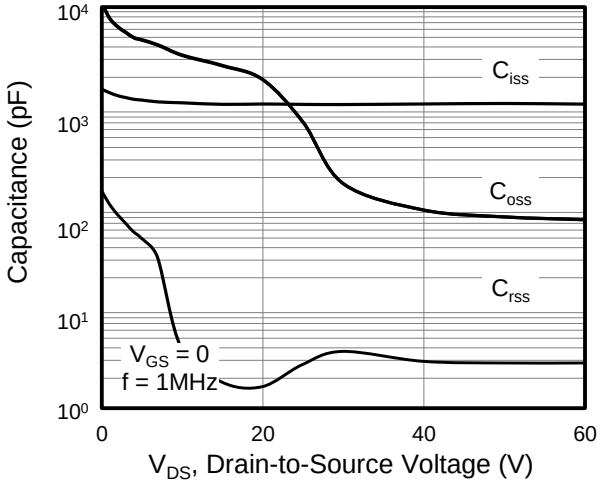


Figure 5. Gate Charge

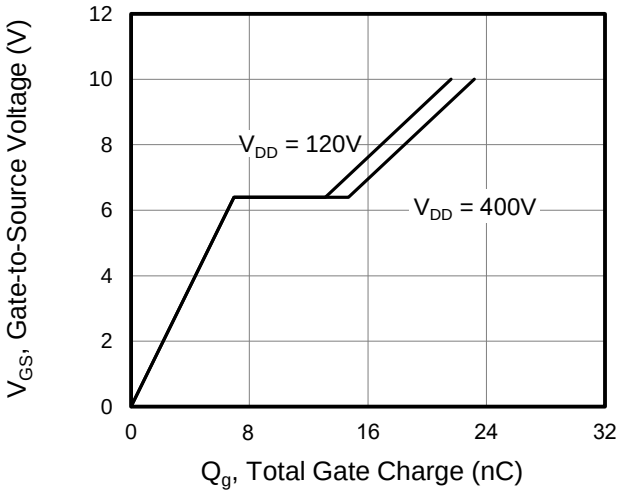


Figure 6. Body Diode Forward Voltage

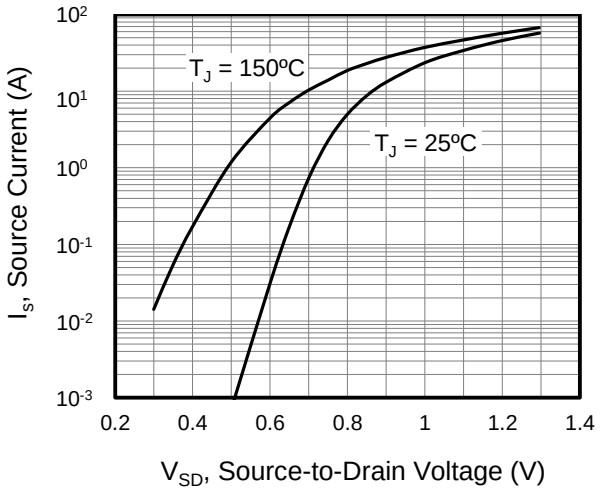


Figure 7. On-Resistance vs. Junction Temperature

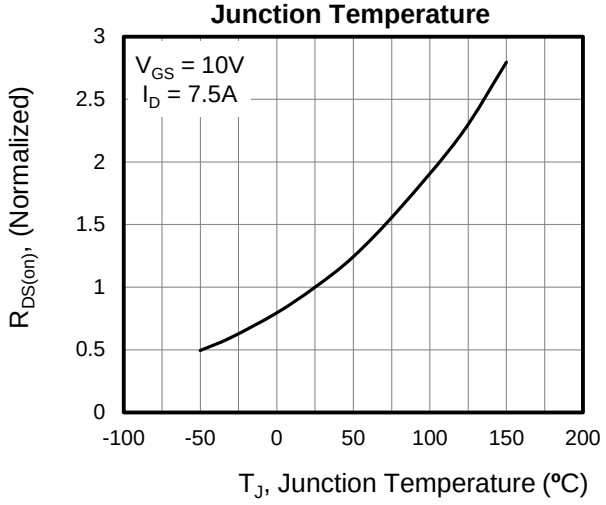


Figure 8. Threshold Voltage vs. Junction Temperature

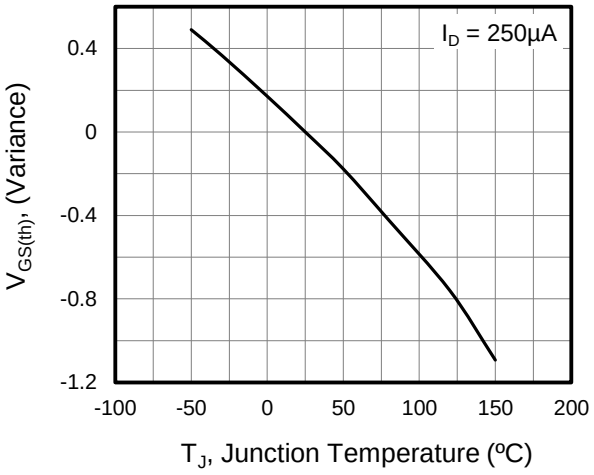


Figure 9. Transient Thermal Impedance TO-252

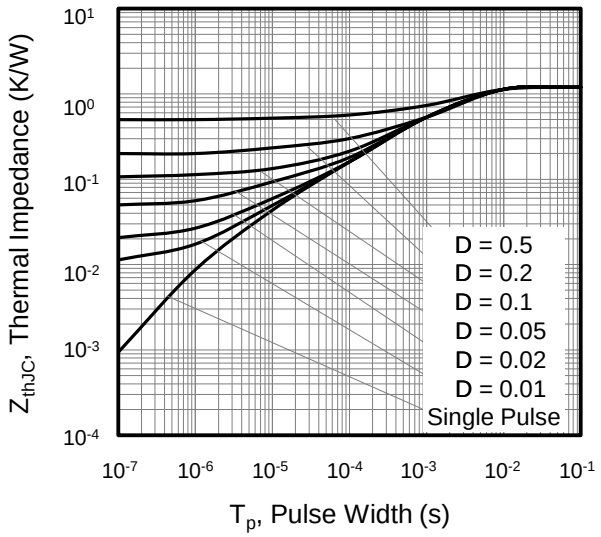


Figure 10. Transient Thermal Impedance TO-220F

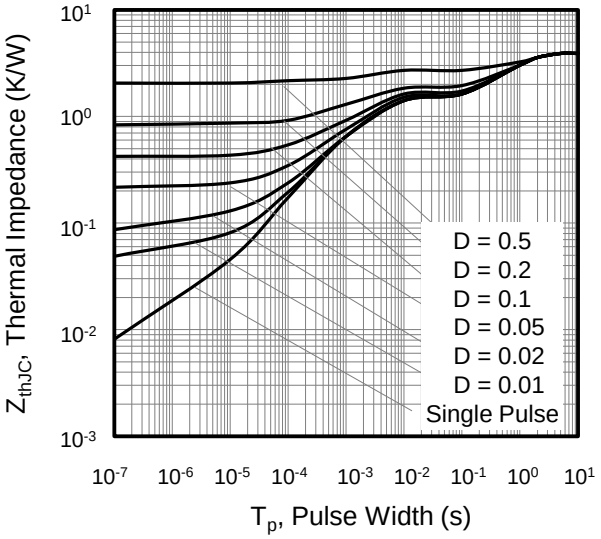


Figure 11. Safe operation area for TO-252

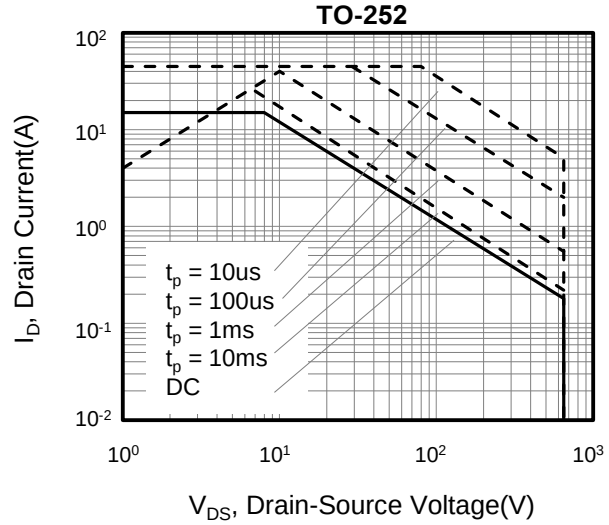
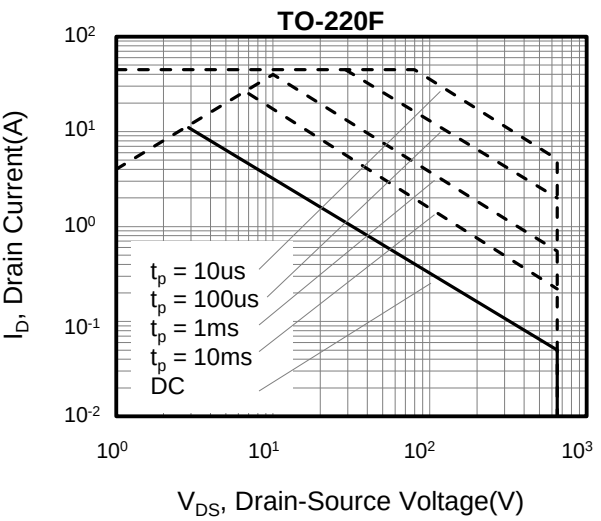
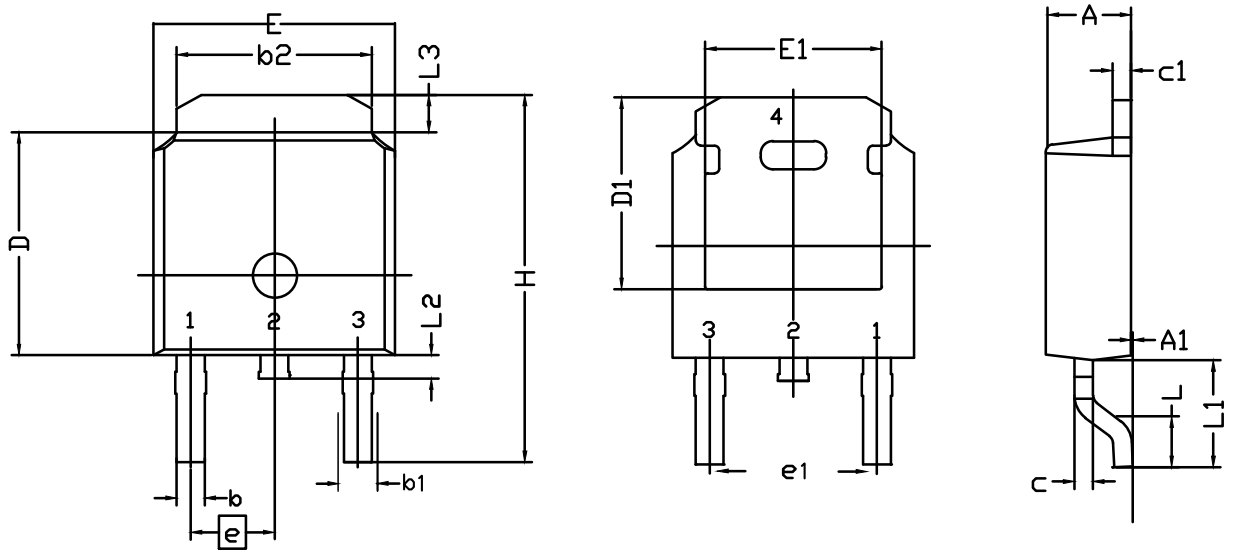


Figure 12. Safe operation area for TO-220F

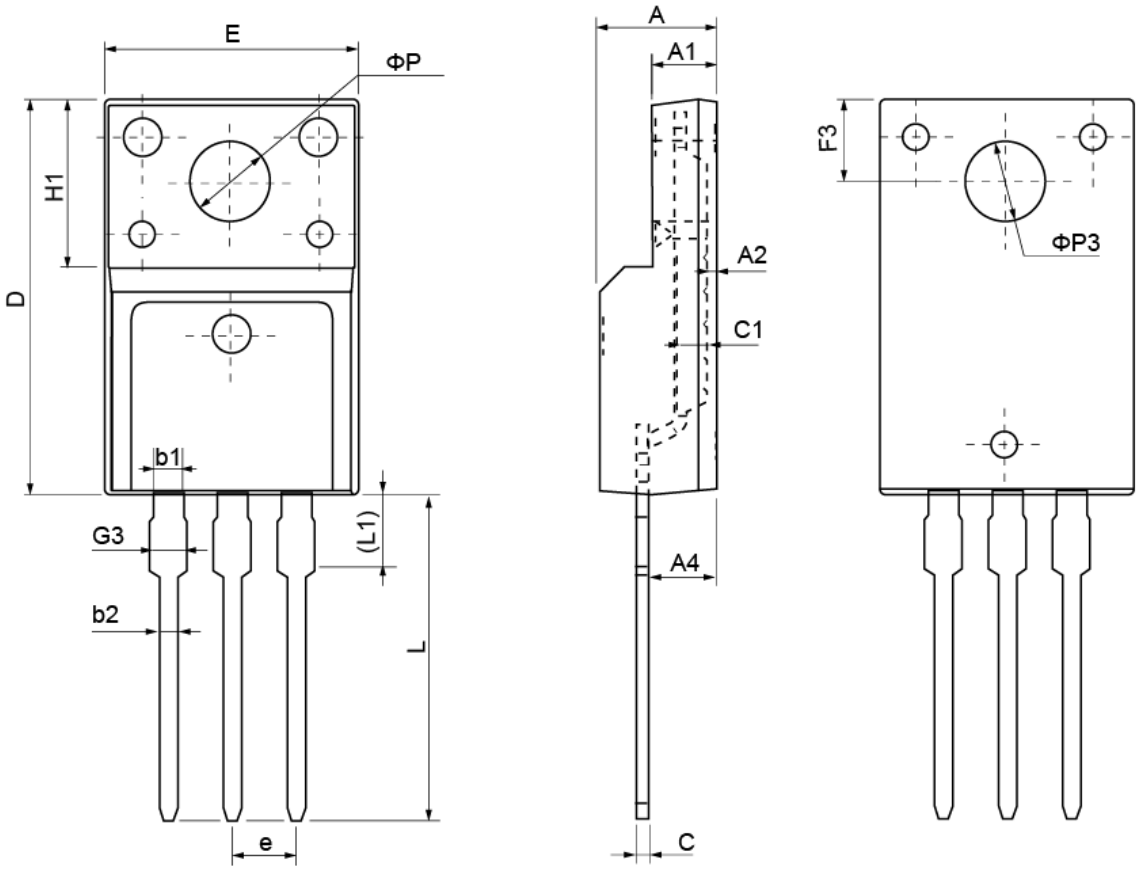


TO-252 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	2.20	2.30	2.38	E	6.40	6.60	6.731
A_1	0.00	0.10	0.20	E_1	4.40	--	--
b	0.64	0.76	0.89	e	2.286 BSC		
b_1	0.77	0.85	1.14	e_1	4.572 BSC		
b_2	5.00	5.33	5.46	H	9.40	10.00	10.40
c	0.458	0.508	0.610	L	1.40	1.52	1.77
C_1	0.458	0.508	0.620	L_1	--	2.743	--
D	5.98	6.10	6.223	L_2	0.60	0.80	1.01
D_1	5.20	5.25	5.38	L_3	0.90	1.06	1.25

TO-220F Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	4.40	4.70	5.00	**H1**	6.70 REF		
A1	2.30	2.55	2.80	**L**	12.30	12.98	13.30
A2	0.30	0.50	0.70	**L1**	2.95	3.10	3.50
A4	2.45	2.80	3.05	**ϕ P**	3.03	3.20	3.50
c	0.30	0.50	0.70	**ϕ P3**	3.15	3.45	3.65
c1	1.20	1.30	1.40	**b1**	1.10	1.30	1.45
D	15.40	15.90	16.40	**b2**	0.60	0.80	1.00
E	9.86	10.16	10.46	**F3**	3.05	3.30	3.55
e	2.54 BSC			**G3**	1.15	1.35	1.55