ATR055N60S

N-Channel Super Junction Power MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
600V	55mΩ@10V	51A

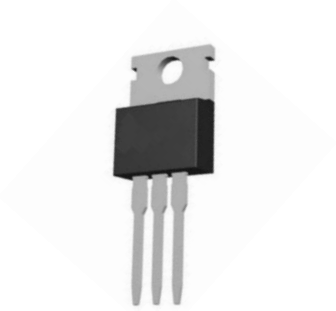
Feature

- Optimized body diode reverse recovery performance
- Low on-resistance and low conduction losses
- Ultra Low Gate Charge cause lower driving requirements

Application

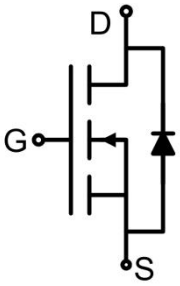
- Power factor correction（PFC）
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply（UPS）
- LLC Half-bridge

Package

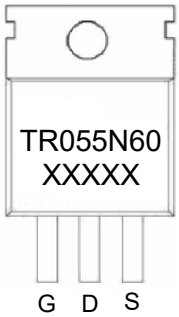


TO-220AB

Circuit diagram



Marking



ATR055N60S

N-Channel Super Junction Power MOSFET

Absolute maximum ratings (T_C=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage (V_{DS} =0V) AC (f>1Hz)	V_{GS}	±30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	51	A
Continuous Drain Current(T_C=100℃)	I_D(100℃)	35.7	A
Pulsed Drain Current[1)]	I_{DM}	153	A
Maximum Power Dissipation (Tc=25℃)	P_D	378	W
De-rate above 25°C		2.52	W/℃
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	0.39	℃/W
Single pulse avalanche energy[2)]	E_{AS}	576	mJ
Avalanche current[1)]	I_{AR}	12	A
Repetitive Avalanche energy , t_{AR} limited by T_{jmax} [1)]	E_{AR}	0.9	mJ
Drain Source voltage slope, V_{DS}≤480V	dv/dt	50	V/ns
Reverse diode dv/dt, V_{DS}≤480V,I_{SD}<I_D	dv/dt	50	V/ns
Junction Temperature	T_J	175	℃
Storage Temperature	T_{STG}	-55 ~ +175	℃

Electrical characteristics (T_A=25 ℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =1mA	600			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =600V,V_{GS} =0V, Tc=25℃			10	μA
		V_{DS} =600V,V_{GS} = 0V, Tc=125℃			300	
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V			±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =500μA	3.0	4.0	5.0	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =25A		50	55	mΩ
Dynamic characteristics[3)]						
Input Capacitance	C_{iss}	V_{DS} =50V,V_{GS} =0V, f =1.0MHz		3836		pF
Output Capacitance	C_{oss}			155		
Reverse Transfer	C_{rss}			5.1		
Intrinsic Gate Resistance	R_G	f=1MHz open drain		2		Ω
Total Gate Charge	Q_g	V_{DS} =480V,V_{GS} =10V, I_D =25A		58		nC
Gate-Source Charge	Q_{gs}			22		
Gate-Drain Charge	Q_{gd}			15		
Gate plateau voltage	V_{gp}			6.6		V
Turn-on delay time	$t_{d(on)}$	V_{DD}=380V, V_{GS} =10V, I_D =25A,R_G=1.7Ω		32		nS
Turn-on rise time	t_r			14		
Turn-off delay time	$t_{d(off)}$			90		
Turn-off fall time	t_f			9		
Source-Drain Diode characteristics						
Diode Forward Current	I_{SD}	T_C =25℃			51	A
Source-drain current (Body Diode)	I_{SDM}				153	A
Diode Forward voltage	V_{SD}	V_{GS} =0V, I_{SD} =51A, T_j =25℃			1.2	V
Reverse Recovery Time	t_{rr}	I_F =25A,di/dt =100A/μs, T_j =25°C		140		nS
Reverse Recovery Charge	Q_{rr}			0.63		μC
Peak Reverse Recovery Current	I_{mm}			9		A

Notes:

1) Repetitive Rating: Pulse width limited by maximum junction temperature.
2) Tj=25°C,V_{DD}=50V,V_G=10V,R_G=25Ω
3) Guaranteed by design, not subject to production

Typical Characteristics

Figure1. Safe operating area

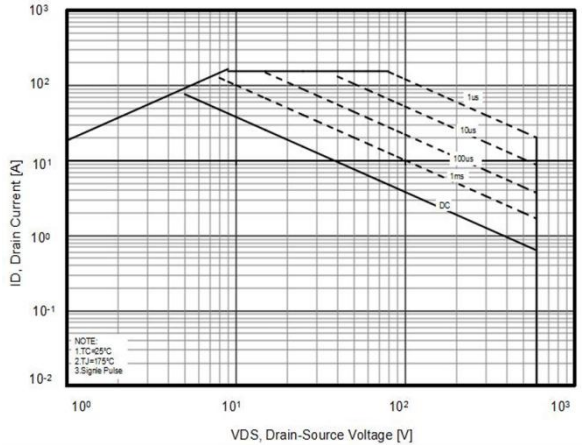


Figure2. Capacitance

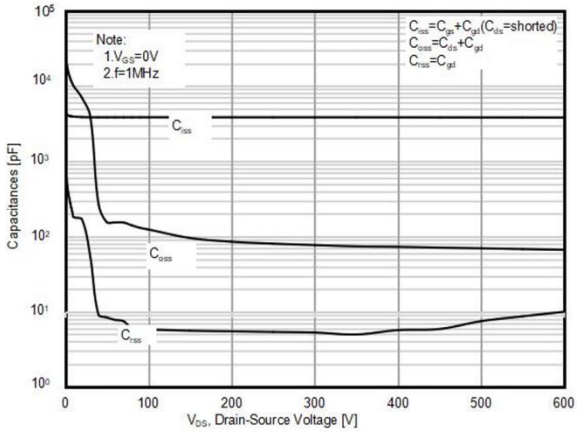


Figure3. Source-Drain Diode Forward Voltage

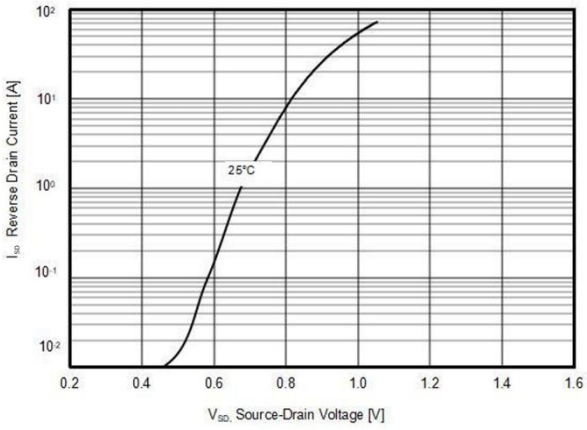


Figure4. Output characteristics

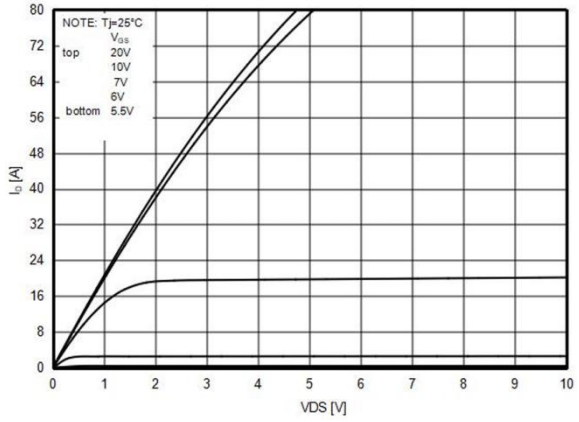


Figure5. $R_{DS(ON)}$ vs Junction Temperature

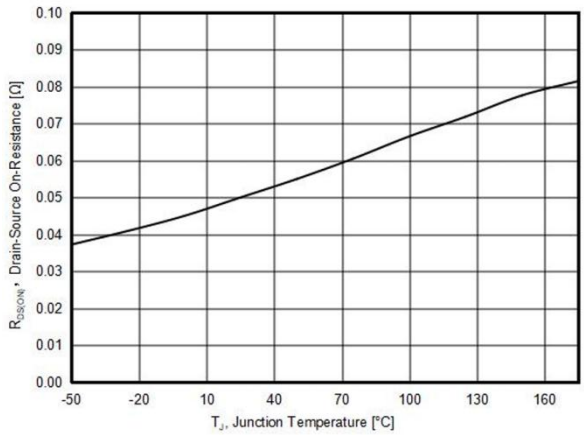
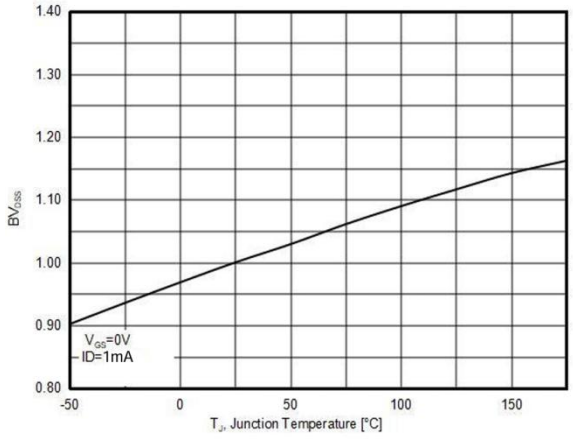


Figure6. BV_{DSS} vs Junction Temperature



Typical Characteristics

Figure7. Maximum I_D vs Junction Temperature

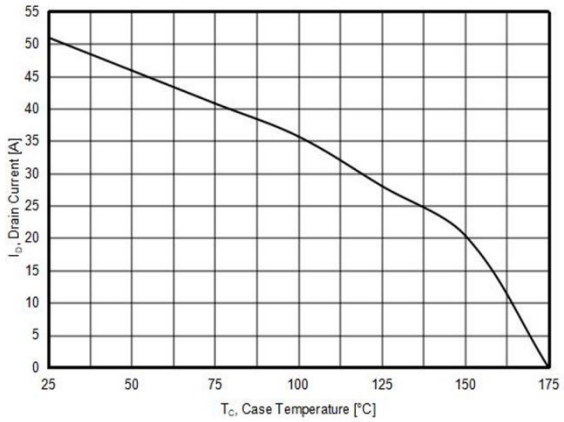


Figure8. Gate charge waveforms

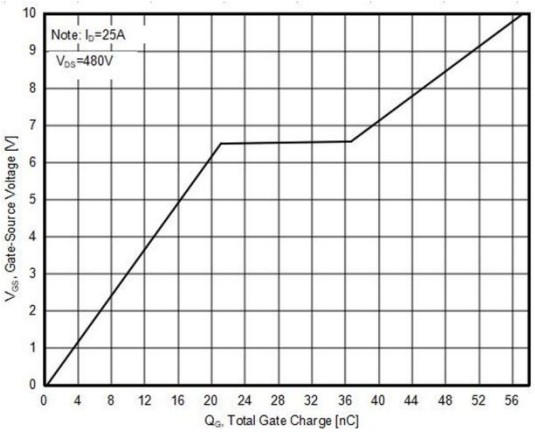


Figure9. Static drain-source on resistance

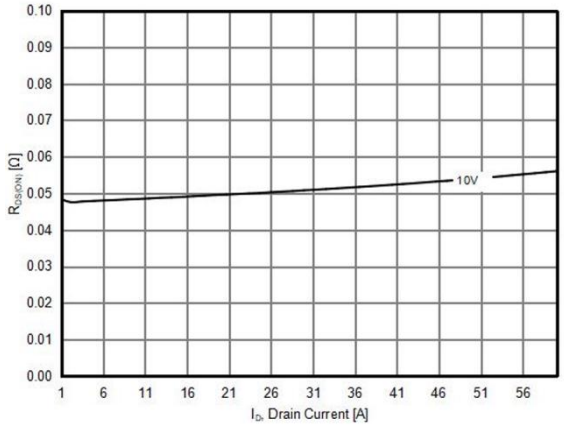
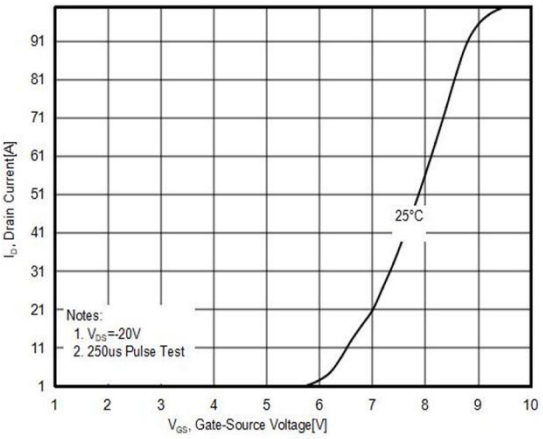
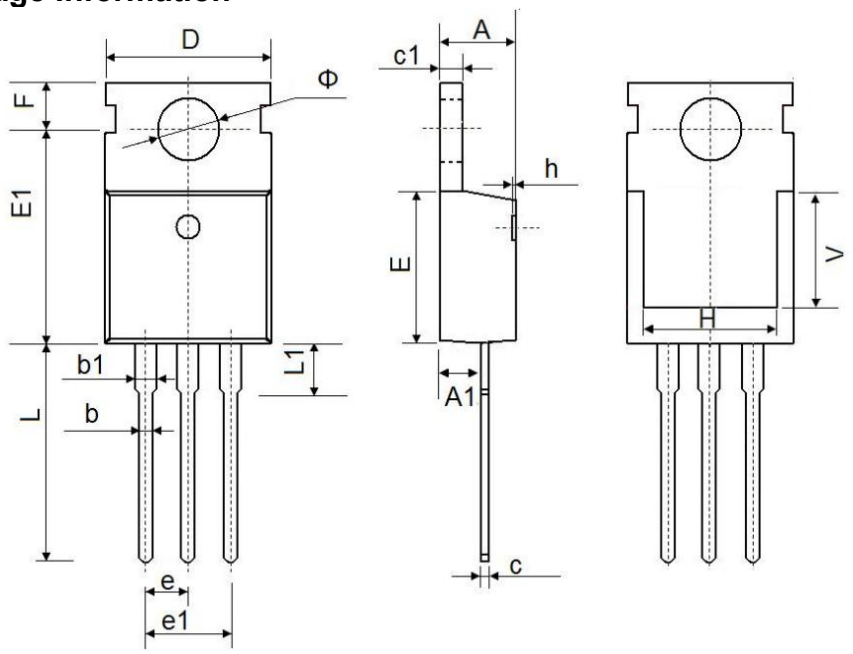


Figure10. Transfer characteristics



TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.200	4.600	0.165	0.181
A1	2.250	2.550	0.089	0.100
b	0.700	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276REF.	
Φ	3.400	3.800	0.134	0.150