

MOSFET Silicon N-Channel MOS



1. Applications

Single-ended flyback or two-transistor forward topologies.
PC power, PD Adaptor, LCD & PDP TV and LED lighting.

2. Features

Low drain-source on-resistance:
TO252 RDS(ON) = 4mΩ (typ.)
DFN5X6 RDS(ON) = 3.6mΩ (typ.)
TO263&TO220 RDS(ON) = 4.3mΩ (typ.)
Easy to control Gate switching
Enhancement mode: Vth = 2.5 to 4.5 V

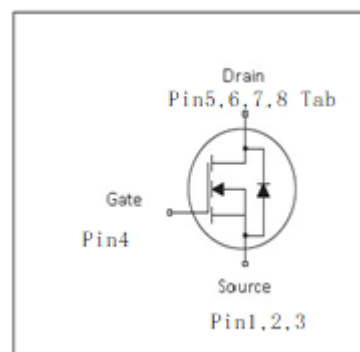
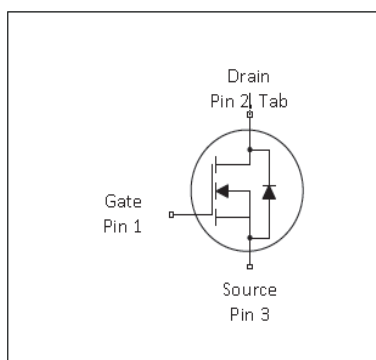
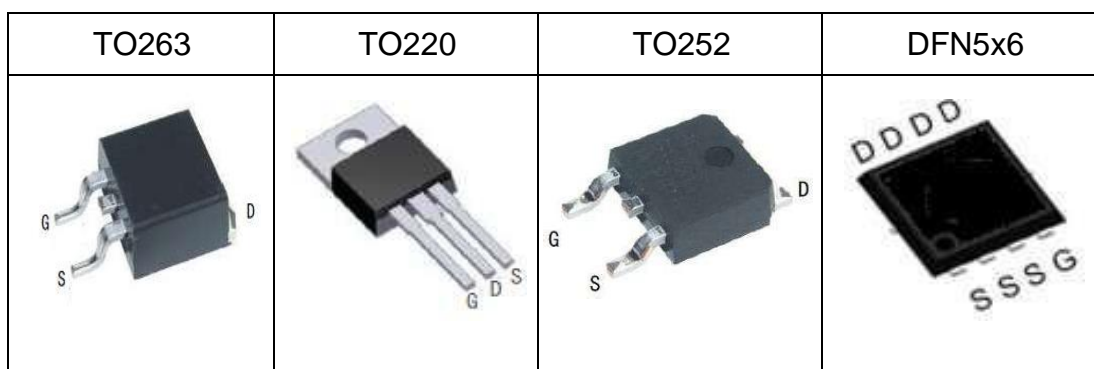


Table 1 Key Performance Parameters

Parameter	Value	Unit
V _{DS} @ T _{j,max}	55	V
R _{DS(on),max} TO252	6.0	mΩ
R _{DS(on),max} DFN5X6	4.2	mΩ
R _{DS(on),max} TO263&TO220	6.0	mΩ
Q _{g,typ}	53.5	nC
I _{D,pulse}	280	A

3. Packaging and Internal Circuit

Part Name	Package	Marking
AUD060N055	TO252	AUD060N055
AUN042N055	DFN5X6	AUN042N055
AUB050N055	TO263	AUB050N055
AUP060N055	TO220	AUP060N055



1 Maximum ratings

at $T_j = 25^\circ\text{C}$, unless otherwise specified

Table 2 Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain current ¹⁾	I_D		-	125	A	$T_C=25^\circ\text{C}$
Pulsed drain current ²⁾	$I_{D,pulse}$	-	-	280	A	$T_C=25^\circ\text{C}$
Avalanche energy, single pulse	E_{AS}	-	-	331	mJ	$T_C=25^\circ\text{C}$, $V_{DD}=50\text{V}$, $I_D=36.4\text{A}$, $L=0.5\text{mH}$, $R_G=25\Omega$
Avalanche current, single pulse	I_{AR}	-	-	36.4	A	$T_C=25^\circ\text{C}$, $V_{DD}=50\text{V}$, $L=0.5\text{mH}$, $R_G=25\Omega$
Gate source voltage (static)	V_{GS}	-20	-	20	V	static;
Power dissipation(TO220,263,T252)	P_{tot}	-	-	120	W	$T_C=25^\circ\text{C}$
Power dissipation (DFN5x6)	P_{tot}	-	-	74	W	$T_C=25^\circ\text{C}$
Storage temperature	T_{stg}	-55	-	150	$^\circ\text{C}$	
Operating junction temperature	T_j	-55	-	150	$^\circ\text{C}$	
Soldering Temperature Distance of 1.6mm from case for 10s	T_L			260	$^\circ\text{C}$	
Transconductance	GFS	-	71	-	S	$V_{DS}=5\text{V}$ $I_{DS}=20\text{A}$

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

2 Thermal characteristics

Thermal characteristics(TO252,TO263,TO220)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case	R_{thJC}	-	-	1	°C/W	-
Thermal resistance, junction - ambient	R_{thJA}	-	-	62	°C/W	device on PCB, minimal footprint

Thermal characteristics(DFN5X6)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case	R_{thJC}	-	-	1.3	°C/W	-
Thermal resistance, junction - ambient	R_{thJA}	-	-	50	°C/W	device on PCB, minimal footprint

3 Electrical characteristics

at $T_j=25^{\circ}\text{C}$, unless otherwise specified

Table 4 Static characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	55	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{(GS)th}$	2.5		4.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=55V, V_{GS}=0V, T_j=25^{\circ}\text{C}$
Gate-source leakage current	I_{GSS}	-	-	100	nA	$V_{GS}=20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	4	6.0	m Ω	$V_{GS}=10V, I_D=20A, T_j=25^{\circ}\text{C}(\text{TO252})$
Drain-source on-state resistance	$R_{DS(on)}$	-	3.6	4.2	m Ω	$V_{GS}=10V, I_D=20A, T_j=25^{\circ}\text{C}(\text{DFN5X6})$
Drain-source on-state resistance	$R_{DS(on)}$	-	4.3	6.0	m Ω	$V_{GS}=10V, I_D=20A, T_j=25^{\circ}\text{C}(\text{TO263\&TO220})$
Gate resistance (Intrinsic)	R_G	-	1.2	-	Ω	$f=1\text{MHz}$, open drain

Table 5 Dynamic characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	3803	-	pF	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$
Output capacitance	C_{oss}	-	1416	-	pF	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$
Reverse transfer capacitance	C_{rss}	-	124.3	-	pF	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$
Turn-on delay time	$t_{d(on)}$	-	21	-	ns	$V_{DD}=30V, V_{GS}=10V, I_D=2A, R_G=2.5\Omega$
Rise time	t_r	-	9	-	ns	$V_{DD}=30V, V_{GS}=10V, I_D=2A, R_G=2.5\Omega$
Turn-off delay time	$t_{d(off)}$	-	42	-	ns	$V_{DD}=30V, V_{GS}=10V, I_D=2A, R_G=2.5\Omega$
Fall time	t_f	-	78	-	ns	$V_{DD}=30V, V_{GS}=10V, I_D=2A, R_G=2.5\Omega$

Table 6 Gate charge characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	16.5	-	nC	$V_{DD}=30V, I_D=30A, V_{GS}=0 \text{ to } 10V$
Gate to drain charge	Q_{gd}	-	12.6	-	nC	$V_{DD}=30V, I_D=30A, V_{GS}=0 \text{ to } 10V$
Gate charge total	Q_g	-	53.5	-	nC	$V_{DD}=30V, I_D=30A, V_{GS}=0 \text{ to } 10V$

Table 7 Reverse diode characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode forward voltage	V_{SD}	-	0.7	-	V	$V_{GS}=0V, I_F=1A, T_J=25^{\circ}C$
Reverse recovery time	t_{rr}	-	49	-	ns	$V_R=40V, I_F=75A, di_F/dt=100A/\mu s$
Reverse recovery charge	Q_{rr}	-	52	-	nC	$V_R=40V, I_F=75A, di_F/dt=100A/\mu s$
Peak reverse recovery current	I_{rrm}	-	1.5	-	A	$V_R=40V, I_F=75A, di_F/dt=100A/\mu s$

4 Electrical characteristics diagram

Diagram 1: Typ. output characteristics

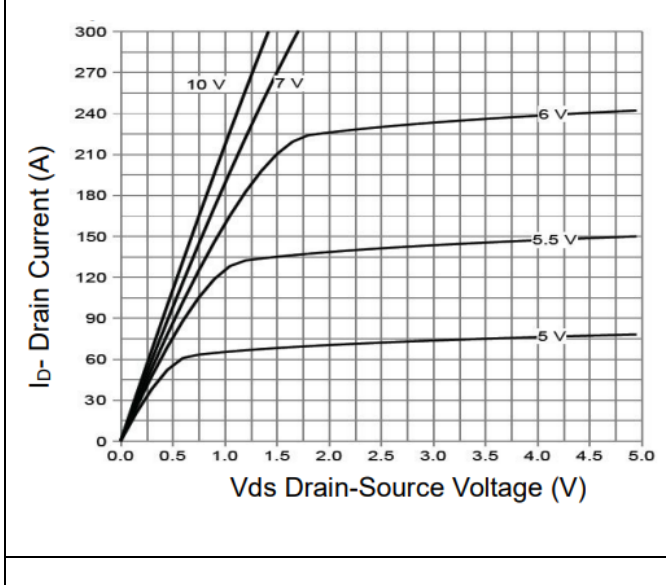


Diagram 2: Typ. transfer characteristics

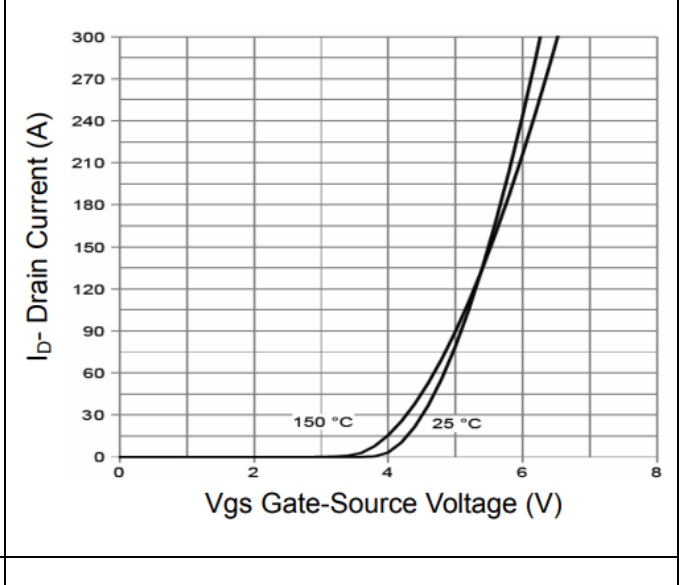


Diagram 3: Typ. Rdson vs. Drain Current

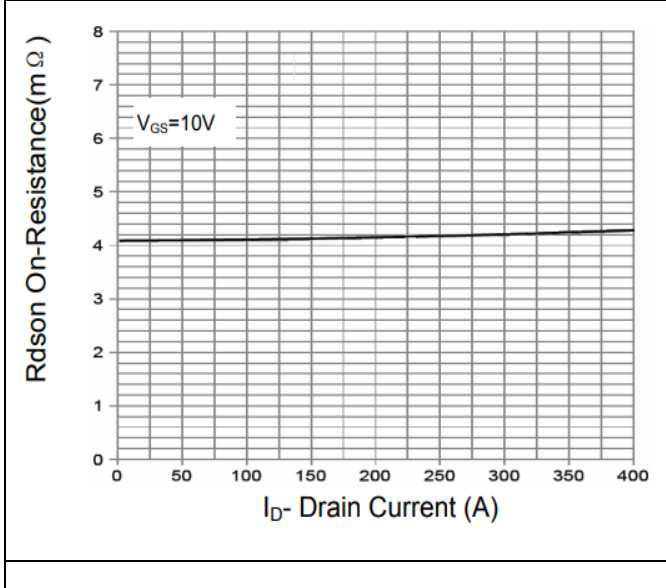


Diagram 4: Typ. Rdson – Junction Temperature

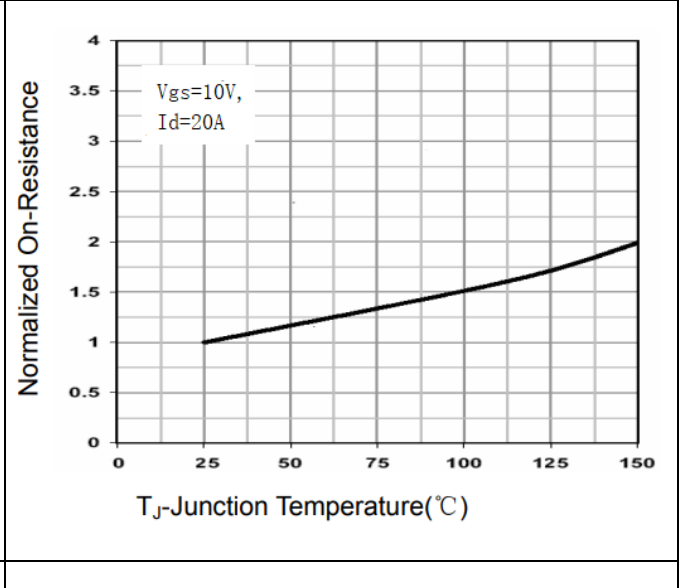


Diagram 5: Typ. Body-Diode Characteristics

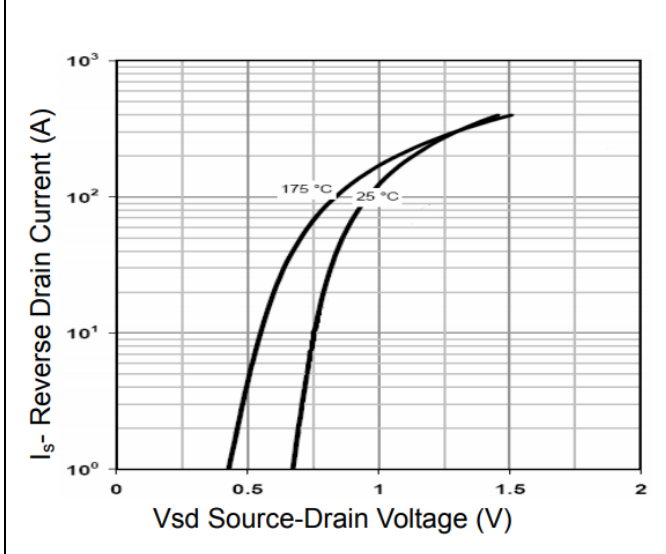


Diagram 6: Typ. Capacitance vs. Vds

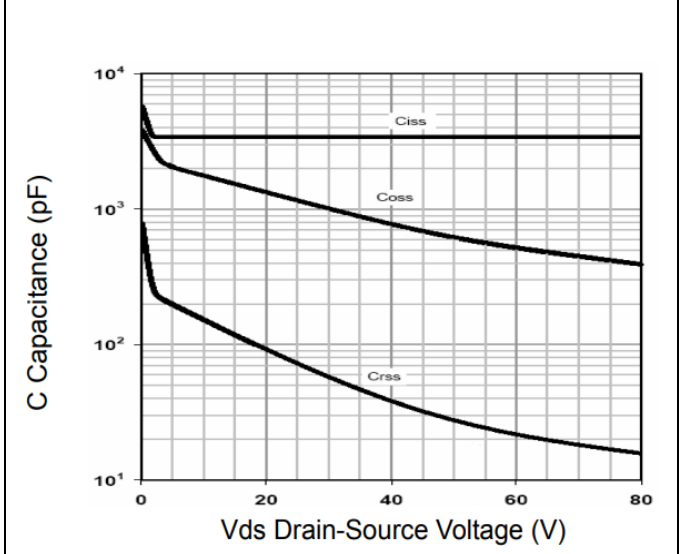


Diagram 7: Typ. Power Dissipation

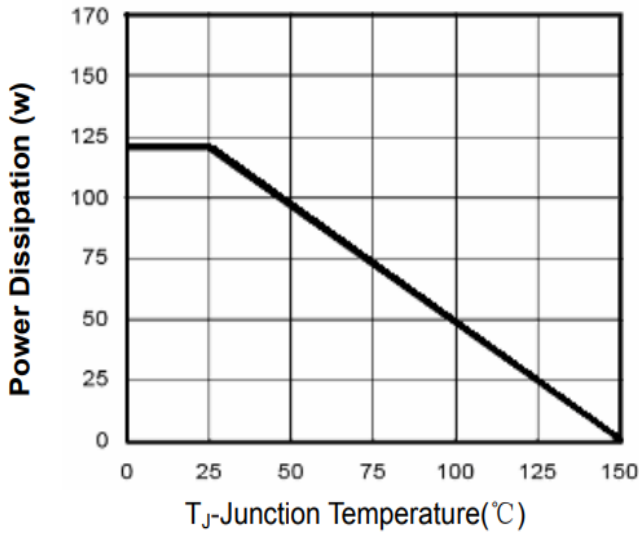


Diagram 8: Typ. Drain Current De-rating

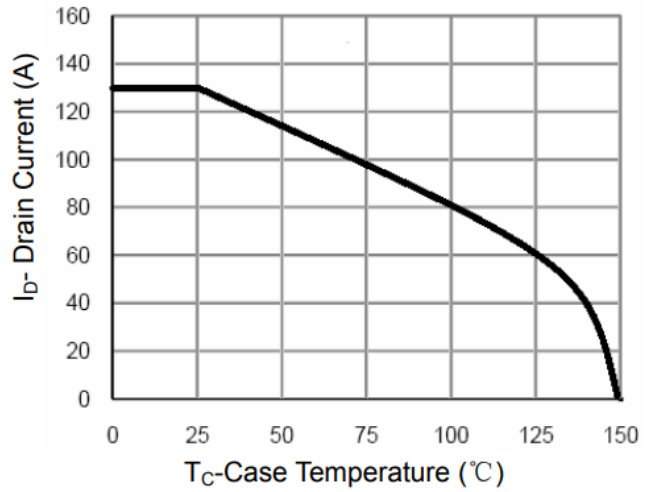


Diagram 9: Typ. Gate charge

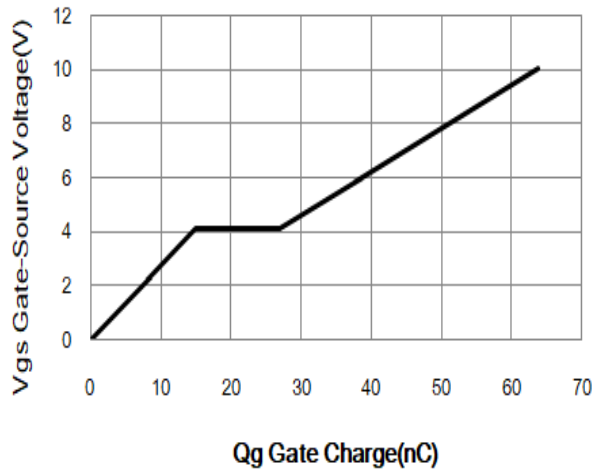


Diagram 10: Typ. Maximum Safe Operating Area

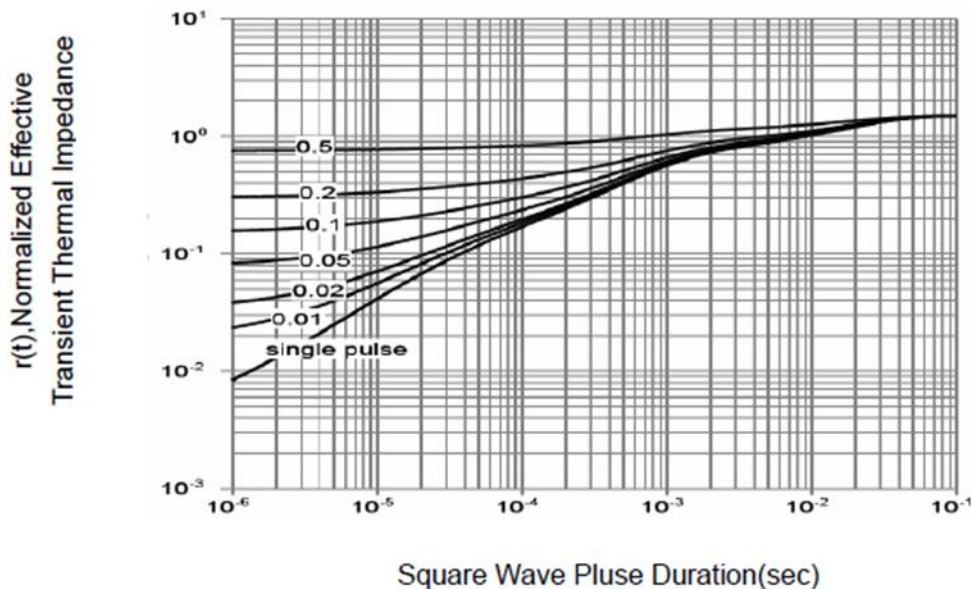
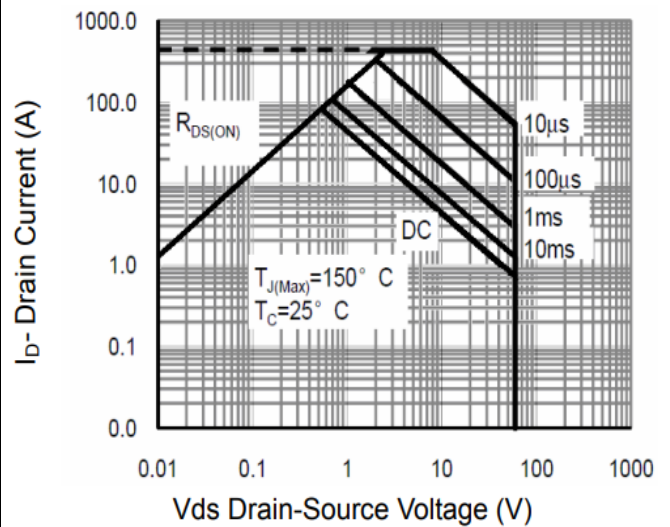


Figure 11 Normalized Maximum Transient Thermal Impedance

5 Test Circuits

Table 8 Diode characteristics

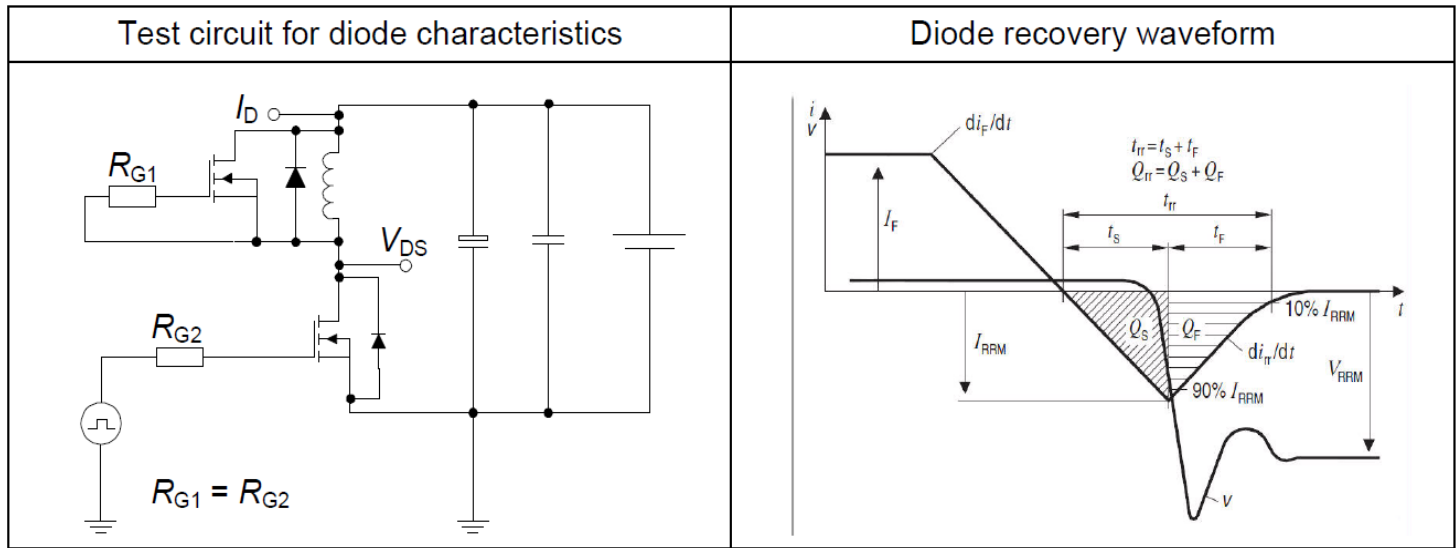


Table 9 Switching times

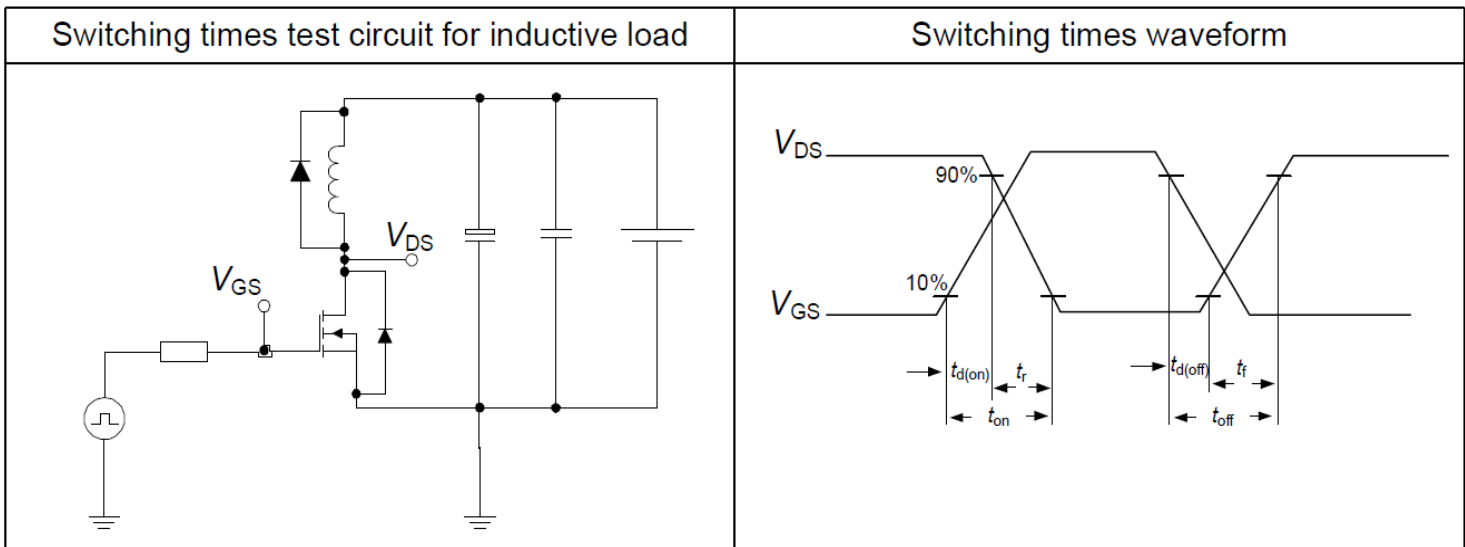
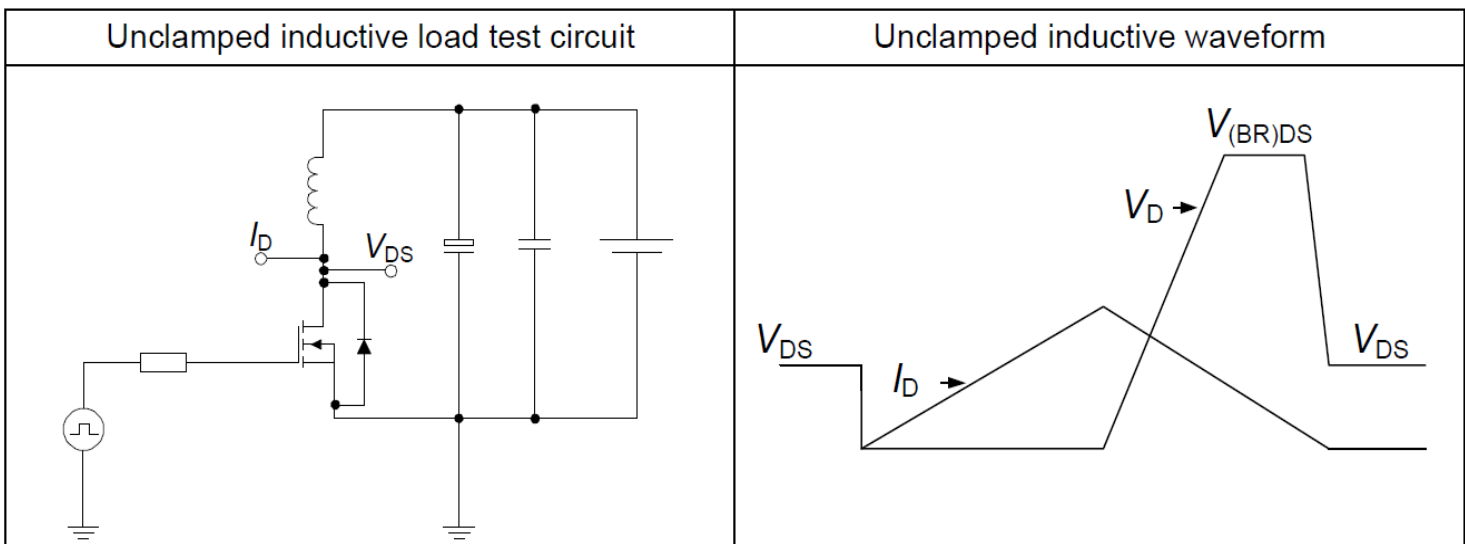
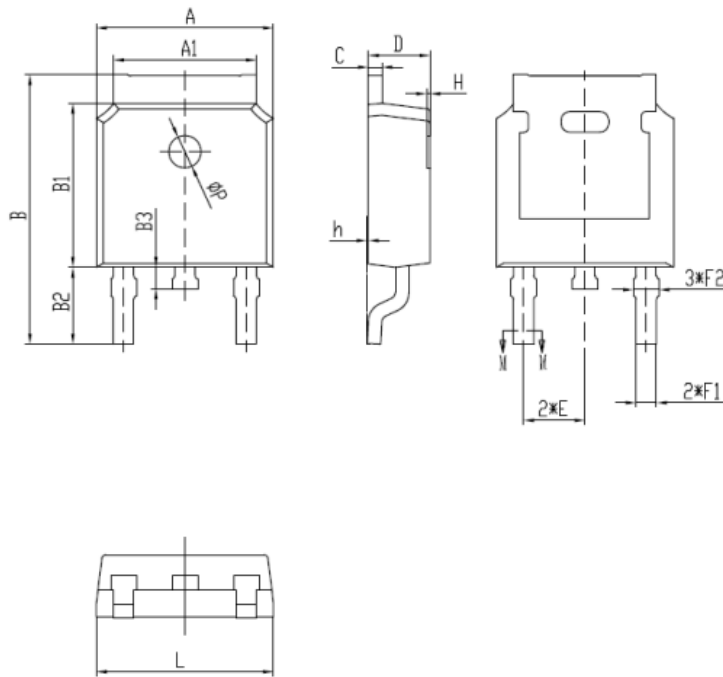


Table 10 Unclamped inductive load

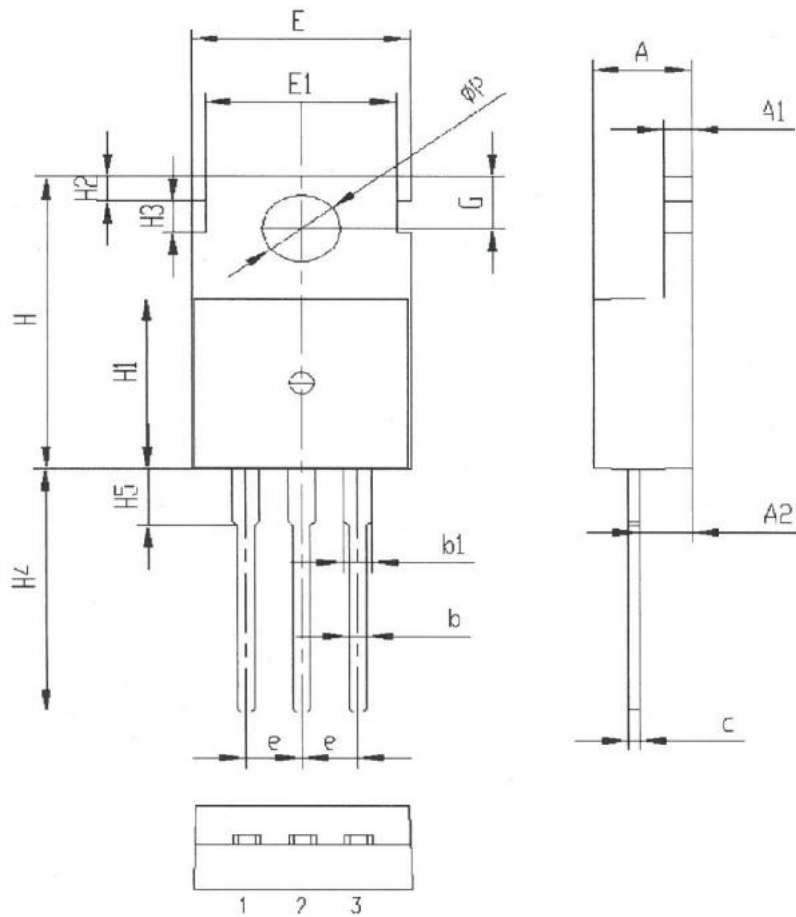


6 Package Outlines



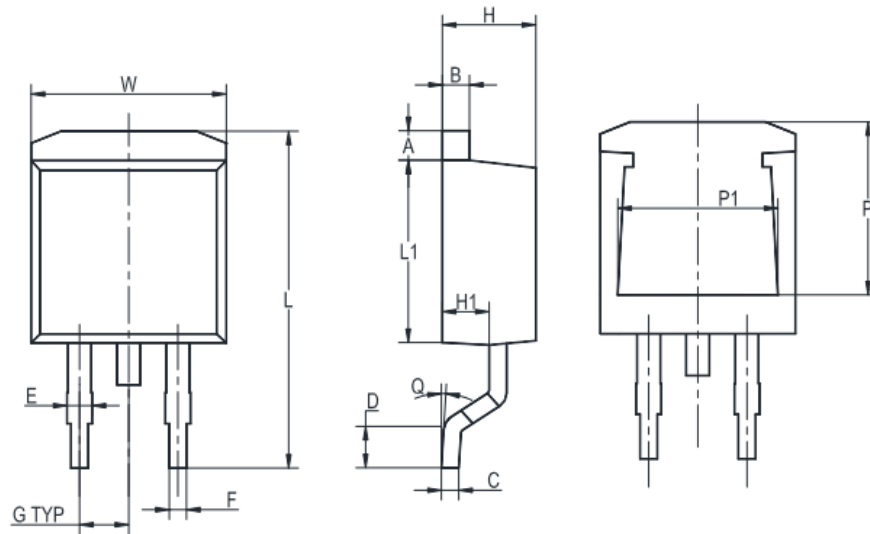
项目	规范(mm)	
	MIN	MAX
A	6.50	6.70
A1	5.16	5.46
B	9.77	10.17
B1	6.00	6.20
B2	2.60	3.00
B3	0.70	0.90
C	0.45	0.61
D	2.20	2.40
E	2.186	2.386
F1	0.67	0.87
F2	0.76	0.96
H	0.00	0.30
h	0.00	0.127
L	6.50	6.70
ϕP	1.10	1.30

Figure1: Outline PG-T0252(HT)



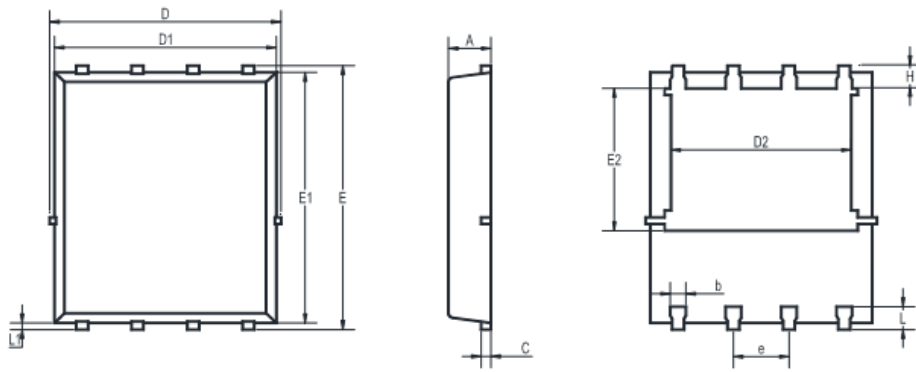
Symbol	单位 mm		
	min	Nom	max
A	4.30	4.50	4.70
A1	1.20	1.30	1.40
A2	2.20	2.50	2.82
b	0.60	0.80	1.00
b1	1.20	1.30	1.40
c	0.40	0.50	0.60
e	2.44	2.54	2.64
E	9.80	10.00	10.20
E1	8.50	8.70	8.90
H	15.40	15.70	15.90
H1	9.00	9.20	9.40
H2	1.10	1.34	1.50
H3	1.50	1.70	1.90
H4	12.90	13.30	13.70
H5	2.80	3.00	3.20
G	2.60	2.80	3.00
ΦP	3.40	3.60	3.88

Figure2: Outline PG-T0220(HT&CD)



UNIT	A	B	C	D	E	F	G	W	H	H1	L	L1	Q	P	P1
mm	1.5	1.5	0.5	2.60	1.6	0.94	2.54	10.5	4.8	2.9	16.5	8.7	8°	7.6	8.2
	1.1	1.1	0.3	2.15	1.1	0.68	TYP	9.6	4.4	2.5	14.5	8.2	MAX	7.1	7.4

Figure3: Outline PG-T0263(HC)



UNIT	A	b	C	D	D1	D2	E	E1	E2	e	L	L1	H
mm	1.12	0.51	0.34	5.26	5.1	4.5	6.25	6	3.66	1.37	0.71	0.2	0.71
	0.9	0.33	0.11	4.7	4.7	3.56	5.75	5.6	3.18	1.17	0.35	0.06	0.35

Figure4: Outline PG-DFN5X6(HC)

Revision History

Revision	Date	Subjects (major changes since last revision)
1.0	2021-10-25	Preliminary version
1.1	2021-11-30	Updated Qrr and EAS. Added electrical characteristics diagram
1.2	2022-09-13	Updated Vth limit