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RSU12N65D

Multi-Epi Super Junction MOSFETs

Pb Lead Free Package and Finish
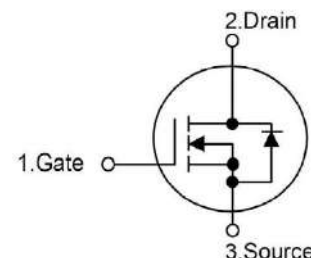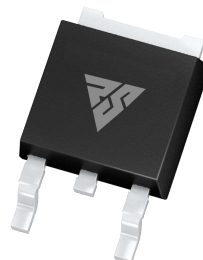
Applications:

•Switch Mode Power Supply(SMPS)

•Uninterruptible Power Supply(UPS)

•PFC stages for server & telecom

•Consumer

I_D	$R_{DS(ON)}$(Typ.)	V_DSS
12A	390mΩ	650V

Features:

•New revolutionary high voltage technology

•Better RDS(on) in TO-252

•Ultra Low Gate Charge cause lower driving requirements

•Periodic avalanche rated

•Ultra low effective capacitances

2.Drain

1.Gate

3.Source

Ordering Information

Not to Scale

Part Number	Package	Marking
RSU12N65D	TO-252	RSU12N65D

Absolute Maximun Ratings Tc=25℃ unless otherwise specified

Symbol	Parameter	RSU12N65D	Units
VDSS	Drain-to-Source Voltage	650	V
ID	Continuous Drain Current (TC = 25℃)	12	A
	Continuous Drain Current (TC = 100℃)	7	
IDM	Pulsed Drain Current (Note*1)	36	
PD	Power Dissipation(Tc=25℃)	80	W
VGS	Gate-to-Source Voltage	±30	V
EAS	Single Pulse Avalanche Engergy (Note*2)	120	mJ
EAR	Repetitive Avalanche Engergy (Note*1)	0.35	mJ
TL TPKG	Maximum Temperature for Soldering	300 260	℃
	Leads at 0.063in(1.6mm)from Case for 10 seconds Package Body for 10 seconds		
TJ and TSTG	Operating Junction and Storage Temperature Range	-55 to 150	

*Drain Current Limited by Maximum Junction Temperature

Caution:Stresses greater than those listed in the"Absolute Maximum Ratings"Table may cause permanent damage to the device.

Thermal Resistance

Symbol	Parameter	RSU12N65D	Units	Test Conditions
RθJC	Junction-to-Case	1.56	℃/W	Drain lead soldered to water cooled heatsink,PD Adjusted for a peak junction temperature of +150℃.
RθJA	Junction-to-Ambient	68		1 cubic foot chamber,free air.

OFF Characteristics   TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain-to-source Breakdown Voltage	650	--	--	V	VGS = 0V, ID = 250µA, TJ= 25℃
		--	650	--	V	VGS = 0V, ID = 250µA, TJ= 150℃
IDSS	Drain-to-Source Leakage Current	--	--	1.0	µA	VDS=650V,VGS=0V
IGSS	Gate-to-Source Forward Leakage	--	--	80	nA	VGS=+30V VDS=0V
	Gate-to-Source Reverse Leakage	--	--	-80		VGS=-30V VDS=0V

ON Characteristics   TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain-to-Source On-Resistance	--	390	450	mΩ	VGS=10V,ID=6A
VGS(TH)	Gate Threshold Voltage	3.5	--	4.5	V	VGS=VDS,ID=250µA
gfs	Transconductance		40		S	VDS=20V,ID=6A

Resistive Switching Characteristics   Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn-on Delay Time	--	21	--	ns	VDS=400V ID=6A RG=25Ω VGS=10V
trise	Rise Time	--	20	--		
td(OFF)	Turn-OFF Delay Time	--	51			
tfall	Fall Time	--	40			

Dynamic Characteristics   Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	850	--	pF	VGS=0V VDS=100V f=1.0MHz
Coss	Output Capacitance	--	35	--		
Crss	Reverse Transfer Capacitance	--	5	--		
Qg	Total Gate Charge	--	19	--	nC	VDS=480V ID=6A, f=1MHz VGS=10V
Qgs	Gate-to-Source Charge	--	6.00	--		
Qgd	Gate-to-Drain("Miller"）Charge	--	6.00	--		

Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	12	A	Integral pn-diode in MOSFET
ISM	Maximum Pulsed Current	--	--	36	A	
VSD	Diode Forward Voltage	0.5	0.83	1	V	IS=6A,VGS=0V Tj=25℃
trr	Reverse Recovery Time	--	212	--	nS	VR=400V,VGS=0V IS=6A,di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	2.28	--	μC	
Irrm	Peak Reverse Recovery Current	--	18	--	A	

Notes:

*1.Repetitive rating;pulse width limited by maximum junction temperature.

*2. VDD = 100V, VGS = 10V, L = 60mH, RG = 25Ω

Typical Feature curve T_J=25℃, unless otherwise noted

Fig 1. Output Characteristics (Tj=25℃)
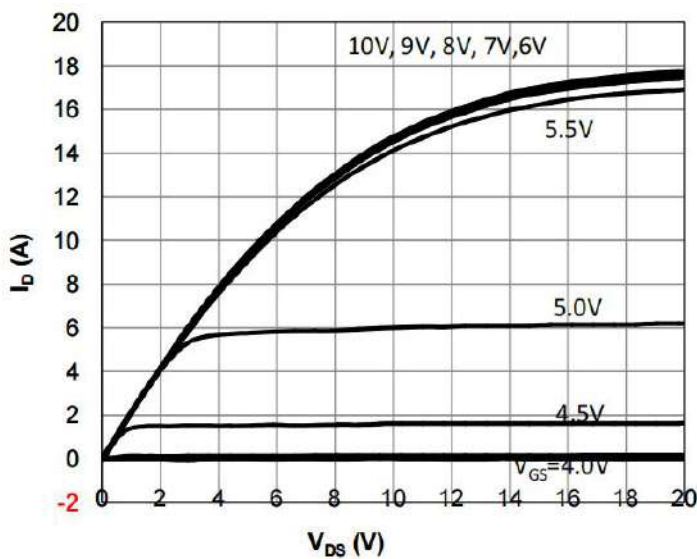
Fig 2 .Output Characteristics (Tj=125℃)
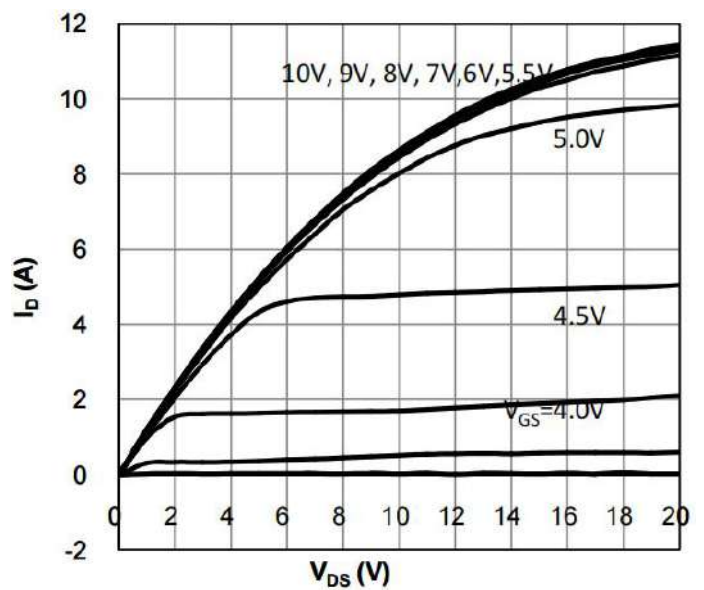
Fig 3. Transfer Characteristics
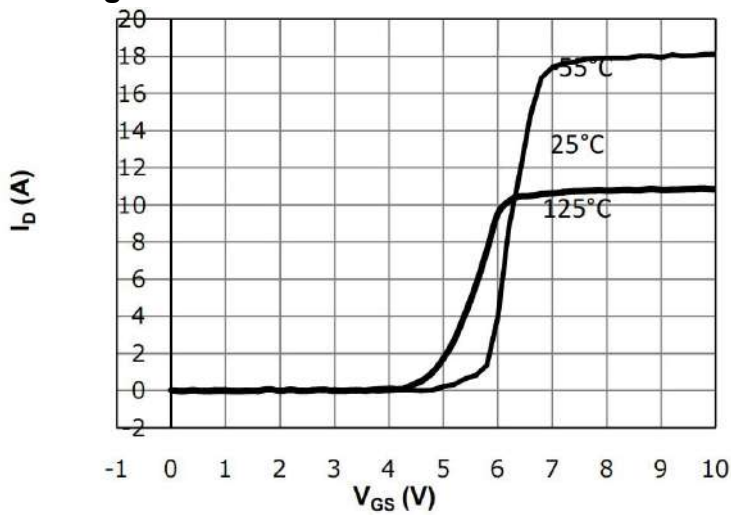
Fig 4. VTH Vs Tj Temperature
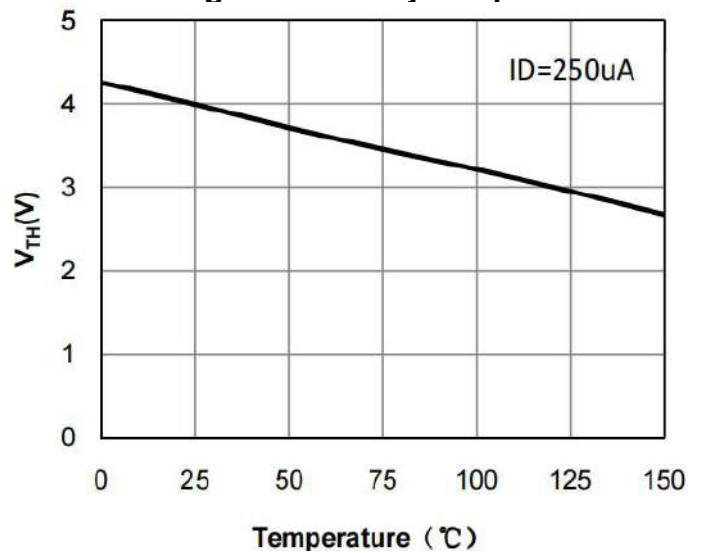
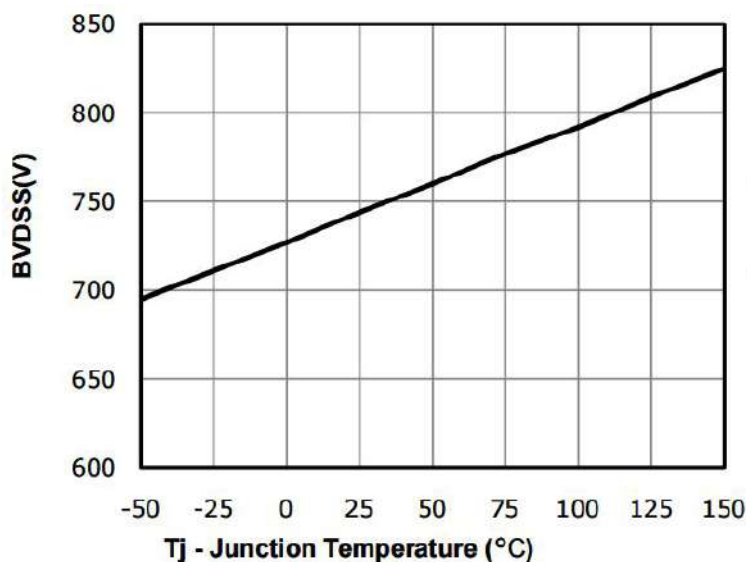

Fig 5.Rdson Vs Ids Characteristics(Tc=25℃)
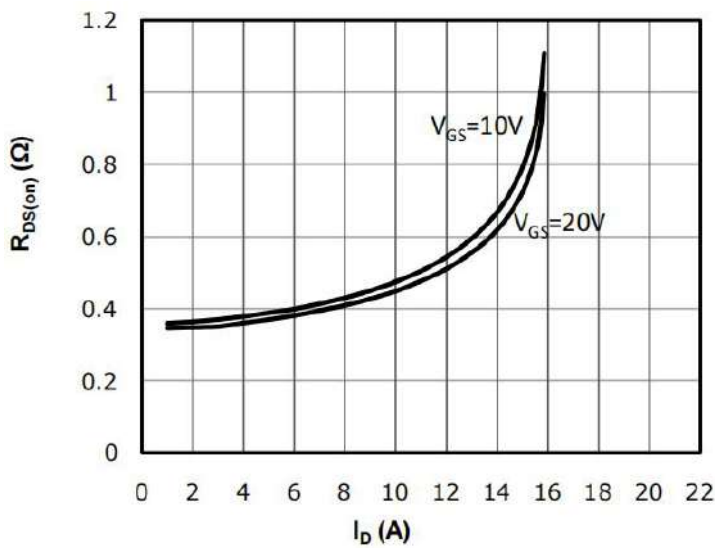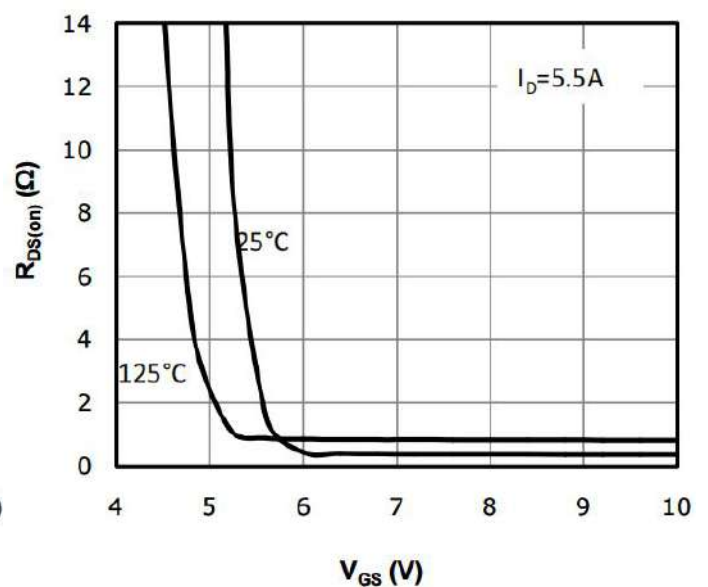

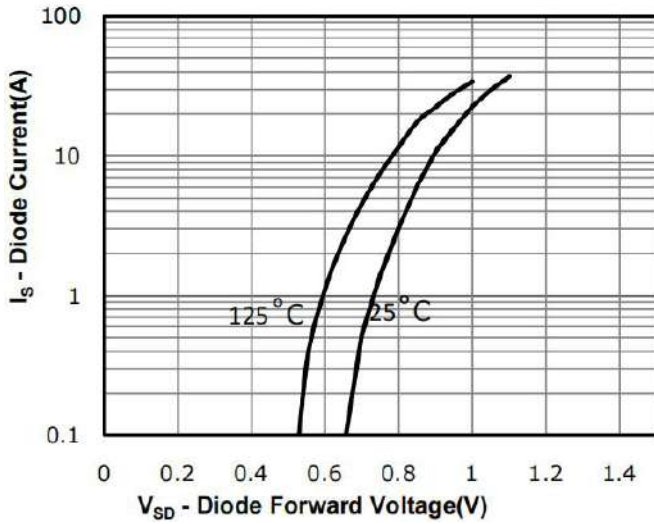**Fig 6. Rds(on) vs. Temperature**
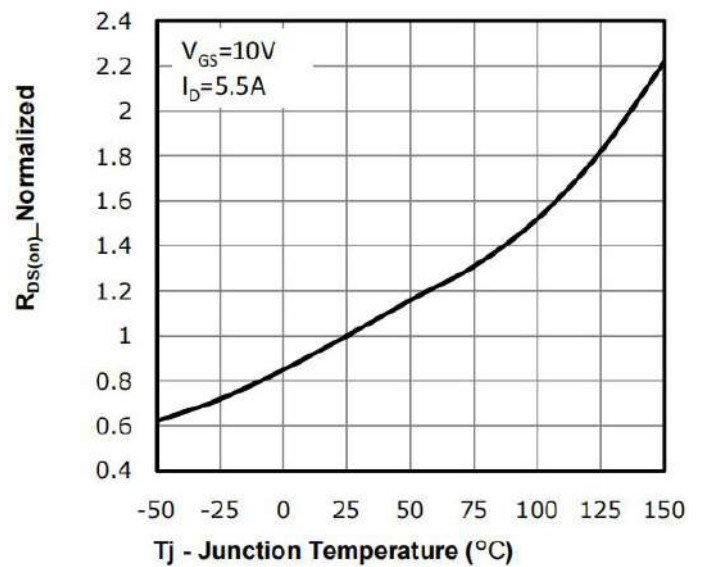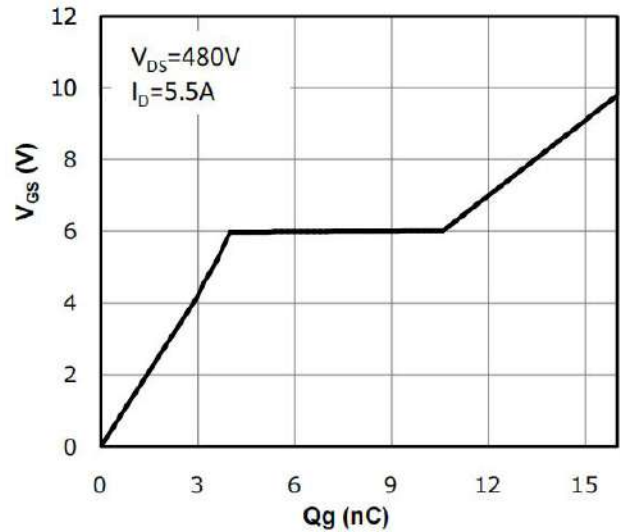

Fig 7. BVDSS vs. Temperature Characteristics

Fig 8. Rds(on) vs Gate
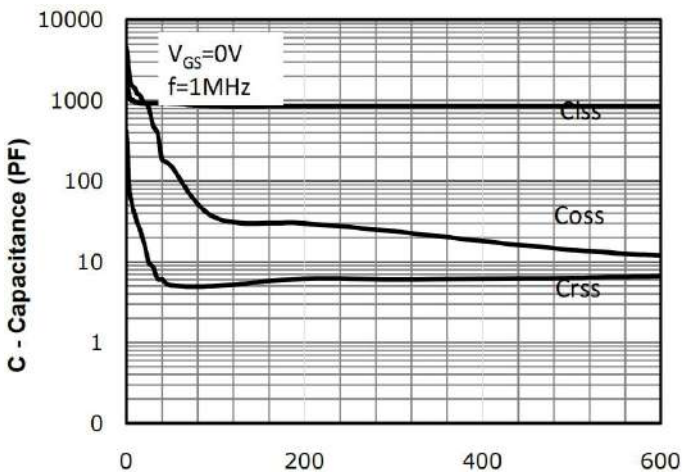
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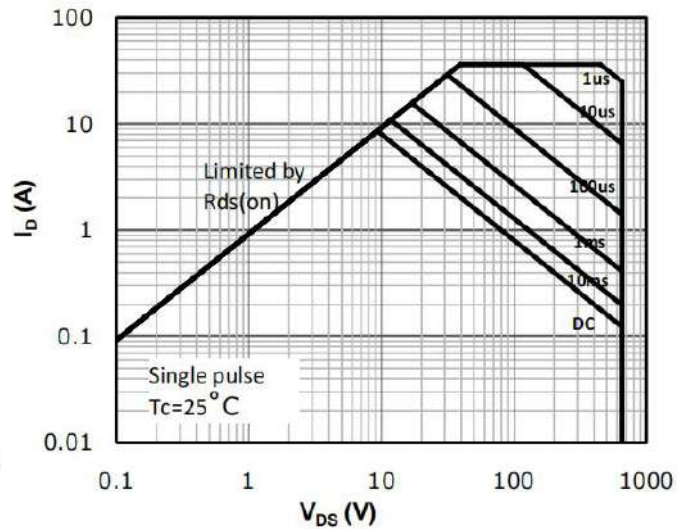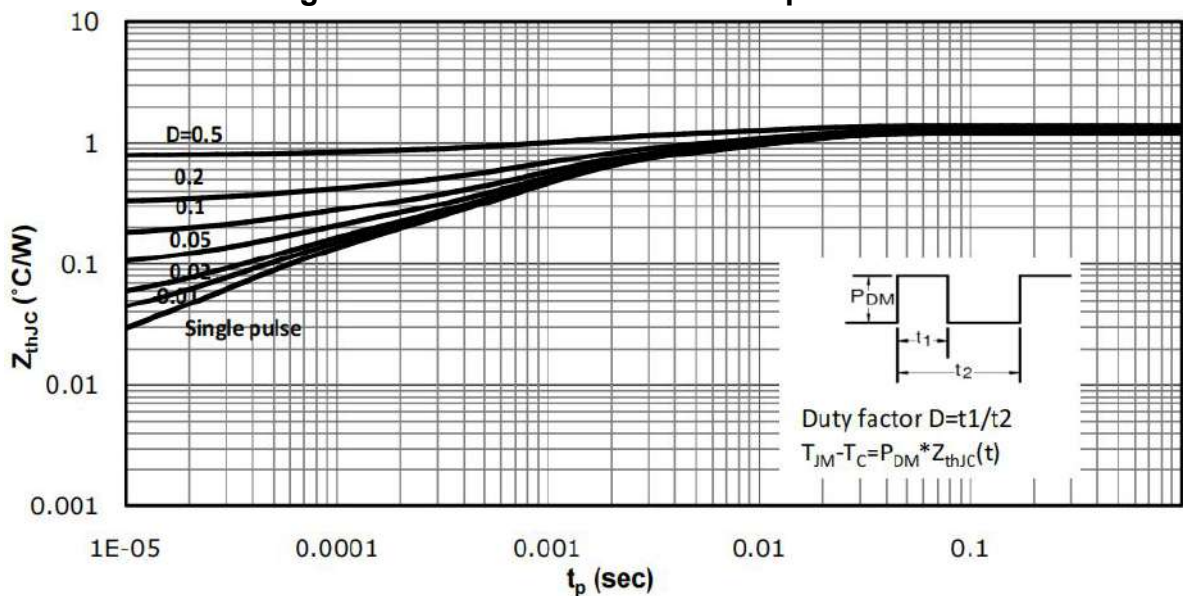**Fig 9. Body-diode Forward**

Fig 10. Gate Charge Characteristics

Fig 11. Capacitance Characteristics

Fig 12. Safe Operating Area

Fig 13. Max. Transient Thermal Impedance

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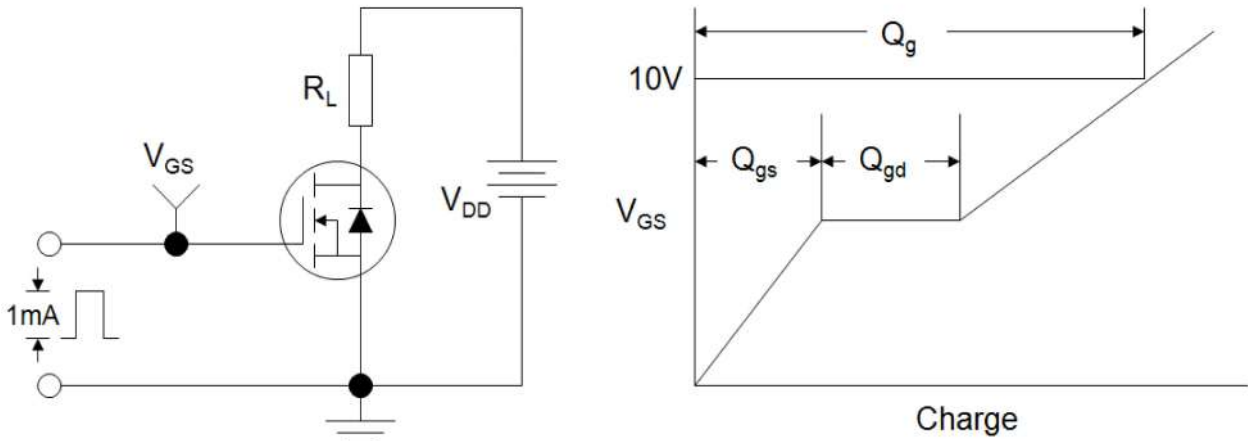## Test Circuits and Waveforms

Figure A: Gate Charge Test Circuit and Waveform

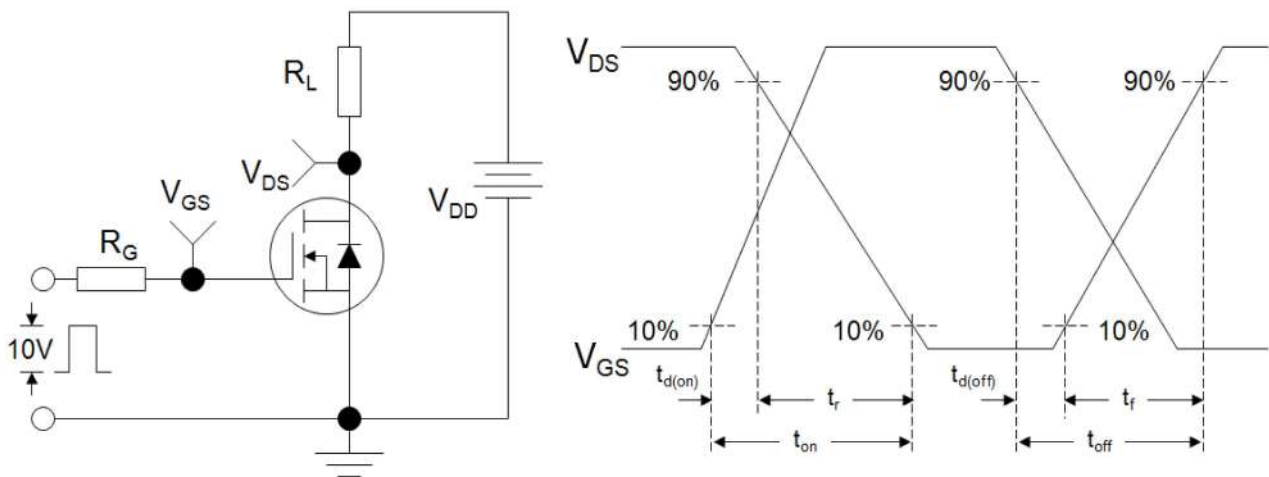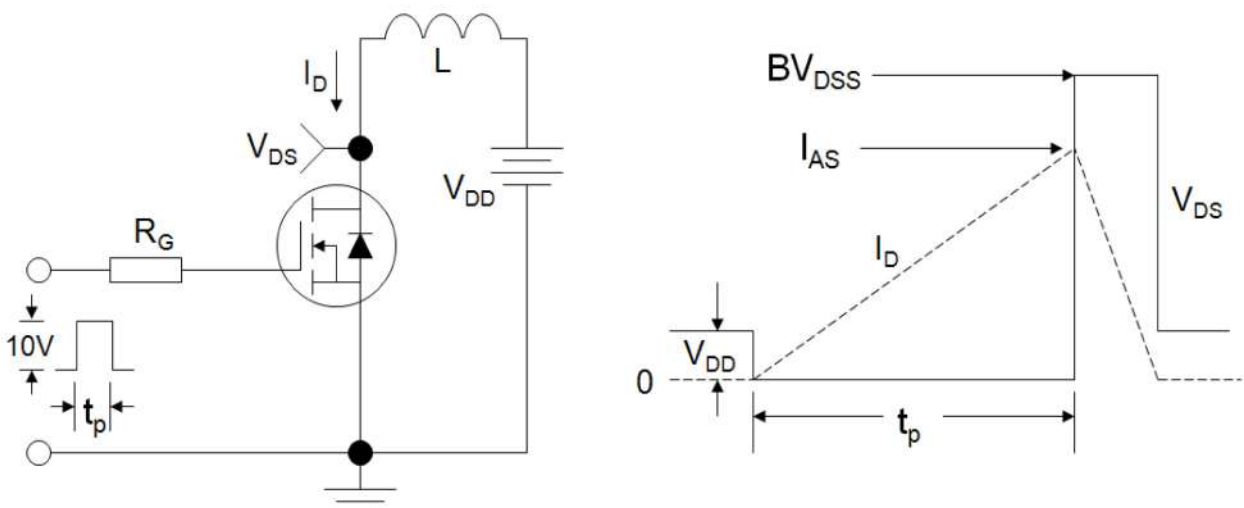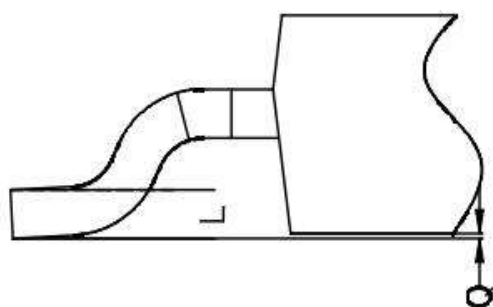### Figure B: Resistive Switching Test Circuit and Waveform

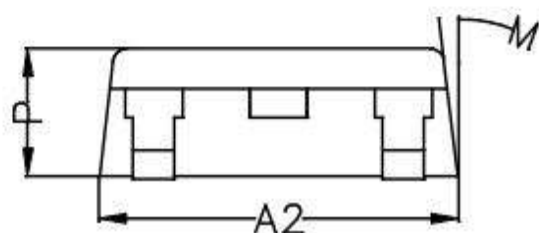### Figure C: Unclamped Inductive Switching Test Circuit and Waveform

Package outline drawing

Unit:mm

DETAIL A
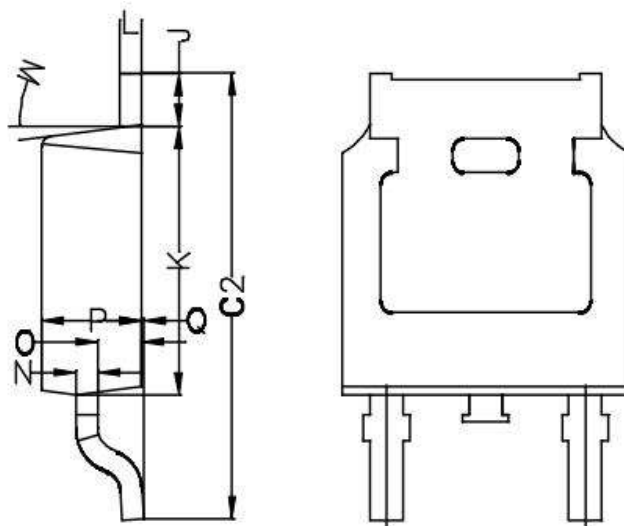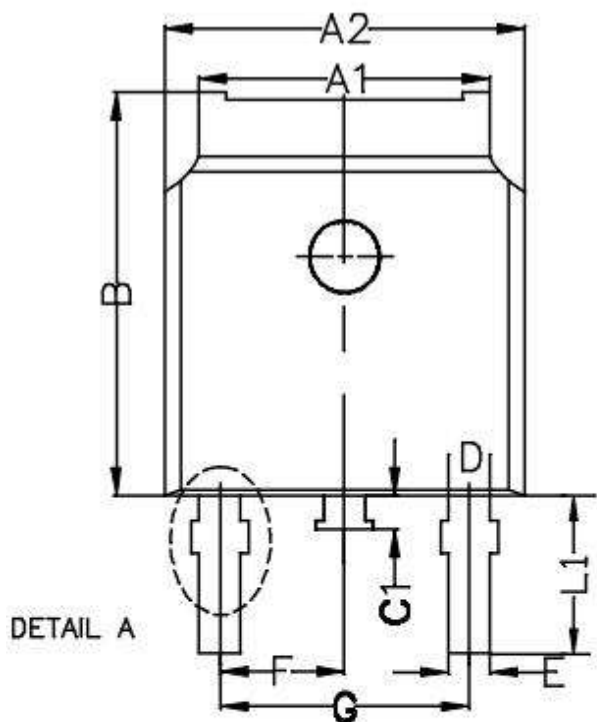
Symbol	Min	Non	Max
A1	5.22	5.32	5.42
A2	6.55	6.60	6.65
B	7.05	7.10	7.15
C1	0.70	0.80	0.90
C2	9.70	9.90	10.10
D	1.00 REF.		
E	0.76 REF.		
F	2.286 REF.		
G	4.572 REF.		
J	0.95	1.00	1.05
K	6.05	6.10	6.15
L	0.508 REF.		
L1	2.65	2.80	2.95
M	7° REF.		
N	0.508 REF.		
O	0.96	1.01	1.06
P	2.25	2.30	2.35
Q	0.00	0.05	0.10

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