Multi-Epi Super Junction MOSFETs

Lead Free Package and Finish

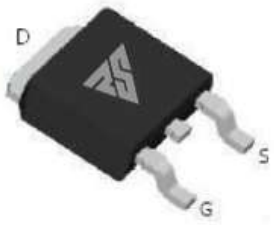
Applications:

- Switch Mode Power Supply(SMPS)
- Uninterruptible Power Supply(UPS)
- PFC stages for server & telecom
- Consumer

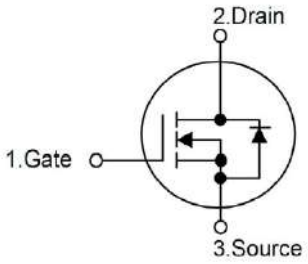
I_D	$R_{DS(ON)}$(Max.)	V_{DSS}
5A	850mΩ	650V

Features:

- New revolutionary high voltage technology
- Better RDS(on) in TO-252
- Ultra Low Gate Charge cause lower driving requirement
- Periodic avalanche rated
- Ultra low effective capacitances



Not to Scale



Ordering Information

Part Number	Package	Marking
RSU5N65D	TO-252	RSU5N65D

Absolute Maximun Ratings Tc=25℃ unless otherwise specified

Symbol	Parameter	RSU5N65D	Units
V_{DSS}	Drain-to-Source Voltage	650	V
I_D	Continuous Drain Current (TC = 25℃)	5	A
	Continuous Drain Current (TC = 100℃)	2.5	
I_{DM}	Pulsed Drain Current (Note*1)	18.0	
PD	Power Dissipation(Tc=25℃)	45.0	W
VGS	Gate-to-Source Voltage	±30	V
EAS	Single Pulse Avalanche Engergy (Note*2)	70	mJ
I_{AR}	Avalanche Current (Note*1)	4.5	A
EAR	Repetitive Avalanche Engergy (Note*1)	0.13	mJ
TL	Maximum Temperature for Soldering	300	℃
TPKG	Leads at 0.063in(1.6mm)from Case for 10 seconds Package Body for 10 seconds	260	
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	RSU5N65D	Units	Test Conditions
RθJC	Junction-to-Case	1.73	℃/W	Drain lead soldered to water cooled heatsink,PD Adjusted for a peak junction temperature of +150℃.
RθJA	Junction-to-Ambient	106		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	--	--	100	nA	VGS=+30V VDS=0V
	Gate-to-Source Reverse Leakage	--	--	-100		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	--	730	850	mΩ	VGS=10V,ID=2.5A
VGS(TH)	Gate Threshold Voltage	3.0	--	4.0	V	VGS=VDS,ID=250μA

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn-on Delay Time	--	7.6	--	ns	VDS=400V ID=2.5A RG=25Ω VGS=10V
trise	Rise Time	--	19.8	--		
td(OFF)	Turn-OFF Delay Time	--	27.5			
tfall	Fall Time	--	22.3			

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	421	--	pF	VGS=0V VDS=100V f=1.0MHz
Coss	Output Capacitance	--	28	--		
Crss	Reverse Transfer Capacitance	--	9	--		
Qg	Total Gate Charge	--	13.5	--	nC	VDS=480V ID=2.5A VGS=10V
Qgs	Gate-to-Source Charge	--	3	--		
Qgd	Gate-to-Drain("Miller"）Charge	--	3.7	--		

Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	5	A	Integral pn-diode in MOSFET
ISM	Maximum Pulsed Current	--	--	18	A	
VSD	Diode Forward Voltage	--	0.8	1.2	V	IS=2.5A,VGS=0V Tj=25℃
trr	Reverse Recovery Time	--	175	--	nS	VR=60V,VGS=0V IS=2.5A,di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	1.08	--	μC	
Irrm	Peak Reverse Recovery Current	--	14	--	A	

Notes:

*1.Pulse width limited by safe operating area.
*2. starting TJ = 25 °C, ID = IAR, VDD = 50 V)

Typical Feature curve T_J=25℃, unless otherwise noted

Fig 1. Output Characteristics (Tj=25℃)

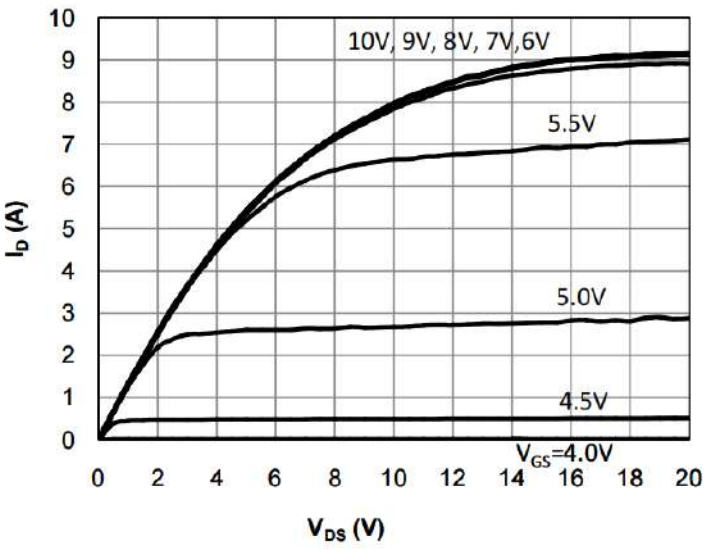


Fig 2. Output Characteristics (Tj=125℃)

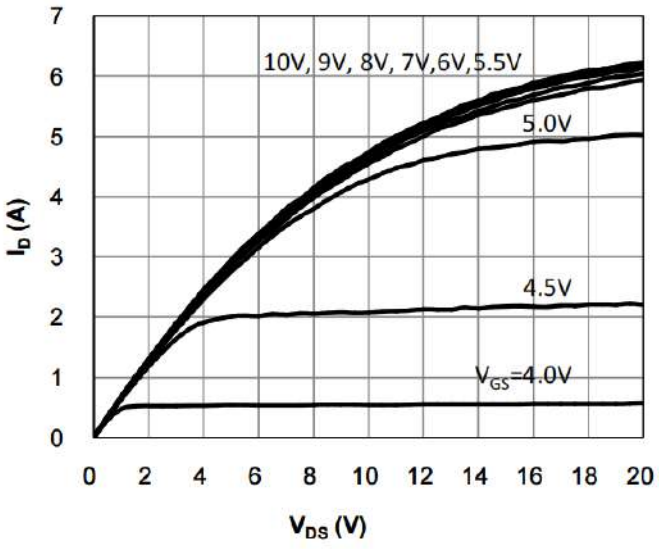


Fig 3: Transfer Characteristics

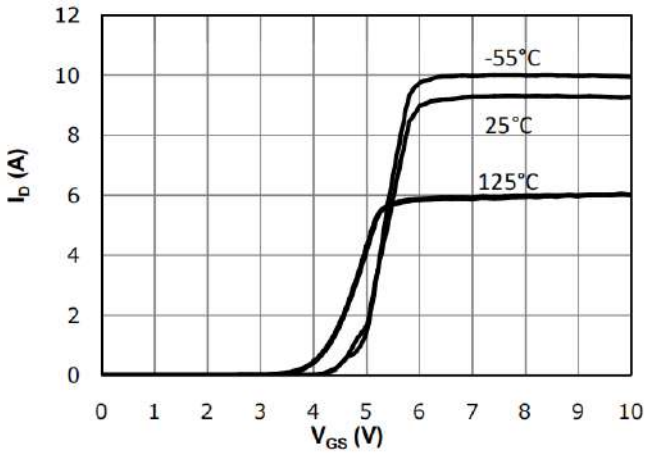


Fig 4: V_{TH} Vs Tj Temperature Characteristics

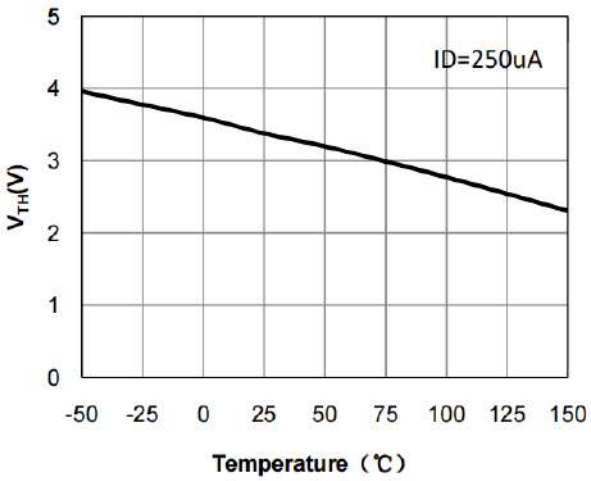


Fig 5: Rdson Vs Ids Characteristics(Tc=25℃)

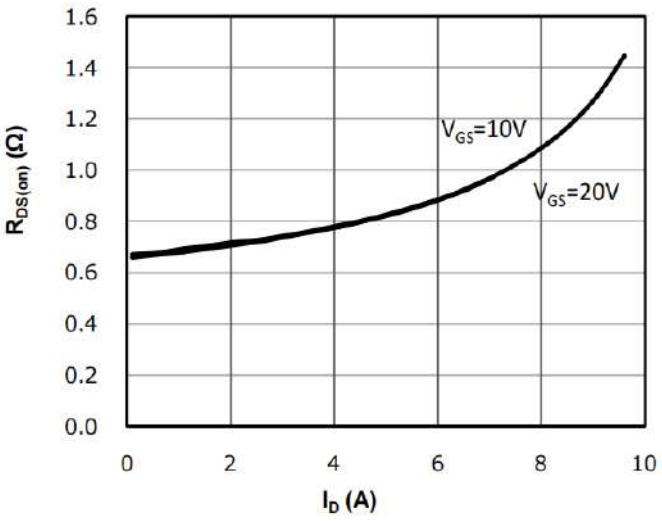


Fig 6: Rds(on) vs. Temperature

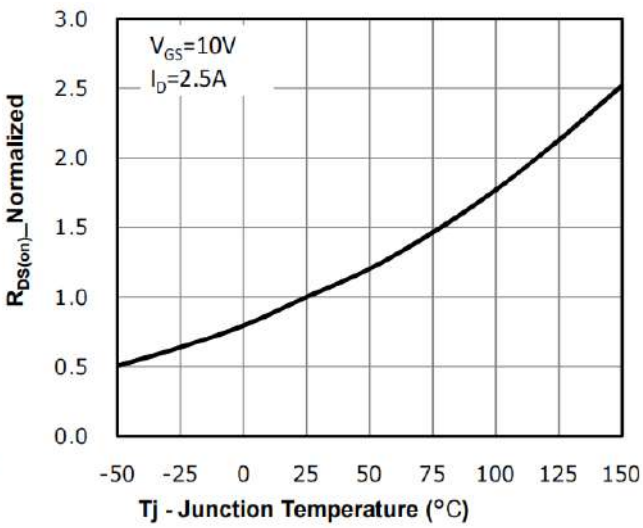


Fig 7: BVDSS vs. Temperature Characteristics

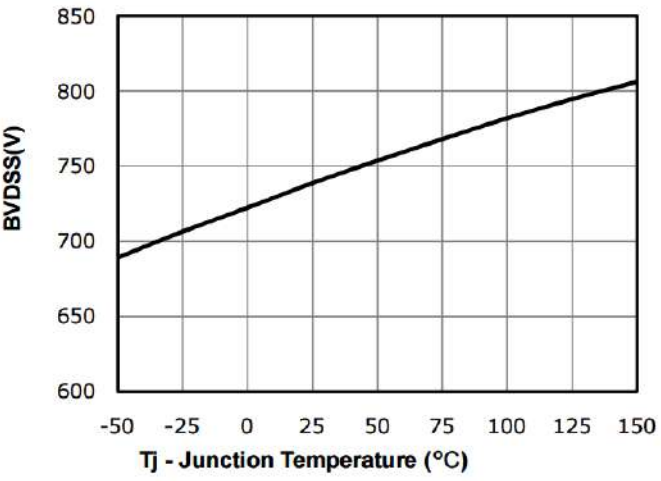


Fig 8: Rds(on) vs Gate Voltage

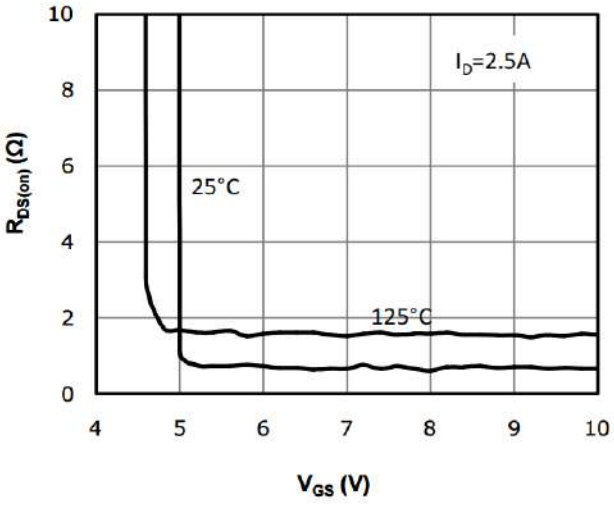


Fig 9: Body-diode Forward Characteristics

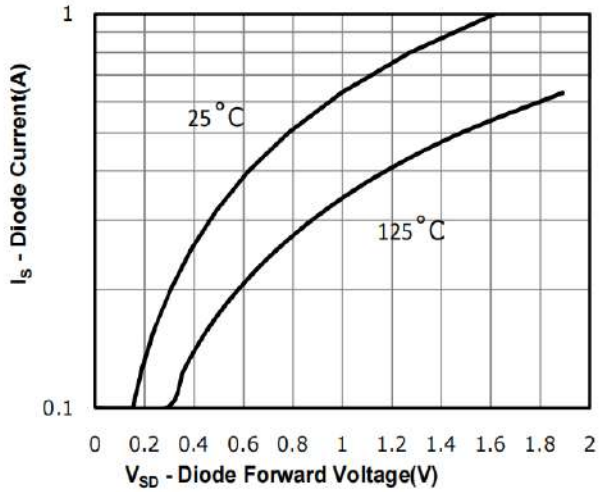


Fig 10: Gate Charge Characteristics

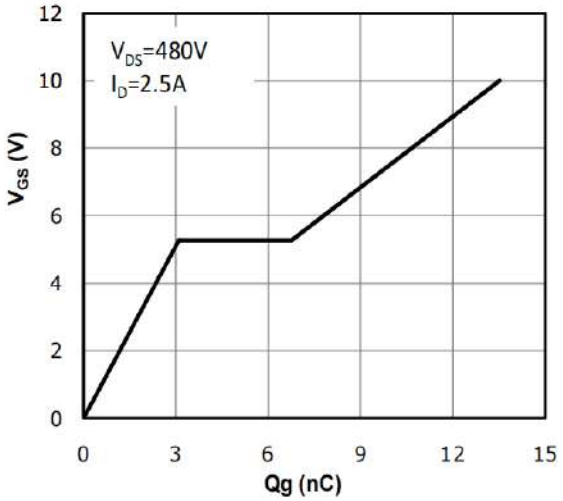


Fig 11: Capacitance Characteristics

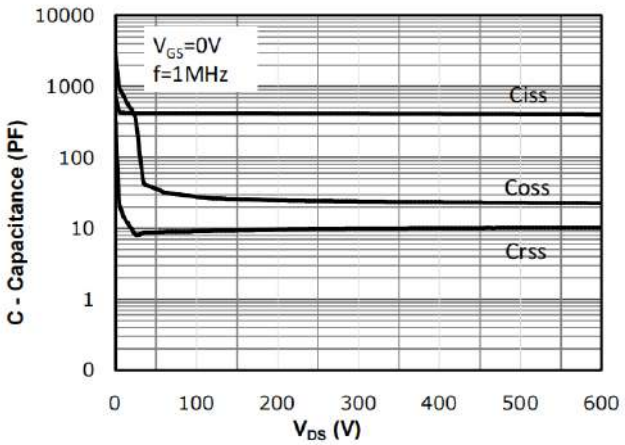


Fig 12: Safe Operating Area

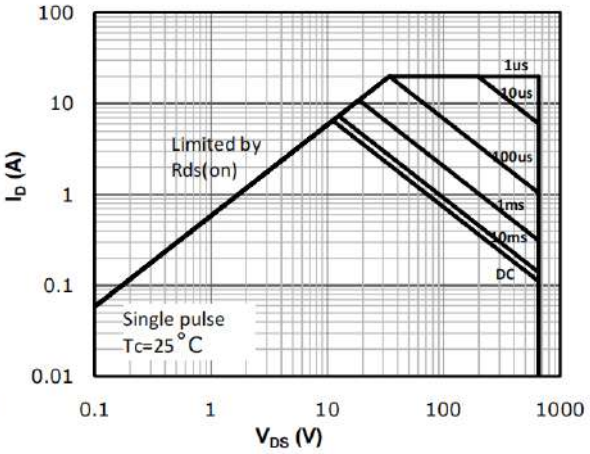
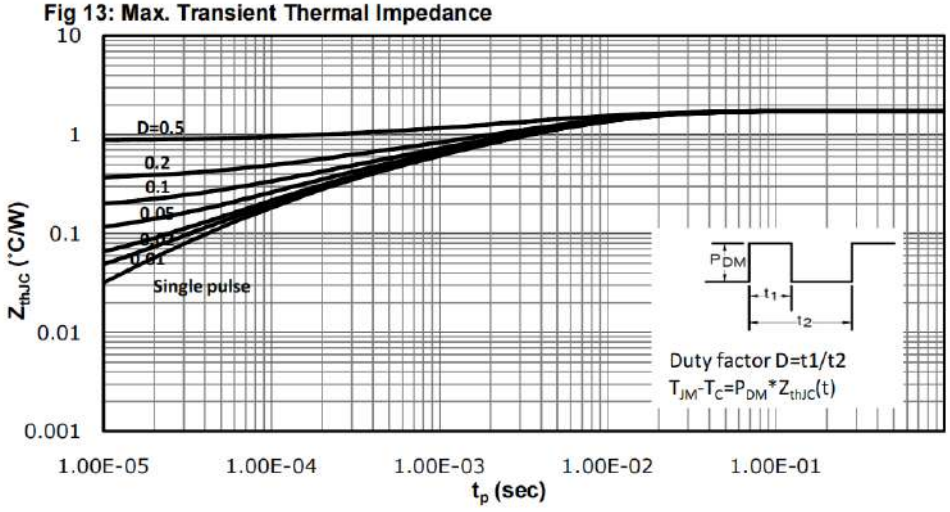


Fig 13: Max. Transient Thermal Impedance



Test Circuits and Waveforms

Figure A: Gate Charge Test Circuit and Waveform

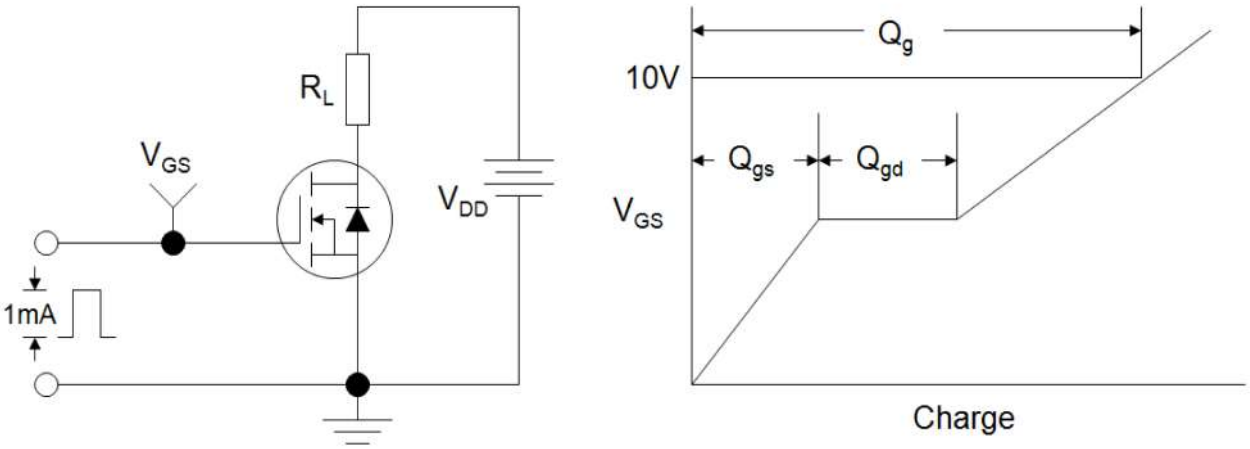


Figure B: Resistive Switching Test Circuit and Waveform

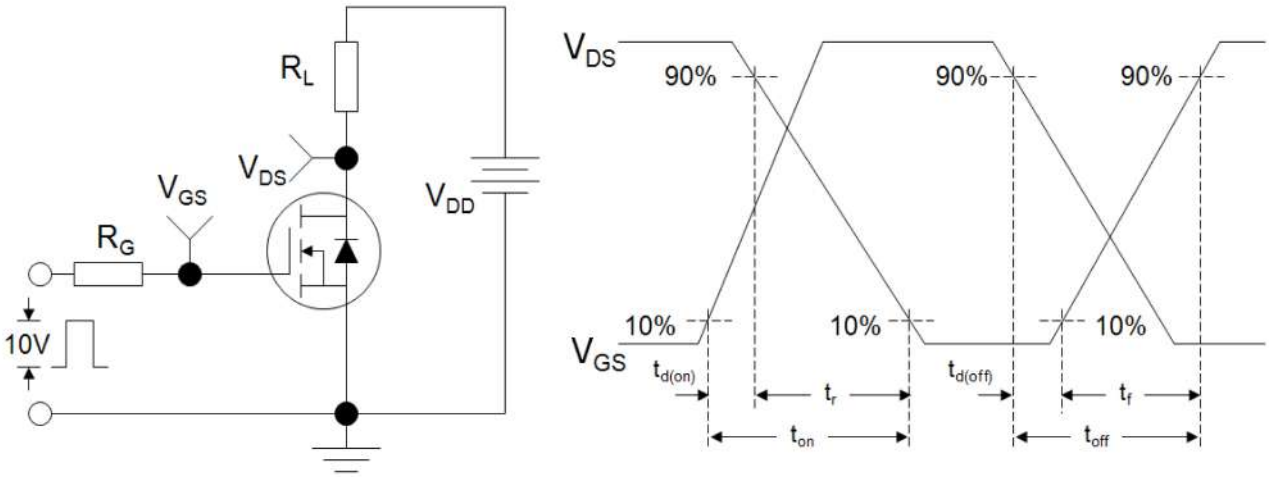
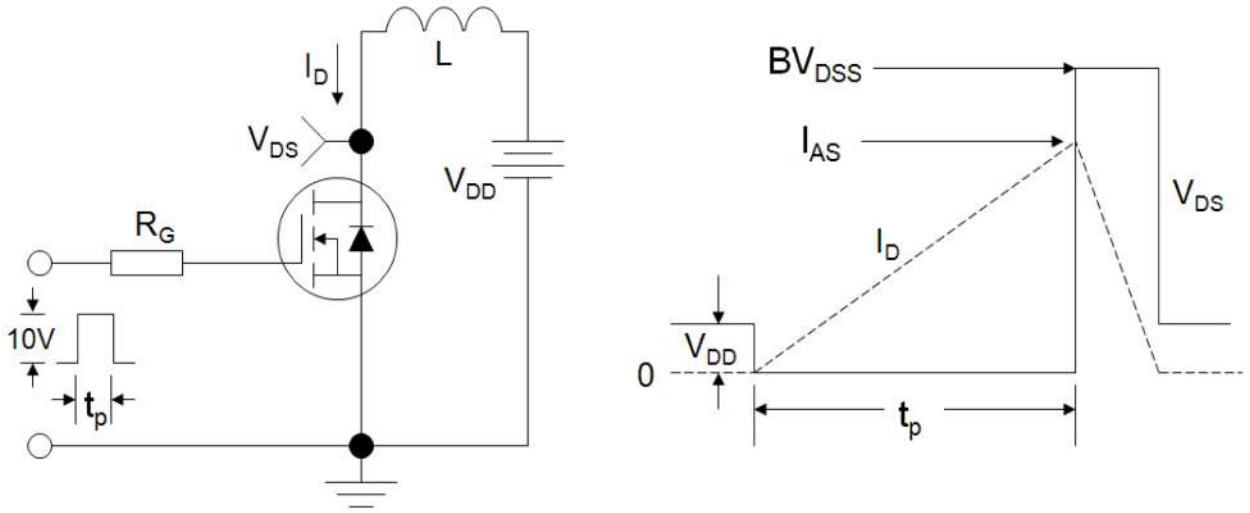


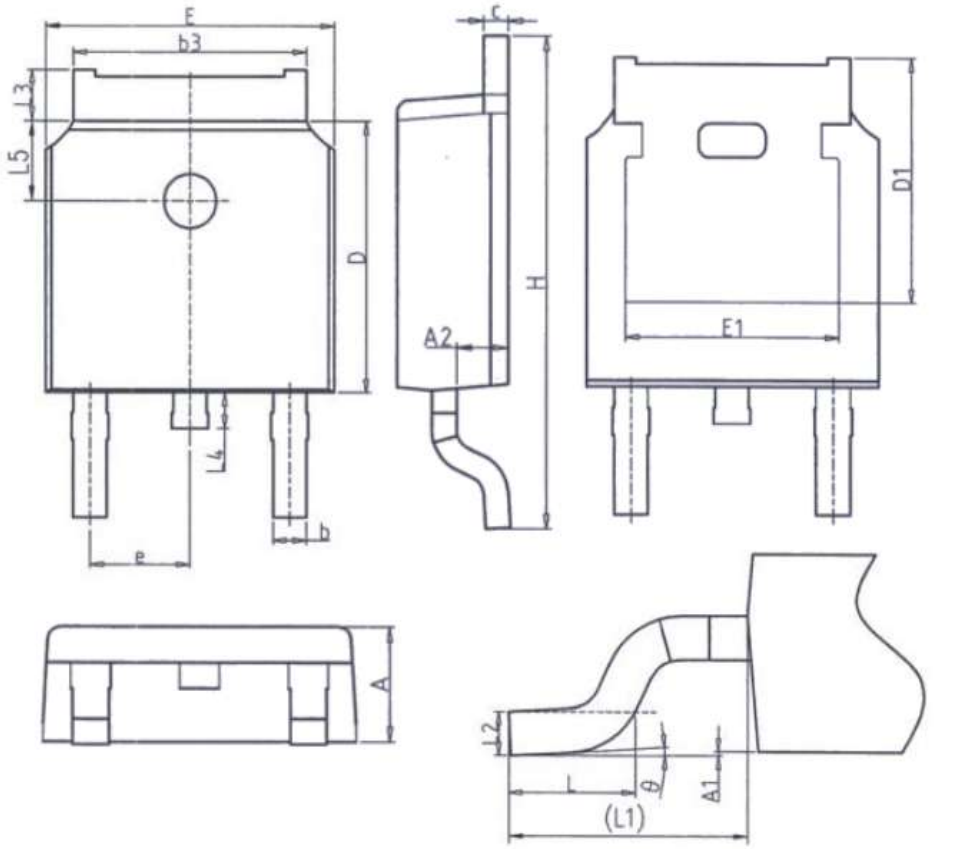
Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Package outline drawing

Unit:mm

TO-252



Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	-

Unit: mm		
Symbol	Min.	Max.
e	2.286BSC	
H	9.40	10.50
L	1.38	1.75
L1	2.90REF	
L2	0.51BSC	
L3	0.88	1.28
L4	-	1.00
L5	1.65	1.95
θ	0°	8°

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