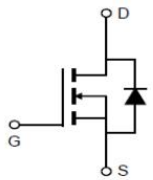
HMS11N65D/Q

650V Super-Junction MOSFET

•General Description

The SJ MOSFET HMS11N65 has the low $R_{DS(on)}$, low gate charge,fast switching and excellent avalanche characteristics.This device offers extremely fast and robust body diode,and is suitable for telecom and power supplies.



VDS =650V

$R_{DS(ON)}$ =310mΩ

ID =11A

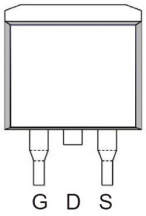
•Features

■Much lower Ron*A performance for On-state efficiency
■Much lower FOM for fast switching effciency

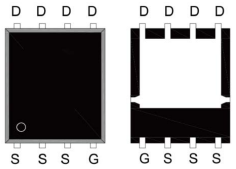
•Application

■LED/LCD/PDP TV and monitor Lighting
■Solar/Renewable/UPS-Micro Inverter System
■Power Supplies

■ RoHS COMPLIANT



TO-263



DFN5*6

•Ordering Information:

Part number	HMS11N65D	HMS11N65Q
Package	TO-263	DFN5*6
Basic ordering unit (pcs)	800	5000
Normal Package Material Ordering Code	HMS11N65D-TO263	HMS11N65Q-DFN5*6
Halogen Free Ordering Code	HMS11N65D-TO263-HF	HMS11N65Q-DFN5*6-HF

•Absolute Maximum Ratings（TC =25℃）

PARAMETER		SYMBOL	Value	UNIT
Drain-Source Breakdown Voltage		BV_{DSS}	650	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	TC = 25°C	I_D	11	A
	TC = 100°C		6.6	
Pulsed drain current (TC = 25°C, tp limited by Tjmax)[1]		I_D pulse	33	A
Single Pulse Avalanche Energy		I_{AR}	1.8	A
Single Pulse Avalanche Energy[2]		E_{AS}	215	mJ
Repetitive Avalanche Energy[2]		E_{AR}	0.32	mJ
Power Dissipation(TC=25℃)		P_D	82	W
Operating Temperature and Storage Temperature Range		T_J/T_{STG}	-55~+150	℃
Reverse diode dv/dt[3]		dv/dt	15	V/ns
Maximum diode commutation speed[3]		di_f/dt	500	V/ns

●Electronic Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D=250uA	650	--	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=VGS,I_D=250uA	2.5	--	4.5	V
Drain-source On Resistance[3]	$R_{DS(ON)}$	V_{GS}=10V,I_D=5.5A	--	0.31	0.36	Ω
Drain-Source Leakage Current	I_{DSS}	V_{DS}=650V,V_{GS}=0V,T_J=25℃	--	--	1	uA
		V_{DS}=650V,V_{GS}=0V,T_J=125℃	--	--	100	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30	--	--	±100	nA
Forward Transconductance[3]	R_G	f=1.0MHz open drain	--	--	18	Ω
Input Capacitance	Ciss	V_{GS} = 0V, V_{DS} = 100V f = 1.0MHz	--	808	--	pF
Output Capacitance	Coss		--	33	--	
Reverse transfer Capacitance	Crss		--	2.0	--	
Turn -Off Delay Time	Td(off)	V_{DD}=400V, I_D =11.0A R_G=25Ω	--	145	--	ns
Turn-on delay time	Td(on)		--	70	--	
Rise time	Tr		--	70	--	
Fall time	Tf		--	59	--	
Total Gate Charge	Qg	I_D =11A, V_{DS} = 520V V_{GS} = 10V	--	22	---	nC
Gate-to-Source Charge	Qgs		--	4	--	
Gate-to-Drain Charge	Qgd		--	8	---	
Continuous Diode Forward Current	I_S		--	--	11	A
Pulsed Diode Forward Current[1]	I_{SM}		--	--	33	A
Diode Forward Voltage	V_{SD}	Tj=25°C, Is=5.5A V_{GS} =0V	--	0.9	1.2	V
Reverse Recovery Time	trr	V_{RR}=400V, If=Is di_F/dt=100A/μs	--	377	--	ns
Reverse Recovery Charge	Qrr		--	3.4	--	uC
Peak Reverse Recovery Current	I_{RRM}		--	17.8	--	A

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	Rth_{JC}	1.51	℃/W
Thermal Resistance Junction-ambient	Rth_{JA}	62	℃/W

Notes:

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

2. I_{AS} = 1.8A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

3. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

●Typical Characteristics T_J=25ºC,unless otherwise noted

Figure 1. Output Characteristics

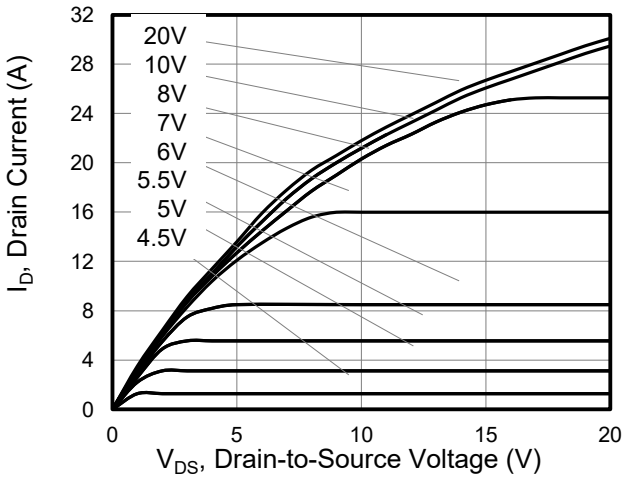


Figure 2. Transfer Characteristics

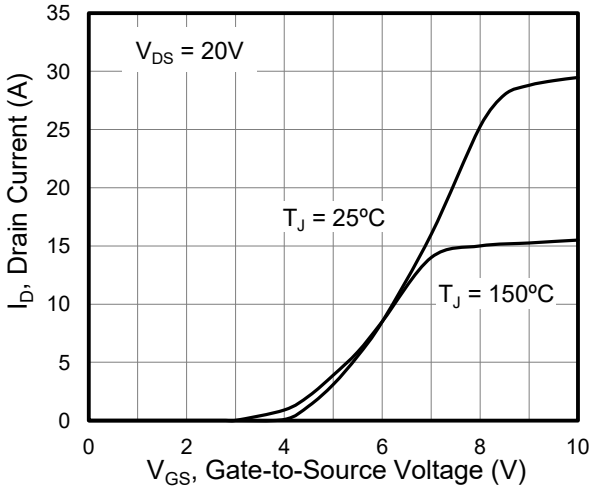


Figure 3. On-Resistance vs. Drain Current

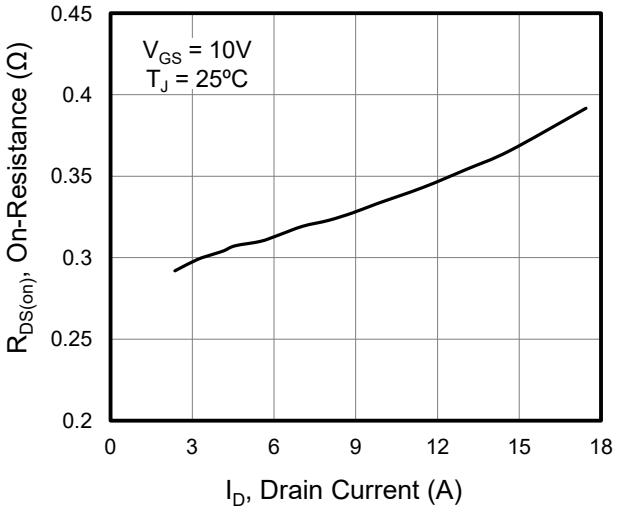


Figure 4. Capacitance

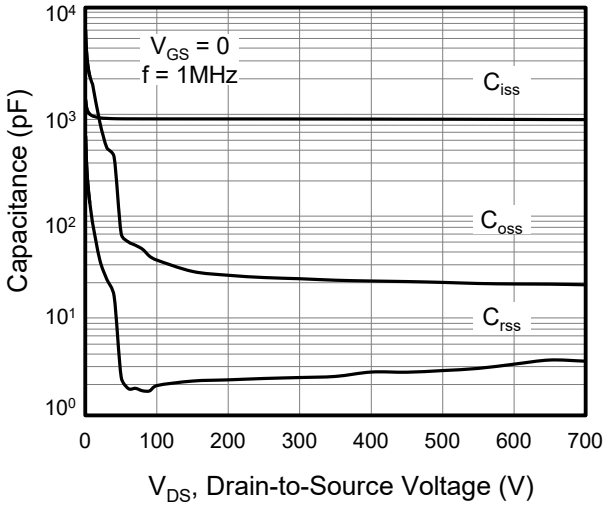


Figure 5. Gate Charge

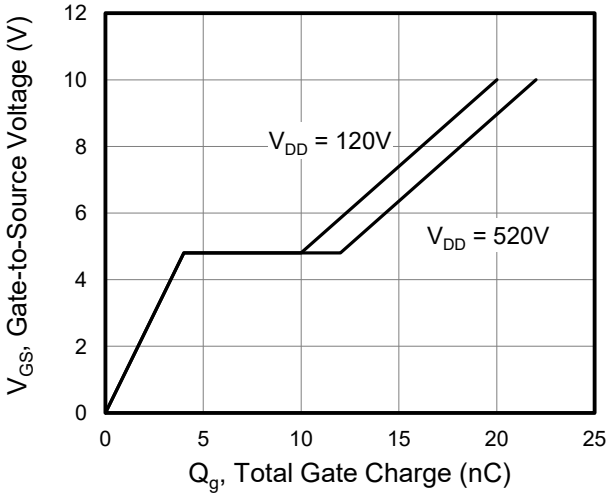
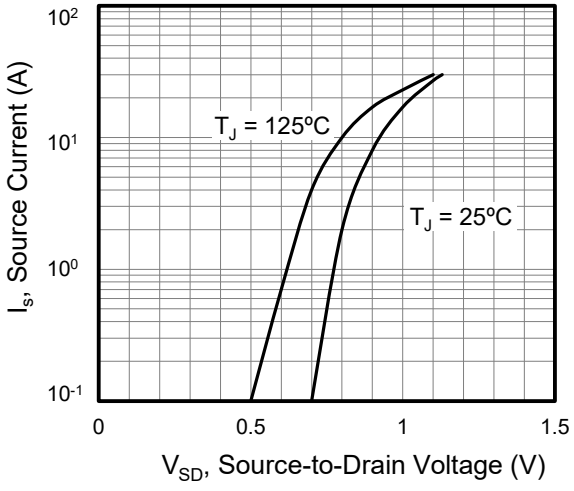


Figure 6. Body Diode Forward Voltage



●Typical Characteristics(Cont.)

Figure 7. On-Resistance vs. Junction Temperature

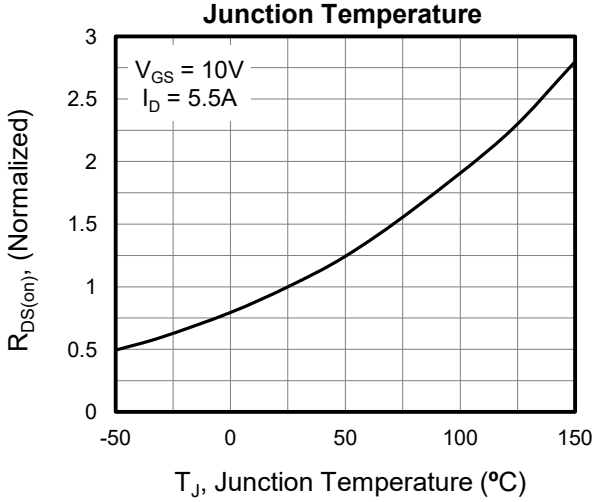


Figure 8. Breakdown voltage vs. Junction Temperature

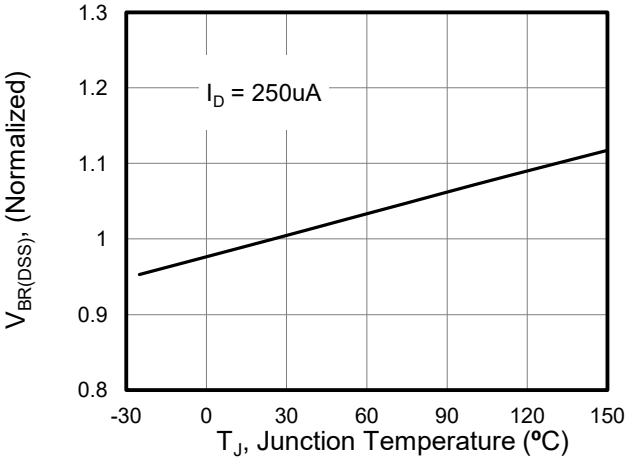


Figure 9. Transient Thermal Impedance

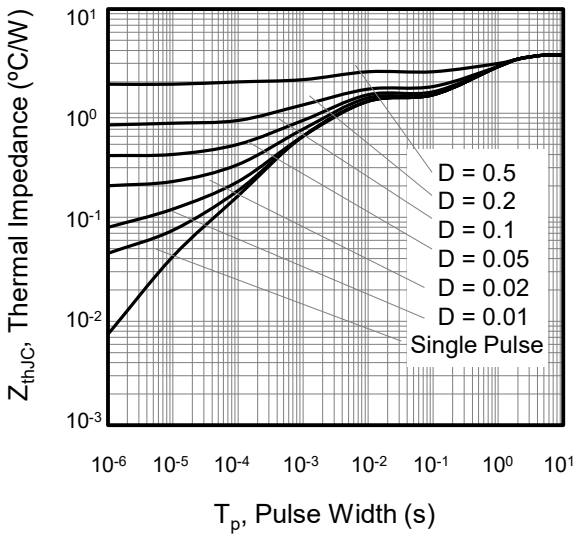
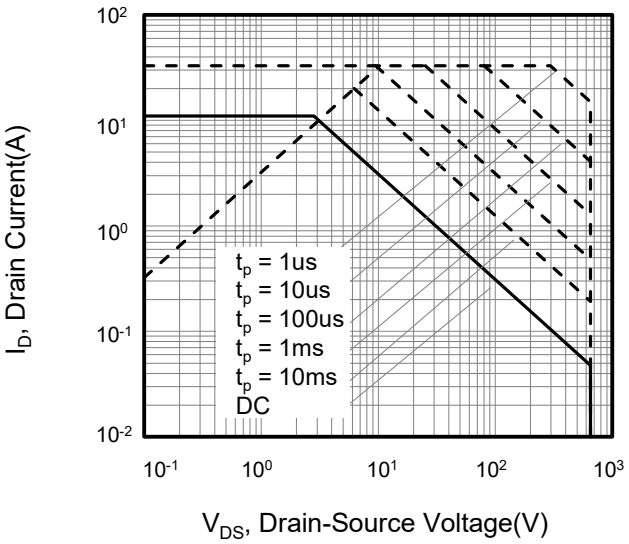


Figure 10. Safe operation area



● Test Circuit and Waveforms

Figure A：Gate Charge Test Circuit and Waveform

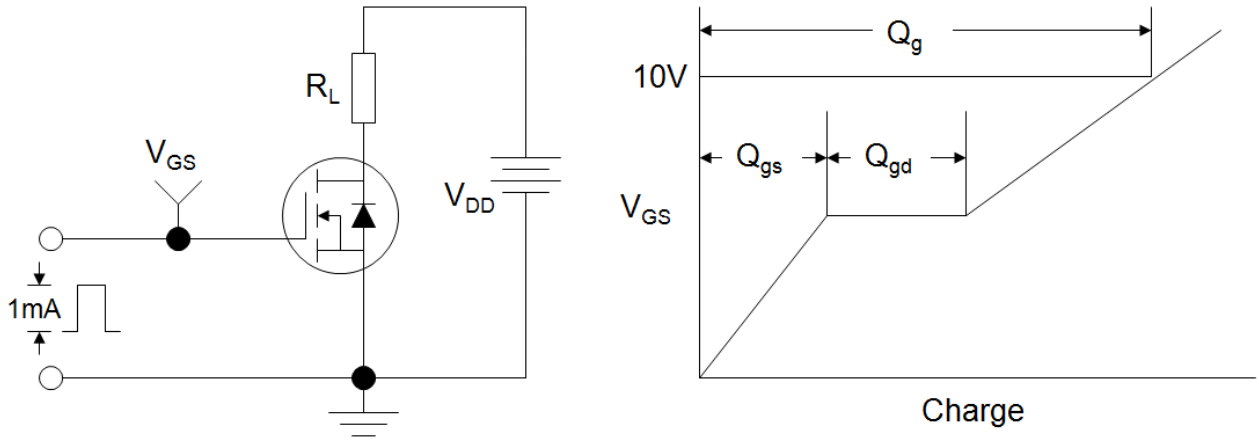


Figure B：Resistive Switching Test Circuit and Waveform

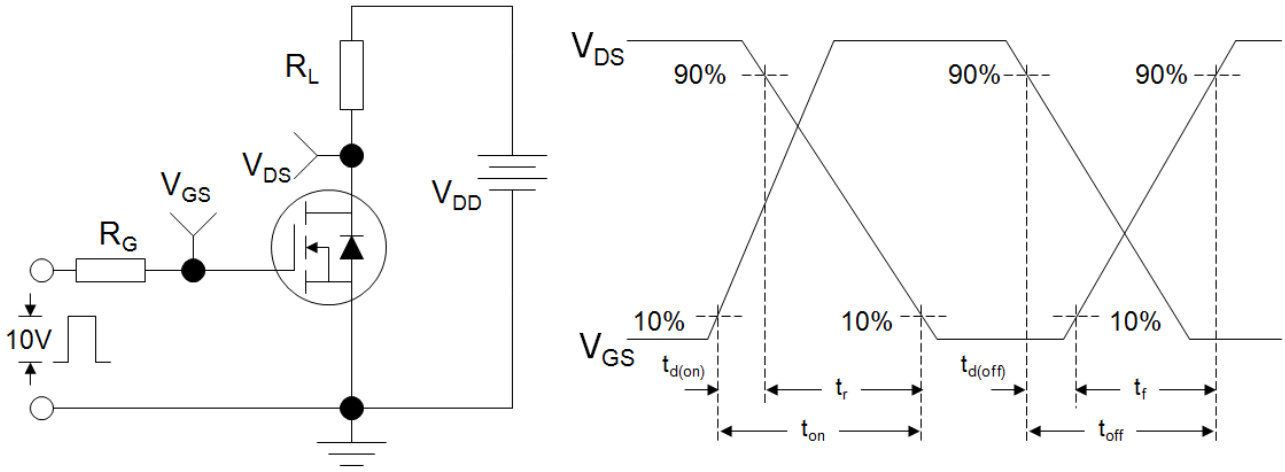
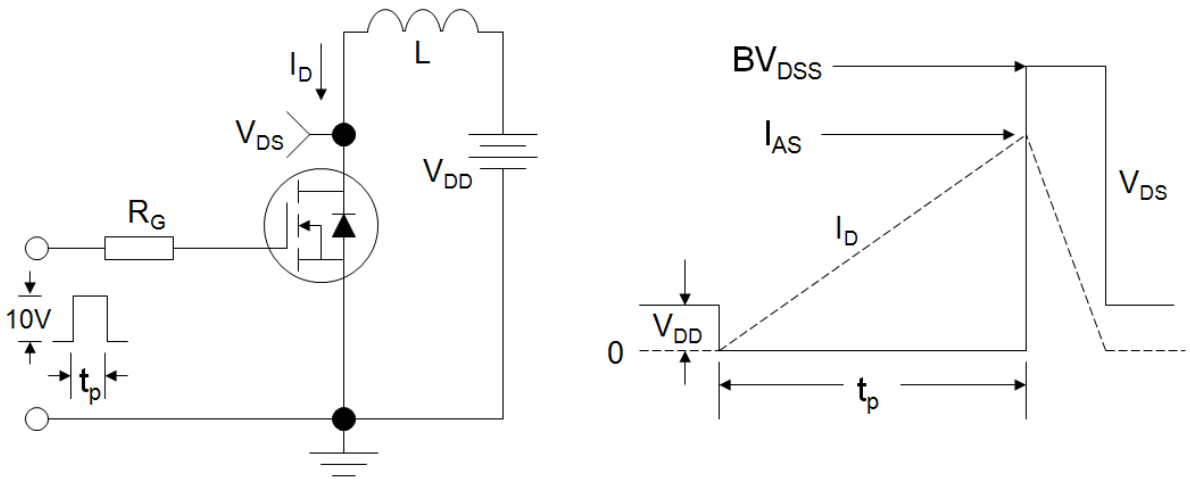


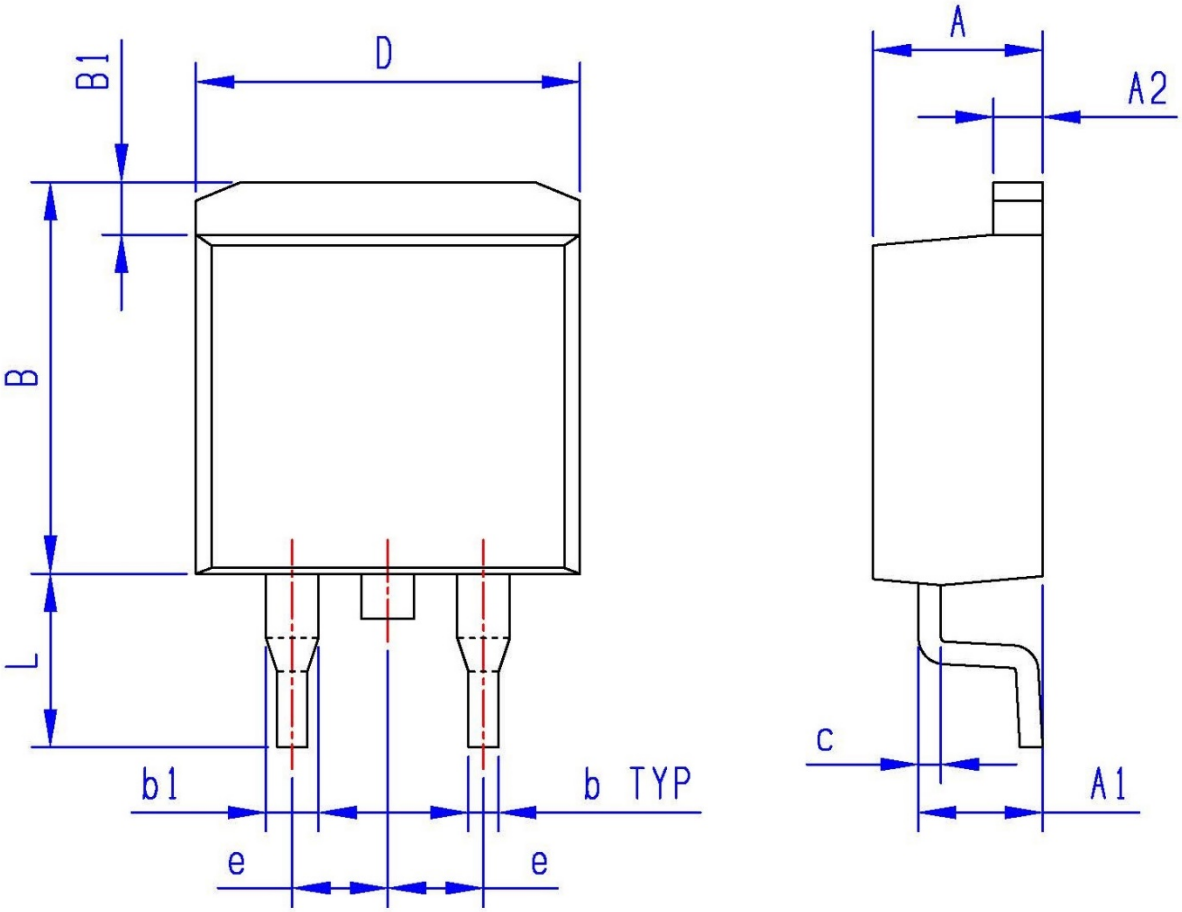
Figure C：Unclamped Inductive Switching Test Circuit and Waveform



- **Dimensions（TO-263）**

Unit：mm

SYMBOL	min	max	SYMBOL	min	max
A	4.25	4.85	B1	1,20	1.80
A1	2.30	3.00	e	2.40	2.70
A2	1.20	1.40	L	4.80	5.60
b	0.60	0.90			
b1	1.10	1.70			
c	0.40	0.70			
D	9.80	10.60			
B	10.40	11.40			



• Dimensions（DFN5*6)

Unit：mm

SYMBOL	min	max	SYMBOL	min	max
A	1.00	1.20	e	1.27BSC	
b	0.30	0.50	L	0.05	0.30
c	0.20	0.30	L1	0.40	0.80
D	4.80	5.20	L2	1.20	2.00
D1	3.90	4.30	H	3.30	3.80
E	5.50	5.90	I	-	0.18
E1	5.90	6.40