

●General Description

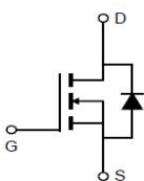
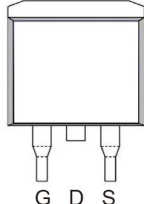
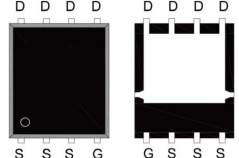
The SJ MOSFET HMS13N65 has the low  $R_{DS(on)}$ , low gate charge, fast switching and excellent avalanche characteristics. This device offers extremely fast and robust body diode, and is suitable for telecom and power supplies.

●Features

- Much lower  $R_{on} \cdot A$  performance for On-state efficiency
- Much lower FOM for fast switching efficiency

●Application

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

	<p><math>V_{DS} = 650V</math></p> <p><math>R_{DS(ON)} = 240m\Omega</math></p> <p><math>I_D = 13A</math></p>
 <p>TO-263</p>	<p>■ RoHS COMPLIANT</p>  <p>DFN5*6</p>

●Ordering Information:

Part number	HMS13N65D	HMS13N65Q
Package	TO-263	DFN5*6
Basic ordering unit (pcs)	800	5000
Normal Package Material Ordering Code	HMS13N65D-TO263	HMS13N65Q-DFN5*6
Halogen Free Ordering Code	HMS13N65D-TO263-HF	HMS13N65Q-DFN5*6-HF

●Absolute Maximum Ratings (TC = 25°C)

PARAMETER	SYMBOL	Value	UNIT
Drain-Source Breakdown Voltage	$V_{DSS}$	650	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current	$I_D$	TC = 25°C	13
		TC = 100°C	6.6
Pulsed drain current (TC = 25°C, tp limited by Tjmax) <sup>1</sup>	$I_D$ pulse	33	A
Single Pulse Avalanche Energy	$E_{AR}$	1.8	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	215	mJ
Repetitive Avalanche Energy <sup>2</sup>	$E_{AR}$	0.32	mJ
Power Dissipation (TC=25°C)	$P_D$	82	W
Operating Temperature and Storage Temperature Range	$T_J/T_{STG}$	-55~+150	°C
Reverse diode $dv/dt$ <sup>3</sup>	$dv/dt$	15	V/ns
Maximum diode commutation speed <sup>3</sup>	$di_f/dt$	500	V/ns

●Electronic Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	650	--	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	--	4.0	V
Drain-source On Resistance <sup>3</sup>	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5.5A$	--	0.24	0.28	$\Omega$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V, T_J=25^\circ C$	--	--	1	$\mu A$
		$V_{DS}=650V, V_{GS}=0V, T_J=125^\circ C$	--	--	100	
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30$	--	--	$\pm 100$	nA
Forward Transconductance <sup>3</sup>	$R_G$	f=1.0MHz open drain	--	--	18	$\Omega$
Input Capacitance	$C_{iss}$	$V_{GS}=0V,$ $V_{DS}=100V$ f = 1.0MHz	--	808	--	pF
Output Capacitance	$C_{oss}$		--	33	--	
Reverse transfer Capacitance	$C_{rss}$		--	2.0	--	
Turn -Off Delay Time	$T_d(off)$	$V_{DD}=400V,$ $I_D=13.0A$ $R_G=25\Omega$	--	145	--	ns
Turn-on delay time	$T_d(on)$		--	70	--	
Rise time	$T_r$		--	70	--	
Fall time	$T_f$		--	59	--	
Total Gate Charge	$Q_g$	$I_D=13A,$ $V_{DS}=520V$ $V_{GS}=10V$	--	22	---	nC
Gate-to-Source Charge	$Q_{gs}$		--	4	--	
Gate-to-Drain Charge	$Q_{gd}$		--	8	---	
Continuous Diode Forward Current	$I_s$		--	--	13	A
Pulsed Diode Forward Current <sup>1</sup>	$I_{SM}$		--	--	339	A
Diode Forward Voltage	$V_{SD}$	$T_J=25^\circ C, I_s=5.5A$ $V_{GS}=0V$	--	0.9	1.2	V
Reverse Recovery Time	trr	$V_{RR}=400V,$ If=Is diF/dt=100A/ $\mu s$	--	377	--	ns
Reverse Recovery Charge	Qrr		--	3.4	--	$\mu C$
Peak Reverse Recovery Current	$I_{RRM}$		--	17.8	--	A

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	$R_{thJC}$	1.51	$^\circ C/W$
Thermal Resistance Junction-ambient	$R_{thJA}$	62	$^\circ C/W$

Notes:

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
2.  $I_{AS} = 1.8A, V_{DD} = 50V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ C$
3. Pulse Test : Pulse width  $\leq 300\mu s, \text{Duty cycle } \leq 2\%$

• Typical Characteristics  $T_J=25^\circ\text{C}$ , unless otherwise noted

Figure 1. Output Characteristics

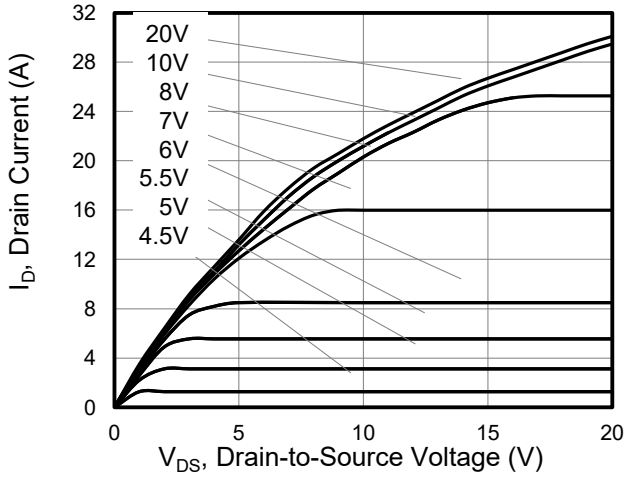


Figure 2. Transfer Characteristics

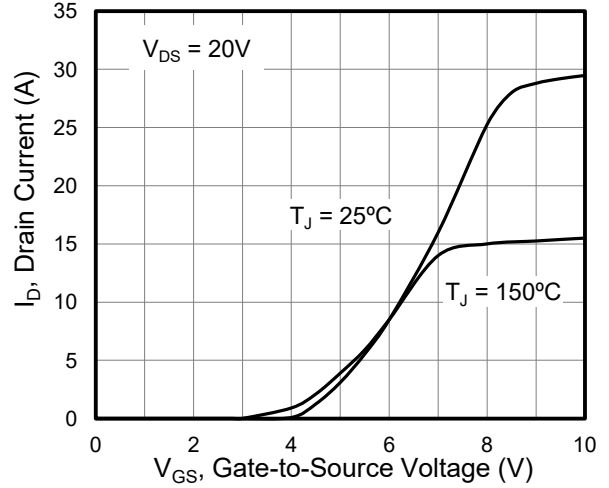


Figure 3. On-Resistance vs. Drain Current

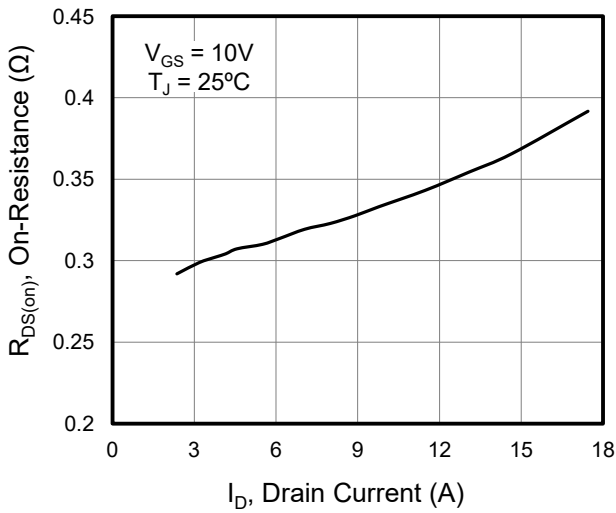


Figure 4. Capacitance

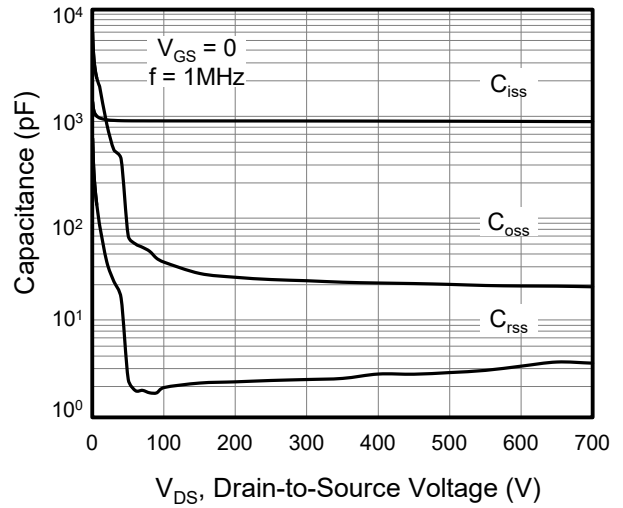


Figure 5. Gate Charge

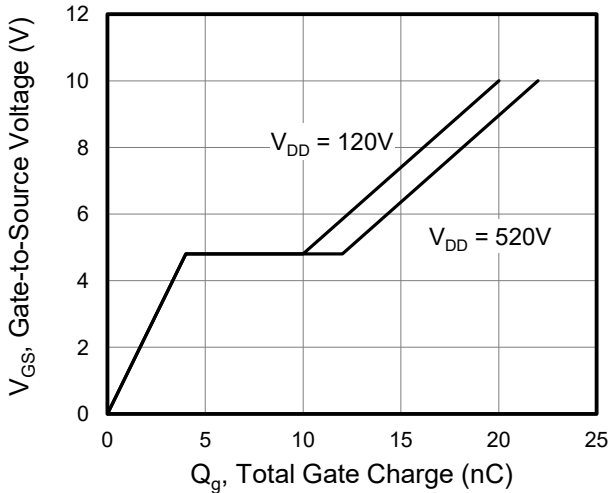
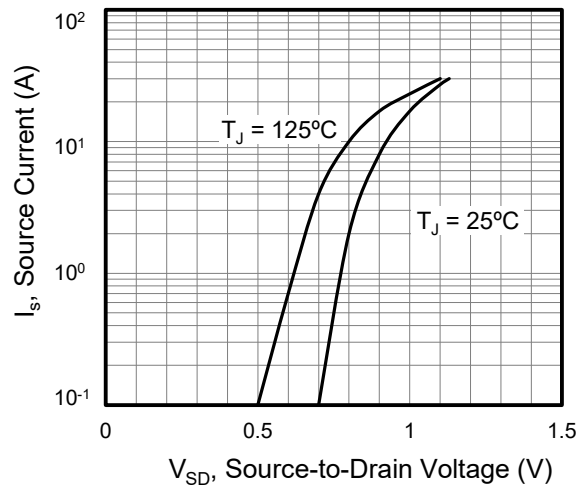


Figure 6. Body Diode Forward Voltage



• Typical Characteristics(Cont.)

Figure 7. On-Resistance vs. Junction Temperature

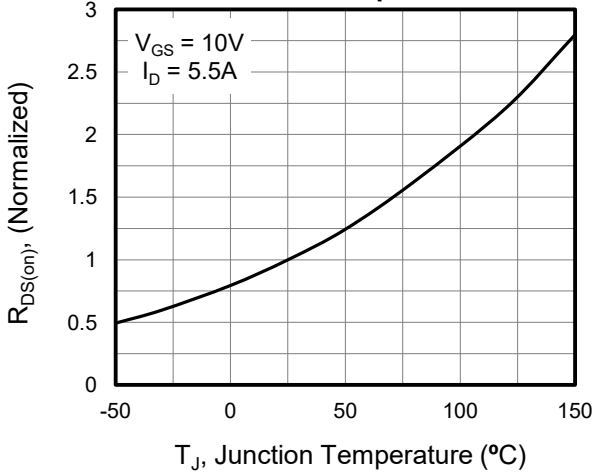


Figure 8. Breakdown voltage vs. Junction Temperature

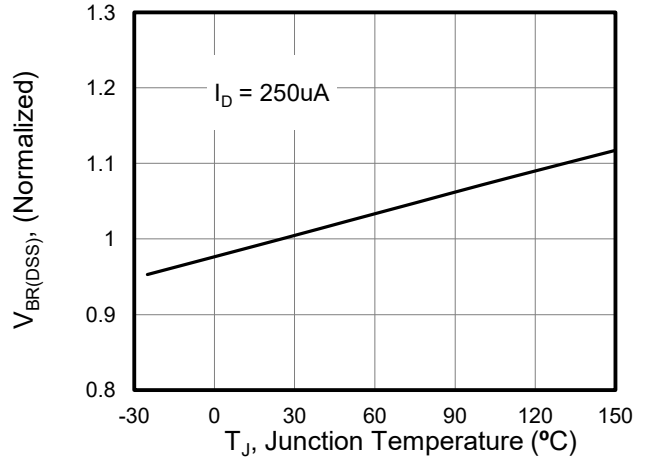


Figure 9. Transient Thermal Impedance

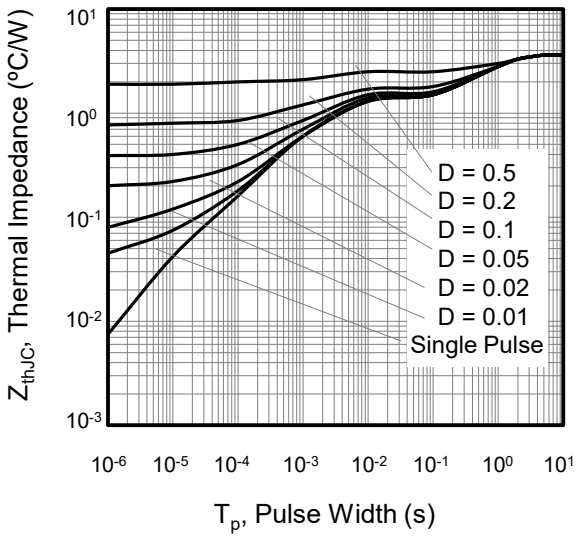
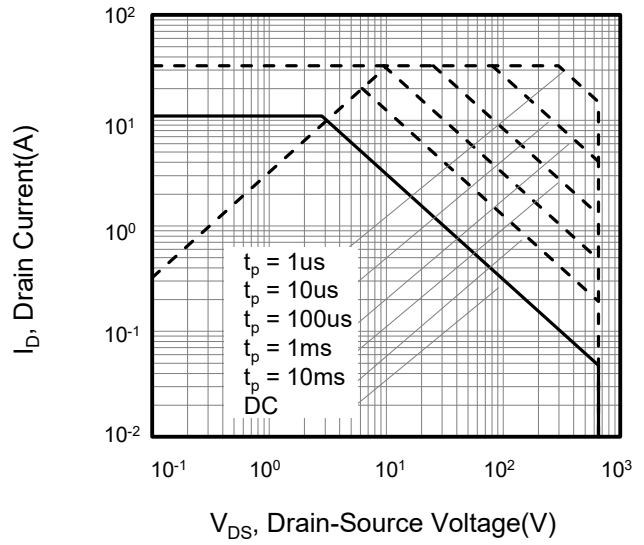


Figure 10. Safe operation area



• Test Circuit and Waveforms

Figure A: Gate Charge Test Circuit and Waveform

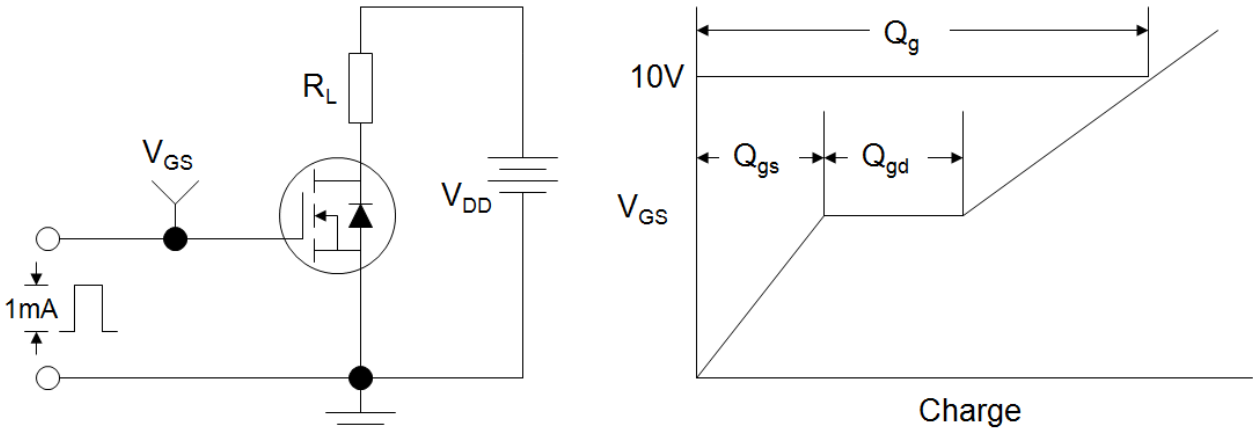


Figure B: Resistive Switching Test Circuit and Waveform

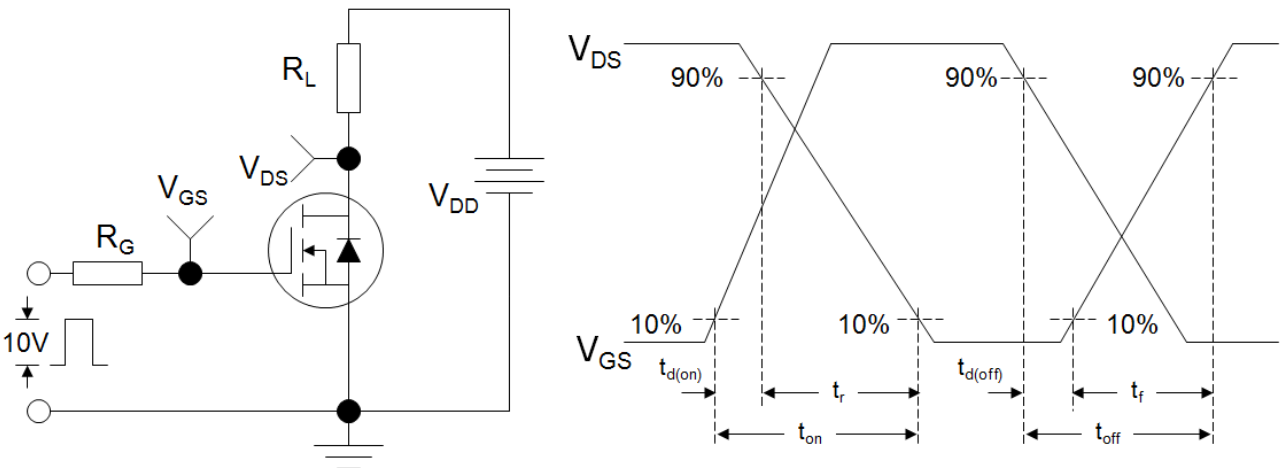
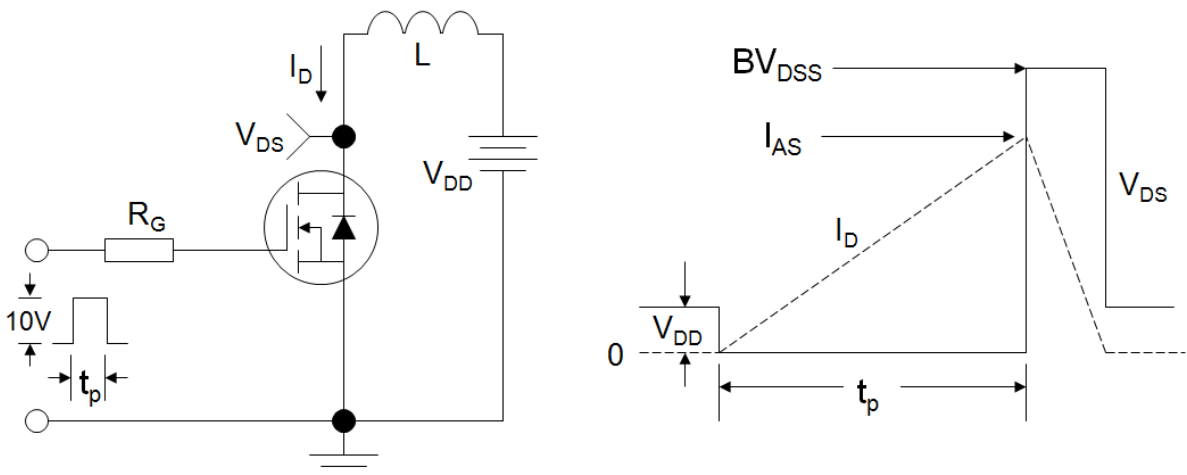


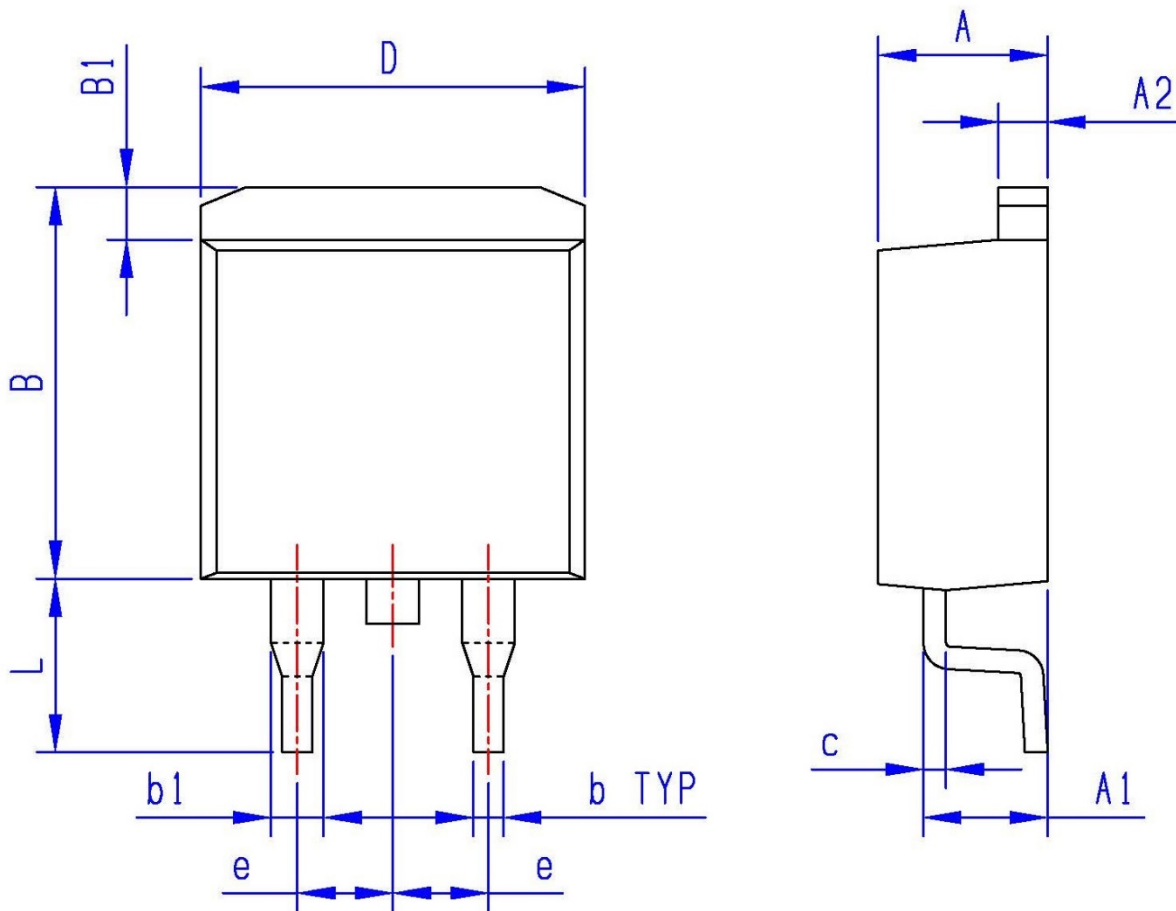
Figure C: Unclamped Inductive Switching Test Circuit and Waveform



• 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			

