

●General Description

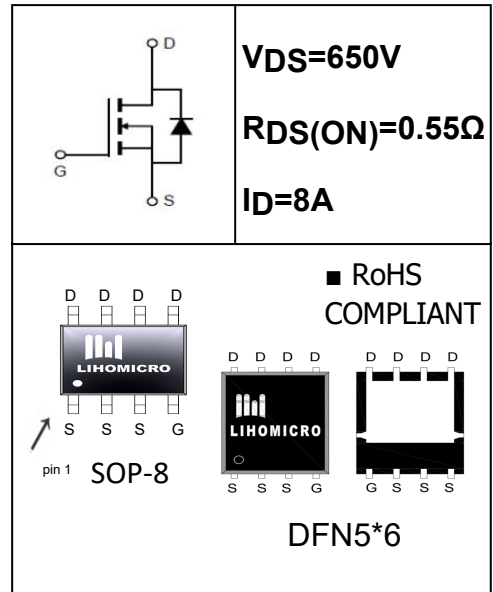
The SJ MOSFET LH65R550 has the low $R_{DS(on)}$, low gate charge, fast switching and excellent avalanche characteristics. This device offers extremely fast and robust body diode, and is suitable for telecom and power supplies.

●Features

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

●Application

- Lighting
- Solar/Renewable/UPS-Micro Inverter System
- Power Supplies



●Ordering Information:

Part number	LH65R550	LH65R550
Package	SOP-8	DFN5*6
Basic ordering unit (pcs)	4000	5000
Normal Package Material Ordering Code	LH65R550S-SOP8-TAP	LH65R550N-DFN5*6-TAP
Halogen Free Ordering Code	LH65R550S-SOP8-TAP-HF	LH65R550N-DFN5*6-TAP-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℃	I_D	8	A
	TC = 100℃		4.8	
Pulsed drain current (TC = 25℃, tp limited by Tjmax) ¹		I_D pulse	23	A
Single Pulse Avalanche Energy		I_{AR}	1.45	A
Single Pulse Avalanche Energy ²		E_{AS}	91	mJ
Repetitive Avalanche Energy ²		E_{AR}	0.32	mJ
Power Dissipation(TC=25℃)		P_D	28	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/dt	50	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 ³	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2.4A$	--	0.48	0.55	Ω
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V, T_J=25^\circ C$	--	--	1	μA
		$V_{DS}=650V, V_{GS}=0V, T_J=125^\circ C$	--	--	100	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V$	--	--	± 1	μA
Input Capacitance	C_{iss}	$V_{GS}=0V,$ $V_{DS}=400V$ $f=1.0MHz$	--	680	--	pF
Output Capacitance	C_{oss}		--	19	--	
Reverse transfer Capacitance	C_{rss}		--	2.9	--	
Turn-on delay time	$T_d(on)$	$V_{DD}=325V,$ $I_D=3.3A$ $R_G=25\Omega$	--	25	--	ns
Turn -Off Delay Time	$T_d(off)$		--	87	--	
Rise time	T_r		--	19	--	
Fall time	T_f		--	18	--	
Total Gate Charge	Q_g	$I_D=3.2A,$ $V_{DS}=520V$ $V_{GS}=10V$	--	16	---	nC
Gate-to-Source Charge	Q_{gs}		--	3.1	--	
Gate-to-Drain Charge	Q_{gd}		--	5.2	---	
Continuous Diode Forward Current	I_S	--	--	--	8.0	A
Pulsed Diode Forward Current ¹	I_{SM}	--	--	--	23	A
Diode Forward Voltage	V_{SD}	$T_J=25^\circ C, I_S=3.3A$ $V_{GS}=0V$	--	--	1.3	V
Reverse Recovery Time	t_{rr}	$V_{RR}=400V,$ $I_f=I_S$	--	250	--	ns
Reverse Recovery Charge	Q_{rr}	$di_F/dt=100A/\mu s$	--	1.9	--	μC

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	R_{thJC}	4.47	$^\circ C/W$
Thermal Resistance Junction-ambient	R_{thJA}	80	$^\circ C/W$

Notes:

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

2. $I_{AS}=1.45A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^\circ C$

3. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

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

Figure 1. On Region Characteristics

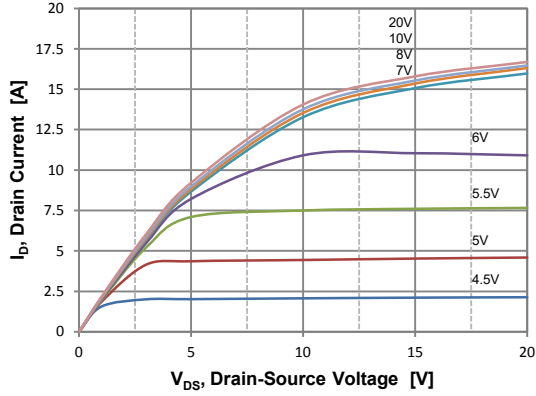


Figure 2. Transfer Characteristics

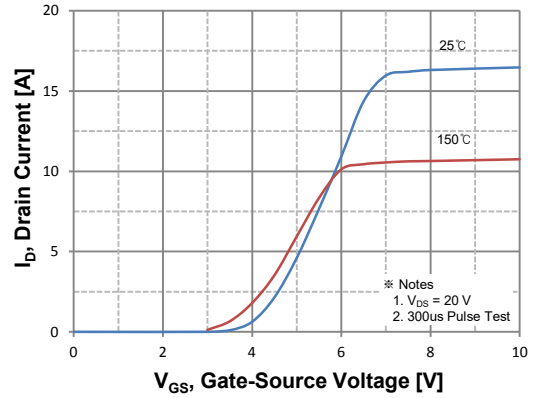


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

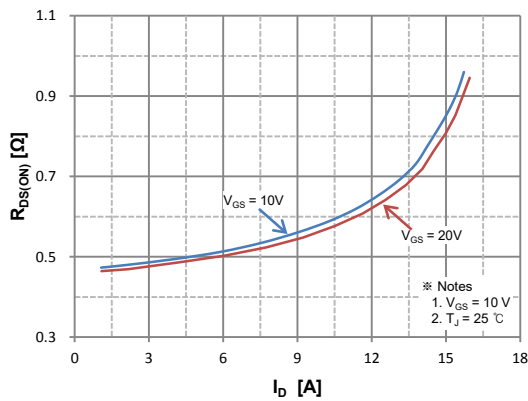


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

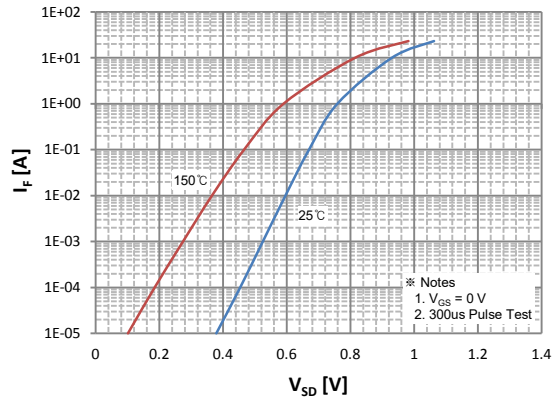


Figure 5. Capacitance Characteristics

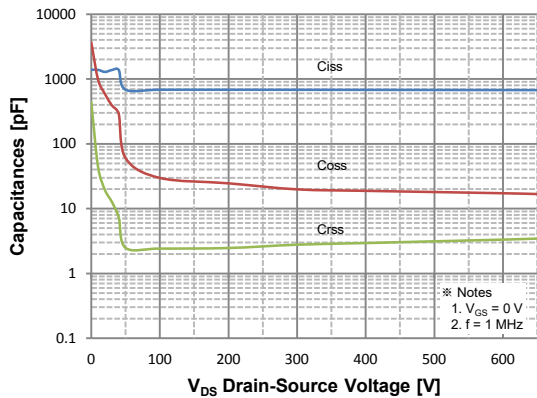
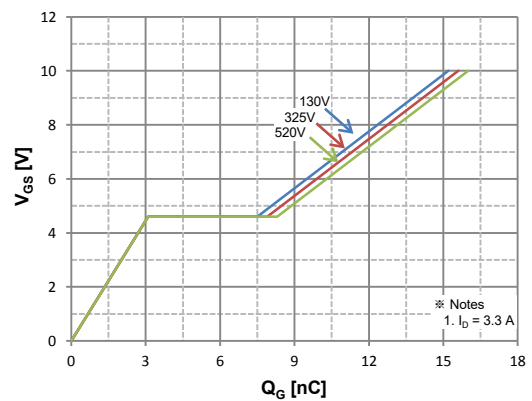


Figure 6. Gate Charge Characteristics



• **Typical Characteristics**(cont.)

Figure 7. Breakdown Voltage Variation vs. Temperature

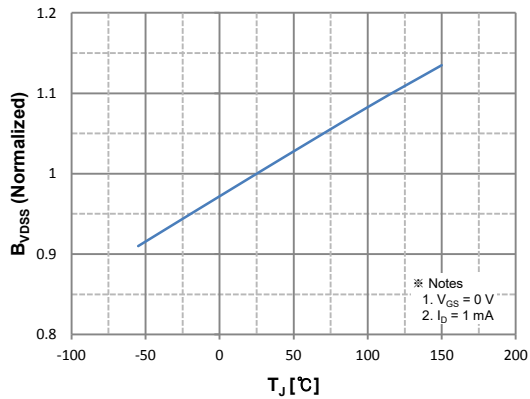


Figure 8. On-Resistance Variation vs. Temperature

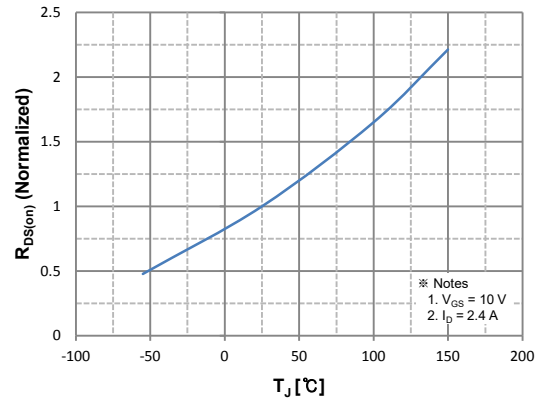


Figure 9. Maximum Safe Operating Area

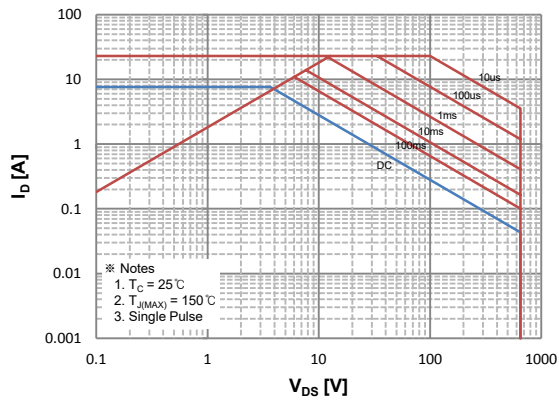


Figure 10. Maximum Drain Current vs. Case Temperature

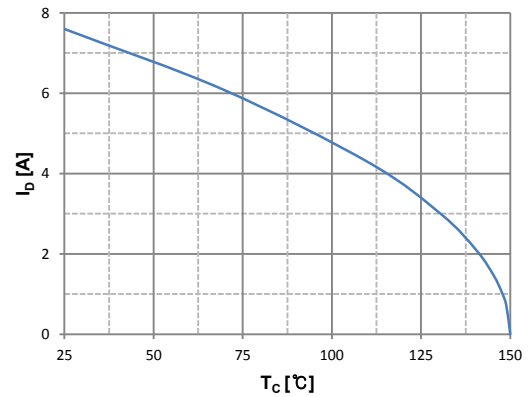
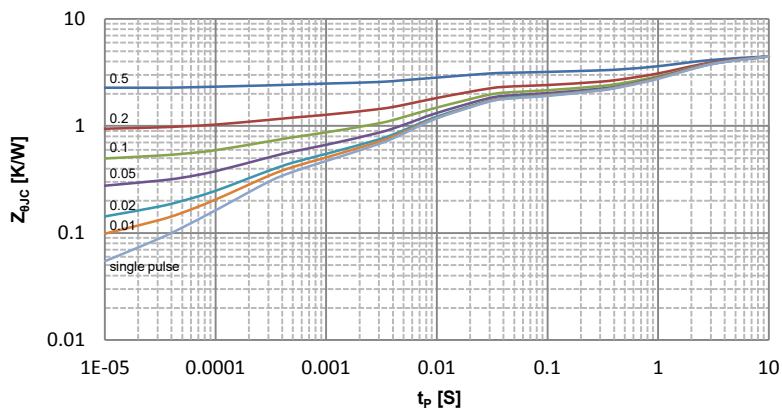


Figure 11. Transient Thermal Response Curve



● **Test circuits&Waveforms**

Fig 1. Gate Charge Test Circuit & Waveform

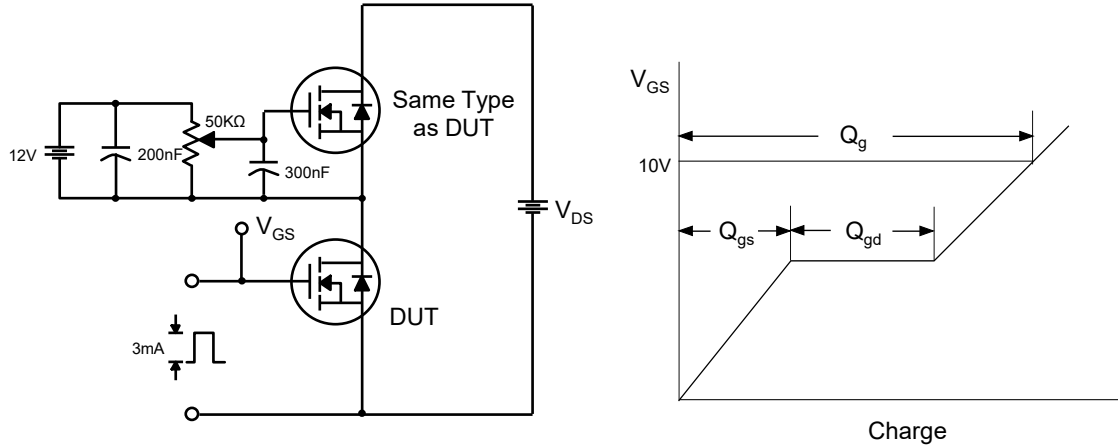


Fig 2. Resistive Switching Test Circuit & Waveforms

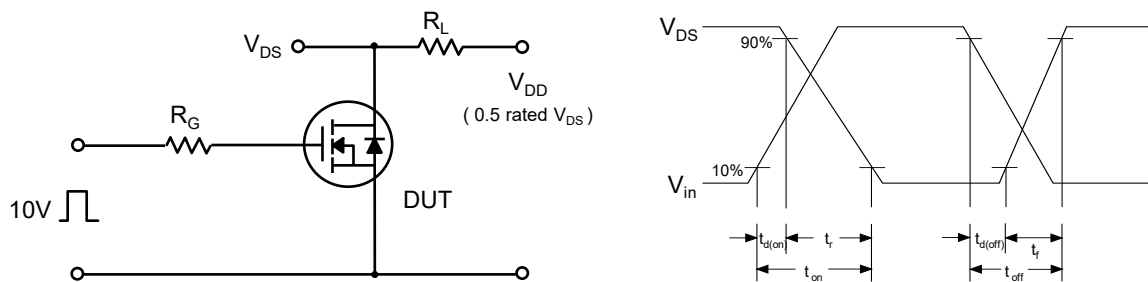
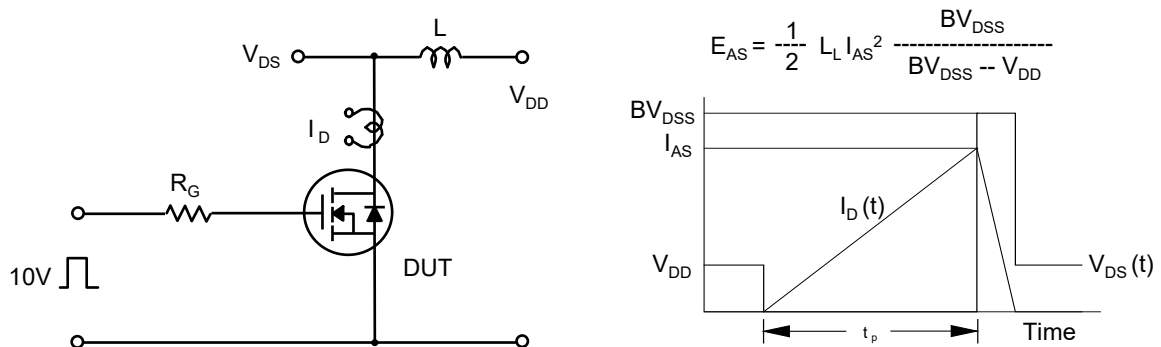
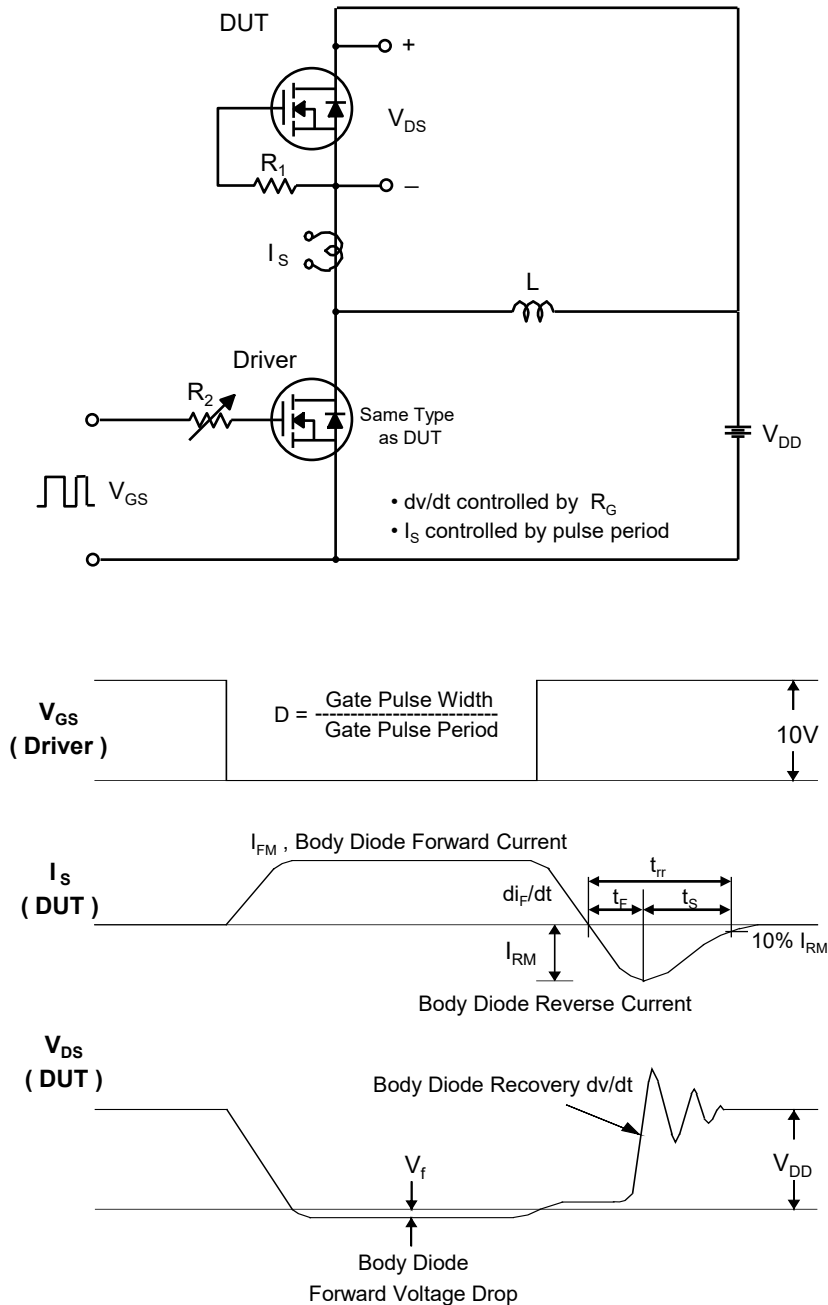


Fig 3. Unclamped Inductive Switching Test Circuit & Waveforms



•Test circuits&Waveforms(cont.)

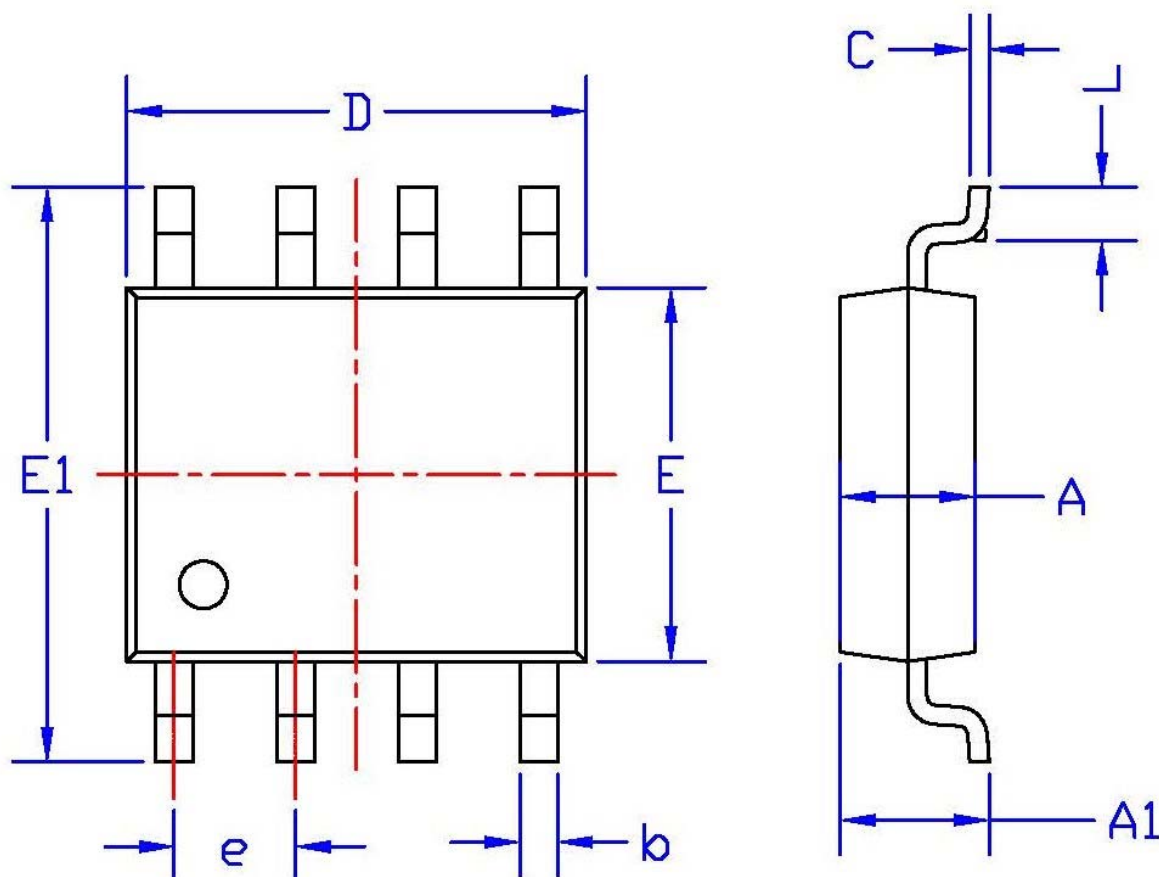
Fig 4. Peak Diode Recovery dv/dt Test Circuit & Waveforms



●Dimensions (SOP-8)

UNIT:mm

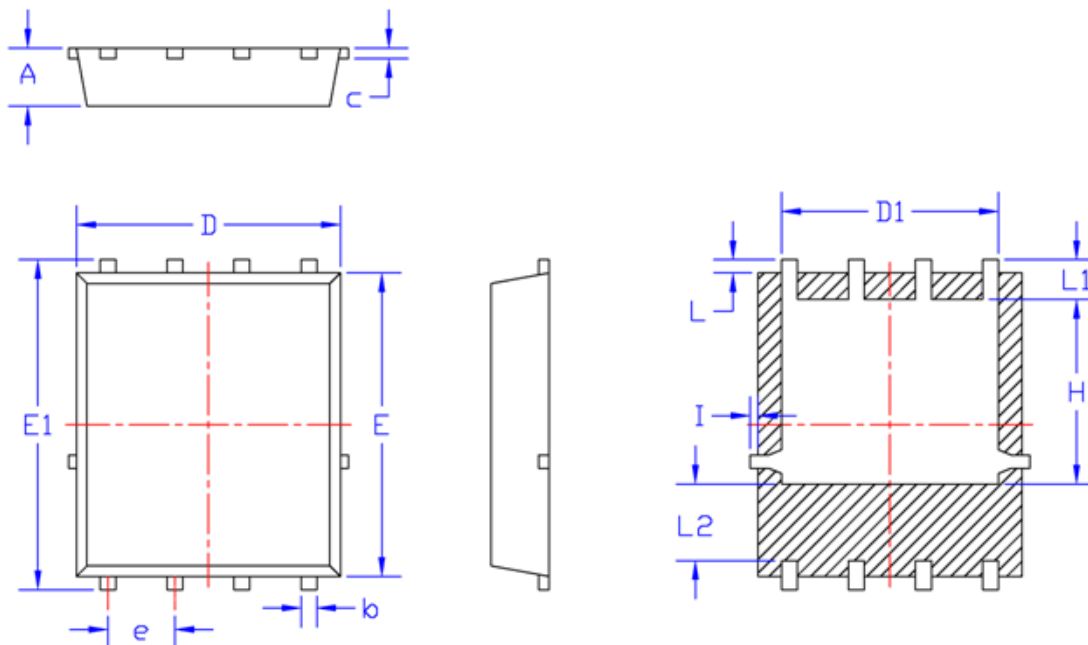
SYMBOL	min	max	SYMBOL	min	max
A	1.30	1.60	e	1.27BSC	
A1	1.35	1.85	L	0.40	1.30
b	0.30	0.60			
C	0.15	0.35			
D	4.60	5.20			
E	3.70	4.10			
E1	5.70	6.30			



• **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			



650V Super-Junction MOSFET
● Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (T_{smin}) Temperature max (T_{smax}) Time (T_{smin} to T_{smax}) (t_s)	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L) Time at liquidous (t_L)	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body Temperature (T_p)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (t_p)** within 5°C of the specified classification temperature (T_c)	20** seconds	30** seconds
Average ramp-down rate (T_p to T_{smax})	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
* Tolerance for peak profile Temperature (T_p) is defined as a supplier minimum and a user maximum. ** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.		

Table 1. SnPb Eutectic Process – Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2. Pb-free Process – Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
≥2.5 mm	250 °C	245 °C	245 °C

Reliability Test Program

Test Item	Method	Description
Solder ability	JESD-22, B012	5 SEC., 245°C
HOLT	JESD-22, A108	1000 HRs, Bias@125°C
PCT	JESD-22, A102	168 HRs, 100% RH, 2ATM, 121°C
TCT	JESD-22, A104	500 Cycles, -65 ~ 150°C