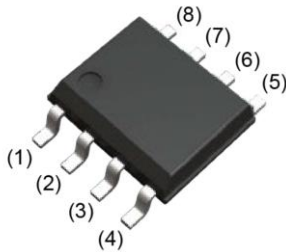


**Description**
**40V N-CHANNEL ENHANCEMENT MODE POWER MOSFET**
**Features**

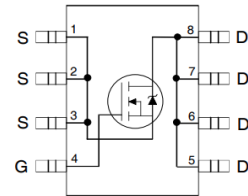
- Device Rating  $V_{DS} = 40V$ ,  $I_D = 14A$
- $R_{DS(ON)} = 5.7m\Omega$  (typ.) @  $V_{GS} = 10V$ ,  $I_D = 8A$
- $R_{DS(ON)} = 8.8m\Omega$  (typ.) @  $V_{GS} = 4.5V$ ,  $I_D = 6A$
- Proprietary High Density Trench Technology
- RoHS Compliant & Halogen-Free

**Application**

- Battery management system and Power management

**Package**


**SOP8**  
**JFG14N40G**


**Absolute Maximum Ratings**  $T_C = 25^\circ C$  unless otherwise specified

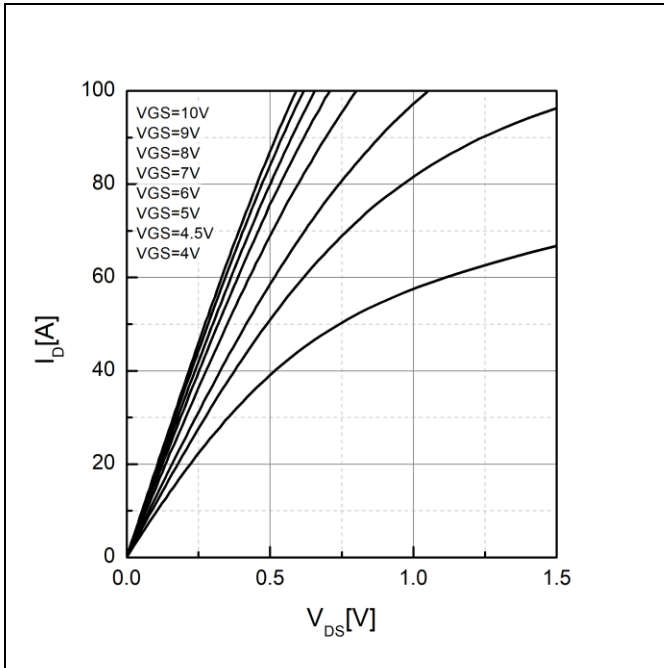
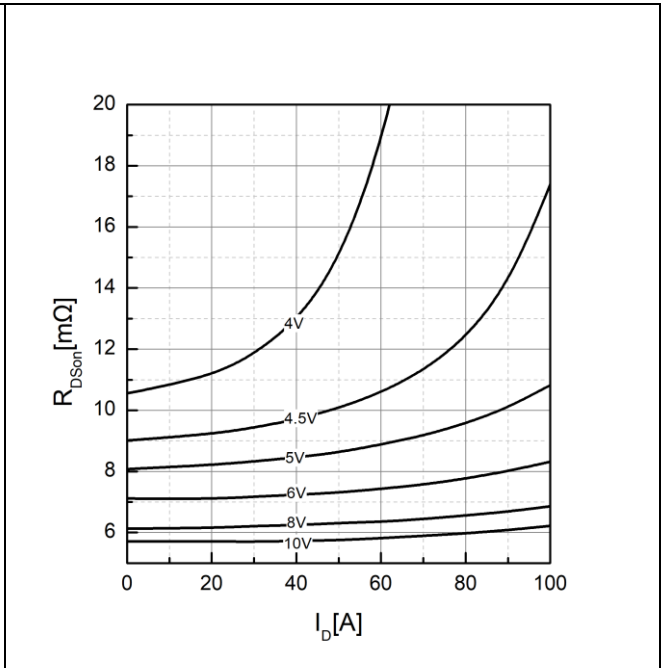
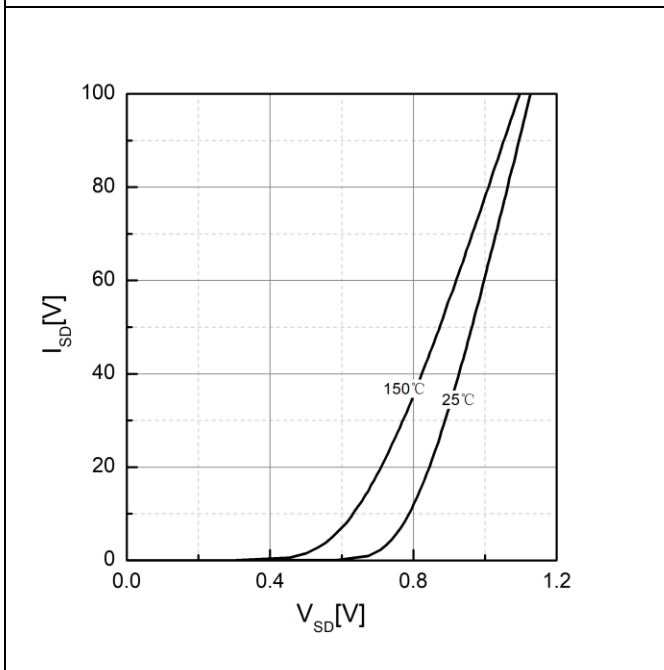
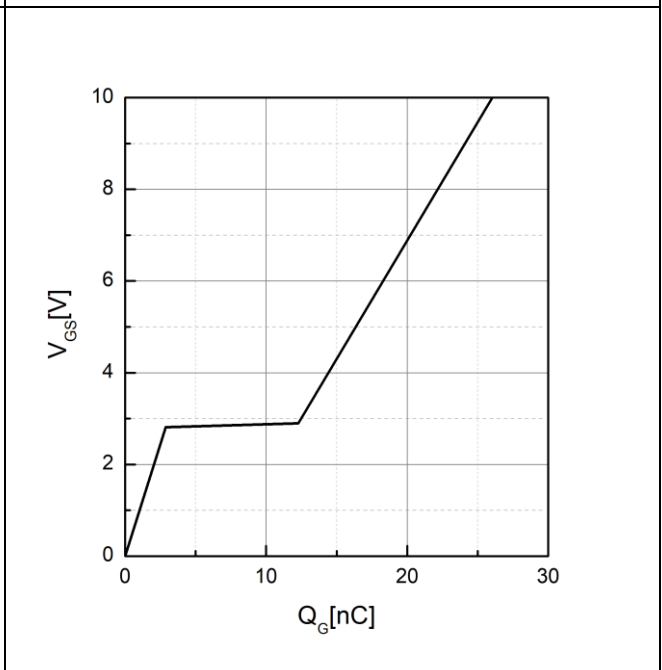
Symbol	Parameter	Max.	Units	
$V_{DS}$	Drain-Source Voltage	40	V	
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V	
$I_D$	Continuous Drain Current, $V_{GS} @ 10V$ <sup>note1</sup>	$T_A = 25^\circ C$	14	A
		$T_A = 70^\circ C$	11	A
$I_{DM}$	Pulsed Drain Current <sup>note2</sup>	115	A	
$P_D$	Power Dissipation <sup>note4</sup>	$T_A = 25^\circ C$	2.15	W
	Power Dissipation	$T_A = 70^\circ C$	1.37	W
$E_{AS}$	Single Pulsed Avalanche Energy <sup>note3</sup>	39	mJ	
$R_{\theta JL}$	Thermal Resistance, Junction to Lead <sup>note1</sup>	20	$^\circ C/W$	
$R_{\theta JA}$	Junction to Ambient (mounted on 1 inch square PCB)	58	$^\circ C/W$	
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ C$	

**Electrical Characteristics**  $T_C=25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	40	-	-	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS} = 40V, V_{GS} = 0V, T_C = 25^{\circ}\text{C}$	-	-	1	$\mu A$
		$V_{DS} = 40V, V_{GS} = 0V, T_C = 55^{\circ}\text{C}$	-	-	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-100	-	100	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	-	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance <small>note2</small>	$V_{GS} = 10V, I_D = 8A$	-	5.7	6.9	m $\Omega$
		$V_{GS} = 4.5V, I_D = 6A$	-	8.8	10.6	m $\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 10V, I_D = 8A$		46	-	S
<b>Dynamic Characteristics</b>						
$R_g$	Gate Resistance		-	1.68	-	$\Omega$
$C_{iss}$	Input Capacitance	$V_{DS} = 20V, V_{GS} = 0V,$ $f = 1\text{MHz}$	-	1070	-	pF
$C_{oss}$	Output Capacitance		-	190	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	182	-	pF
$Q_g$	Total Gate Charge	$V_{DS} = 20V, I_D = 8A,$ $V_{GS} = 10V$	-	26	-	nC
$Q_{gs}$	Gate-Source Charge		-	2.87	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	9.40	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 20V, I_D = 8A,$ $R_G = 1\Omega, V_{GS} = 10V$	-	14	-	ns
$t_r$	Turn-On Rise Time		-	36	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	40	-	ns
$t_f$	Turn-Off Fall Time		-	28	-	ns
<b>Source-Drain Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Diode Forward Current <small>note1,5</small>		-	-	1.79	A
$I_{SM}$	Maximum Pulsed Diode Forward Current <small>note2,5</small>		-	-	115	A
$t_{rr}$	Reverse Recovery Time	$T_J = 25^{\circ}\text{C}, I_S = 8A, V_{GS} = 0V$	-	32	-	ns
$Q_{rr}$	Reverse Recovery Charge	$T_J = 25^{\circ}\text{C}, I_S = 8A,$ $di/dt = 100A/\mu s$		30		nC
$V_{SD}$ <small>note2</small>	Source to Drain Diode Forward Voltage	$T_J = 25^{\circ}\text{C}, I_S = 8A, V_{GS} = 0V$	-	0.79	-	V

Note :

- 1.The data tested by surface mounted on one inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- 3.The EAS data shows Max. rating. The test condition is  $L=0.1\text{mH}$ ,  $I_{AS}= 27.9\text{A}$ .
- 4.The power dissipation is limited by  $150^{\circ}\text{C}$  junction temperature.
- 5.The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

**Typical Performance Characteristics**

**Figure 1. Output Characteristics, T<sub>J</sub>=25°C**

**Figure 2. Drain-source on resistance , T<sub>J</sub>=25°C**

**Figure 3. Forward characteristics of body diode**

**Figure 4. Gate Charge Characteristics**

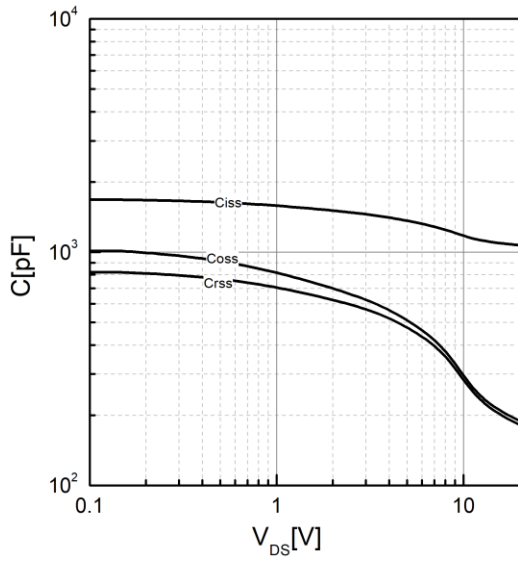


Figure 5. Capacitance Characteristics

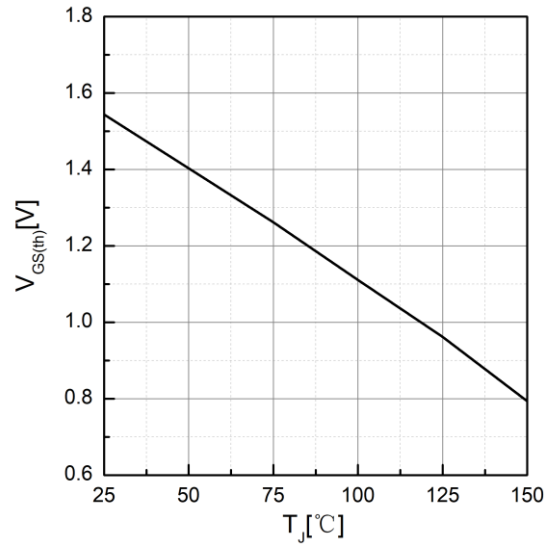


Figure 6. Threshold Voltage Vs. Temperature

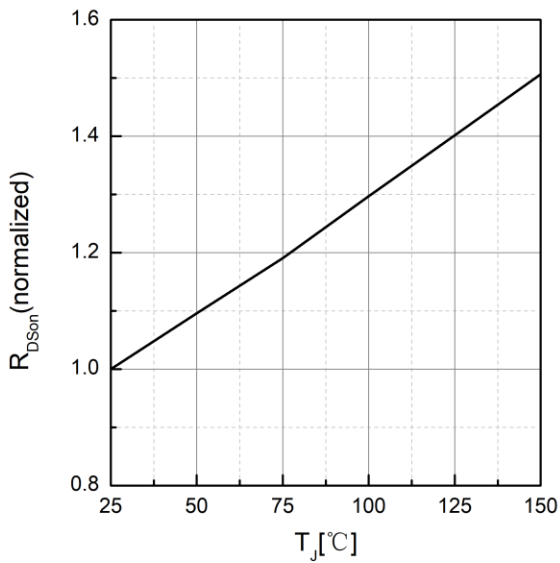


Figure 7. Drain-source on-state resistance

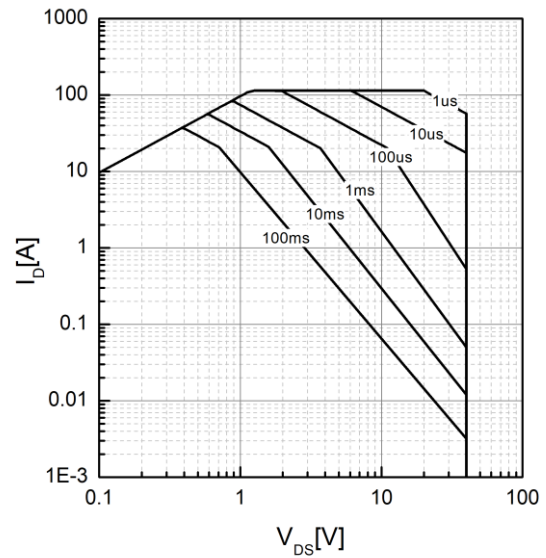
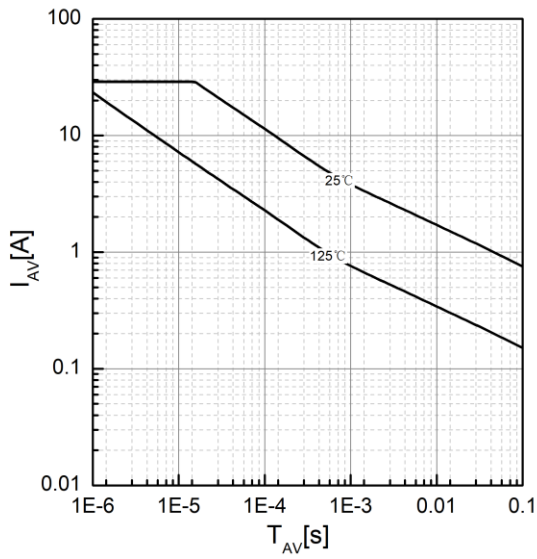
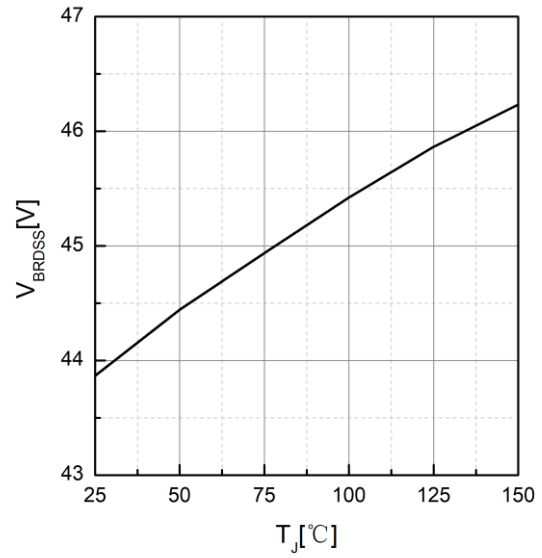
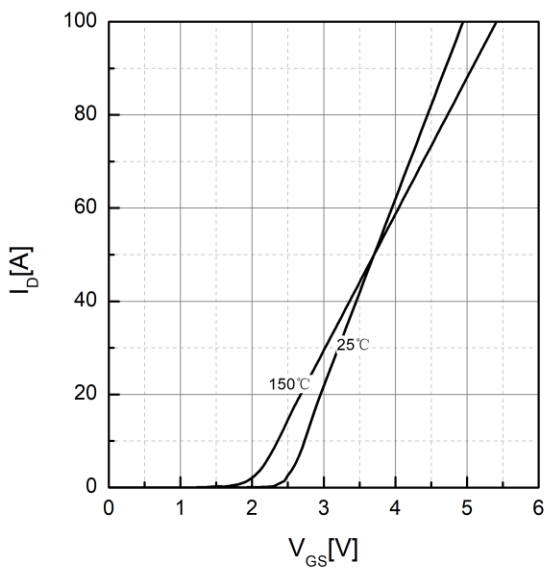
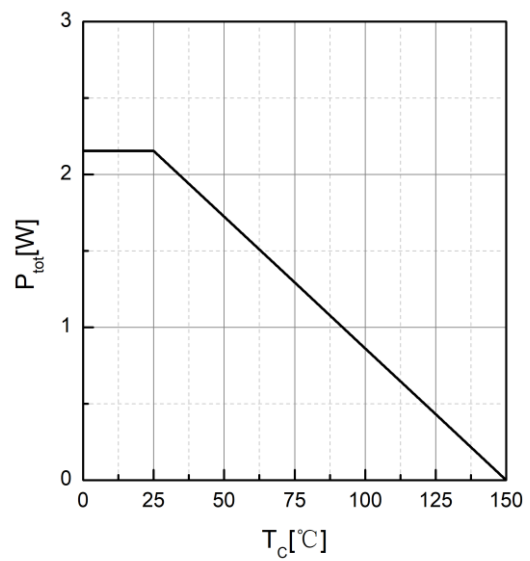


Figure 8. Maximum Safe Operating Area


**Figure 9. Avalanche characteristics**

**Figure 10. Drain-source breakdown voltage**

**Figure 11. Transfer characteristics**

**Figure 12. Power dissipation**

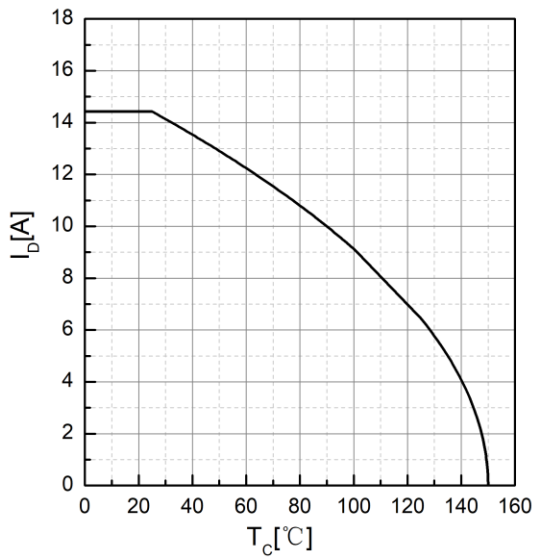


Figure 13. Drain current

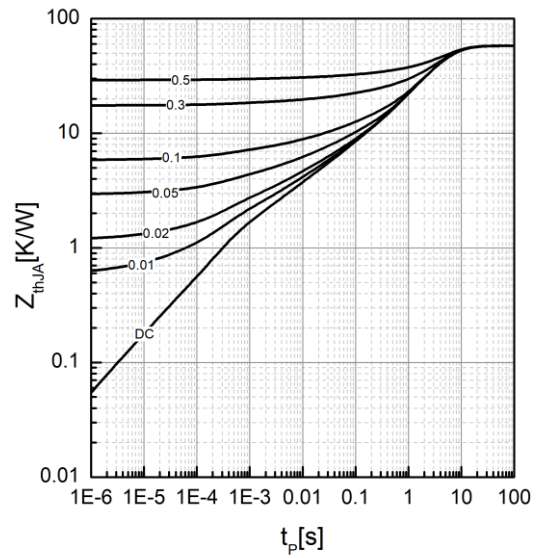


Figure 14. Effective Transient Thermal Impedance

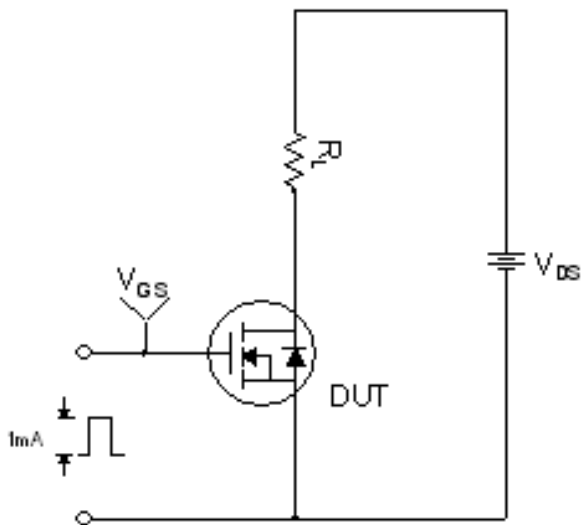


Figure 15. Gate Charge Test Circuit & Waveform

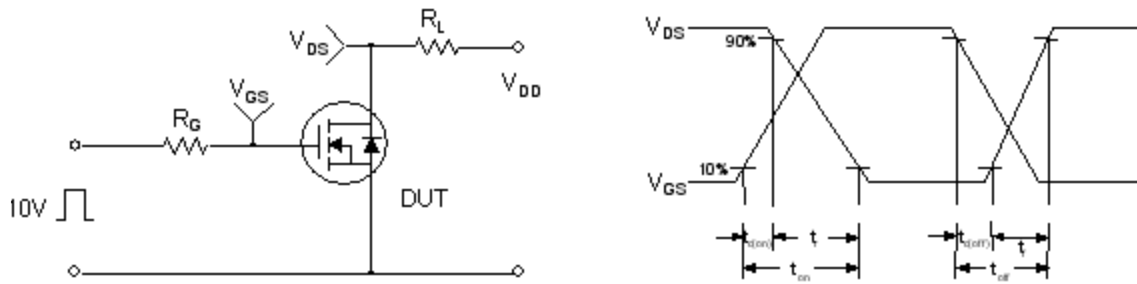


Figure 16. Resistive Switching Test Circuit & Waveforms

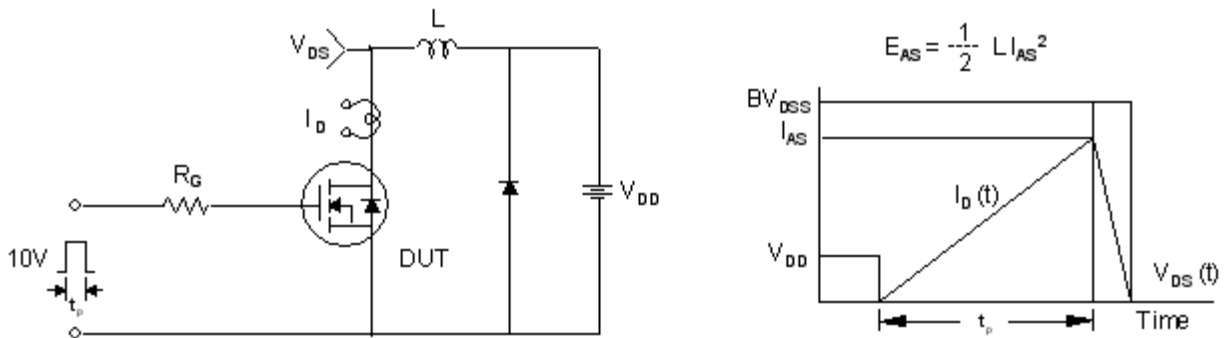
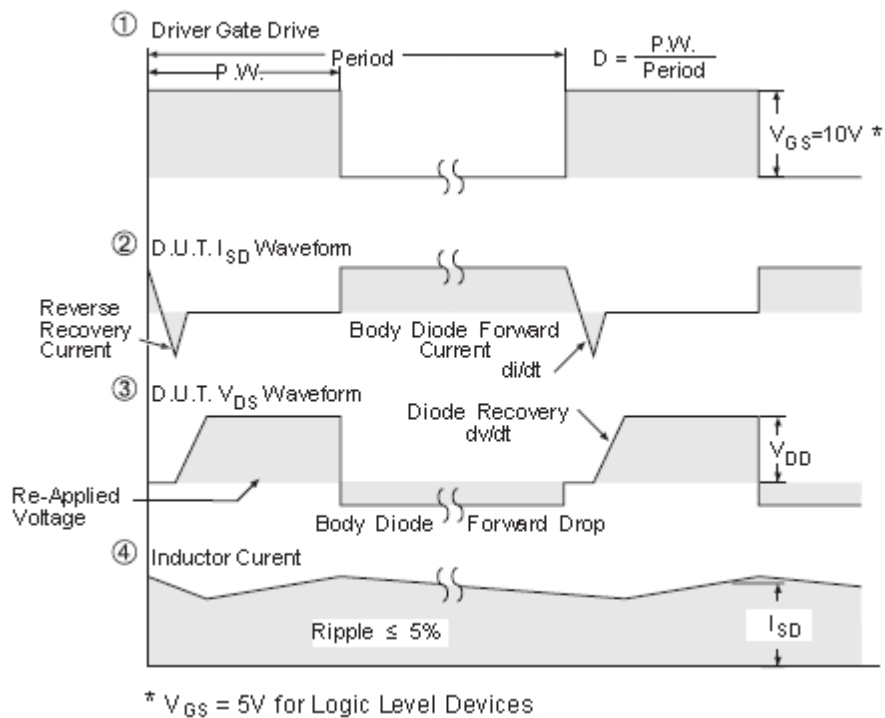
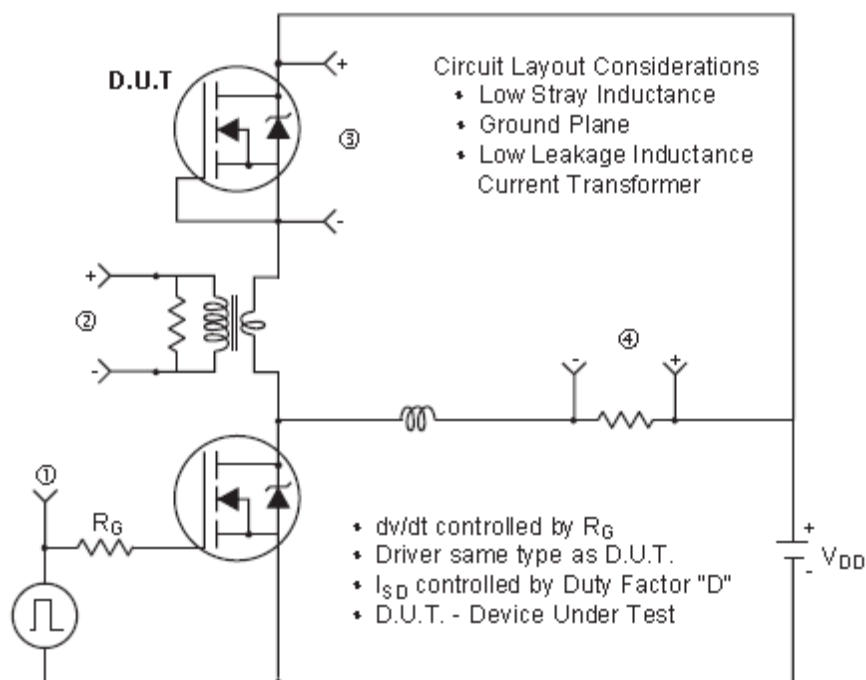
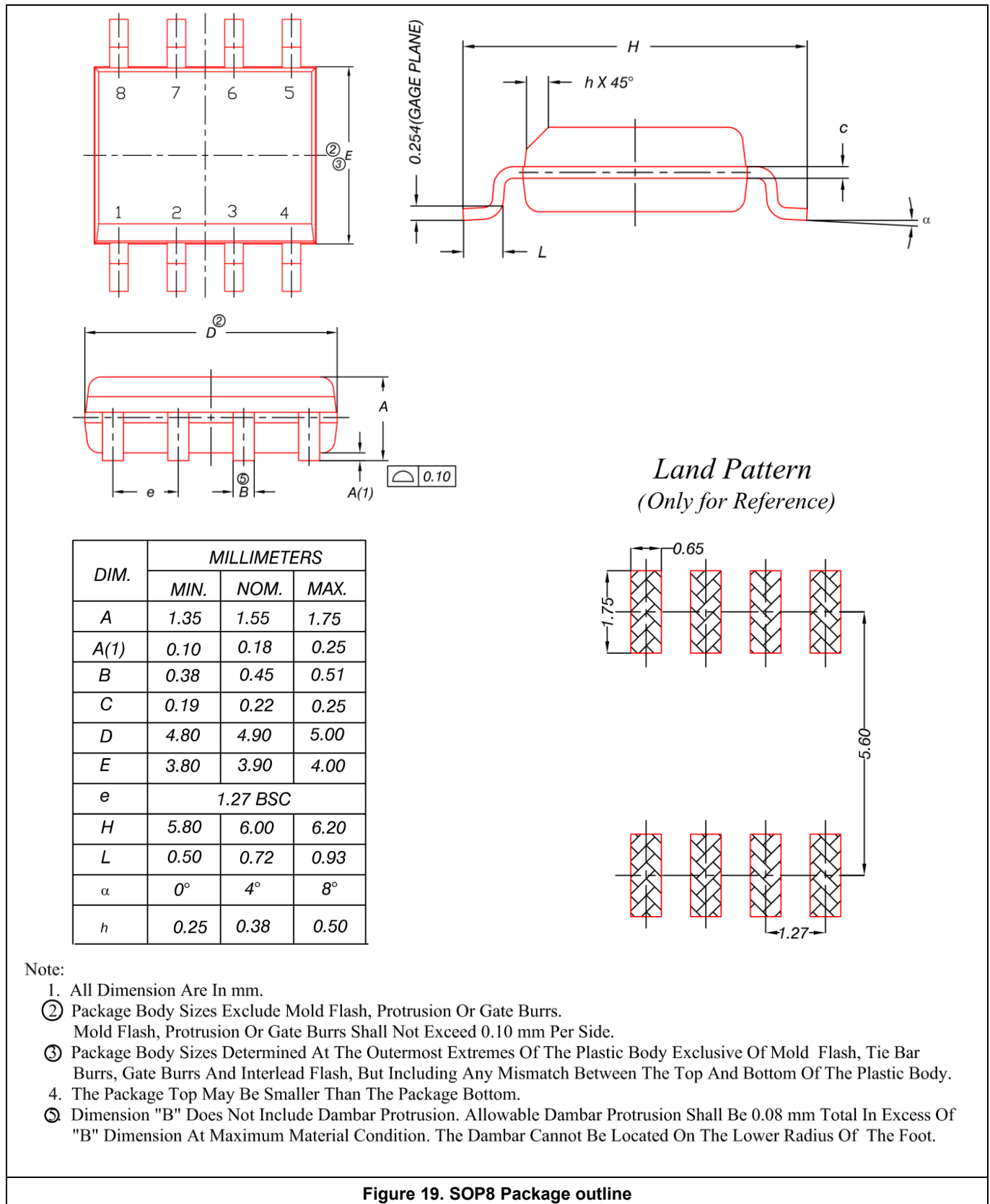


Figure 17. Unclamped Inductive Switching Test Circuit & Waveforms



**Figure 18. Peak Diode Recovery  $dv/dt$  Test Circuit & Waveforms (For N-channel)**



**Package outline**




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