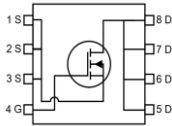
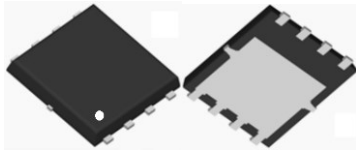




N-channel 30V 1.55mΩ (Typ) Power MOSFET

1 FEATURES

- Optimized for high performance Buck converter
- Ultra-low R_{DS-ON} & FOM ($R_{on} \times Q_g$)
- Superior thermal resistance
- Fast switching on/off
- 100% avalanche tested

**PDFN3.3*3.3-8L**

2 APPLICATIONS

- Low voltage DCDC converter
- Switching voltage regulators
- Battery charger
- Motor driver

3 ORDERING INFORMATION

TYPE	MARKING	PACKAGE
GBS032R4PMBR	032R4	PDFN3.3*3.3

4 DISCRIPTION

The 30V low voltage SGT MOSFET achieves ultra-low ON-resistance and gate charge. Thanks to excellent balance between switching performance and conduction performance, the GBS032R4PMBR provides very high efficiency in both hard switching and soft switching topology. The GBS032R4PMBR is available in PDFN3.3*3.3 package.

5 KEY PERFORMANCE PARAMETERS

PARAMETER	VALUE	UNIT
V_{DS}	30	V
$R_{DS-ON} \max @V_{gs}=10V$	1.85	mΩ
$R_{DS-ON} \max @V_{gs}=4.5V$	2.8	mΩ
Q_g (Typ) @ $V_{gs}=4.5V$	18	nC
I_D	168	A
$Q_{oss}@15V$	32	nC



6 SPECIFICATIONS

6.1 ABSOLUTE MAXIMUM RATINGS

$T_J=25^{\circ}\text{C}$ operating free-air temperature unless otherwise noted

SYMBOL	PARAMETER	TEST CONDITION	VALUE	UNIT
V_{DS}	Drain-source voltage		30	V
I_D	Continuous drain current	$T_C=25^{\circ}\text{C}$	168	A
		$T_C=100^{\circ}\text{C}$	106	
$I_{D\text{-pulse}}$	Pulsed drain current		670	A
V_{GS}	Gate-source voltage		± 20	V
E_{AS}	Single pulsed avalanche energy	$I_D=10\text{A}$, $V_{DD}=24\text{V}$, $L=1\text{mH}$	130	mJ
I_{AS}	Single pulsed avalanche current		10	A
P_D	Power dissipation		83	W
T_J , T_{stg}	Operating and Storage temperature		$-55 \sim 150$	$^{\circ}\text{C}$

6.2 THERMAL INFORMATION

SYMBOL	PARAMETER	VALUE	UNIT
$R_{\theta JC \text{ max.}}$	Max. Thermal resistance, junction - case	1.5	$^{\circ}\text{C/W}$
$R_{\theta JA \text{ max.}}$	Max. Thermal resistance, junction - ambient	50	$^{\circ}\text{C/W}$

6.3 ELECTRICAL CHARACTERISTICS

$T_J=25^{\circ}\text{C}$ operating free-air temperature unless otherwise noted

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT
STATIC CHARACTERISTICS						
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS}=0\text{V}$, $I_D=1\text{mA}$	30			V
		$V_{GS}=0\text{V}$, $I_D=10\text{mA}$, $T_J=150^{\circ}\text{C}$	35			
$V_{(GS)th}$	Gate threshold voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.1		1.9	V
$R_{DS\text{-ON}}$	Drain-source on state resistance	$V_{GS}=10\text{V}$, $I_D=20\text{A}$		1.55	1.85	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=20\text{A}$		2.4	2.8	
R_g	Gate resistance	$f=1\text{MHz}$, open drain	0.6	0.8	1.7	Ω



SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT
I _{GSS}	Gate-source leakage current	V _{GS} =20V, V _{DS} =0V			100	nA
I _{DSS}	Drain-source leakage current	V _{GS} =0V, V _{DS} =30V			1	μA
		V _{GS} =0V, V _{DS} =30V, T _j =125°C			100	
DYNAMIC CHARACTERISTICS						
C _{iss}	Input capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		2100		pF
C _{oss}	Output capacitance			1200		pF
C _{rss}	Reverse transfer capacitance			100		pF
t _{d(on)}	Turn-on delay time	V _{GS} =10V, V _{DS} =15V, I _D =30A, R _G =1.6Ω		4.8		ns
t _r	Rise time			3.3		ns
t _{d(off)}	Turn-off delay time			13.9		ns
t _f	Fall time			3.3		ns
GATE CHARGE CHARACTERISTICS						
Q _g	Gate charge total	V _{DS} =15V, I _D =30A V _{GS} =0~10V		36	50	nC
Q _g	Gate charge total	V _{DS} =15V, I _D =30A V _{GS} =0~4.5V		18	25	nC
Q _{gd}	Gate to drain charge			6.4	9.5	nC
Q _{gs}	Gate to source charge			5.0	7	nC
V _{plateau}	Gate plateau voltage			2.9		V
Q _{oss}	Output charge	V _{DS} =15V, V _{GS} =0V		32	44	nC
BODY DIODE CHARACTERISTICS						
V _{SD}	Diode forward voltage	V _{GS} =0V, I _F =20A, T _j =25°C		0.8	1	V
t _{rr}	Reverse recovery time	V _{DS} =15V, I _F =20A di _F /dt=300A/μs		33		ns
Q _{rr}	Reverse recovery charge			23.5		nC
I _{rrm}	Peak reverse recovery current			1.42		A



7 Electrical Characteristic Diagram

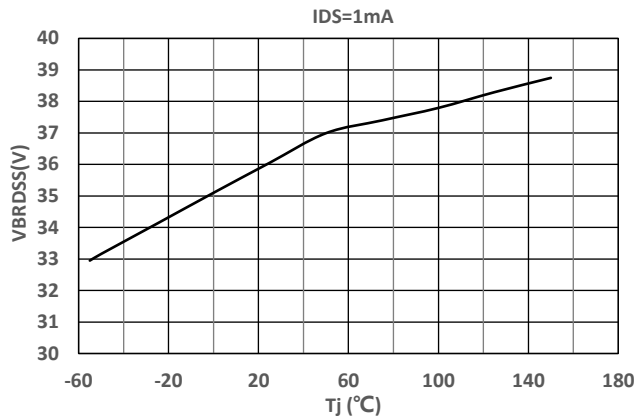


Figure 1. Drain-source Breakdown Voltage

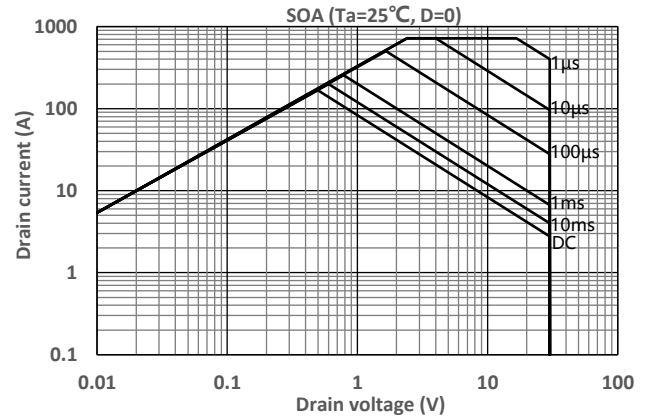


Figure 2. Safe Operating Area

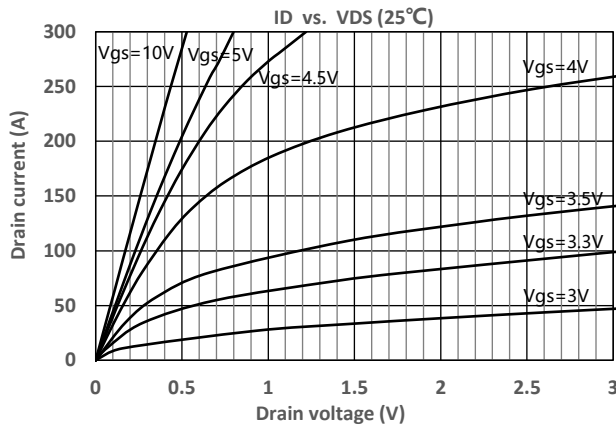


Figure 3. Typ. Output Characteristics

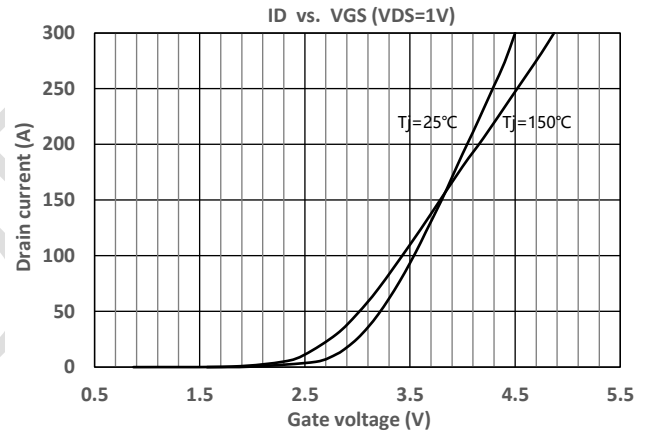


Figure 4. Typ. Transfer Characteristics

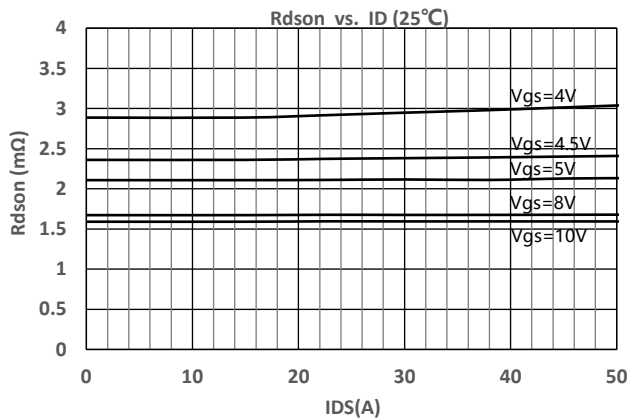


Figure 5. Typ. Drain Source On-state Resistance

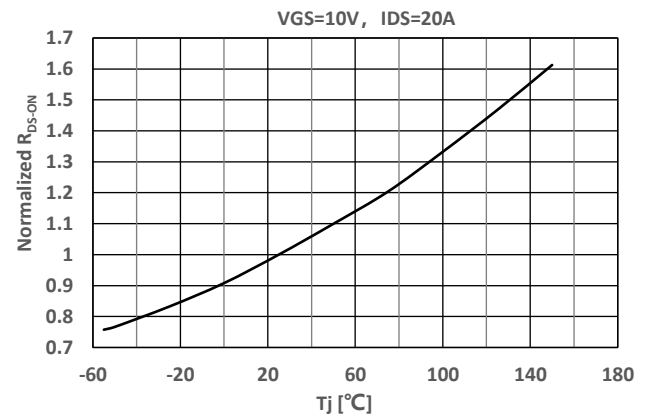


Figure 6. $R_{DS(on)}$ vs. T_j

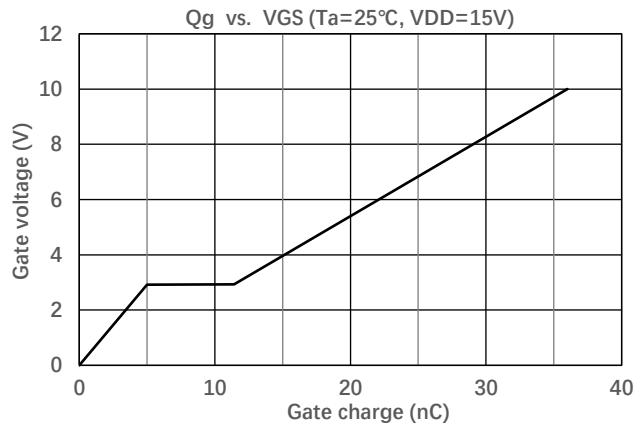


Figure 7. Typ. Gate Charge

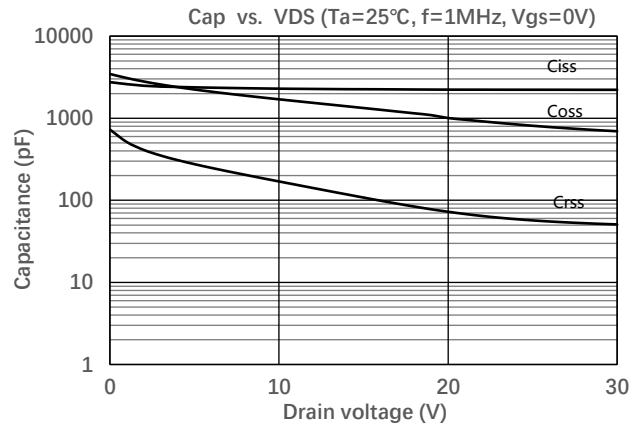


Figure 8. Typ. Capacitance

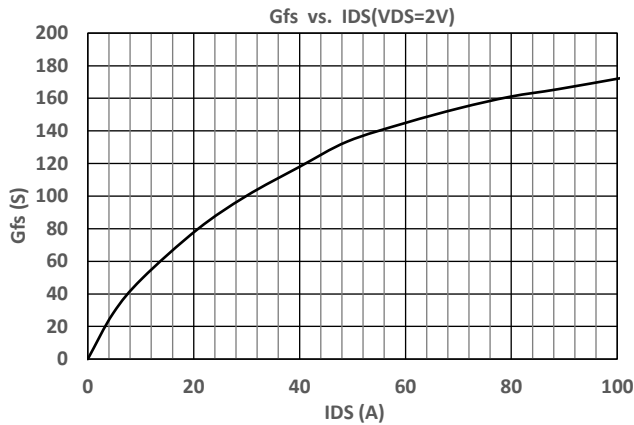


Figure 9. Typ. Forward Transconductance

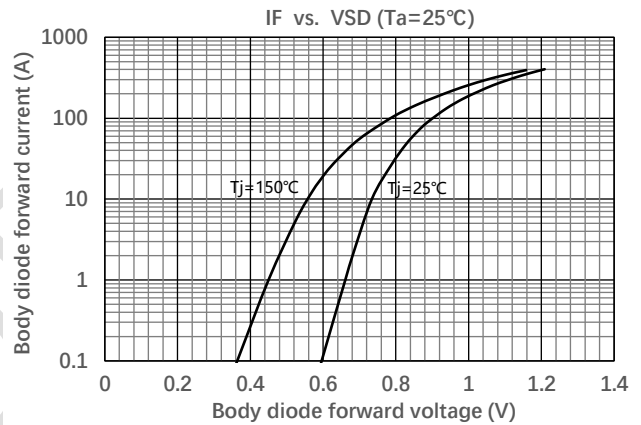


Figure 10. Forward Characteristics Of Body Diode

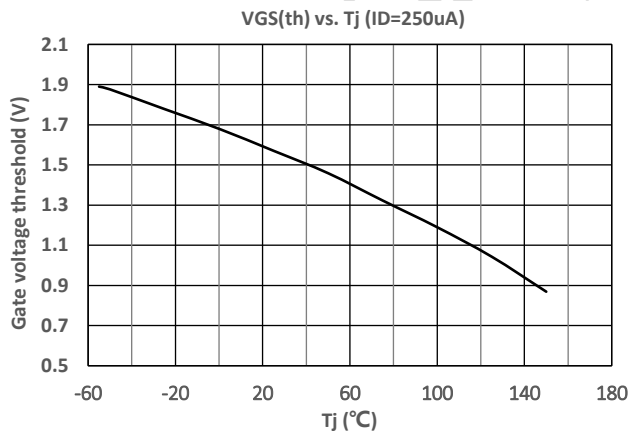


Figure 11. Threshold Voltage vs. Tj

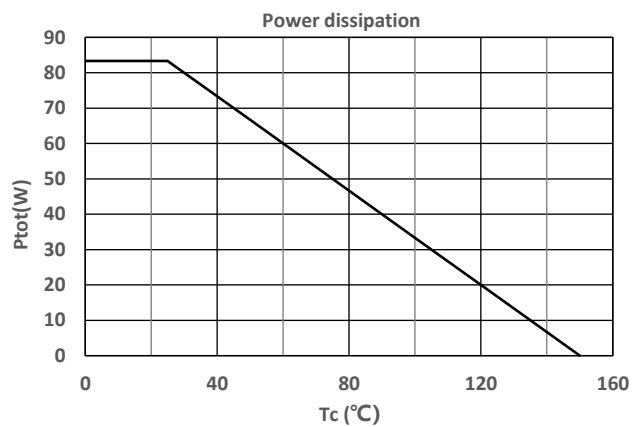


Figure 12. Power Dissipation

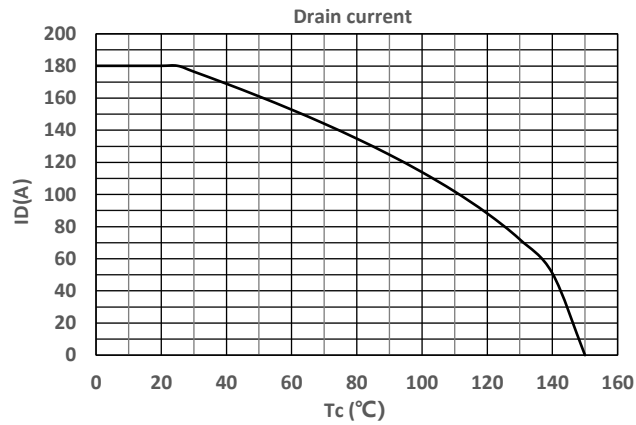


Figure 13. Drain Current

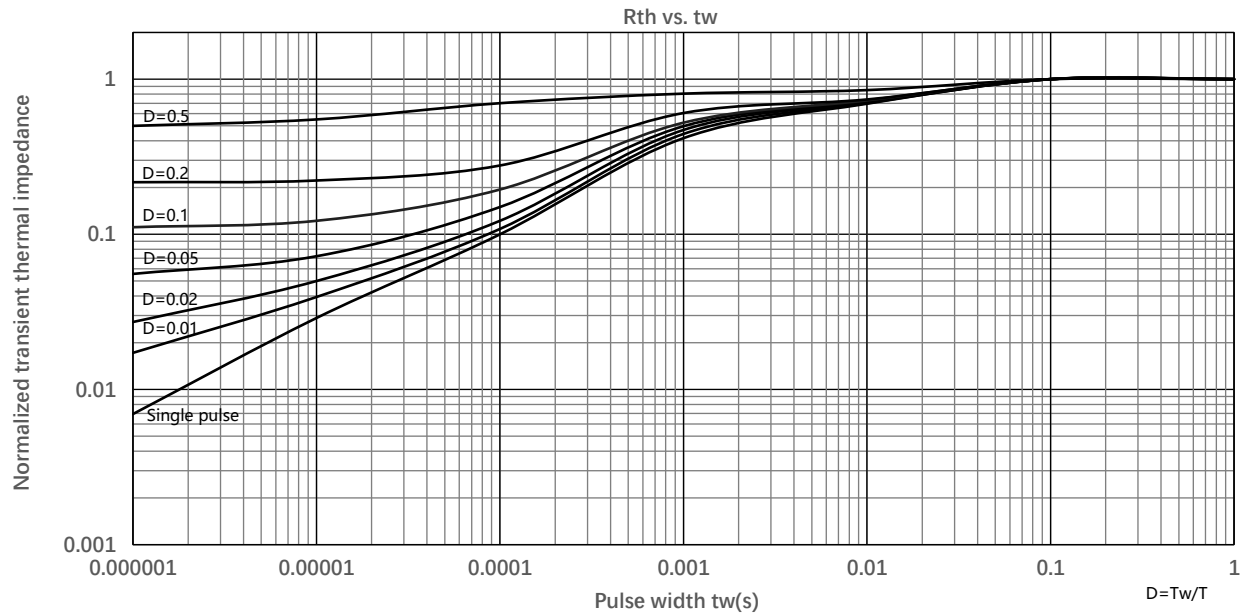


Figure 14. Max Transient Thermal Impedance



8 Test Circuit

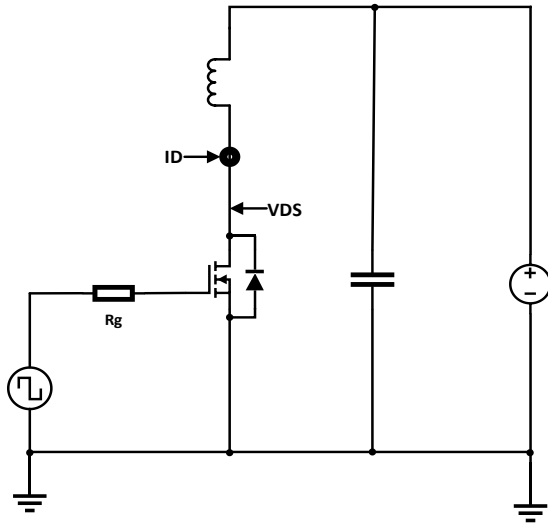
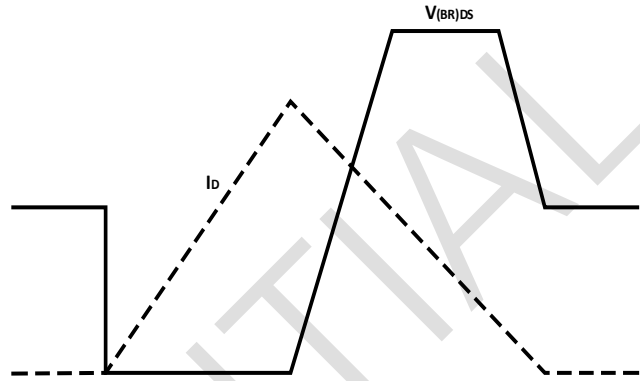


Figure 15. Unclamped inductive switching test circuit



Waveform 1. Unclamped inductive switching waveform

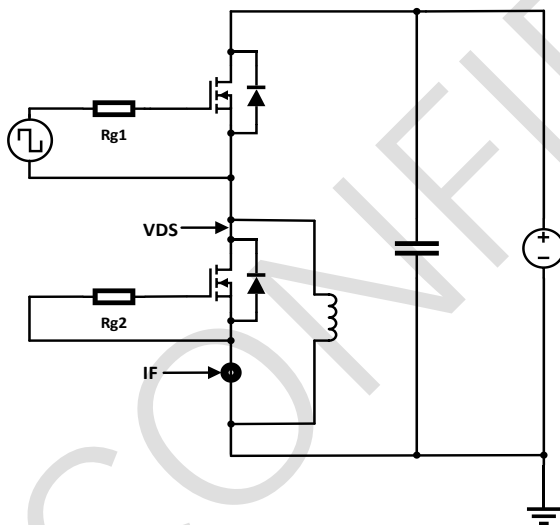
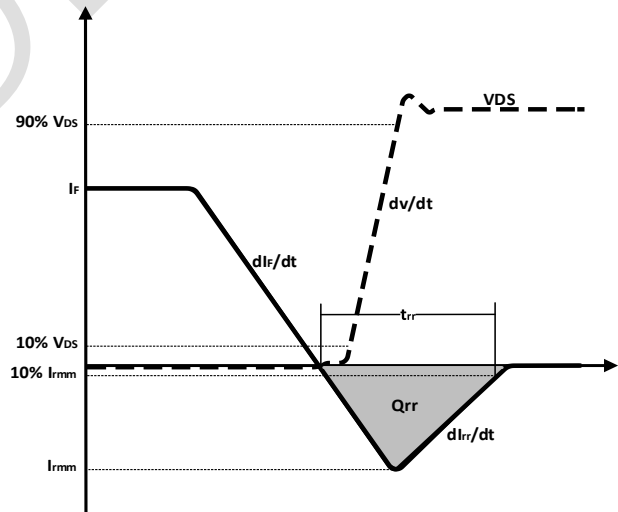


Figure 16. Body diode characteristics test circuit



Waveform 2. Body diode characteristics waveform

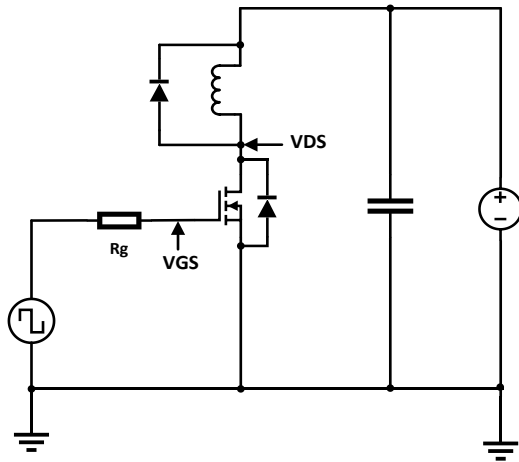
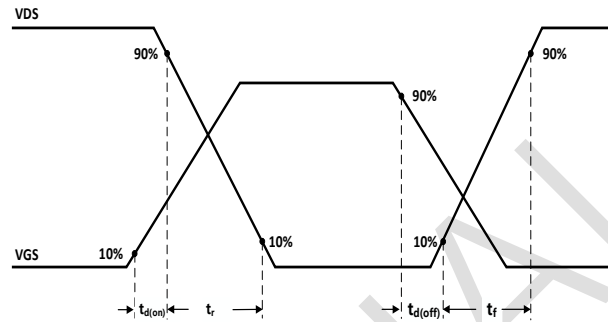
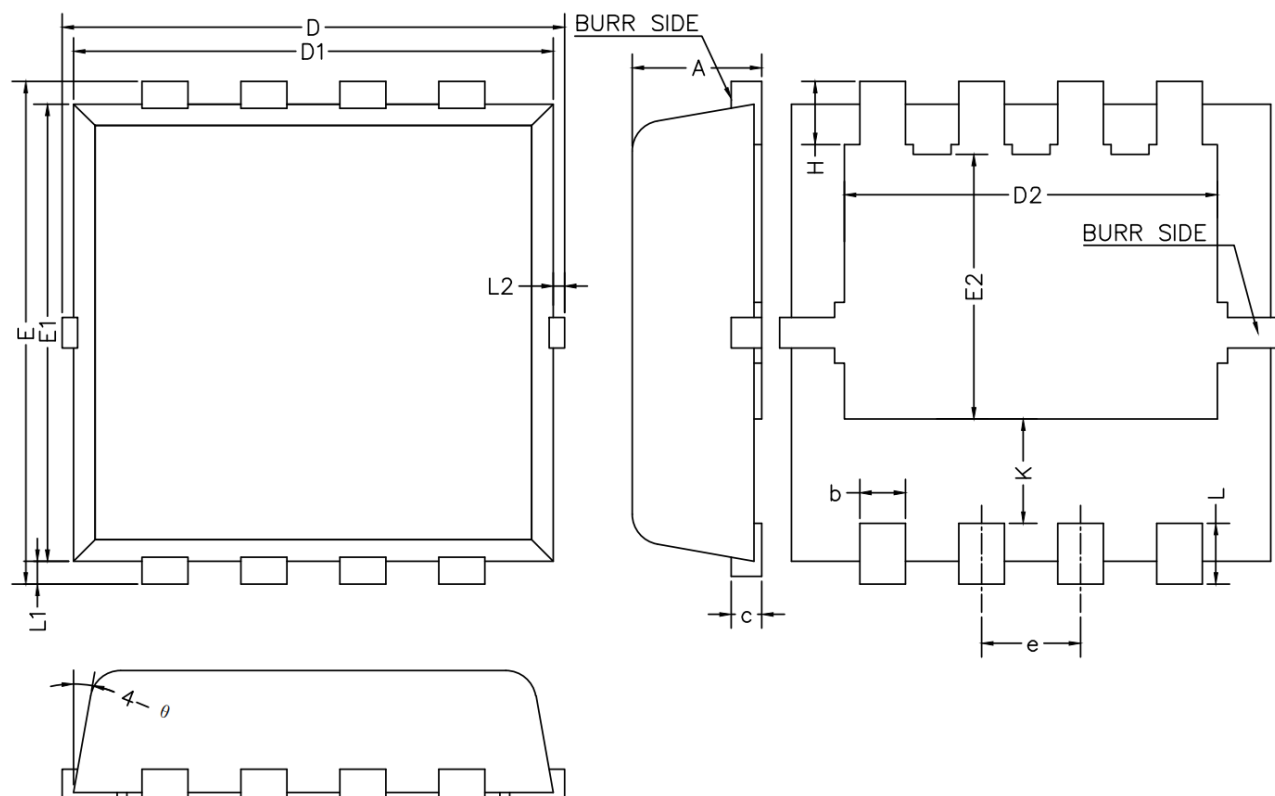


Figure 17. Switching time test circuit



Waveform 3. Switching time waveform

**PACKAGE INFORMATION**

SYMBOL	mm		
	MIN	NOM	MAX
A	0.70	0.80	0.90
b	0.25	0.30	0.35
c	0.14	0.15	0.20
D	3.10	3.30	3.50
D1	3.05	3.15	3.25
D2	2.35	2.45	2.55
e	0.55	0.65	0.75
E	3.10	3.30	3.50
E1	2.90	3.00	3.10
E2	1.64	1.74	1.84
H	0.32	0.42	0.52
K	0.59	0.69	0.79
L	0.25	0.40	0.55
L1	0.10	0.15	0.20
L2	-	-	0.15
θ	8°	10°	12°