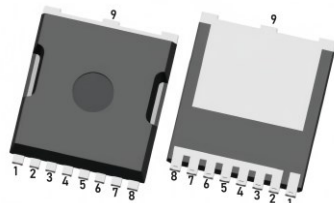
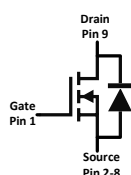


N-channel 30V 1.05mΩ (Typ) Power MOSFET

1. FEATURES

- 30V break down voltage
- Ultra-low R_{DS-ON}
- Ultra-low R_{DS-ON} at high T_j
- Reliable and Rugged


TOLL-8

2. APPLICATIONS

- Battery charger
- BMS
- Switching voltage regulators
- Motor driver

3. ORDERING INFORMATION

TYPE	MARKING	PACKAGE
GBS030R8TLAR	030R8	TOLL-8

4. DISCRIPTION

The 30V low voltage SGT MOSFET achieves ultra-low ON-resistance making the device be suitable for battery application.

Thanks to excellent balance between switching performance and conduction performance, the GBS030R8T provides very high efficiency in both hard switching and soft switching topology. The GBS030R8T is available in TOLL package.

5. KEY PERFORMANCE PARAMETERS

PARAMETER	VALUE	UNIT
V_{DS}	30	V
R_{DS-ON} typ @ $V_{gs}=10V$, $T_j=25^{\circ}C$	1.05	mΩ
R_{DS-ON} max @ $V_{gs}=10V$, $T_j=25^{\circ}C$	1.25	mΩ
R_{DS-ON} typ @ $V_{gs}=10V$, $T_j=125^{\circ}C$	1.50	mΩ
Q_g (Typ@10V)	72	nC
$I_{D-pulse}$	800	A



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	$T_C=25^{\circ}\text{C}$	200	A
		$T_C=100^{\circ}\text{C}$	130	
$I_{D\text{-pulse}}$	Pulsed drain current		800	A
V_{GS}	Gate-source voltage		± 20	V
E_{AS}	Single pulsed avalanche energy	$I_D=14\text{A}$, $V_{DD}=24\text{V}$	250	mJ
I_{AS}	Single pulsed avalanche current		14	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	$^{\circ}\text{C/W}$
T_{sold}	Soldering temperature	260	$^{\circ}\text{C}$

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
$V_{(GS)th}$	Gate threshold voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.0	1.5	2.0	V
R_{DS-ON}	Drain-source on state resistance	$V_{GS}=10\text{V}$, $I_D=20\text{A}$		1.05	1.25	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=20\text{A}$		2.15	2.55	
R_g	Gate resistance	$f=1\text{MHz}$, open drain		1.9		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		4300		pF
C _{oss}	Output capacitance	V _{DS} =15V, f=1MHz		1900		pF
C _{rss}	Reverse transfer capacitance			150		pF
t _{d(on)}	Turn-on delay time	V _{GS} =10V, V _{DS} =15V, I _D =30A, R _G =1.6Ω		11		ns
t _r	Rise time			12		ns
t _{d(off)}	Turn-off delay time			30		ns
t _f	Fall time			14		ns
GATE CHARGE CHARACTERISTICS						
Q _g	Gate charge total	V _{DS} =15V, I _D =30A V _{GS} =0~10V		72		nC
Q _{gd}	Gate to drain charge			19		nC
Q _{gs}	Gate to source charge			10		nC
V _{plateau}	Gate plateau voltage			3.8		V
Q _{g_4.5V}	Gate charge total	V _{DS} =15V, I _D =30A V _{GS} =0~4.5V		39		nC
BODY DIODE CHARACTERISTICS						
V _{SD}	Diode forward voltage	V _{GS} =0V, I _F =30A, T _j =25°C		0.85	1.2	V
t _{rr}	Reverse recovery time	V _{DS} =15V, I _F =30A		60		ns
Q _{rr}	Reverse recovery charge	di _F /dt=100A/μs		36		nC



7. Electrical Characteristic Diagram

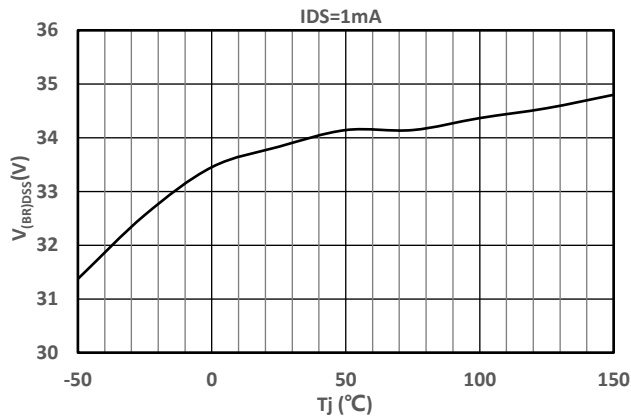


Figure 1. Drain-source Breakdown Voltage

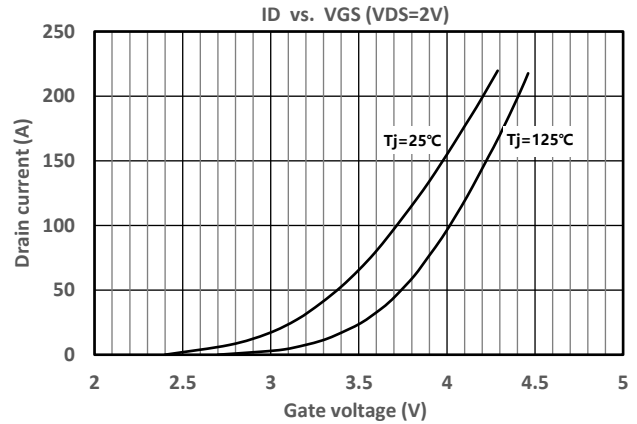


Figure 2. Typ. Transfer Characteristics

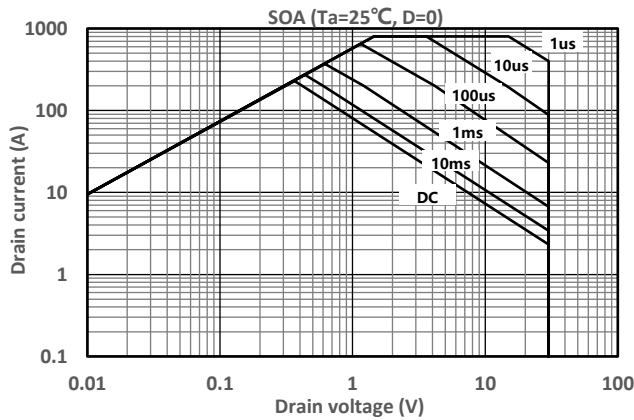


Figure 3. Safety Operating Area

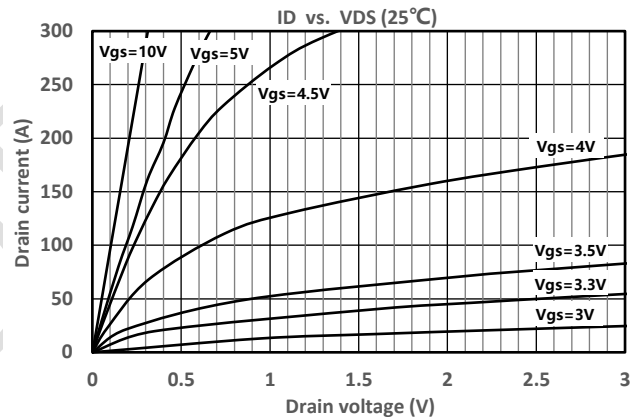


Figure 4. Typ. Output Characteristics

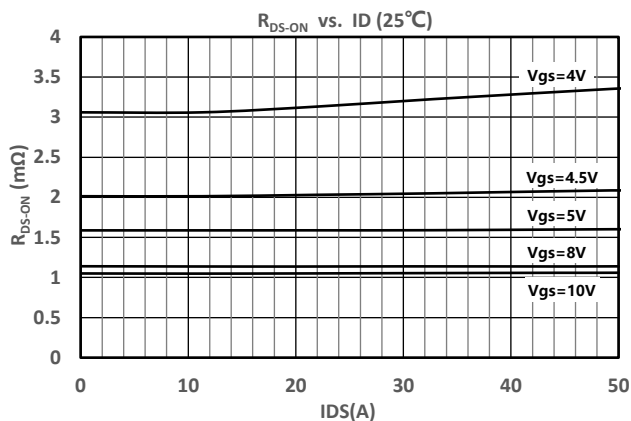


Figure 5. Typ. Drain Source On-state Resistance

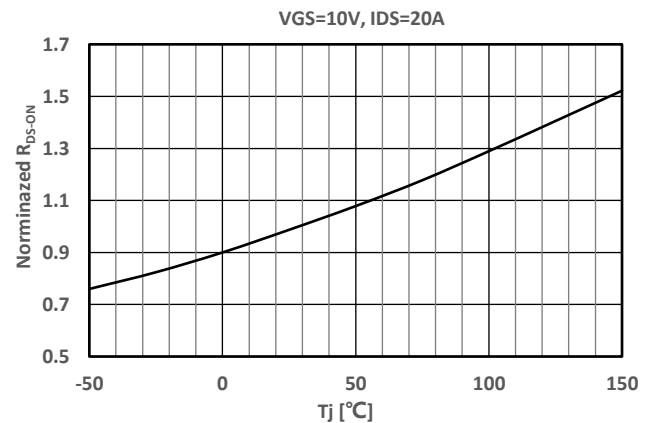


Figure 6. R_{DS-ON} vs. T_j

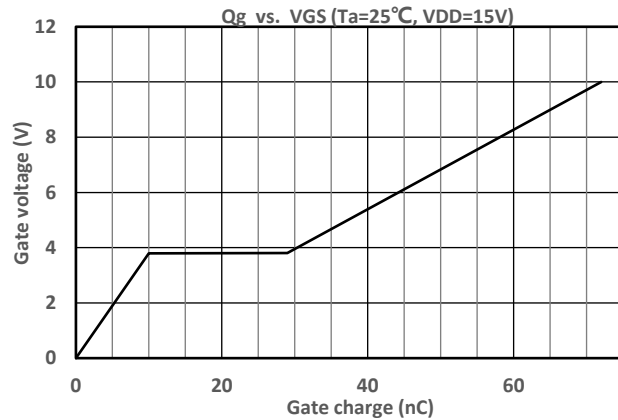


Figure 7. Typ. Gate Charge

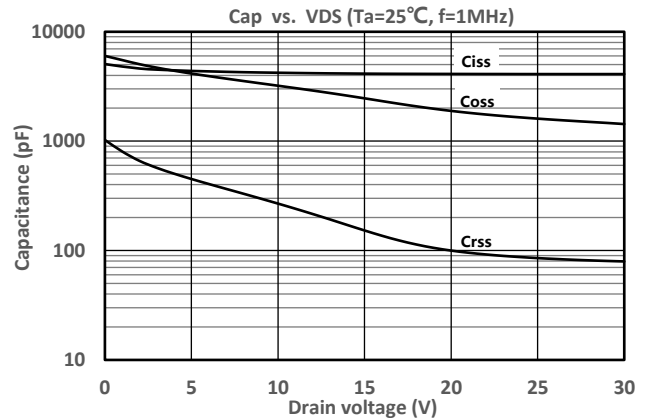


Figure 8. Typ. Capacitance

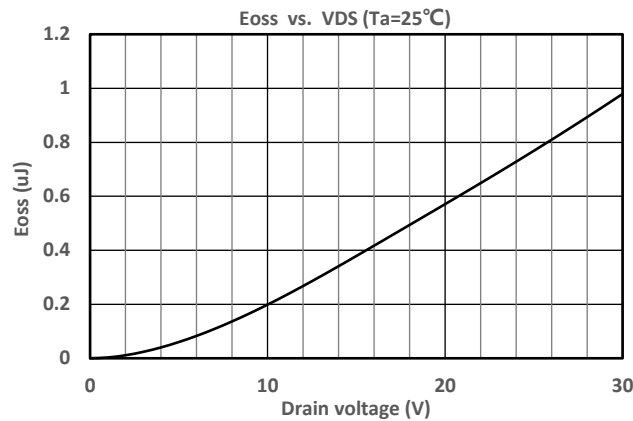


Figure 9. Typ. Coss Stored Energy

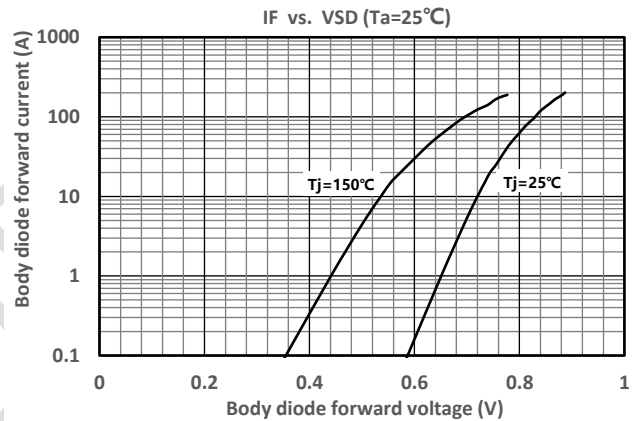


Figure 10. Body diode forward characteristics

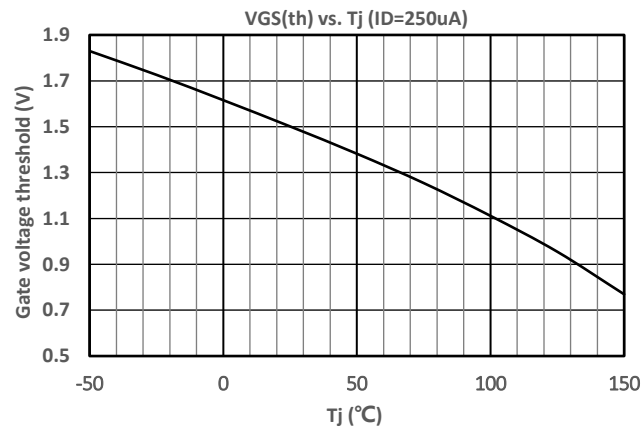


Figure 11. Threshold Voltage vs. Tj

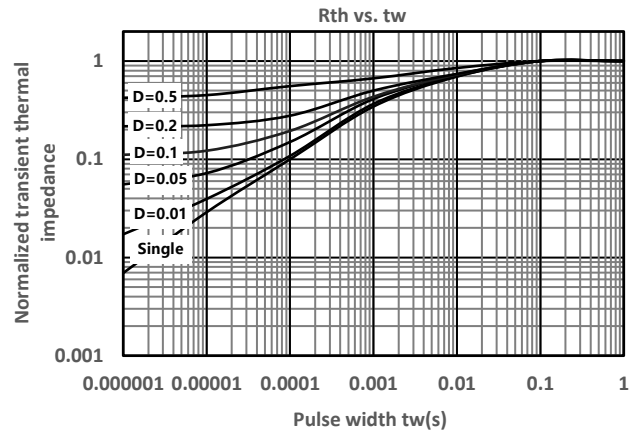


Figure 12. Rth vs. Tw



8. Test Circuit

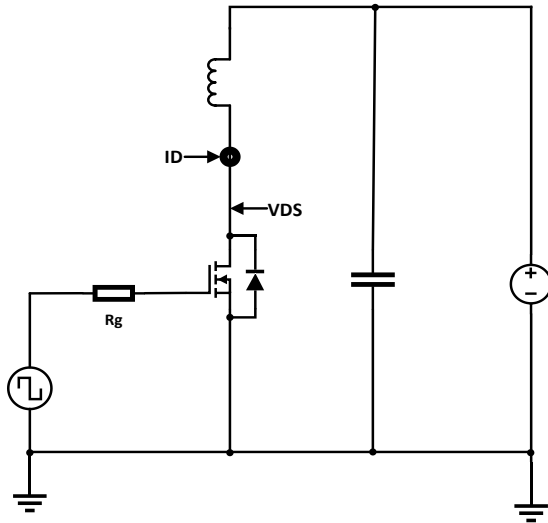
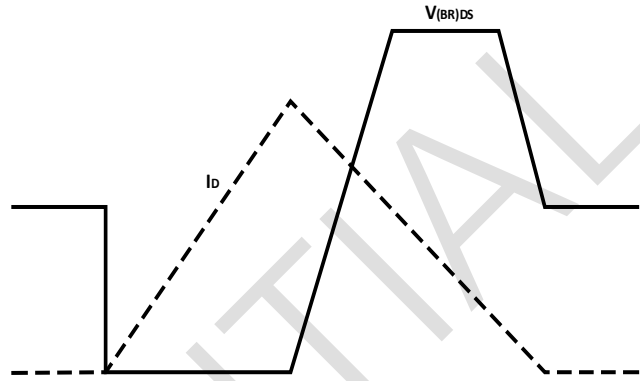


Figure 13. Unclamped inductive switching test circuit



Waveform 1. Unclamped inductive switching waveform

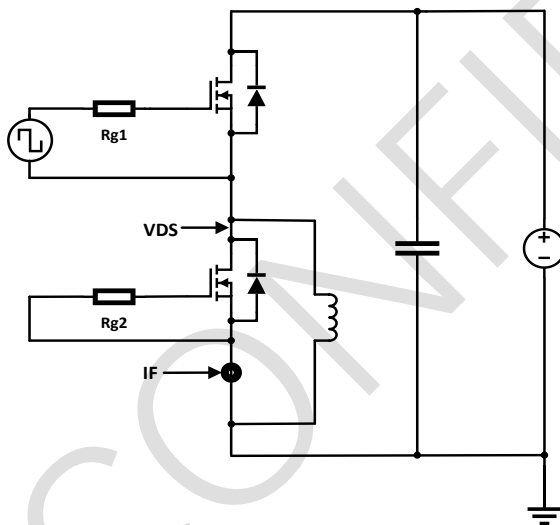
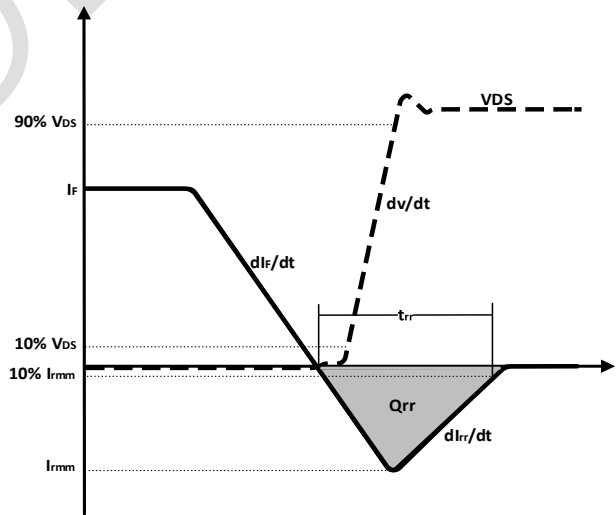


Figure 14. Body diode characteristics test circuit



Waveform 2. Body diode characteristics waveform

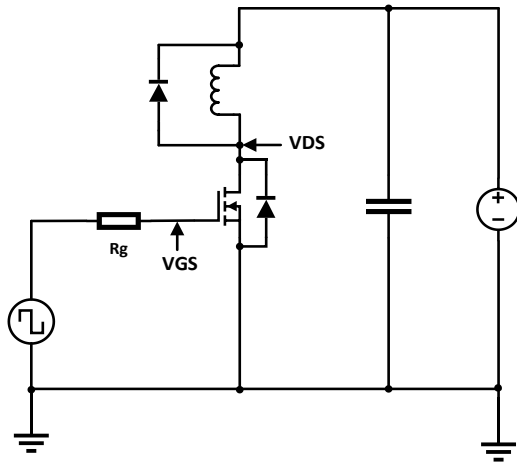
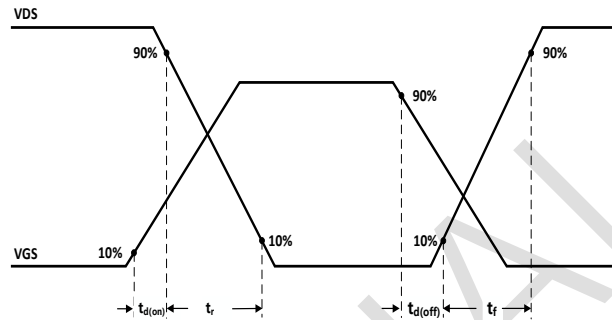


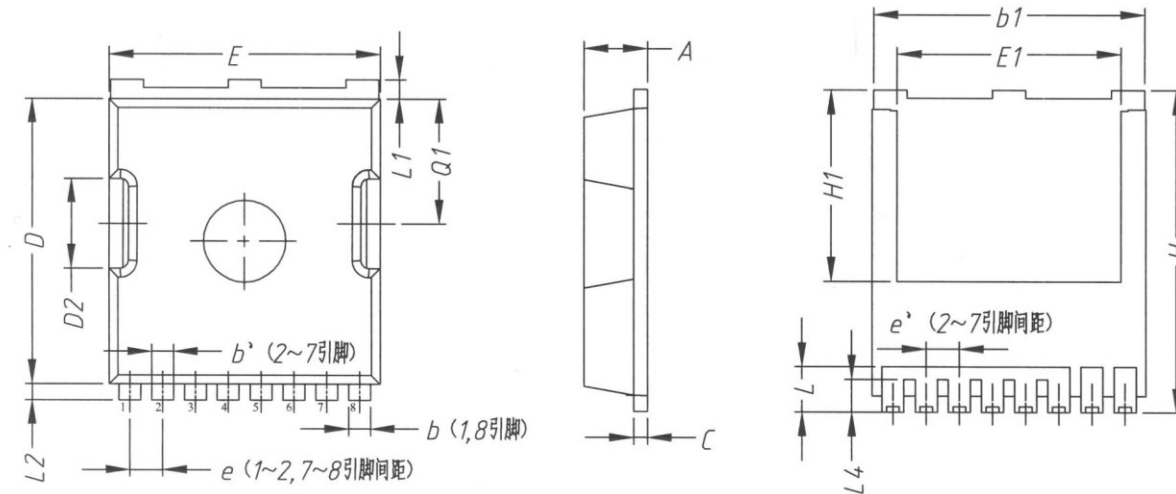
Figure 15. Switching time test circuit



Waveform 3. Switching time waveform



PACKAGE INFORMATION



SYMBOL	mm		
	MIN	NOM	MAX
A	2.15	2.30	2.45
b	0.70	0.75	0.85
b'	0.65	0.70	0.80
b1	9.65	9.80	9.95
C	0.45	0.50	0.60
D	10.18	10.38	10.58
D2	3.15	3.30	3.45
E	9.70	9.90	10.10
E1	7.95	8.10	8.25
e	BSC 1.225		
e'	BSC 1.20		
Q1	4.40	4.55	4.70
H	11.48	11.68	11.88
H1	6.80	6.95	7.10
L	1.60	1.80	2.00
L1	0.50	0.70	0.90
L2	0.48	0.60	0.72
L4	1.00	1.15	1.30