P＋N-Channel Enhancement Mode MOSFET

GBLH3302-S8

Features

- Reliable and Rugged
- Green device available
- RoHS compliant with Halogen-free

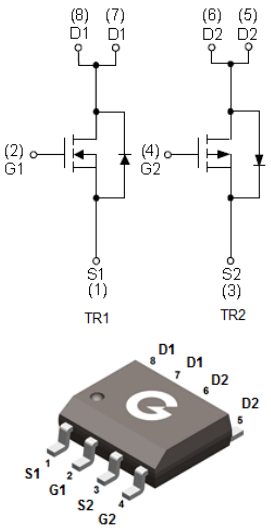
HF

Applications

- Synchronous Rectification
- Motor Control
- Portable equipment application

Mechanical Data

- Case: SOP-8
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



SOP-8

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
GBLH3302-S8	SOP-8	4000 pcs / Tape & Reel	GBLH3302

Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter	Symbol	TR1	TR2	Unit
Drain-to-Source Voltage	V_{DSS}	30	-30	V
Gate-to-Source Voltage	V_{GSS}	±20	±20	V
Continuous Drain Current (T_C = 25°C)	I_D	12	-12	A
Continuous Drain Current (T_A = 25°C) *1		8	-8	A
Continuous Drain Current (T_A = 100°C) *1		5	-5	A
Pulsed Drain Current (t_p =10μs, T_C = 25°C)	I_{DM}	50	-50	A
Single Pulse Avalanche Energy *3	E_{AS}	7.8	22	mJ
Power Dissipation (T_C = 25°C)	P_D	5		W
Power Dissipation (T_A = 25°C) *1		2		W
Operating Junction Temperature Range	T_J	-55 ~ +150		°C
Storage Temperature Range	T_{STG}	-55 ~ +150		°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	-	25	°C/W
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	-	-	62	°C/W

Electrical Characteristics-TR1 (@ T_A = 25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 30V, V_{GS} = 0V	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
On Characteristics						
$R_{DS(ON)}$	Drain-Source On-resistance *2	V_{GS} = 10V,I_D = 8A	-	17	20	mΩ
		V_{GS} = 4.5V,I_D = 8A	-	23	30	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1	1.5	2.5	V
R_G	Gate Resistance	V_{GS} = 0V, f = 1MHz	-	6.7	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = 15V f = 1.0MHz	-	474	-	pF
C_{OSS}	Output Capacitance		-	70	-	
C_{RSS}	Reverse Transfer Capacitance		-	61	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time *4	V_{GS} = 10V V_{DD} = 15V I_D = 8A R_G = 3Ω	-	1.6	-	ns
t_r	Turn-on Rise Time *4		-	25.6	-	
$t_{d(OFF)}$	Turn-Off Delay Time *4		-	16.6	-	
t_f	Turn-Off Fall Time *4		-	9	-	
Q_G	Total Gate-Charge	V_{DD} = 15V V_{GS} = 10V I_D = 8A	-	10	-	nC
Q_{GS}	Gate to Source Charge		-	1.2	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	2.6	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *2	I_{SD} = 8A, V_{GS} = 0V, T_J = 25°C	-	0.88	1.2	V
trr	Reverse Recovery Time	I_F = 8A, V_{GS} = 0V di/dt = 100A/μs	-	85	-	ns
Qrr	Reverse Recovery Charge		-	45	-	nC

Electrical Characteristics-TR2 (@ T_A = 25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = -250μA	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -30V, V_{GS} = 0V	-	-	-1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
On Characteristics						
$R_{DS(ON)}$	Drain-Source On-resistance *2	V_{GS} = -10V, I_D = -8A	-	15	21	mΩ
		V_{GS} = -4.5V, I_D = -8A	-	22	32	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1	-1.7	-2.5	V
R_G	Gate Resistance	V_{GS} = 0V, f = 1MHz	-	9	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = -15V f = 1.0MHz	-	1406	-	pF
C_{OSS}	Output Capacitance		-	157	-	
C_{RSS}	Reverse Transfer Capacitance		-	142	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time *4	V_{GS} = -10V V_{DD} = -15V I_D = -20A R_G = 3Ω	-	12	-	ns
t_r	Turn-on Rise Time *4		-	18	-	
$t_{d(OFF)}$	Turn-Off Delay Time *4		-	90	-	
t_f	Turn-Off Fall Time *4		-	63	-	
Q_G	Total Gate-Charge	V_{DD} = -15V V_{GS} = -10V I_D = -8A	-	30.5	-	nC
Q_{GS}	Gate to Source Charge		-	4.6	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	5.7	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *2	I_{SD} = -8A, V_{GS} = 0V	-	-0.9	-1.2	V
trr	Reverse Recovery Time	I_F = -10A, V_{GS} = 0V di/dt = 100A/μs	-	92	-	ns
Qrr	Reverse Recovery Charge		-	62	-	nC

Notes:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper
2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
3. The E_{AS} data shows Max. rating. The test condition is N: V_{DD} = 20V, V_{GS} = 10V, L = 0.5mH
   P: V_{DD} = -20V, V_{GS} = -10V, L = 0.5mH
4. Guaranteed by design, not subject to production

Ratings and Characteristics Curves-TR1 (@ T_A = 25°C unless otherwise specified)

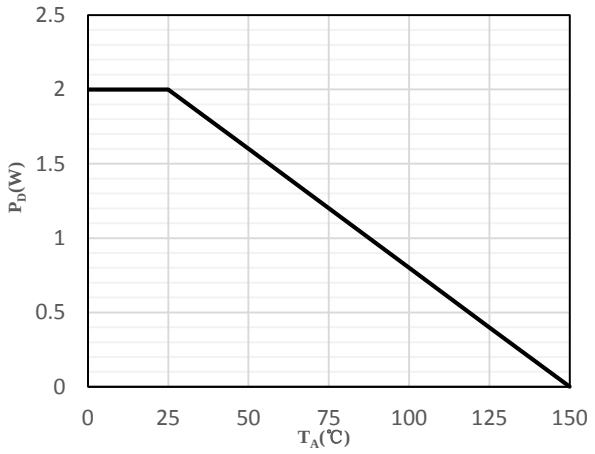


Fig 1 Power Dissipation

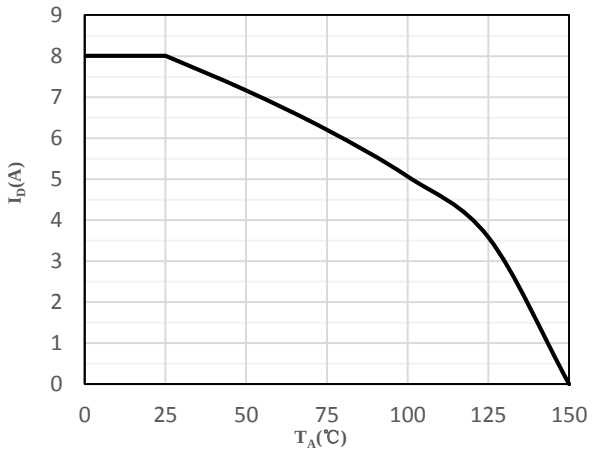


Fig 2 Drain Current

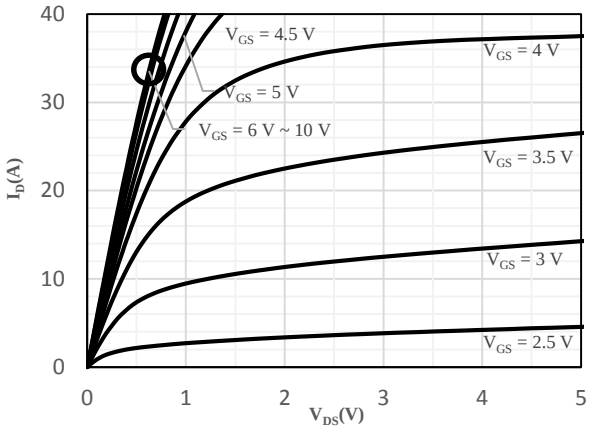


Fig 3 Typical Output Characteristics

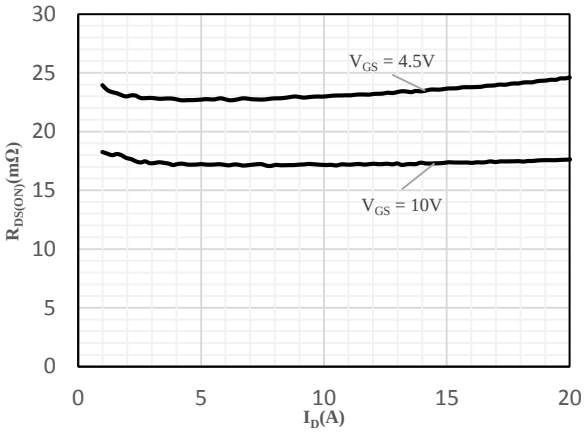


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

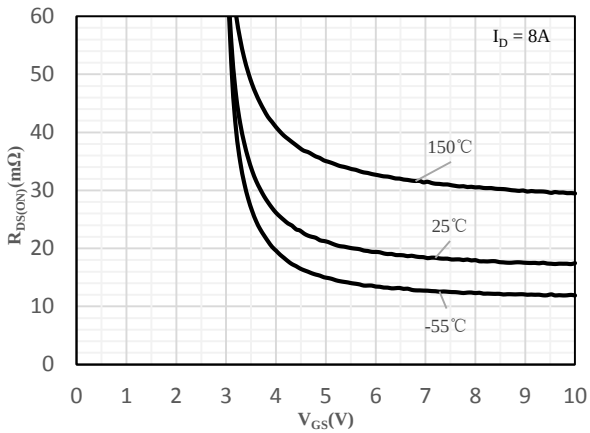


Fig 5 On-Resistance vs. Gate-Source Voltage

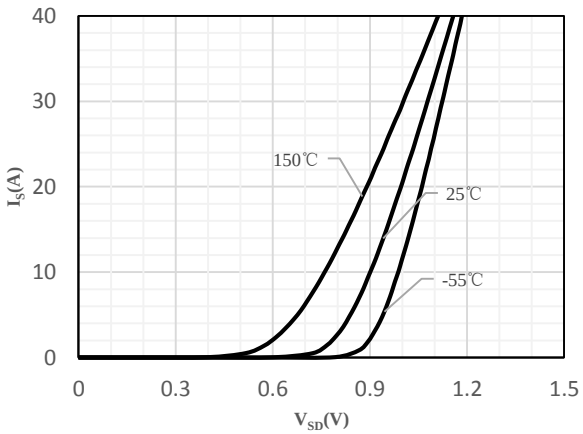


Fig 6 Body-Diode Characteristics

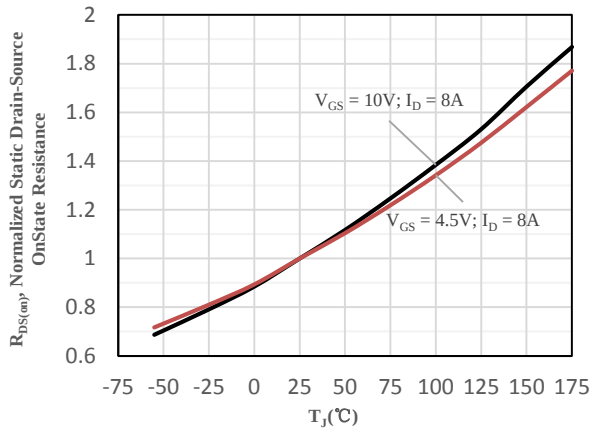


Fig 7 Normalized On-Resistance vs. Junction Temperature

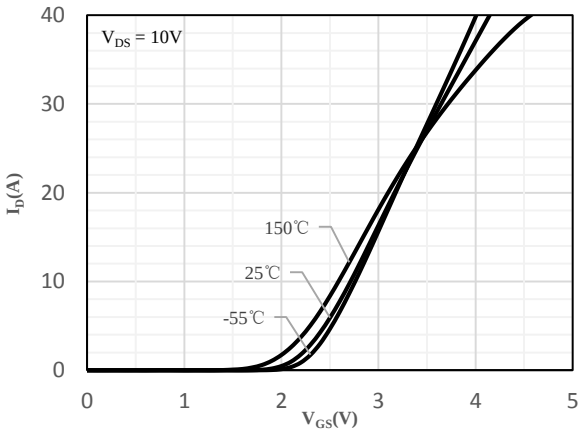


Fig 8 Transfer Characteristics

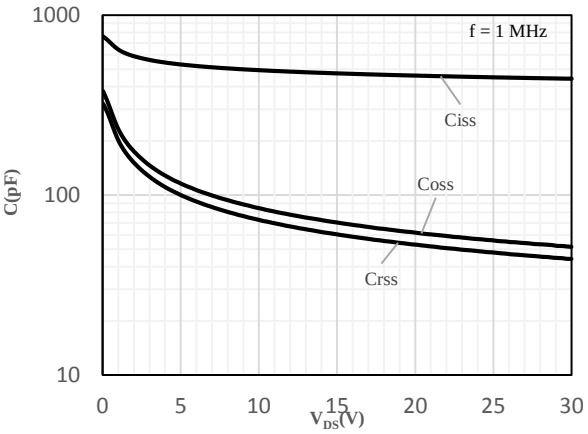


Fig 9 Capacitance Characteristics

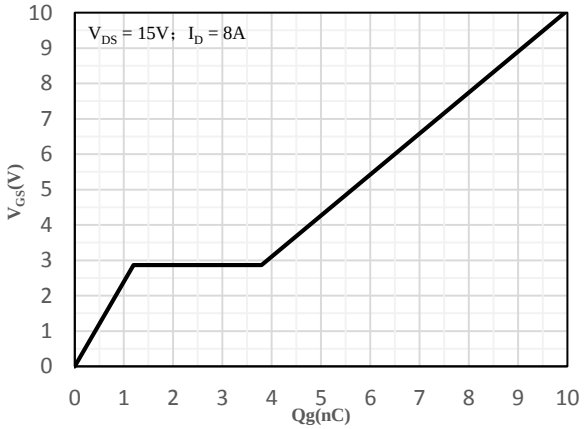


Fig 10 Gate-Charge Characteristics

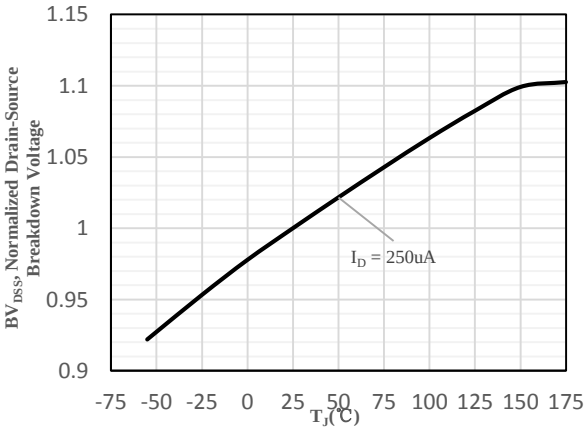


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

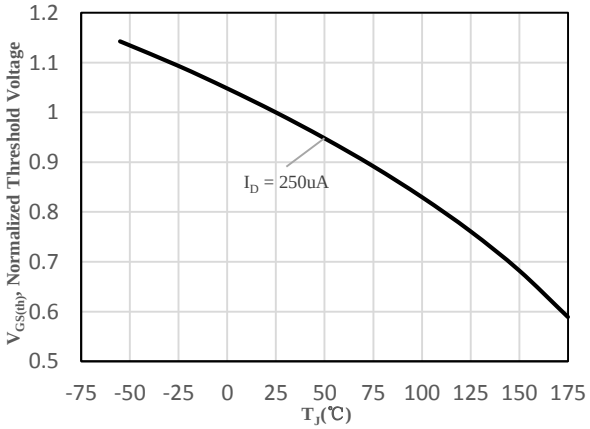


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

Ratings and Characteristics Curves-TR2 (@ T_A = 25°C unless otherwise specified)

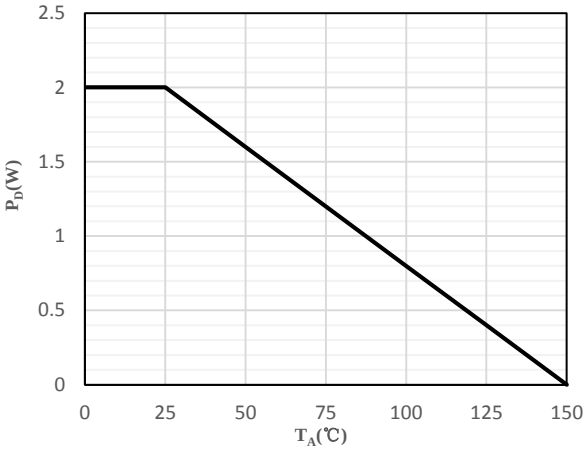


Fig 1 Power Dissipation

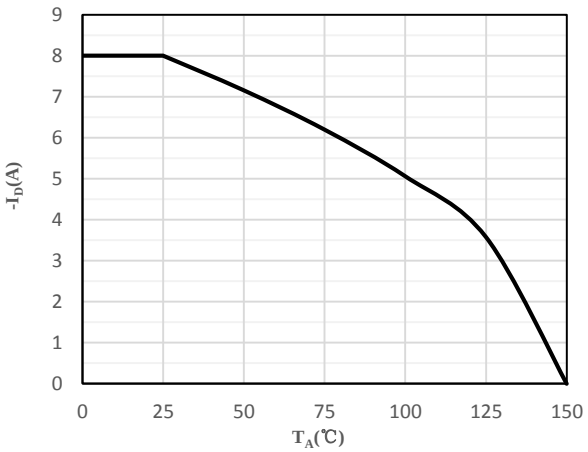


Fig 2 Drain Current

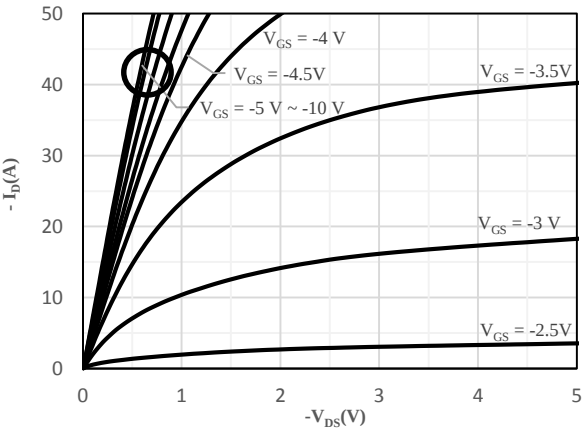


Fig 3 Typical Output Characteristics

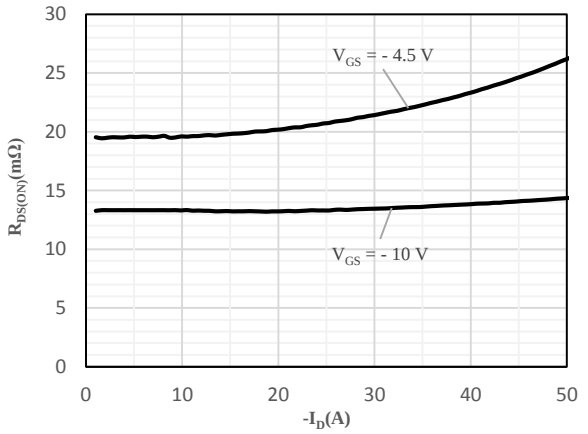


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

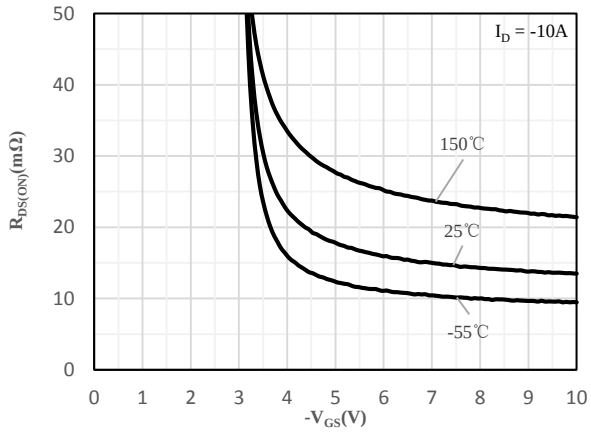


Fig 5 On-Resistance vs. Gate-Source Voltage

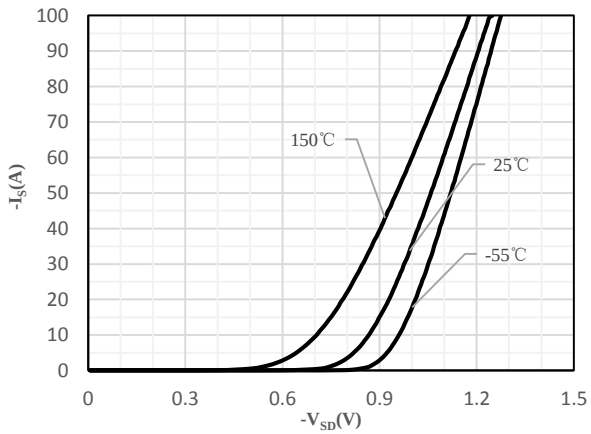


Fig 6 Body-Diode Characteristics

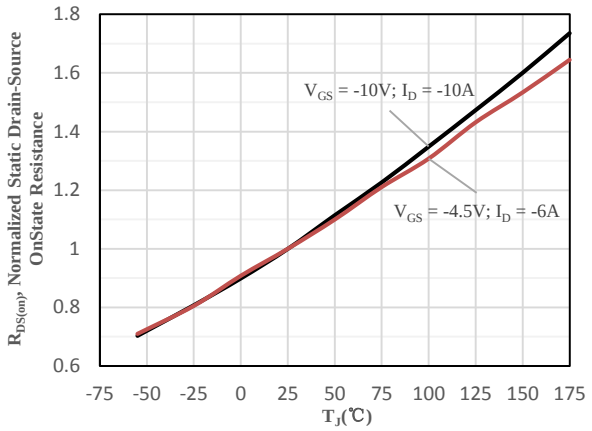


Fig 7 Normalized On-Resistance vs. Junction Temperature

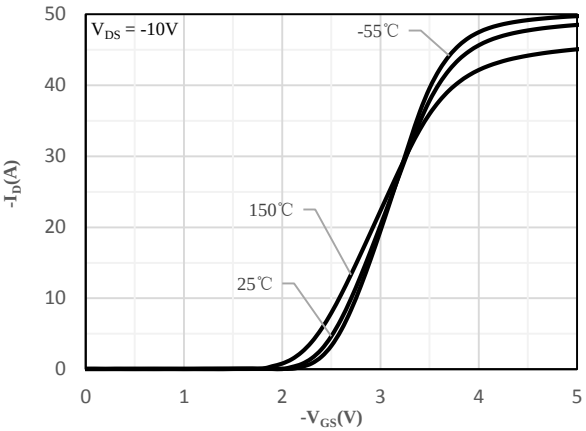


Fig 8 Transfer Characteristics

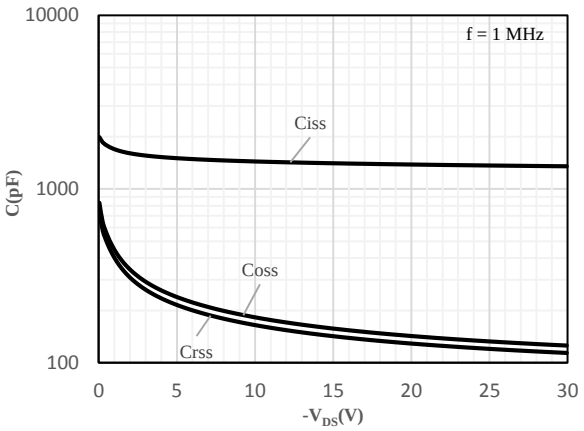


Fig 9 Capacitance Characteristics

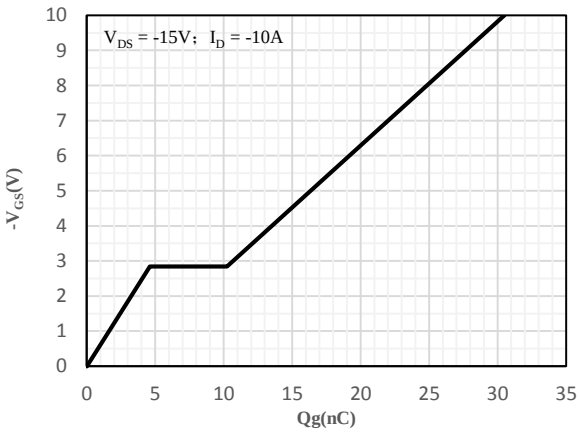


Fig 10 Gate-Charge Characteristics

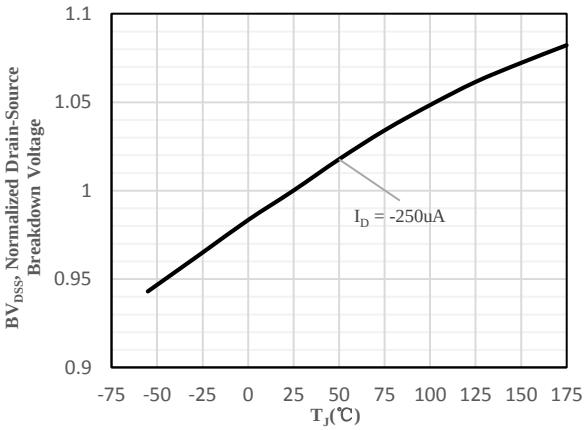


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

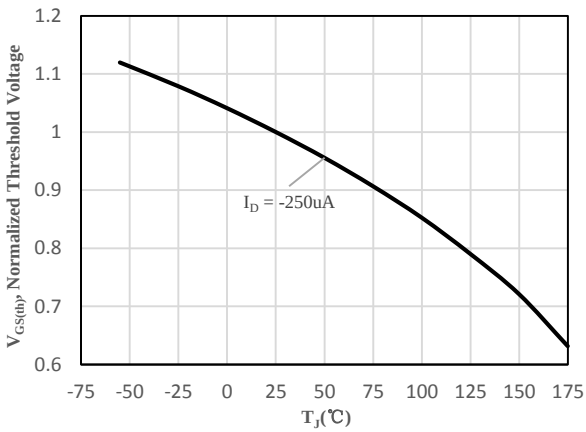
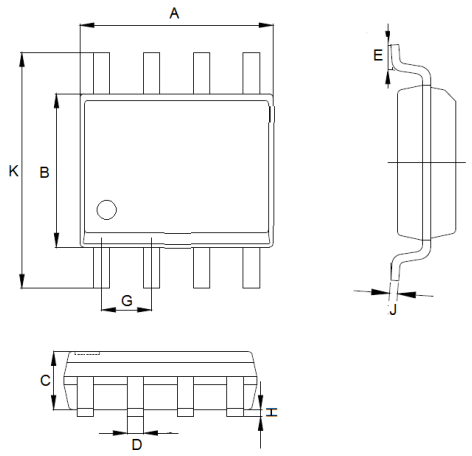


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

Package Outline Dimensions (Unit: mm)



SOP-8		
Dimension	**Min.**	**Max.**
A	4.80	5.20
B	3.80	4.20
C	1.30	1.50
D	0.30	0.50
E	0.40	1.00
G	1.17	1.37
H	0.10	0.30
J	0.10	0.30
K	5.80	6.20

Mounting Pad Layout (Unit: mm)

SOP-8