P＋N-Channel Enhancement Mode MOSFET

GBLH6601-S8

Features

- Advanced trench technology
- Reliable and Rugged
- HBM: JESD22-A114-B: 1B
- RoHS compliant with Halogen-free

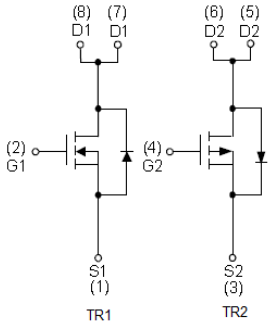
HF

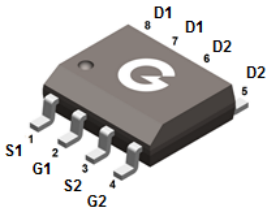
Applications

- 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
GBLH6601-S8	SOP-8	4000 pcs / Tape & Reel	GBLH6601

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

Parameter	Symbol	N	P	Unit
Drain-to-Source Voltage	V_{DSS}	60	-60	V
Gate-to-Source Voltage	V_{GSS}	±20	±20	V
Continuous Drain Current (T_A = 25°C) *1	I_D	5	-4	A
Continuous Drain Current (T_A = 100°C) *1		3.2	-2.5	A
Pulsed Drain Current (t_p = 10μs, T_A = 25°C)	I_{DM}	25	-20	A
Single Pulse Avalanche Energy *4	E_{AS}	15	15	mJ
Power Dissipation (T_A = 25°C) *1	P_D	2		W
Power Dissipation (T_A = 25°C) *2		1.25		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	$R_{\theta JC}$	-	-	35	°C/W
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	-	-	62.5	°C/W
Thermal Resistance Junction-to-Air *2		-	-	100	°C/W

Electrical Characteristics-N (@ 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	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60V, 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 *3	V_{GS} = 10V,I_D = 5A	-	36	45	mΩ
		V_{GS} = 4.5V,I_D = 5A	-	40	60	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1	1.7	3	V
R_G	Gate Resistance	V_{GS} = 0V, f = 1MHz	-	1.8	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = 30V f = 1.0MHz	-	945	-	pF
C_{OSS}	Output Capacitance		-	44	-	
C_{RSS}	Reverse Transfer Capacitance		-	32	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time *5	V_{DD} = 30V V_{GS} = 10V R_G = 3Ω R_L = 7.5Ω	-	8	-	ns
t_r	Turn-on Rise Time *5		-	4	-	
$t_{d(OFF)}$	Turn-Off Delay Time *5		-	32	-	
t_f	Turn-Off Fall Time *5		-	7	-	
Q_G	Total Gate-Charge	V_{DD} = 48V V_{GS} = 10V I_D = 15A	-	20.4	-	nC
Q_{GS}	Gate to Source Charge		-	3	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	3.3	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *3	I_{SD} = 1A, V_{GS} = 0V	-	0.7	1.2	V
trr	Reverse Recovery Time	I_{SD} = 6A, V_{GS} = 0V d_I/d_t = 100A/μs	-	17	-	ns
Qrr	Reverse Recovery Charge		-	9	-	nC

Electrical Characteristics-P (@ 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	-60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -60V, V_{GS} = 0V	-	-	-1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
On Characteristics						
$R_{DS(ON)}$	Static Drain-Source On-resistance *3	V_{GS} = -10V, I_D = -4A	-	70	90	mΩ
		V_{GS} = -4.5V, I_D = -4A	-	100	135	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1	-1.6	-3	V
R_G	Gate Resistance	V_{GS} = 0V, f = 1MHz	-	17	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = -30V f = 1.0MHz	-	930	-	pF
C_{OSS}	Output Capacitance		-	55	-	
C_{RSS}	Reverse Transfer Capacitance		-	41	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time *5	V_{DD} = -30V V_{GS} = -10V R_G = 3Ω R_L = 7.5Ω		8		ns
t_r	Turn-on Rise Time *5			4		
$t_{d(OFF)}$	Turn-Off Delay Time *5			32		
t_f	Turn-Off Fall Time *5			7		
Q_G	Total Gate-Charge	V_{GS} = -10V V_{DD} = -30V I_D = -4A	-	20	-	nC
Q_{GS}	Gate to Source Charge		-	3.1	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	3.2	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *3	I_{SD} = -1A, V_{GS} = 0V	-	-0.7	-1.2	V
trr	Reverse Recovery Time	I_F = -4A, V_{GS} = 0V dI/dt = 100A/μs		23		ns
Qrr	Reverse Recovery Charge			11		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 surface mounted on a minimum recommended FR-4 board
3. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
4. The E_{AS} data shows Max. rating. The test condition is N: V_{DD} = 30V, V_{GS} = 10V, L = 0.5mH
   P: V_{DD} = -30V, V_{GS} = -10V, L = 0.5mH
5. Guaranteed by design, not subject to production

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

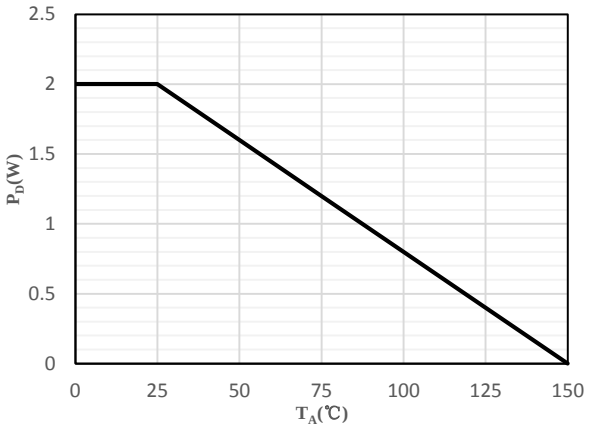


Fig 1 Power Dissipation

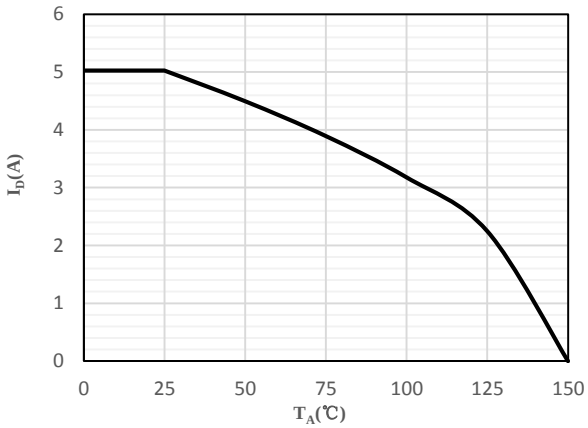


Fig 2 Drain Current

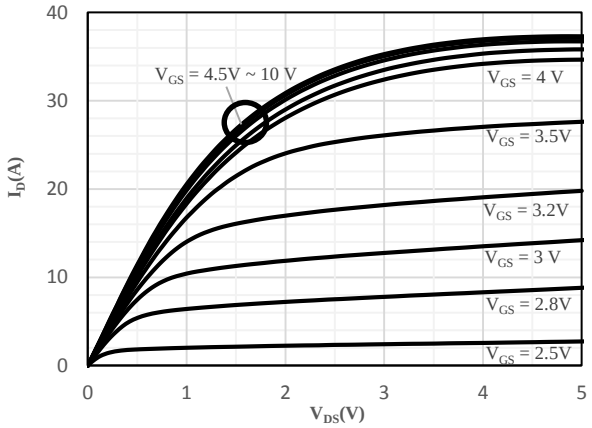


Fig 3 Typical Output Characteristics

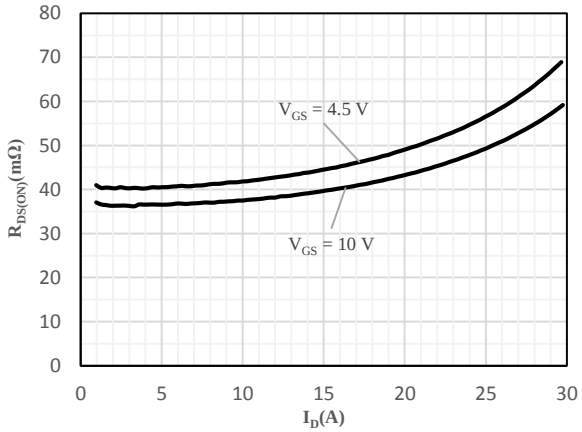


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

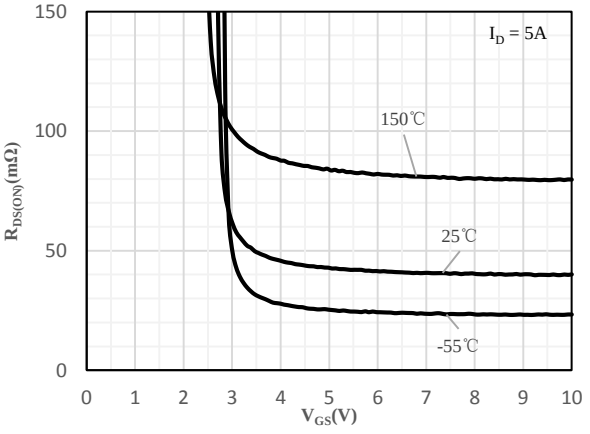


Fig 5 On-Resistance vs. Gate-Source Voltage

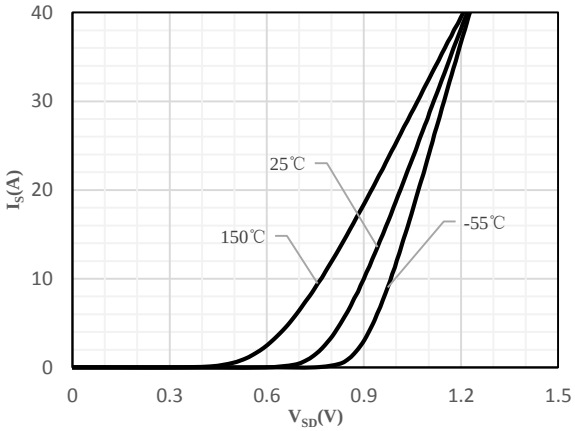


Fig 6 Body-Diode Characteristics

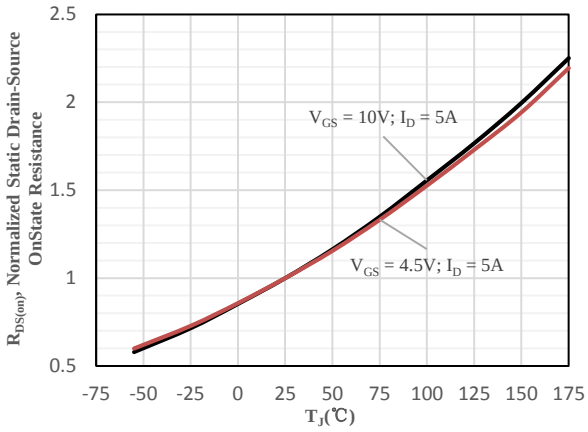


Fig 7 Normalized On-Resistance vs. Junction Temperature

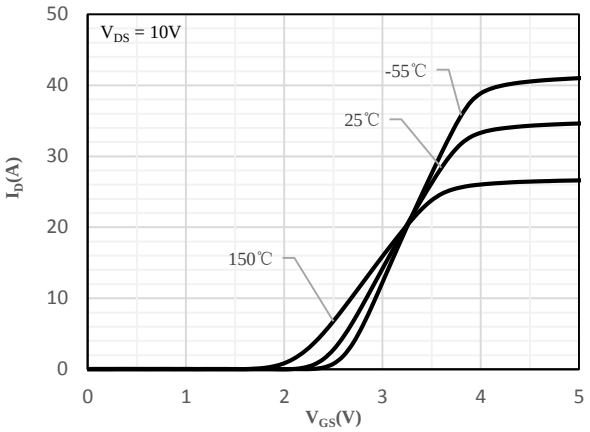


Fig 8 Transfer Characteristics

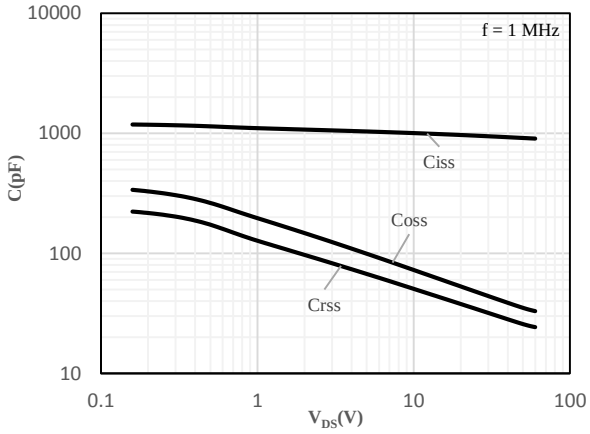


Fig 9 Capacitance Characteristics

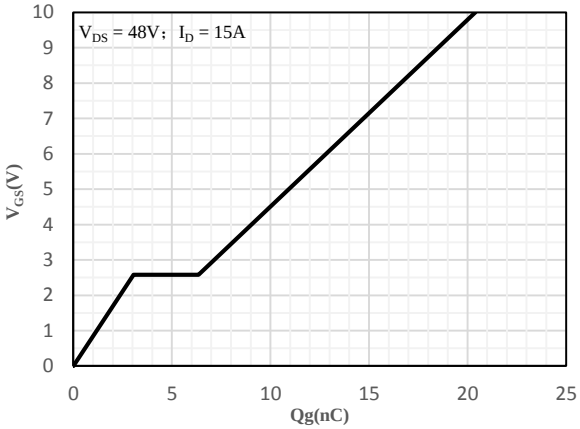


Fig 10 Gate-Charge Characteristics

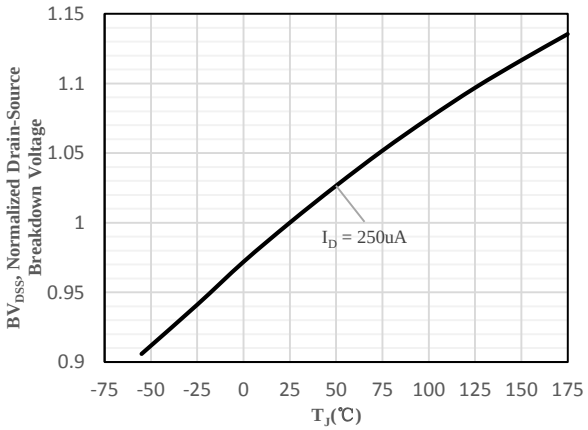


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

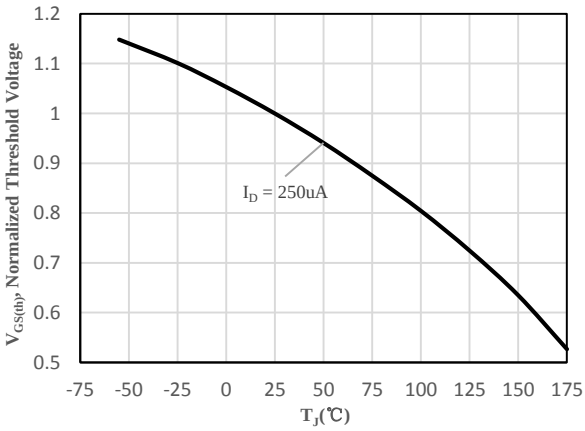


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

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

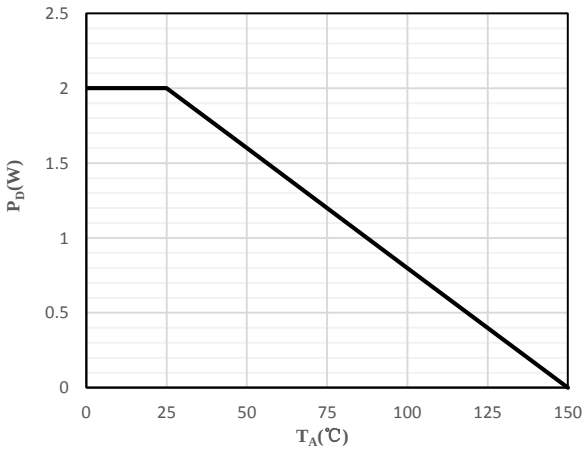


Fig 1 Power Dissipation

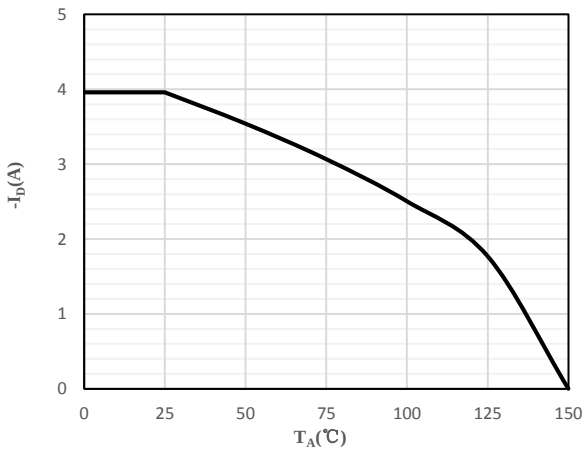


Fig 2 Drain Current

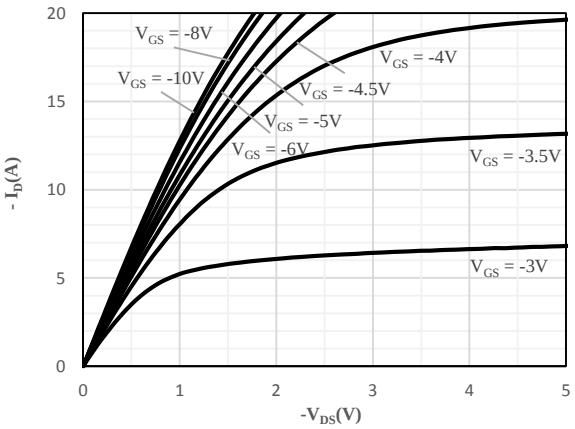


Fig 3 Typical Output Characteristics

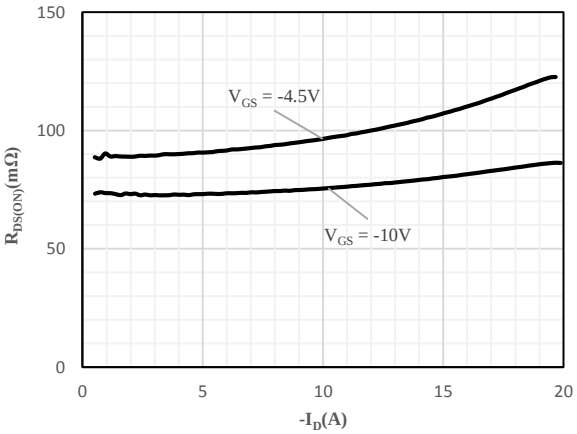


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

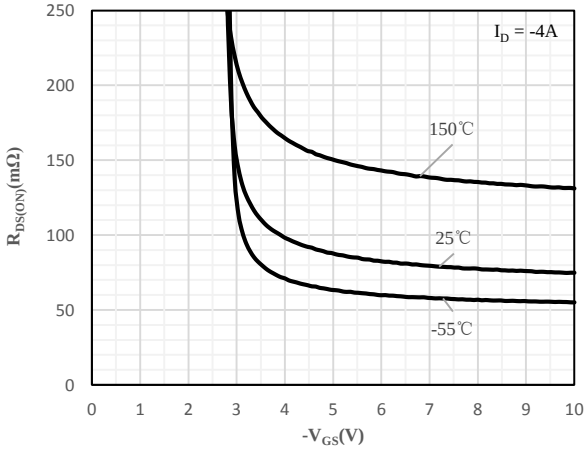


Fig 5 On-Resistance vs. Gate-Source Voltage

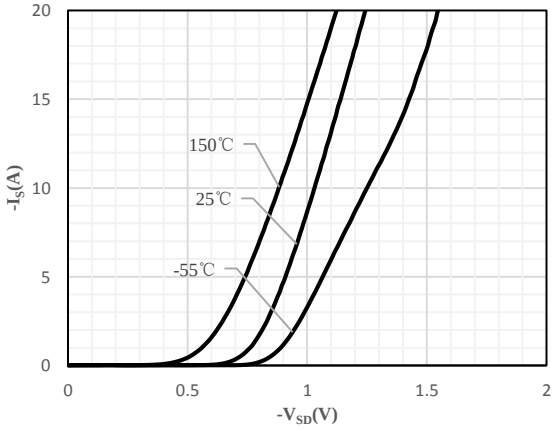


Fig 6 Body-Diode Characteristics

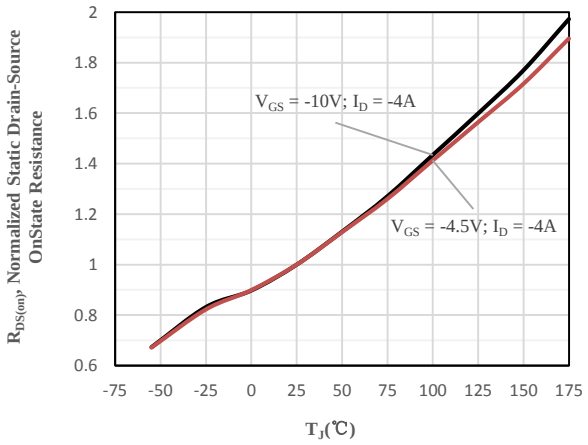


Fig 7 Normalized On-Resistance vs. Junction Temperature

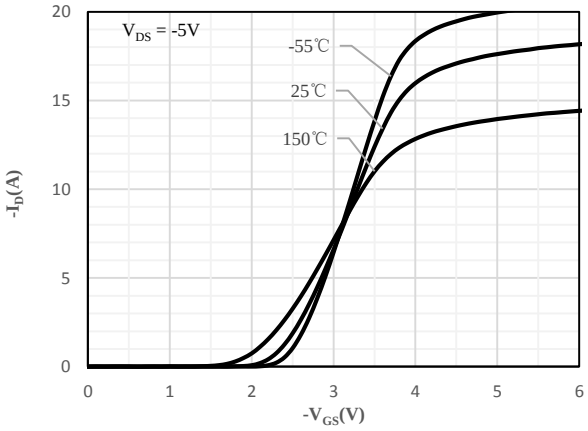


Fig 8 Transfer Characteristics

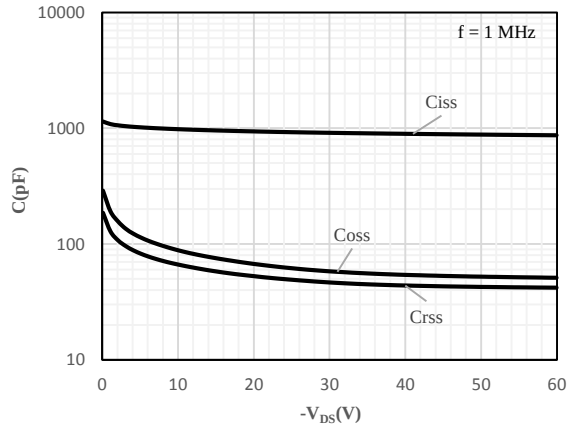


Fig 9 Capacitance Characteristics

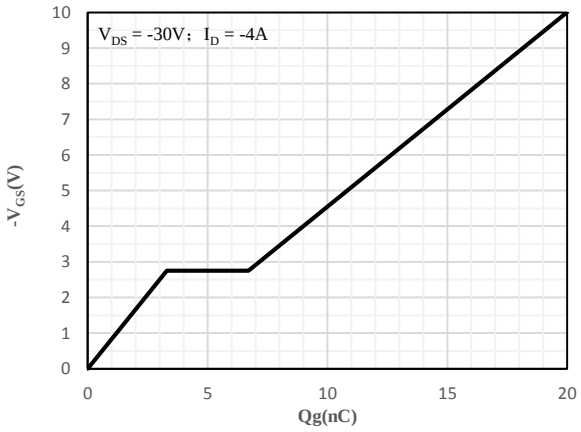


Fig 10 Gate-Charge Characteristics

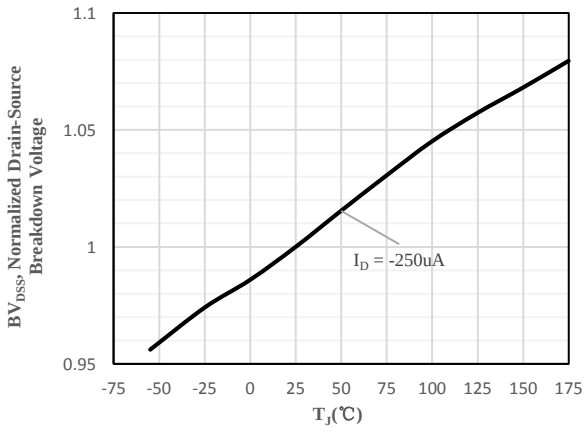


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

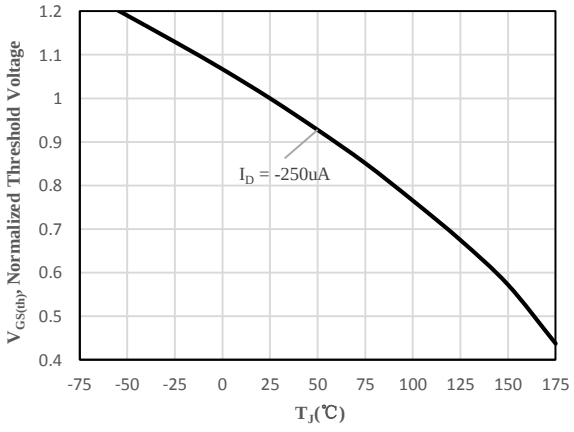
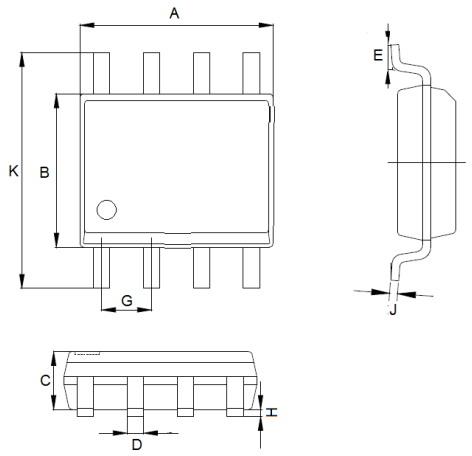


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

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