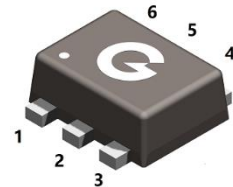
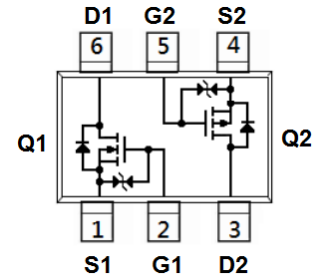


Features

- Advanced trench technology
- High speed switching
- Drive circuits can be simple
- Integrated ESD protection diode
- HBM: AEC-Q101-001: H2 (JESD22-A114-B: 2)
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards

HF



SOT-563

Mechanical Data

- Case: SOT-563
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TBL5384V	SOT-563	3000 pcs / Tape & Reel	5384

Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Q1	Q2	Unit
Drain-to-Source Voltage	V_{DS}	50	-60	V
Gate-to-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current ($T_A = 25^\circ\text{C}$) ^{*1}	I_D	0.35	-0.25	A
Continuous Drain Current ($T_A = 70^\circ\text{C}$) ^{*1}		0.28	-0.2	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_A = 25^\circ\text{C}$)	I_{DM}	1.5	-1	A
Power Dissipation ($T_A = 25^\circ\text{C}$) ^{*1}	P_D	0.3		W
Operating Junction Temperature Range	T_J	-55 ~ +150		$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150		$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Air ^{*1}	$R_{\theta JA}$	-	-	420	$^\circ\text{C/W}$

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper

Electrical Characteristics-Q₁ (@ T_A = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	MIN	TYP	MAX	UNIT
OFF Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	50	-	-	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 50V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate-body Leakage	V _{GS} = ±20V, V _{DS} = 0V	-	-	±10	μA
ON Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = 10V, I _D = 0.5A	-	1.1	1.5	Ω
		V _{GS} = 4.5V, I _D = 0.2A	-	1.2	2.5	
		V _{GS} = 2.5V, I _D = 0.2A	-	1.6	2.9	
		V _{GS} = 1.8V, I _D = 0.05A	-	2.8	4	
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250uA	0.5	0.85	1.0	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	34	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = 20V f = 1.0MHz	-	44	-	pF
C _{OSS}	Output Capacitance		-	10	-	
C _{RSS}	Reverse Transfer Capacitance		-	7	-	
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time *3	V _{DD} = 30V, I _D = 0.2A V _{GS} = 10V, R _G = 25Ω R _L = 150Ω	-	6	-	nS
t _r	Turn-on Rise Time *3		-	5	-	
t _{d(off)}	Turn-Off Delay Time *3		-	25	-	
t _f	Turn-Off Fall Time *3		-	15	-	
Q _G	Total Gate-Charge	V _{DD} = 25V	-	4.3	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	0.7	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 0.2A	-	0.5	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _S = 0.3A, V _{GS} = 0V	-	0.85	1.2	V

Electrical Characteristics-Q₂ (@ 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	-	-	±10	μA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = -10V, I _D = -0.1A	-	1.8	4	Ω
		V _{GS} = -4.5V, I _D = -0.1A	-	2.3	5	
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-1	-1.5	-2	V
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = -20V f = 1.0MHz	-	39	-	pF
C _{OSS}	Output Capacitance		-	12	-	
C _{RSS}	Reverse Transfer Capacitance		-	2	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *3	V _{DS} = -15V R _L = -50Ω I _D = -2.5A	-	2.5	-	ns
t _r	Turn-on Rise Time *3		-	1	-	
t _{d(OFF)}	Turn-Off Delay Time *3		-	16	-	
t _f	Turn-Off Fall Time *3		-	8	-	
Q _G	Total Gate-Charge	V _{DS} = -25V	-	2	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = -4.5V	-	0.7	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = -0.2A	-	0.5	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _S = -0.2A, V _{GS} = 0 V	-	-0.9	-1.4	V

Notes:

- The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
- Guaranteed by design, not subject to production

Ratings and Characteristics Curves-Q₁ (@ T_A = 25°C unless otherwise specified)

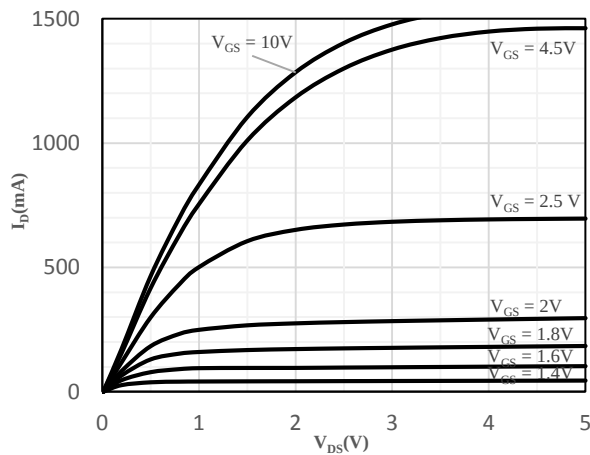


Fig 1 Typical Output Characteristics

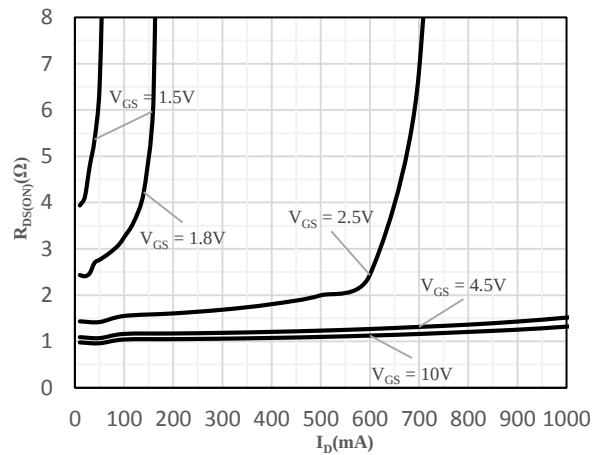


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

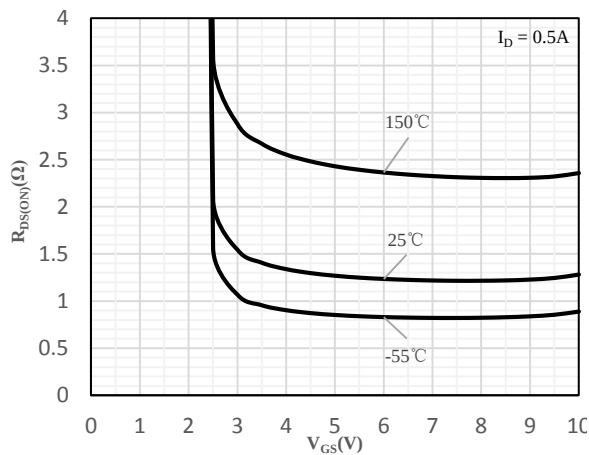


Fig 3 On-Resistance vs. Gate-Source Voltage

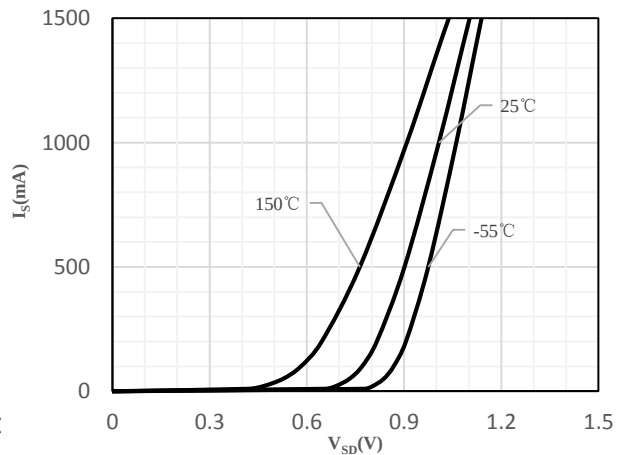


Fig 4 Body-Diode Characteristics

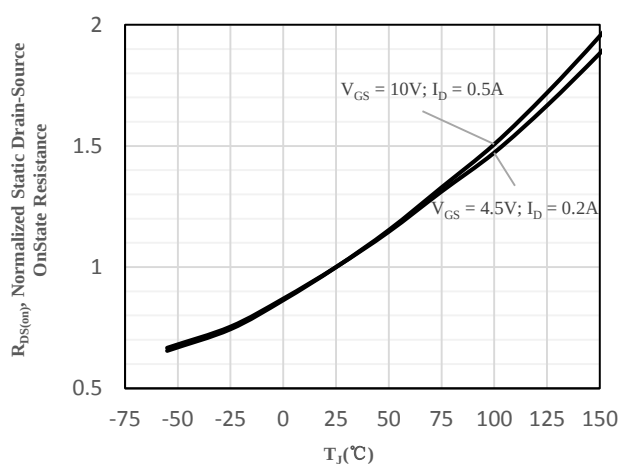


Fig 5 Normalized On-Resistance vs. Junction Temperature

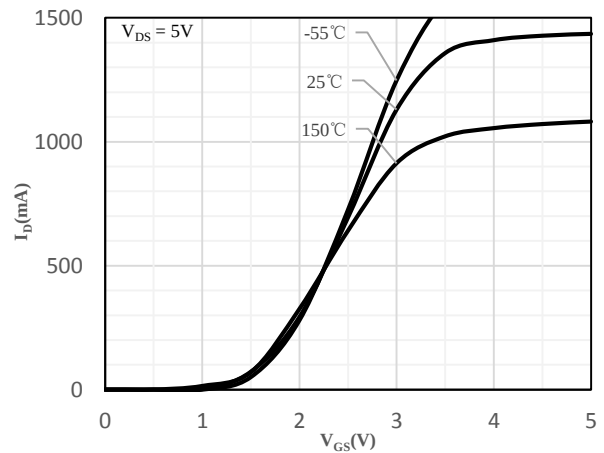


Fig 6 Transfer Characteristics

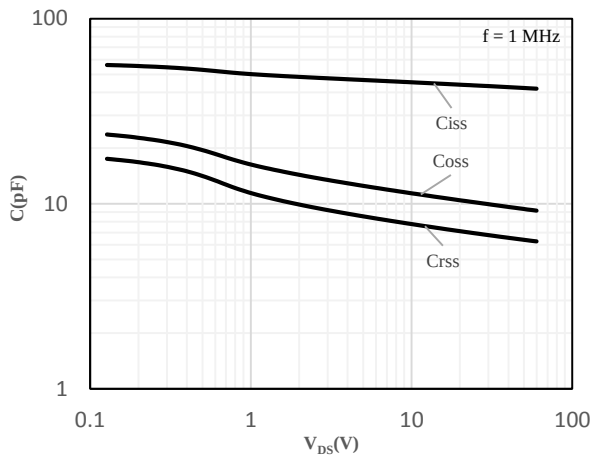


Fig 7 Capacitance Characteristics

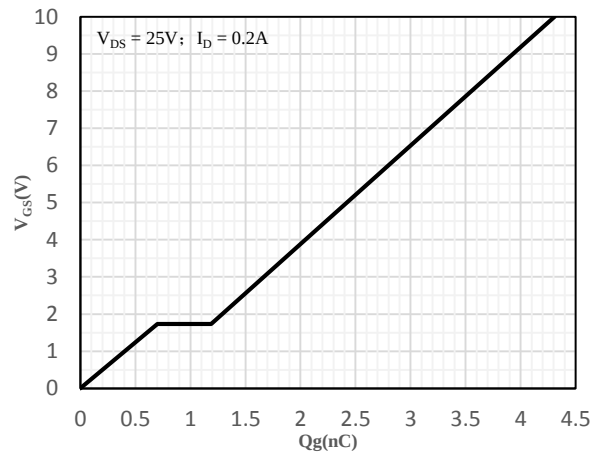


Fig 8 Gate-Charge Characteristics

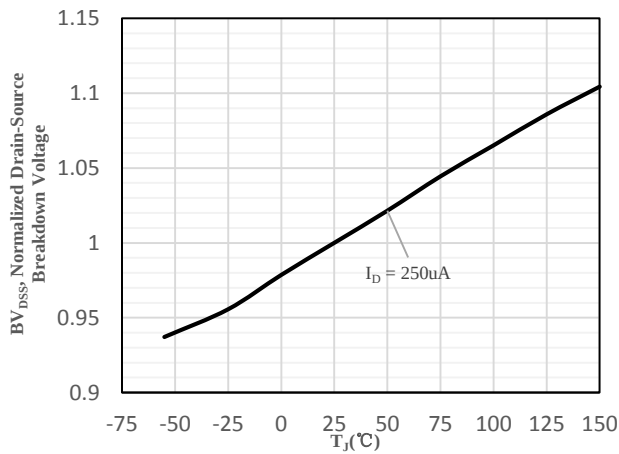


Fig 9 Normalized Breakdown Voltage
vs. Junction Temperature

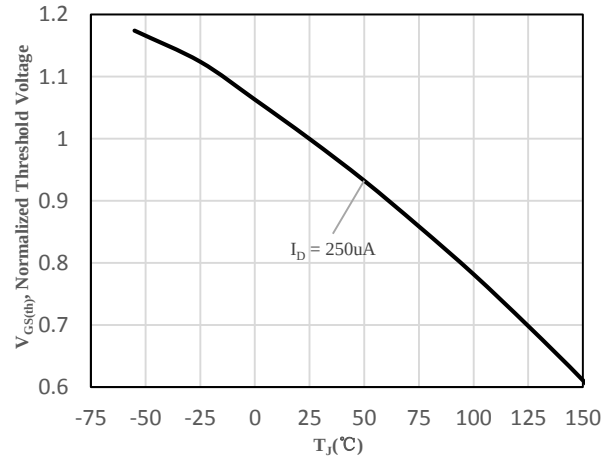


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

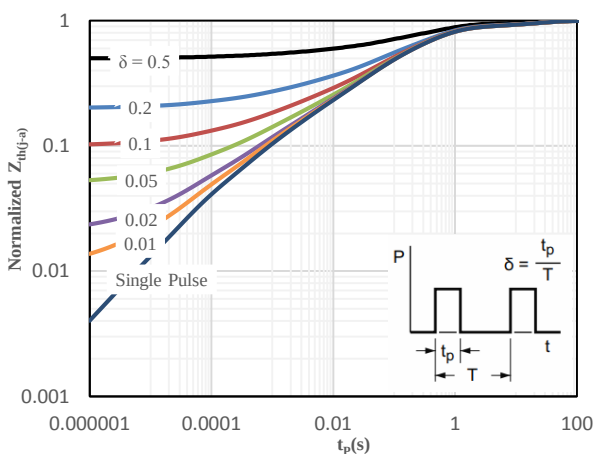


Fig 11 Normalized Maximum transient thermal
impedance

Ratings and Characteristics Curves-Q₂ (@ T_A = 25°C unless otherwise specified)

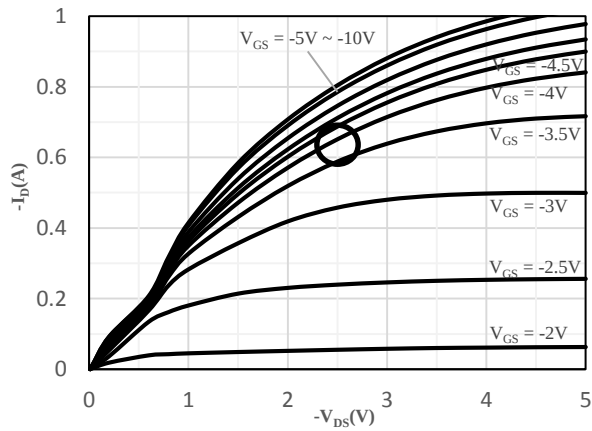


Fig 1 Typical Output Characteristics

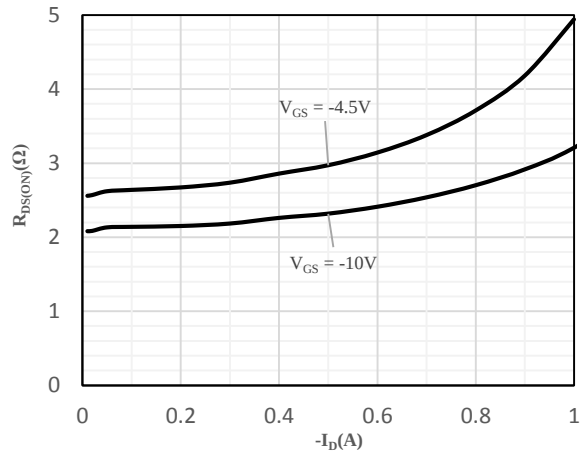


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

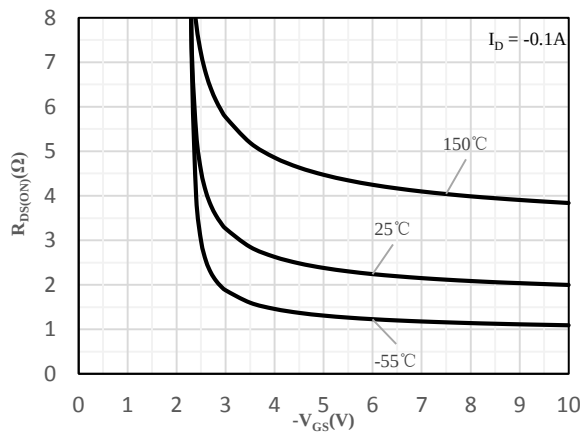


Fig 3 On-Resistance vs. Gate-Source Voltage

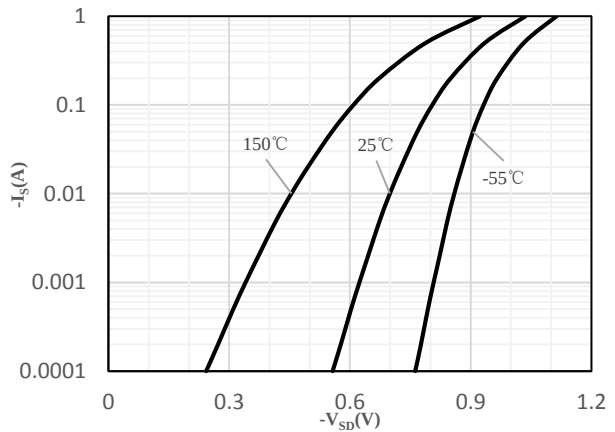


Fig 4 Body-Diode Characteristics

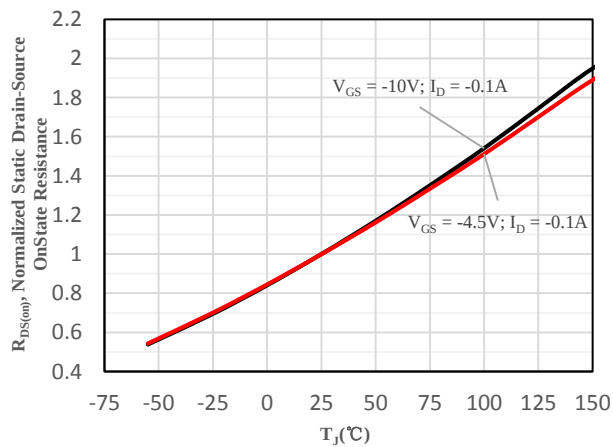


Fig 5 Normalized On-Resistance vs. Junction Temperature

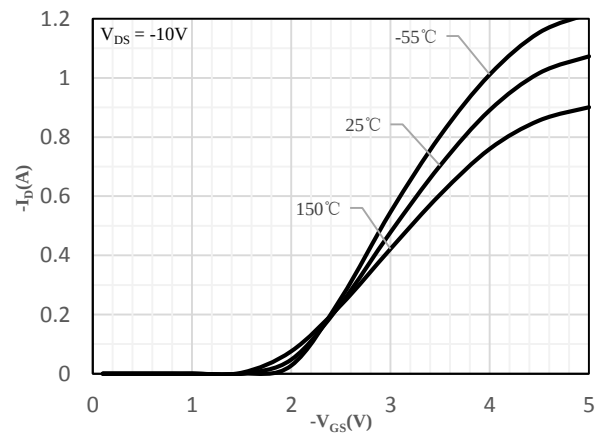


Fig 6 Transfer Characteristics

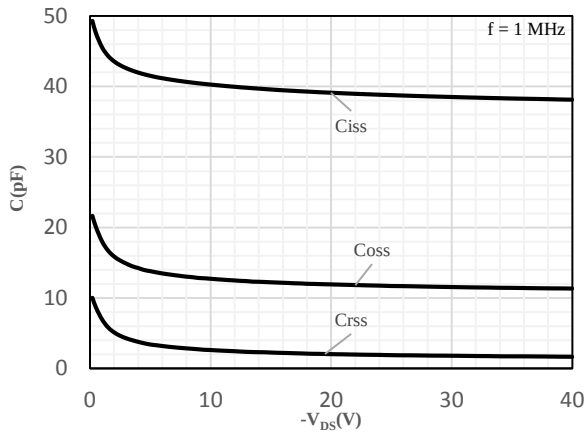


Fig 7 Capacitance Characteristics

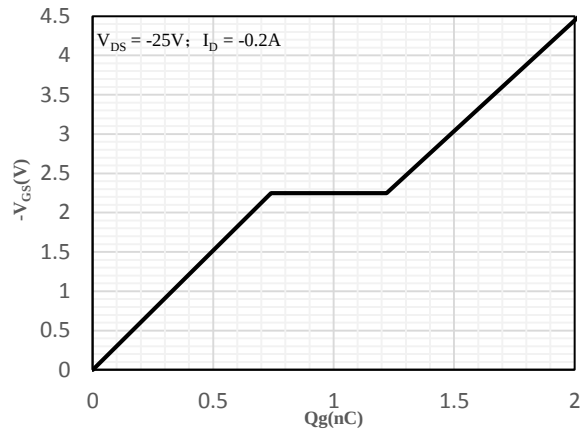


Fig 8 Gate-Charge Characteristics

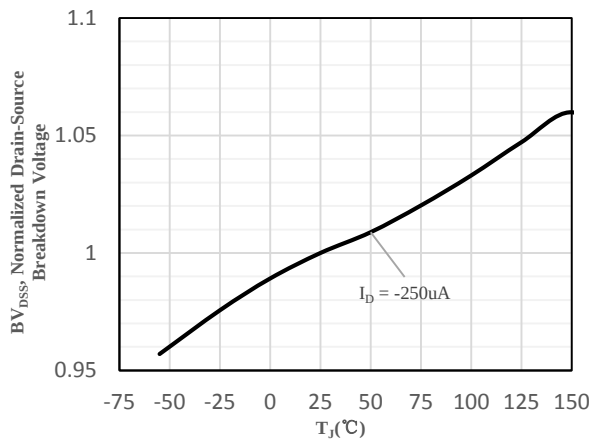


Fig 9 Normalized Breakdown Voltage
vs. Junction Temperature

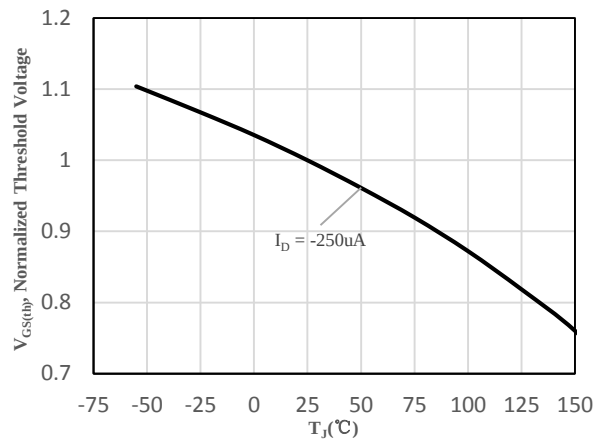


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

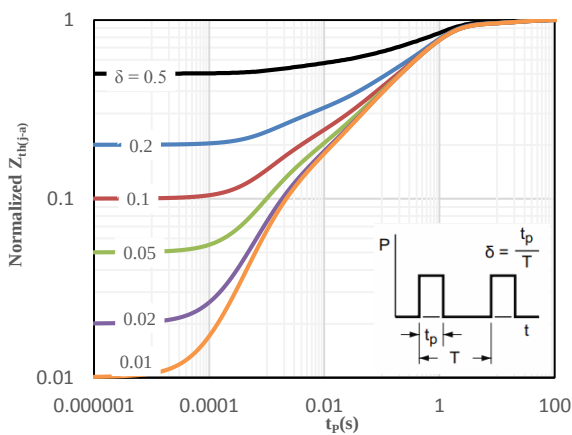
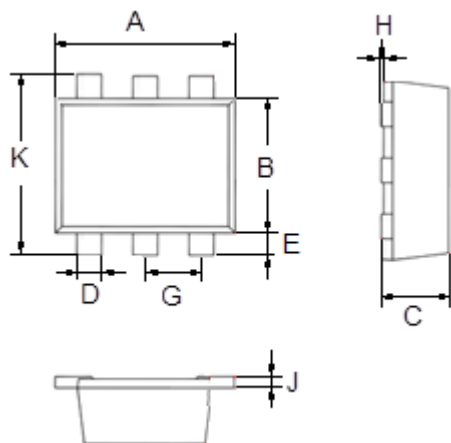


Fig 11 Normalized Maximum transient thermal
impedance

Package Outline Dimensions (Unit: mm)



SOT-563		
Dimension	Min.	Max.
A	1.500	1.700
B	1.100	1.300
C	0.525	0.600
D	0.170	0.270
E	0.100	0.300
G	0.450	0.550
H	0.000	0.050
J	0.090	0.160
K	1.500	1.700

Mounting Pad Layout (Unit: mm)

SOT-563

