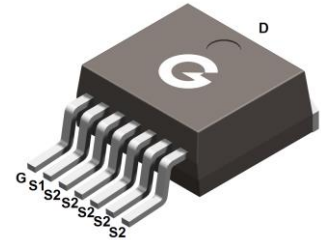
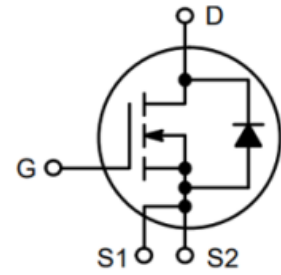


Features

- High blocking voltage with low on-resistance
- High-speed switching with low capacitances
- Low switching losses
- Sense pin for optimized switching performance
- RoHS compliant with Halogen-free

HF



TO-263-7

Applications

- Solar inverters
- High voltage DC/DC converters
- EV-charging
- Switch Mode Power Supplies

Mechanical Data

- Case: TO-263-7
- 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
GSC170R700B7	TO-263-7	1000 pcs / Tape & Reel	GSC170R700B7

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	1700	V
Gate-to-Source Voltage (transient)	V_{GSS}	-8/+22	V
Gate-to-Source Voltage (static)		-4/+18	
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	7	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		5	
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$)	I_{DM}	30	A
Single Pulse Avalanche Energy ^{*3}	E_{AS}	40	mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	68	W
Operating Junction Temperature Range	T_J	-55 ~ +175	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	-	2.2	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air ^{*1}	$R_{\theta JA}$	-	-	40	$^\circ\text{C/W}$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 100μA	1700	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 1700V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = 18V, V _{DS} = 0V	-	-	100	nA
		V _{GS} = -4V, V _{DS} = 0V	-	-	-100	
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = 18V, I _D = 2A, T _J = 25°C	-	540	700	mΩ
		V _{GS} = 18V, I _D = 2A, T _J = 175°C	-	1060	-	
		V _{GS} = 15V, I _D = 2A, T _J = 25°C	-	690	-	
		V _{GS} = 15V, I _D = 2A, T _J = 175°C	-	1130	-	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 0.5mA, T _J = 25°C	2	2.8	4	V
		V _{DS} = V _{GS} , I _D = 0.5mA, T _J = 175°C	-	2	-	
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	24	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = 1000V f = 1MHz	-	260	-	pF
C _{OSS}	Output Capacitance		-	13.5	-	
C _{RSS}	Reverse Transfer Capacitance		-	1.6	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *4	V _{DD} =1000V V _{GS} = -4/18V I _D = 2A R _G = 2.5Ω	-	10	-	ns
t _r	Turn-on Rise Time *4		-	9	-	
t _{d(OFF)}	Turn-Off Delay Time *4		-	14	-	
t _f	Turn-Off Fall Time *4		-	26	-	
E _{on}	Turn-On Energy *4		-	52	-	μJ
E _{off}	Turn-Off Energy *4		-	13	-	
Q _G	Total Gate-Charge	V _{DD} = 1000V	-	22.5	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = -4/18V	-	8	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 2A	-	7.8	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 2A, V _{GS} = -4V, T _J = 25°C	-	4.5	-	V
		I _{SD} = 2A, V _{GS} = -4V, T _J = 175°C	-	4.0	-	
t _{rr}	Reverse Recovery Time	I _F = 2A, V _R = 400V	-	7	-	ns
Q _{rr}	Reverse Recovery Charge	dI/dt = 300A/μs	-	4.5	-	nC

Notes:

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 120V, V_{GS} = 18V, L = 1mH$
- Guaranteed by design, not subject to production

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

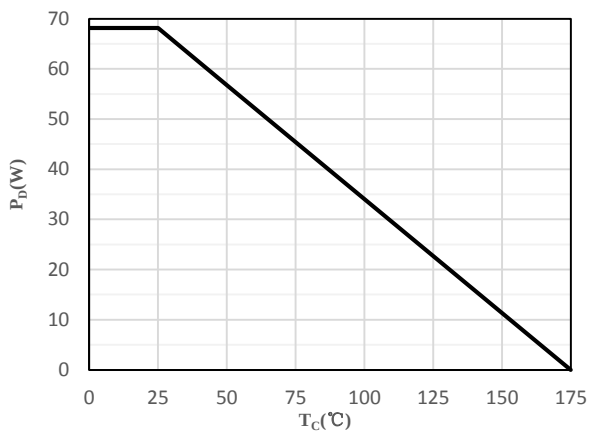


Fig 1 Power Dissipation

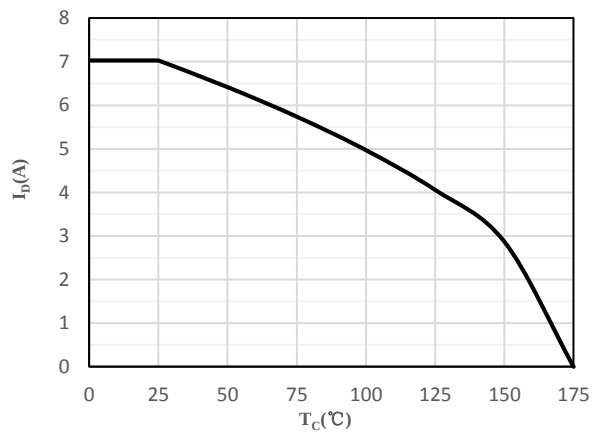


Fig 2 Drain Current

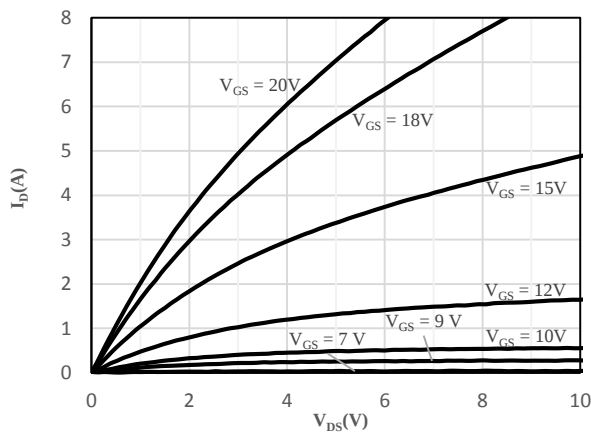


Fig 3 Typical Output Characteristics ($T_j = -55^\circ\text{C}$)

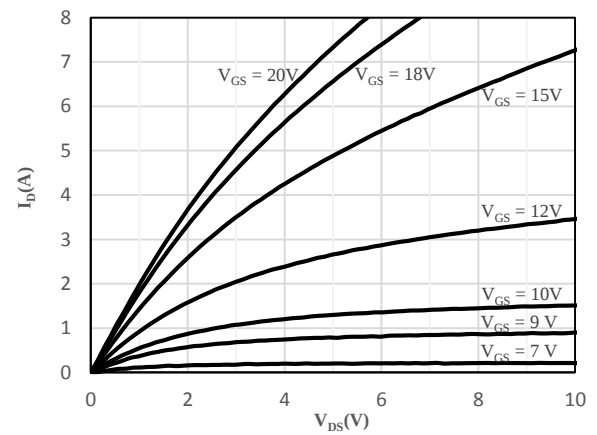


Fig 4 Typical Output Characteristics ($T_j = 25^\circ\text{C}$)

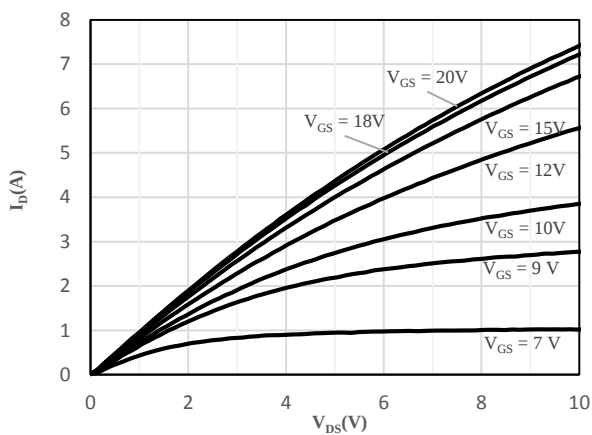


Fig 5 Typical Output Characteristics ($T_j = 175^\circ\text{C}$)

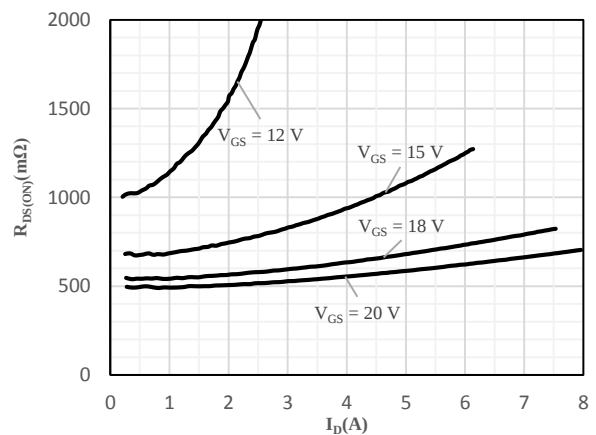


Fig 6 On-Resistance vs. Drain Current

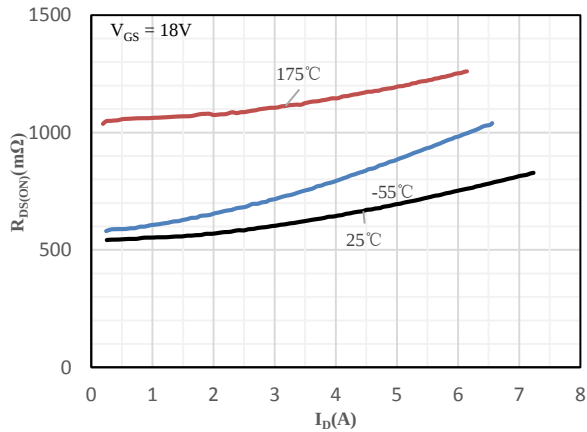


Fig 7 On-Resistance vs. Drain Current
for Various Junction Temperatures

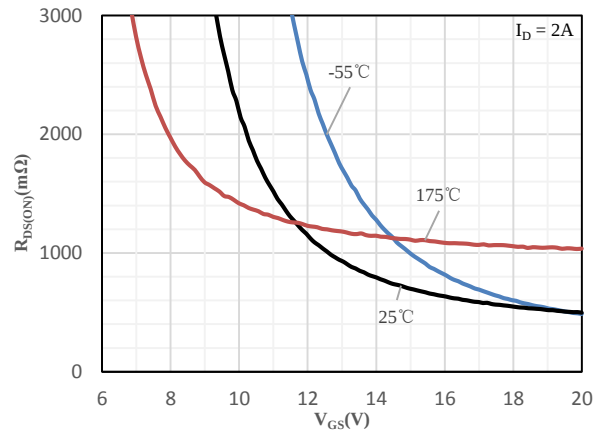


Fig 8 On-Resistance vs. Gate-Source Voltage
for Various Junction Temperatures

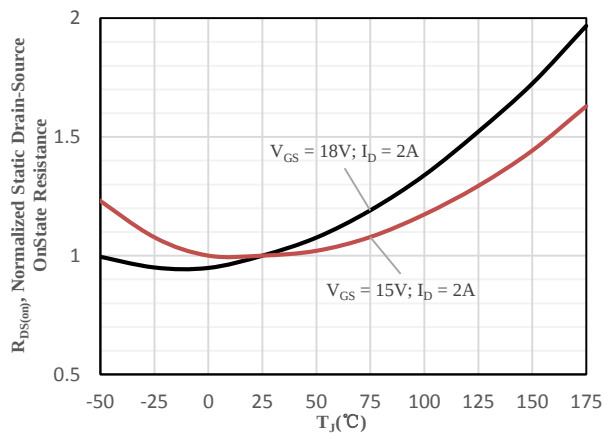


Fig 9 Normalized On-Resistance vs. Junction
Temperature

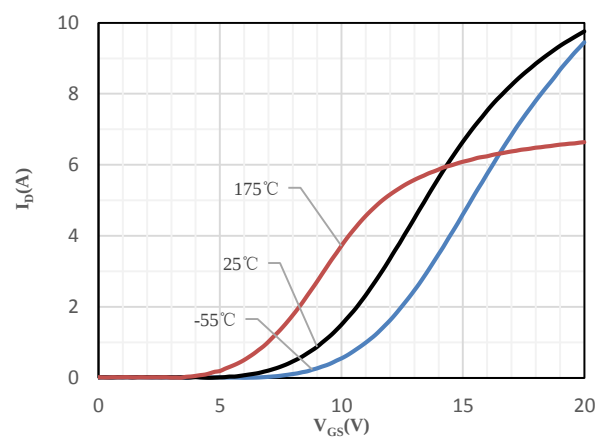


Fig 10 Transfer Characteristics for Various
Junction Temperatures

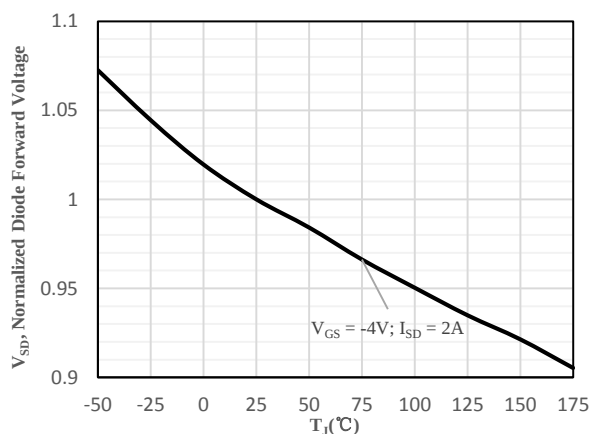


Fig 11 Normalized Diode Forward Voltage vs. Junction
Temperature

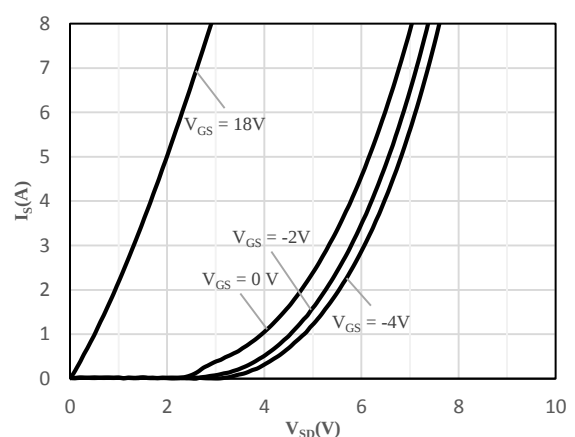


Fig 12 Body-Diode Characteristics ($T_J = -55^\circ\text{C}$)

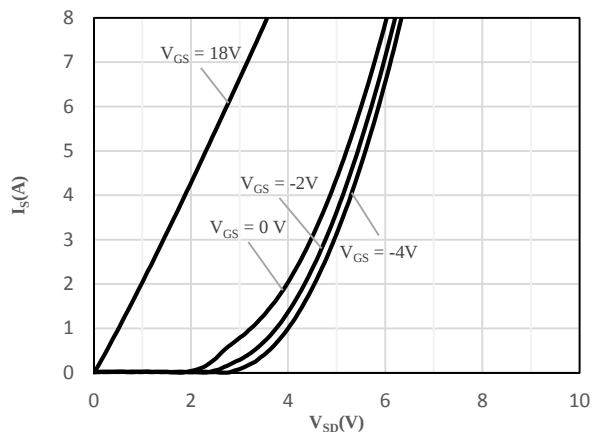


Fig 13 Body-Diode Characteristics ($T_j = 25^\circ\text{C}$)

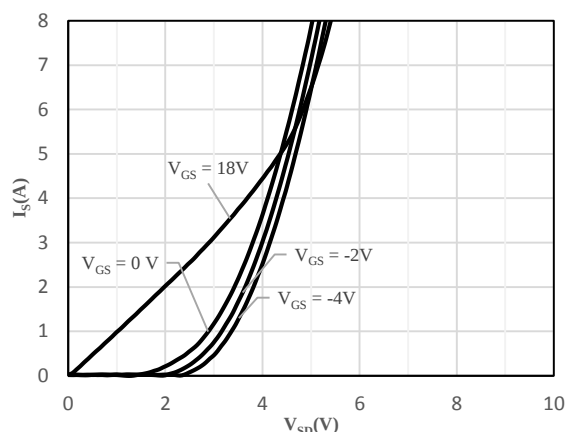


Fig 14 Body-Diode Characteristics ($T_j = 175^\circ\text{C}$)

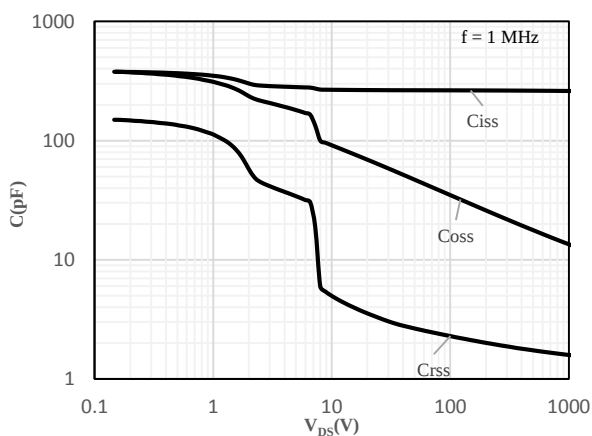


Fig 15 Capacitance Characteristics

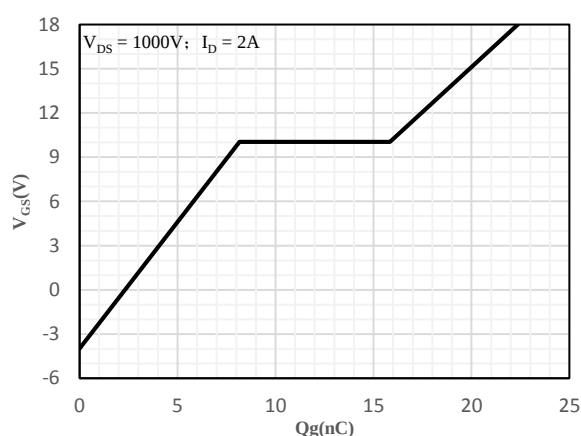


Fig 16 Gate-Charge Characteristics

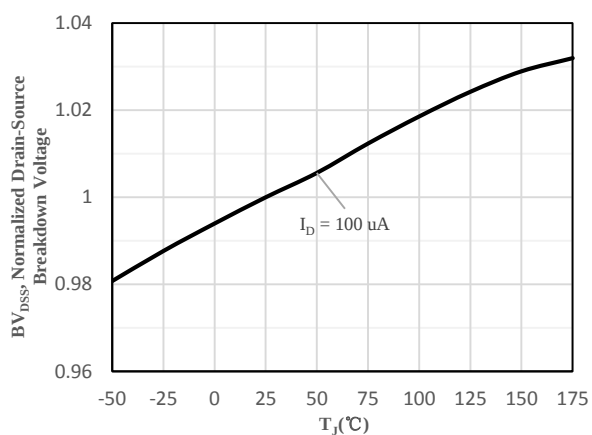


Fig 17 Normalized Breakdown Voltage
vs. Junction Temperature

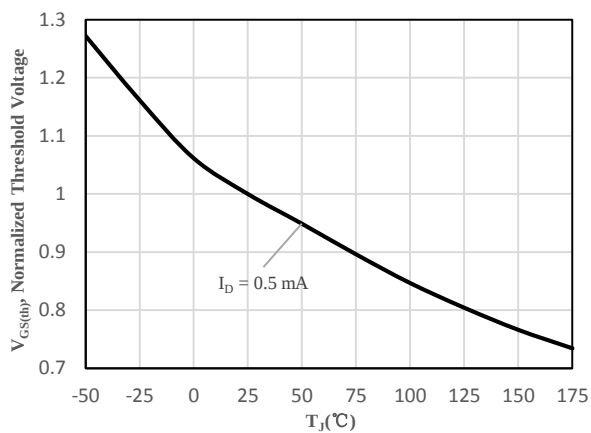


Fig 18 Normalized $V_{GS(th)}$ vs. Junction Temperature

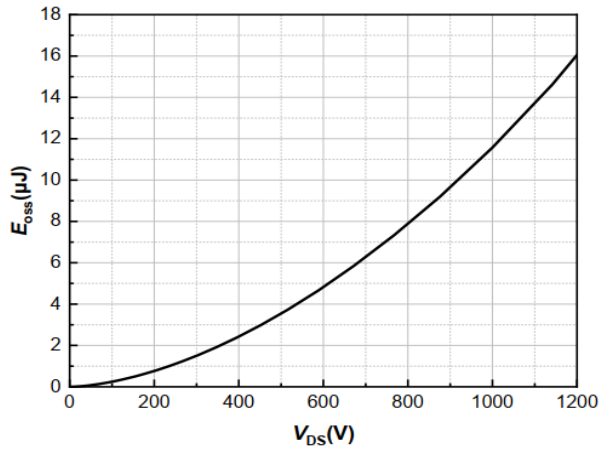


Fig 19 Output Capacitor Stored Energy

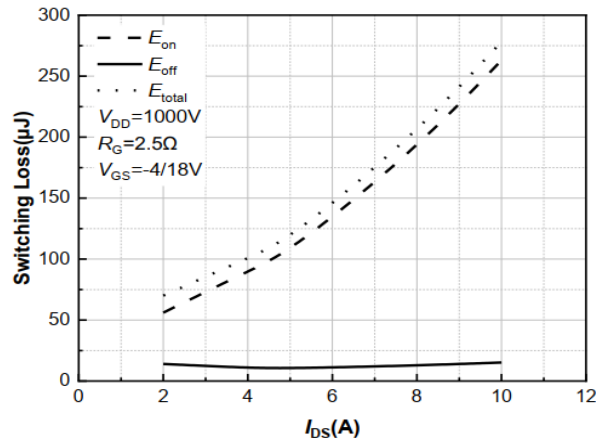


Fig 20 Clamped Inductive Switching Energy vs. Drain Current

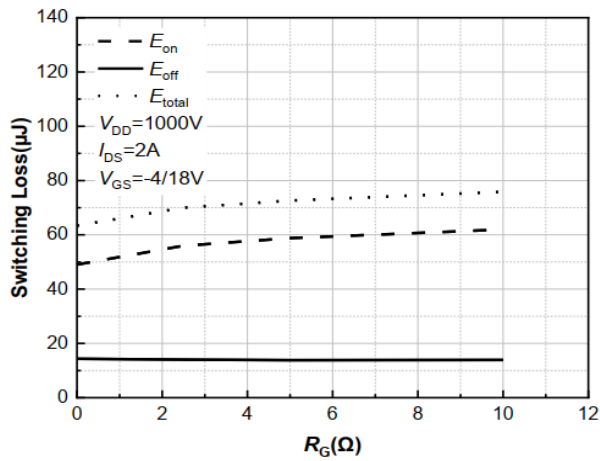


Fig 21 Clamped Inductive Switching Energy vs. R_G

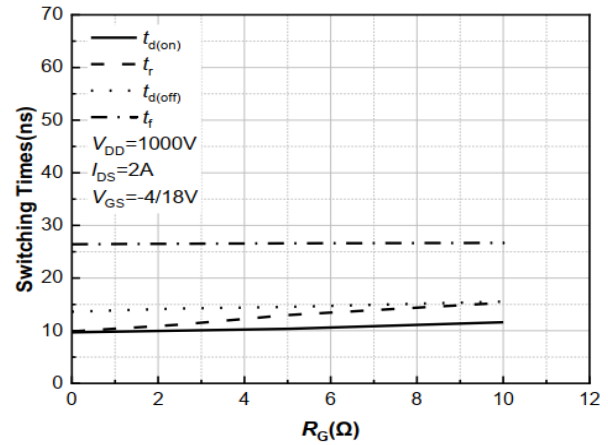


Fig 22 Clamped Inductive Switching Time vs. R_G

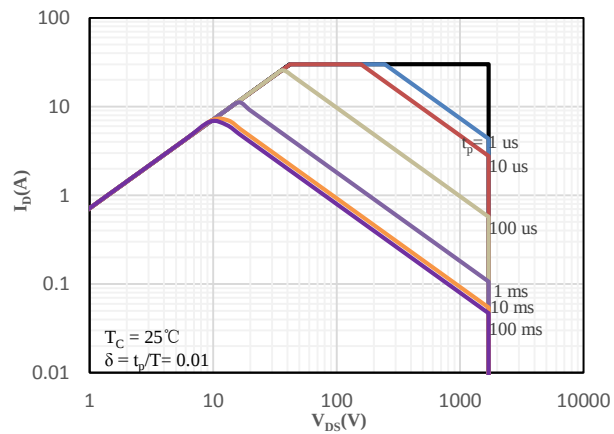


Fig 23 Safe Operating Area

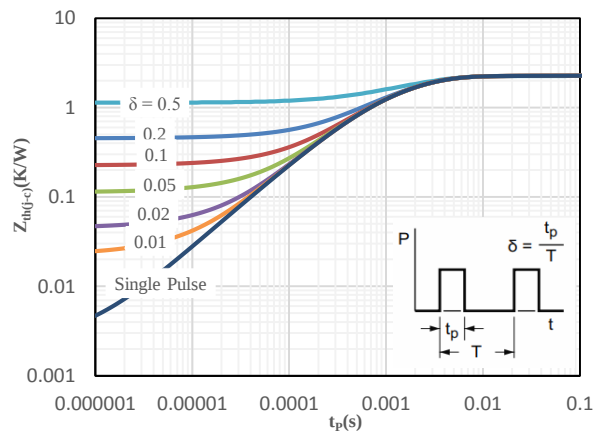
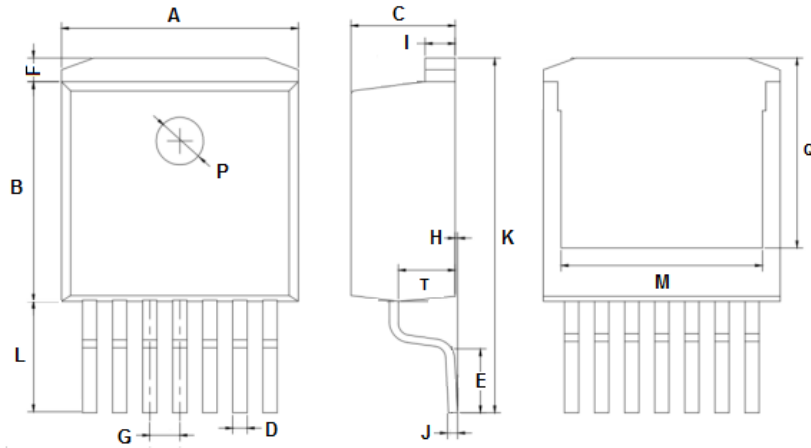


Fig 24 Maximum transient thermal impedance

Package Outline Dimensions (Unit: mm)



TO-263-7		
Dimension	Min.	Max.
A	9.80	10.20
B	9.05	9.45
C	4.30	4.70
D	0.52	0.72
E	2.48	2.88
F	0.87	1.27
G	1.17	1.37
H	0.00	0.25
I	1.07	1.47
J	0.42	0.62
K	14.87	15.27
L	4.55	4.95
M	7.80	8.20
P	1.40	1.80
Q	7.58	7.98
T	2.20	2.60