

Description:

This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

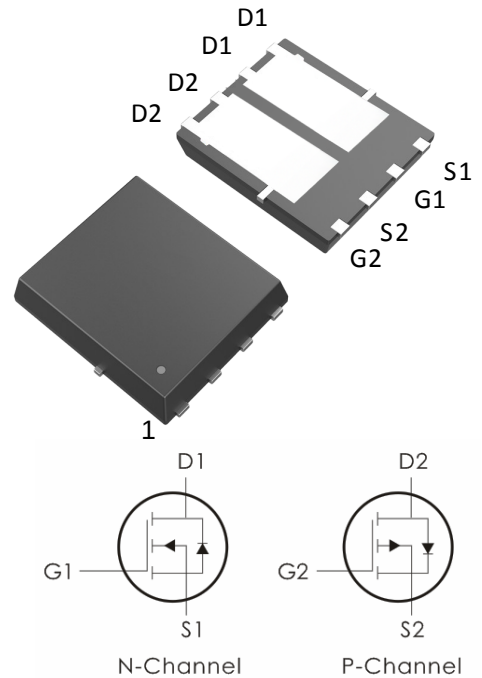
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=40V, I_D=28A, R_{DS(on)} < 13m\Omega @ V_{GS}=10V$ (Type: $10m\Omega$)

P-Channel: $V_{DS}=-40V, I_D=-20A, R_{DS(on)} < 45m\Omega @ V_{GS}=-10V$ (Type: $40m\Omega$)

- 1) Low gate charge.
- 2) Green device available.
- 3) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 4) Excellent package for good heat dissipation.
- 5) MSL3



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DON619	N619	DFN5*6-8	5000 pcs/Reel

Absolute Maximum Ratings: ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current- $T_C=25^\circ C$	28	-20	A
	Continuous Drain Current- $T_C=100^\circ C$	19.8	-16	
I_{DM}	Pulsed Drain Current ¹	70	-40	mJ
P_D	Power Dissipation	35	31.3	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JA}$	Thermal Resistance, Junction to ambient	62	$^\circ C/W$

N-CH Electrical Characteristics: ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	40	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =40V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	1	1.4	2	V
R _{DS(ON)}	Drain-Source On Resistance ²	V _{GS} =10V, I _D =15A	---	10	13	m Ω
		V _{GS} =4.5V, I _D =10A	---	13	20	
G _{FS}	Forward Transconductance	V _{DS} =5V, I _D =15A	---	7	---	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	---	1500	---	pF
C _{oss}	Output Capacitance		---	98	---	
C _{rss}	Reverse Transfer Capacitance		---	86	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} =20V, R _L =2.5 Ω R _G =3 Ω , V _{GS} =10V	---	5.5	---	ns
t _r	Rise Time		---	14	---	ns
t _{d(off)}	Turn-Off Delay Time		---	24	---	ns
t _f	Fall Time		---	12	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =15A	---	22.9	---	nC
Q _{gs}	Gate-Source Charge		---	3.5	---	nC
Q _{gd}	Gate-Drain Charge		---	5.3	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Drain Diode Forward Voltage	V _{GS} =0V, I _S =15A	---	---	1.2	V
I _S	Drain Diode Forward Voltage	V _D =V _G =0V	---	---	28	A

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Characteristics: ($T_c=25^\circ\text{C}$ unless otherwise noted)

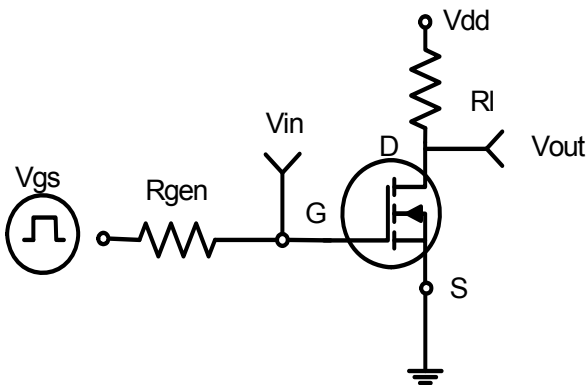


Figure 1: Switching Test Circuit

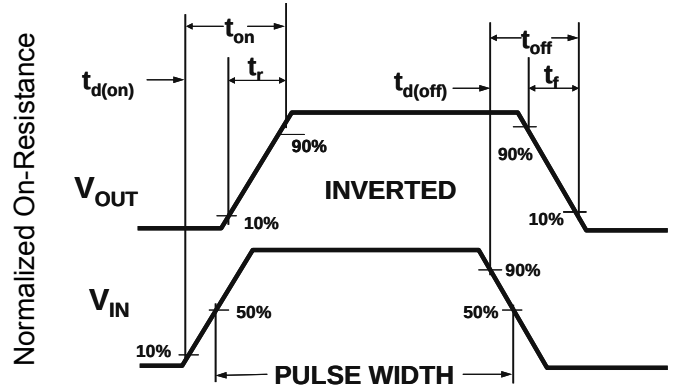


Figure 2: Switching Waveforms

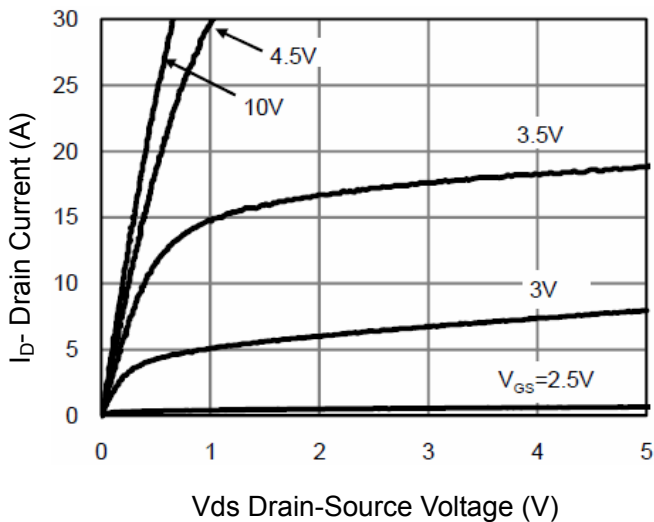


Figure 3: Output Characteristics

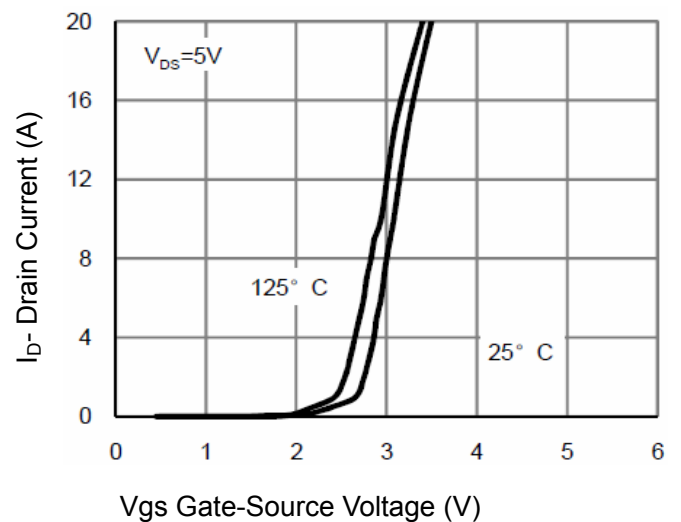


Figure 4: Transfer Characteristics

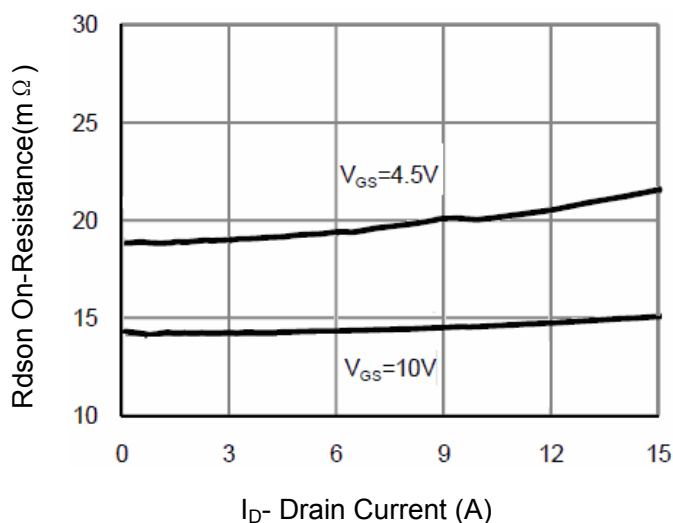


Figure 5: Drain-Source On-Resistance

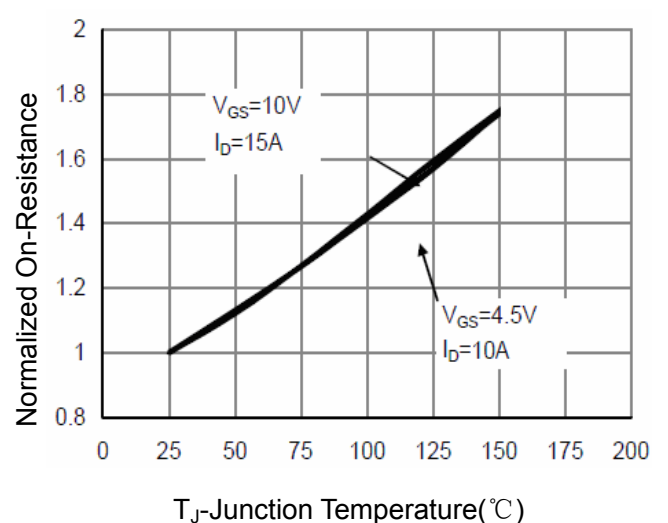


Figure 6: Drain-Source On-Resistance

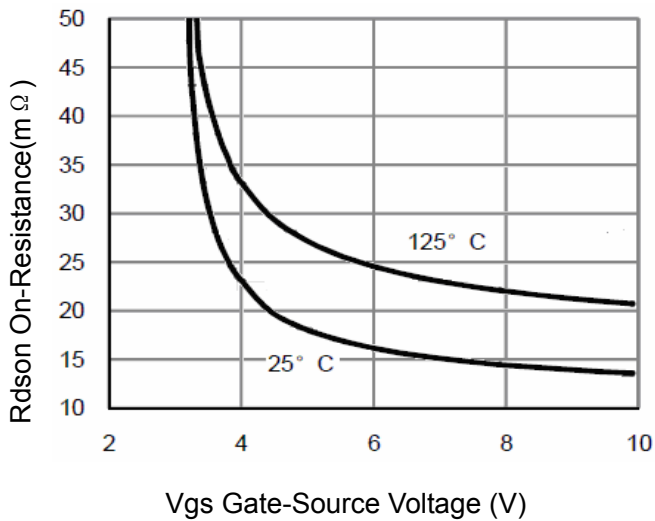


Figure7 Rdson vs Vgs

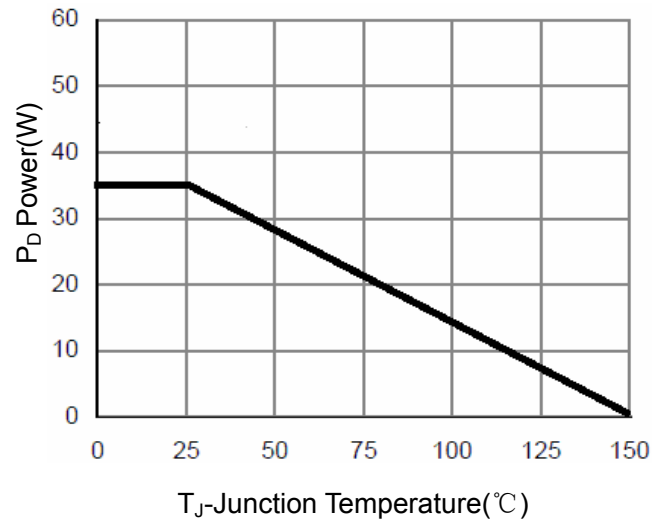


Figure 8 Power Dissipation

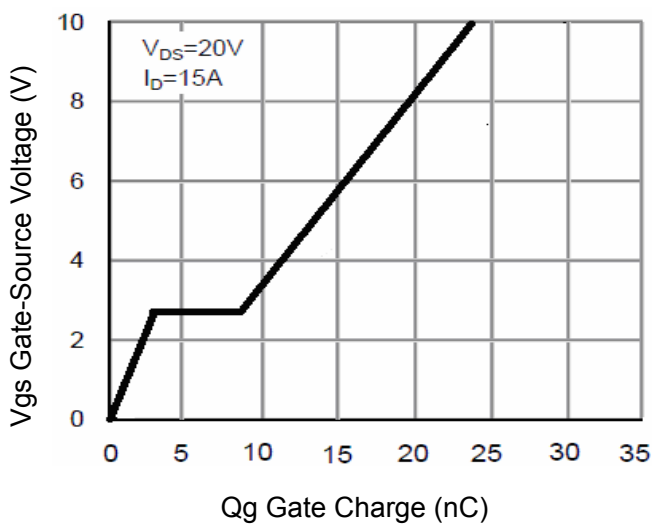


Figure 9 Gate Charge

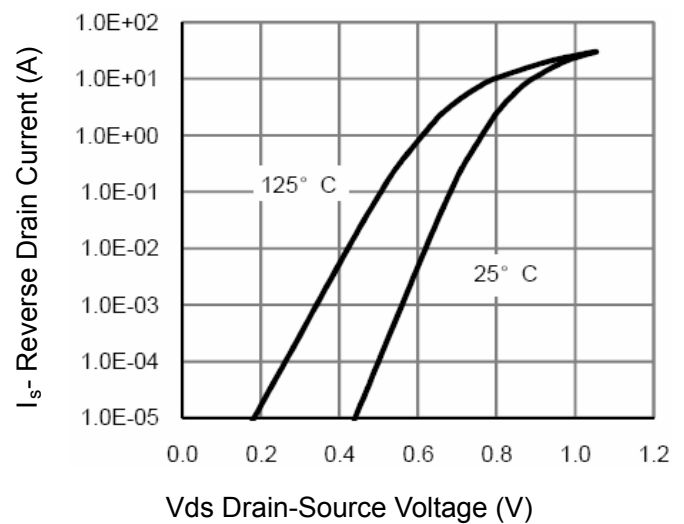


Figure 10 Source- Drain Diode Forward

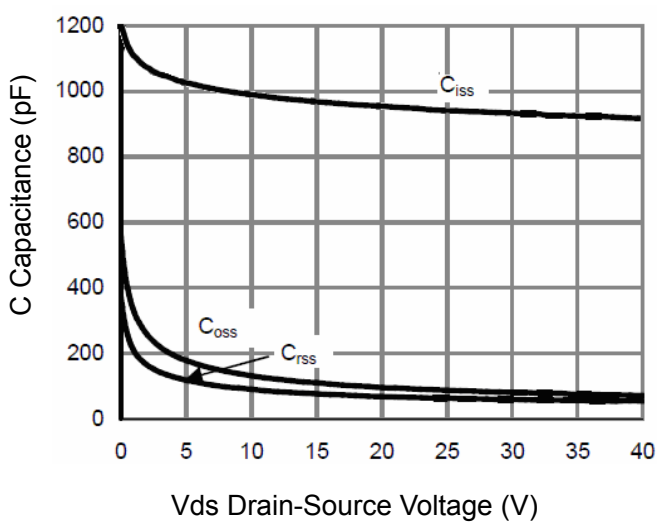


Figure 11 Capacitance vs Vds

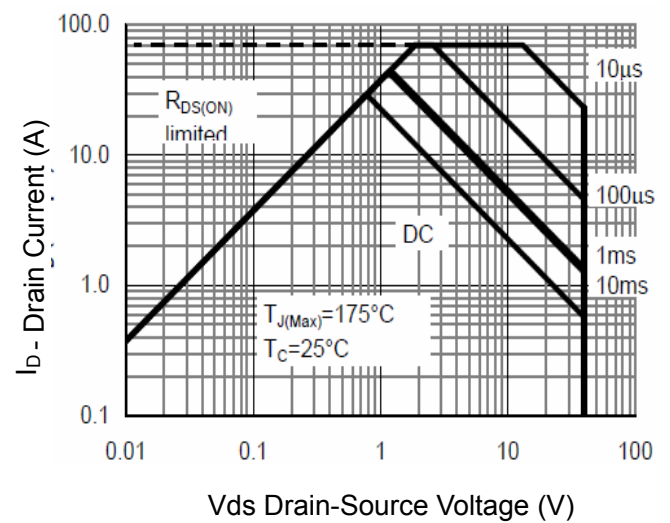


Figure 12 Safe Operation Area

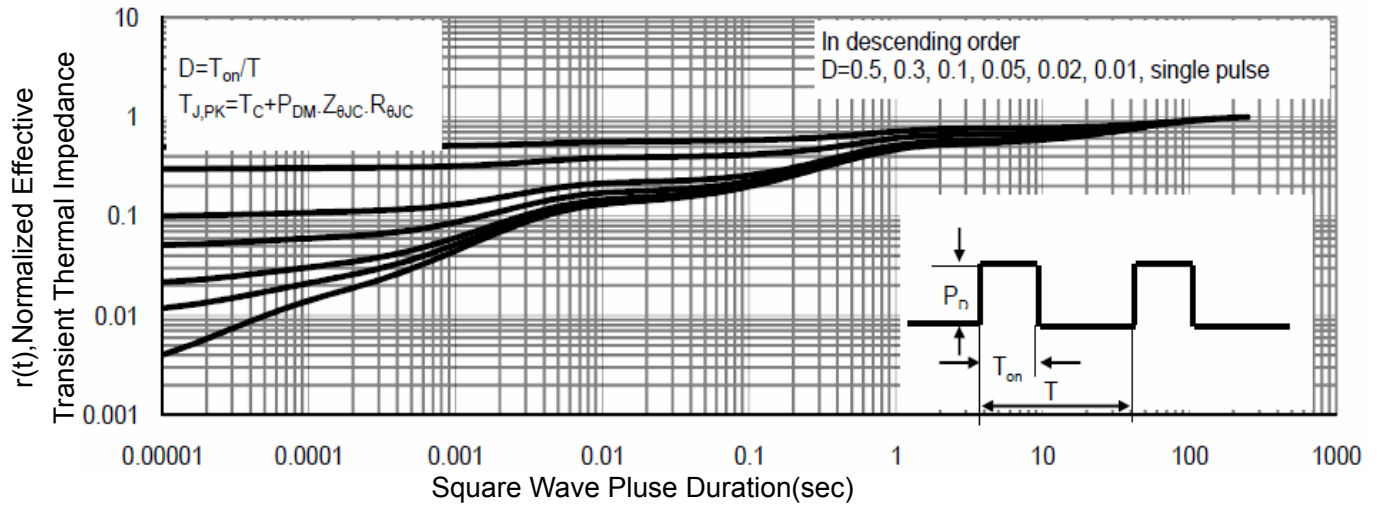


Figure 13 Normalized Maximum Transient Thermal Impedance

P-CH Electrical Characteristics: ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	-40	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-32V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	-1	-1.6	-2.5	V
R _{DS(ON)}	Drain-Source On Resistance ²	V _{GS} =-10V, I _D =-8A	---	40	45	m Ω
		V _{GS} =4.5V, I _D =-4A	---	55	65	
G _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-8A	---	12.6	---	S
Dynamic Characteristics'						
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	1100	---	pF
C _{oss}	Output Capacitance		---	98	---	
C _{rss}	Reverse Transfer Capacitance		---	75	---	
Switching Characteristics'						
t _{d(on)}	Turn-On Delay Time	V _{DD} =-15V, I _D =-1A, R _G =3.3 Ω , V _{GS} =-10V	---	19.2	---	ns
t _r	Rise Time		---	12.8	---	ns
t _{d(off)}	Turn-Off Delay Time		---	48.6	---	ns
t _f	Fall Time		---	4.6	---	ns
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-20V, I _D = -12A	---	9	---	nC
Q _{gs}	Gate-Source Charge		---	2.54	---	nC
Q _{gd}	Gate-Drain Charge		---	3.1	---	nC
R _G	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	13	16	Ω
Drain-Source Diode Characteristics						
I _S	Continuous Source Current	V _D =V _G =0V	---	---	-20	A
I _{SM}	Pulsed Source Current		---	---	-40	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _S =-1A , T _J =25℃	---	---	-1	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

V2.0

Typical Characteristics: ($T_C=25^\circ\text{C}$ unless otherwise noted)

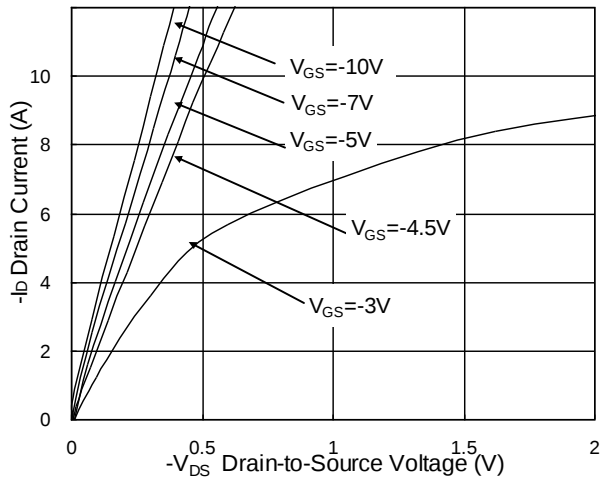


Fig.1 Typical Output Characteristics

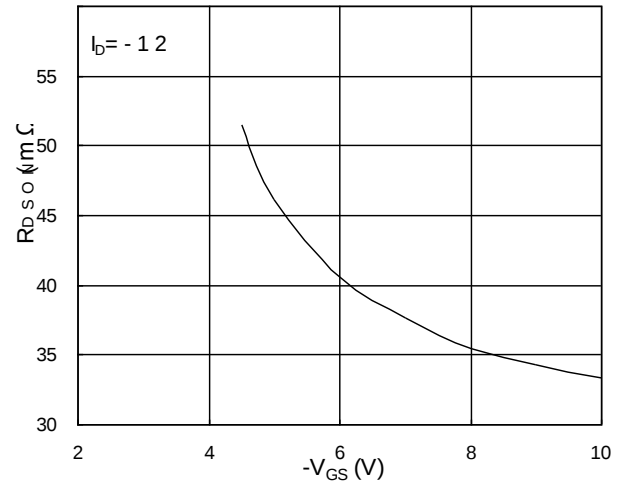


Fig.2 On-Resistance v.s Gate-Source

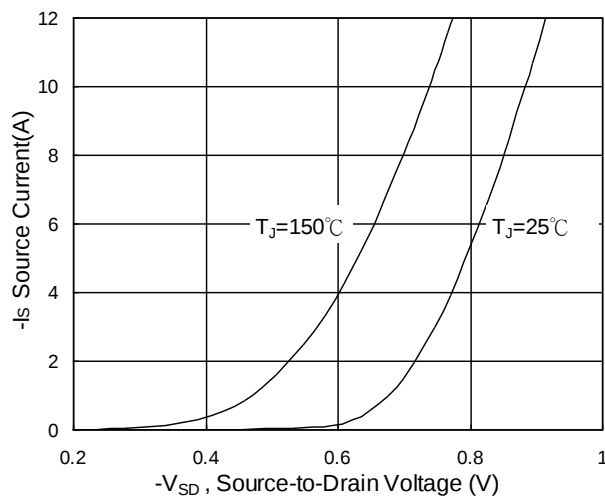


Fig.3 Forward Characteristics of Reverse

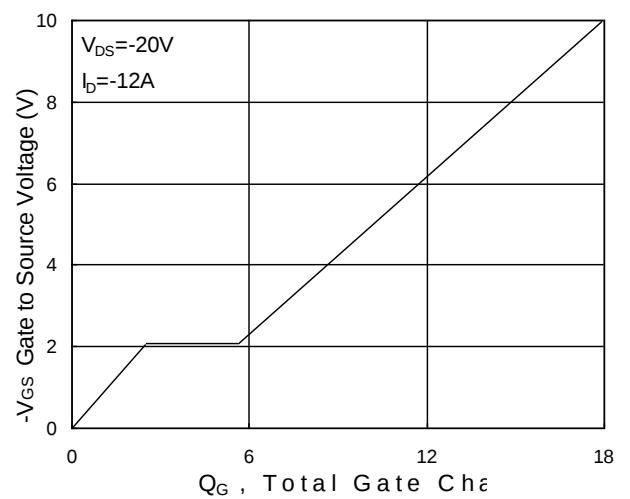


Fig.4 Gate-Charge Characteristics

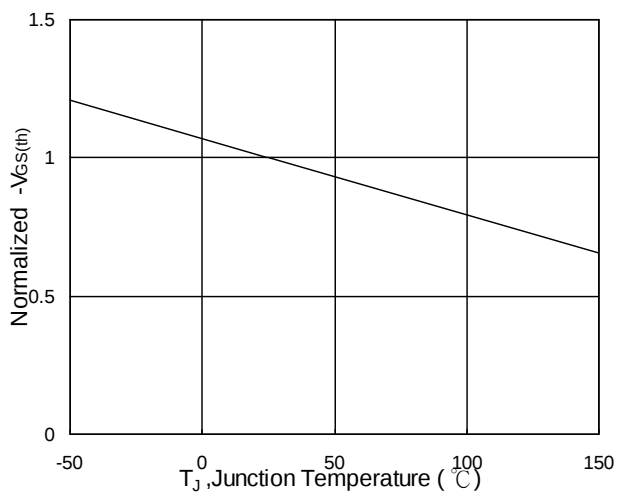


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

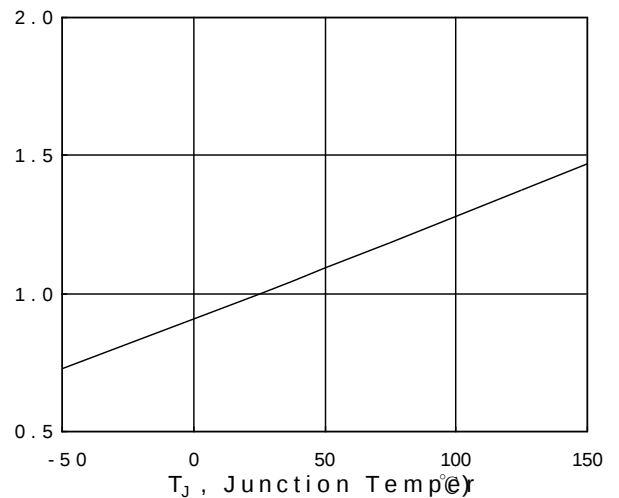


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

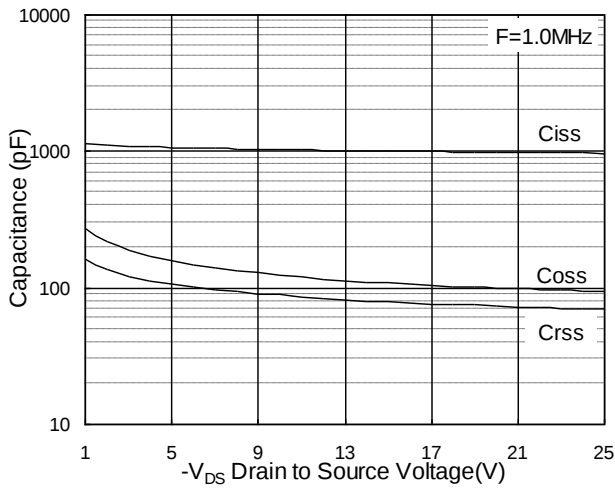


Fig.7 Capacitance

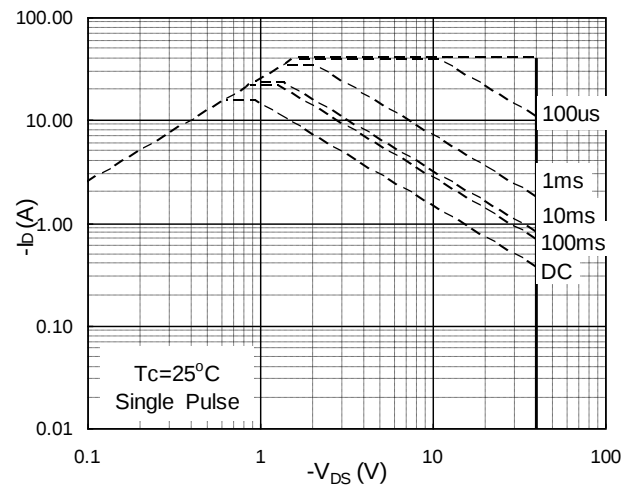


Fig.8 Safe Operating Area

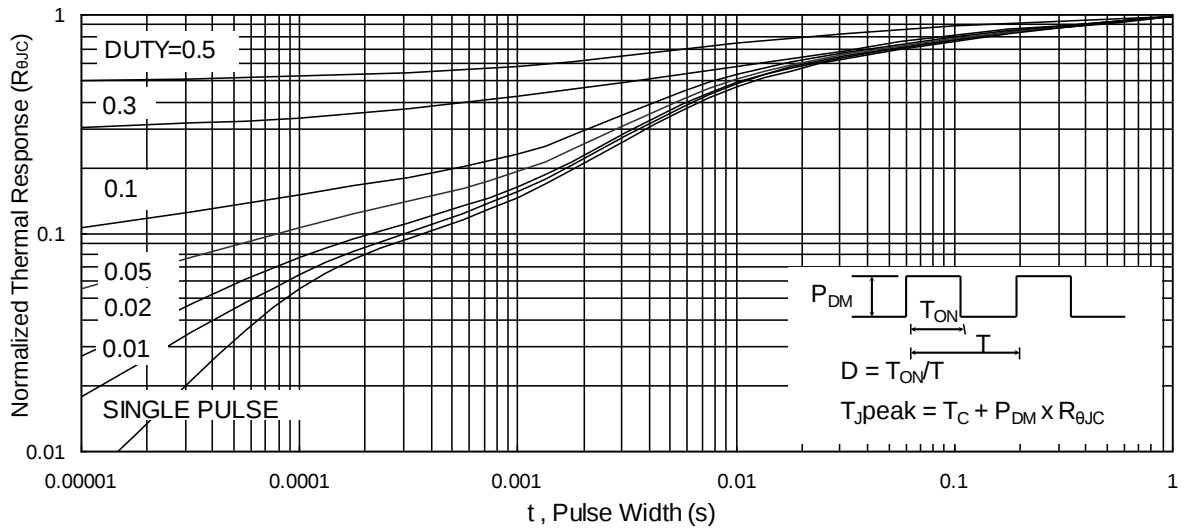


Fig.9 Normalized Maximum Transient Thermal Impedance

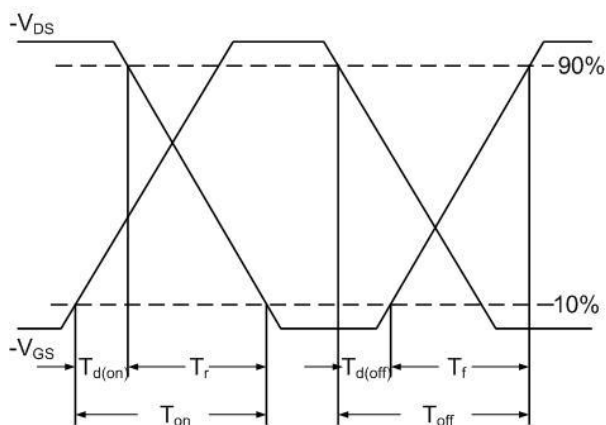


Fig.10 Switching Time Waveform

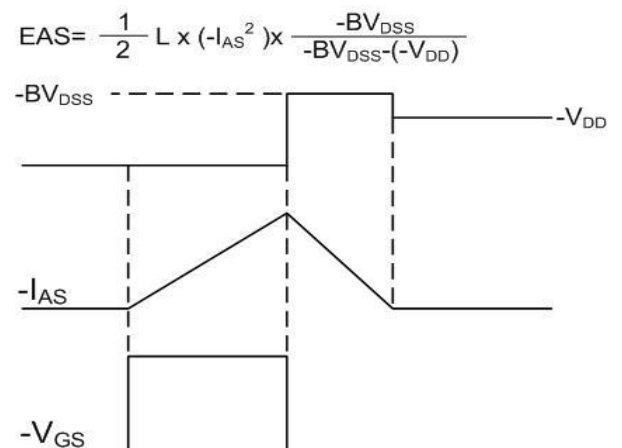
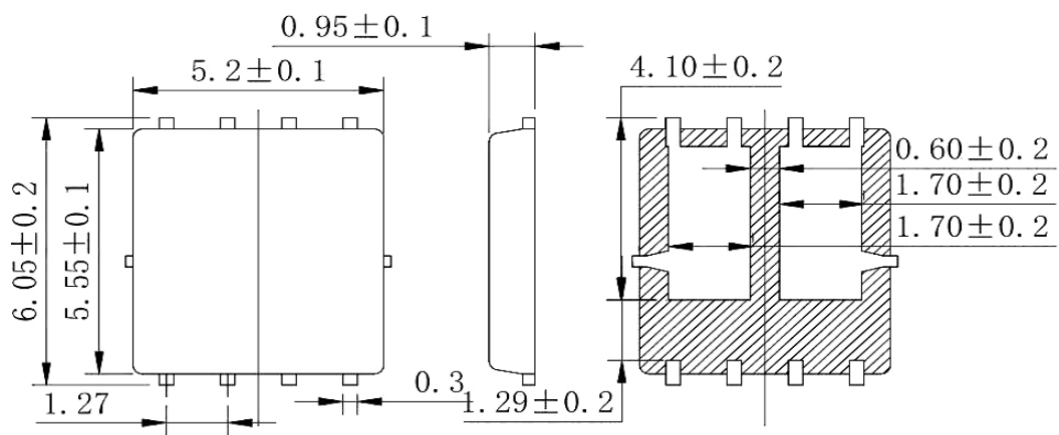
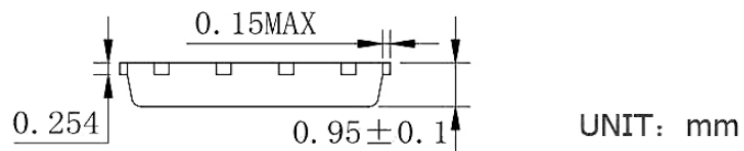


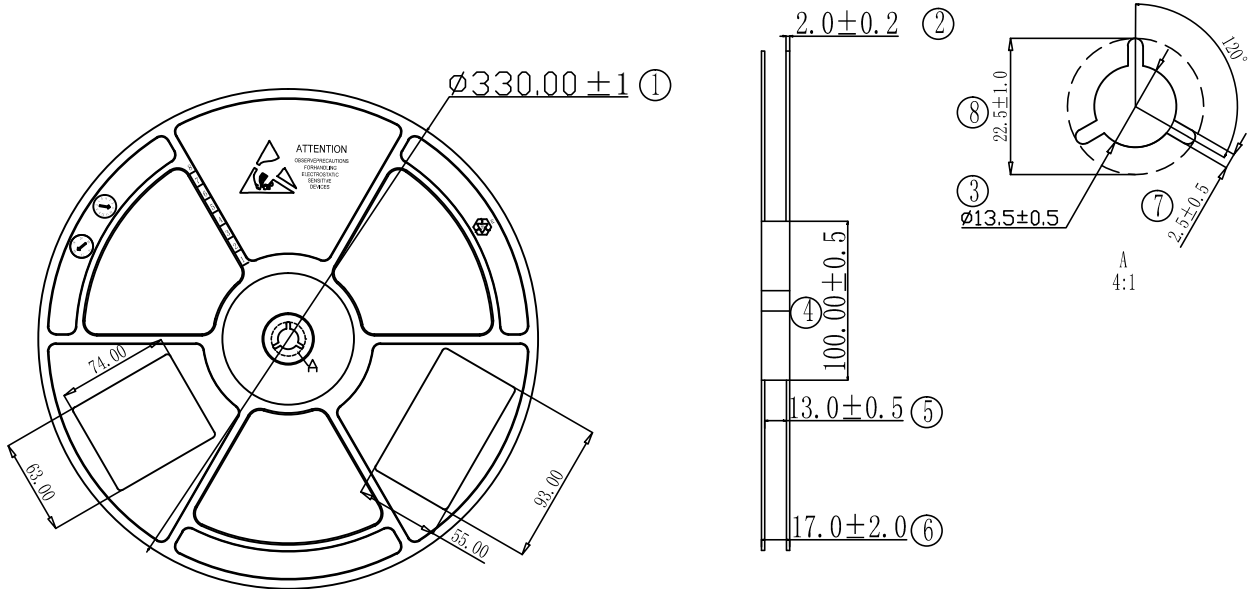
Fig.11 Unclamped Inductive Waveform

DFN5×6-8D Package Information:

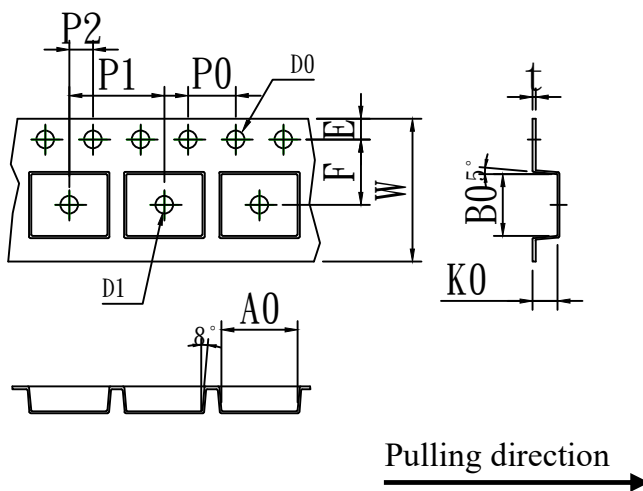


Tape & Reel Information

Dimensions in mm



Symbol	A0	B0	K0	D0	D1	P0	P1	10*P0
Spec	6.15±0.10	5.40±0.10	1.30±0.10	1.55±0.10	1.55±0.10	4.00±0.10	8.00±0.10	40.00±0.10
Symbol	W	E	F	P2	t			
Spec	12.00±0.10	1.75±0.10	5.50±0.10	2.00±0.10	0.20±0.05			



Marking Information:

①. Doingter LOGO

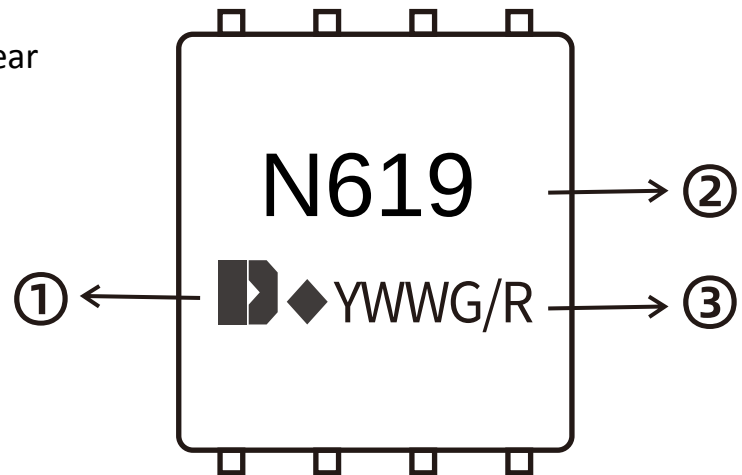
②. Part NO.

③. Date Code(YWWG / R)

Y : Year Code , last digit of the year

WW : Week Code(01-53)

G/R : G(Green) /R(Lead Free)



Previous Version

Version	Date	Subjects (major changes since last revision)
2.0	2024-09-02	Release of final version

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