

Description:

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

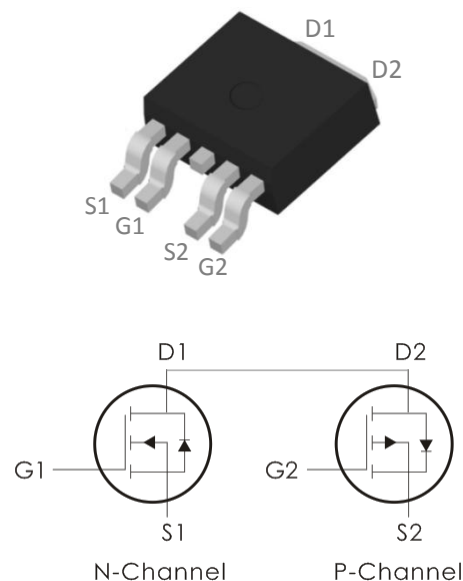
It can be used in a wide variety of applications.

Features:

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

P-Channel: $V_{DS}=-40V, I_D=-35A, R_{DS(on)} < 18m\Omega @ V_{GS}=-10V$

- 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.



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DOD629C	D629C	TO- 252-4	2500 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	-35	A
	Continuous Drain Current- $T_C=100^\circ C$	22	-25	
I_{DM}	Pulsed Drain Current ¹	45	-52	A
E_{AS}	Single pulse avalanche energy ²	28	70	mJ
P_D	Power Dissipation - $T_C=25^\circ C$	40	45	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		$^\circ C$

Thermal Characteristics:

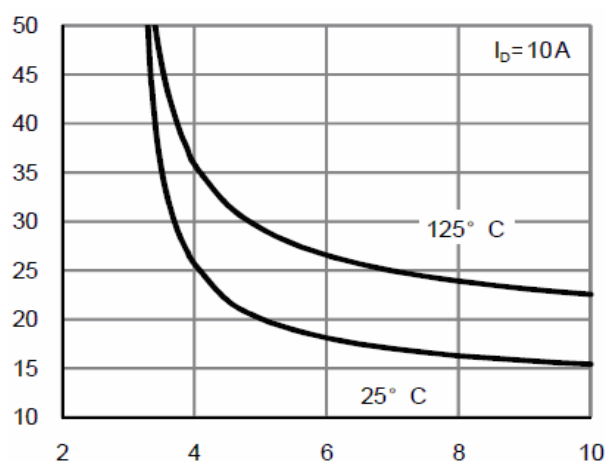
Symbol	Parameter	N-CH	P-CH	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Cast	3.1	2.78	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourctce 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	1.5	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ³	V _{GS} =10V, I _D =10A	---	10	13	m Ω
		V _{GS} =4.5V, I _D =5A	---	13	20	
Dynamic Characteristics ⁴						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	---	1396	---	pF
C _{oss}	Output Capacitance		---	210	---	
C _{rss}	Reverse Transfer Capacitance		---	131	---	
Q _g	Gate Charge	V _{GS} =10V , V _{DS} =20V I _D =10A	---	25.2	---	nC
Q _{gs}	Gate-Source Charge		---	4.2	---	
Q _{gd}	Gate-Drain Charge		---	3.6	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DD} =20V, R _L =2 Ω , R _{REN} =3 Ω ,V _{GS} =10V	---	4.2	---	ns
t _r	Rise Time		---	12	---	ns
t _{d(off)}	Turn-Off Delay Time		---	18.9	---	ns
t _f	Fall Time		---	5.8	---	ns
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _G =V _D =0V	---	----	28	A
I _{SM}	Pulsed Drain to Source Diode	V _G =V _D =0V	---	---	45	A
V _{SD}	Source-Drain Diode Forward Voltage ³	V _{GS} =0V, I _S =10A	---	0.8	1.2	V

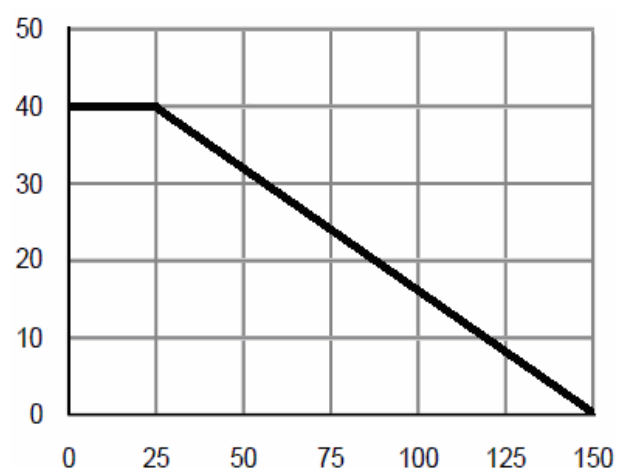
Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=20V, V_G=10V, L=0.5mH$
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

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


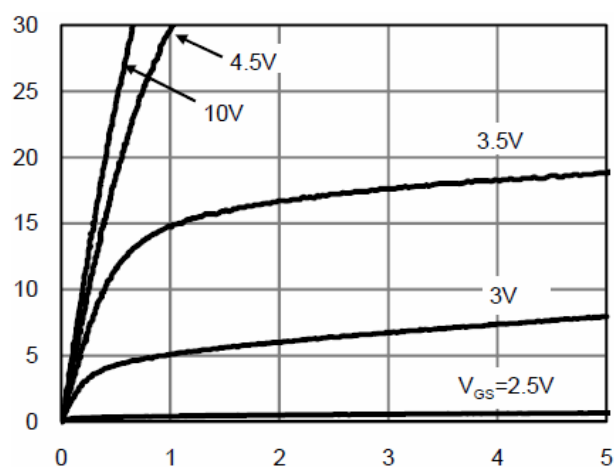
Vgs Gate-Source Voltage (V)

Figure1 Rdson vs Vgs



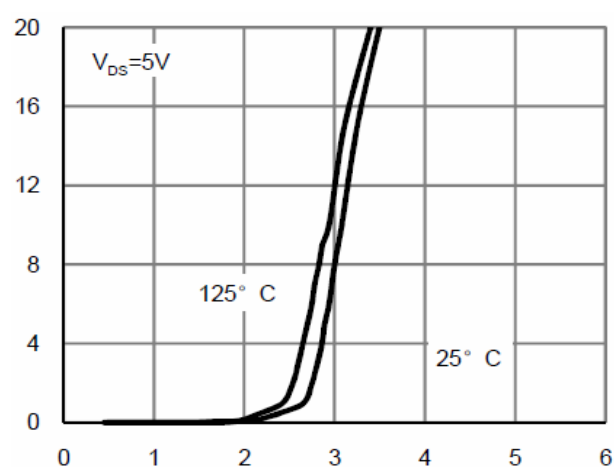
T_J -Junction Temperature($^{\circ}\text{C}$)

Figure 2 Power Dissipation



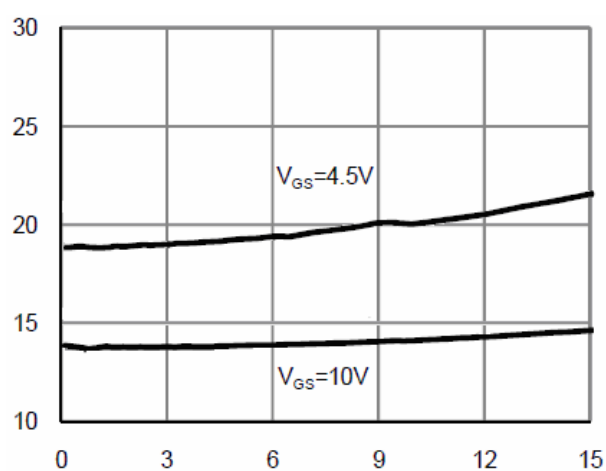
Vds Drain-Source Voltage (V)

Figure 3 Output Characteristics



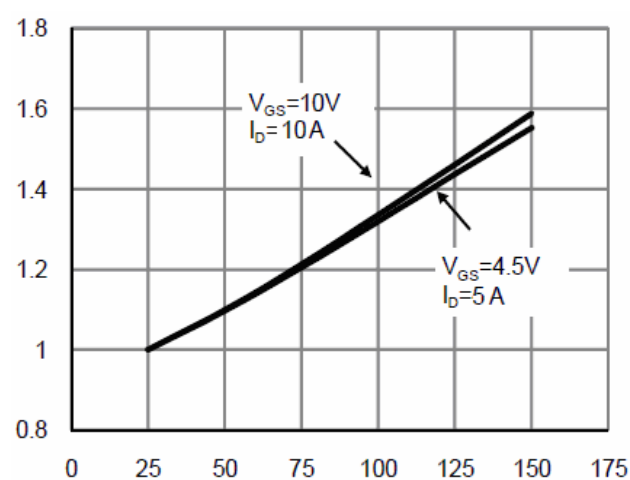
Vgs Gate-Source Voltage (V)

Figure 4 Transfer Characteristics



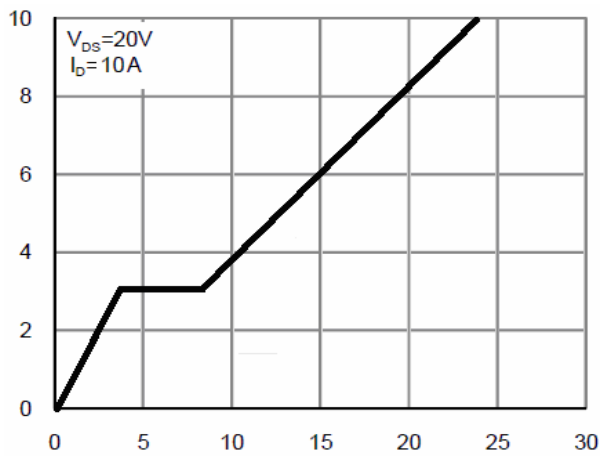
I_D - Drain Current (A)

Figure 5 Drain-Source On-Resistance



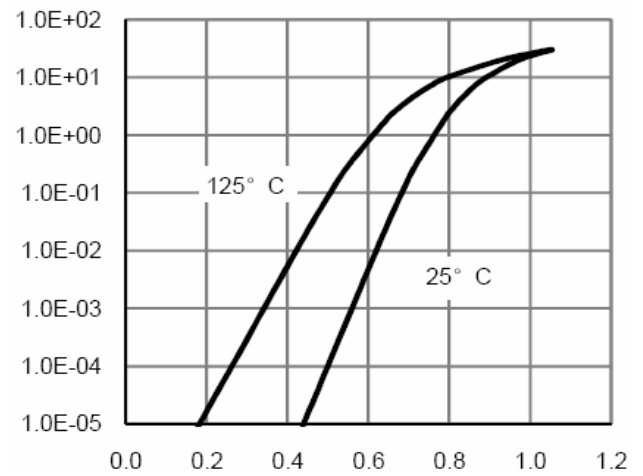
T_J -Junction Temperature($^{\circ}\text{C}$)

Figure 6 Drain-Source On-Resistance



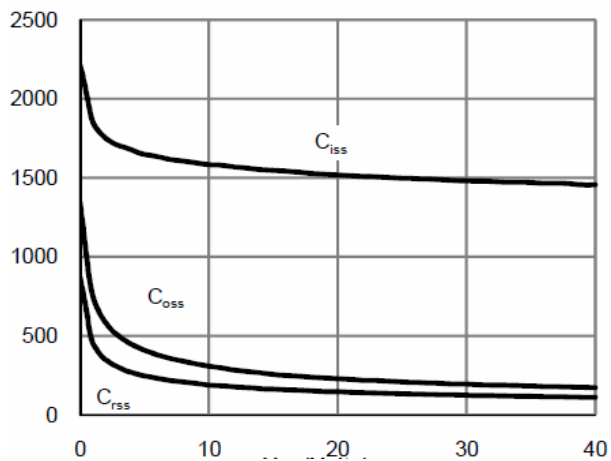
Qg Gate Charge (nC)

Figure 7 Gate Charge



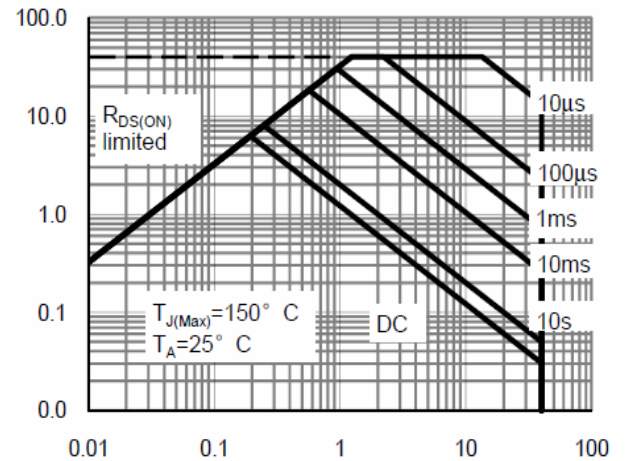
Vds Drain-Source Voltage (V)

Figure 8 Source- Drain Diode Forward



Vds Drain-Source Voltage (V)

Figure 9 Capacitance vs Vds



Vds Drain-Source Voltage (V)

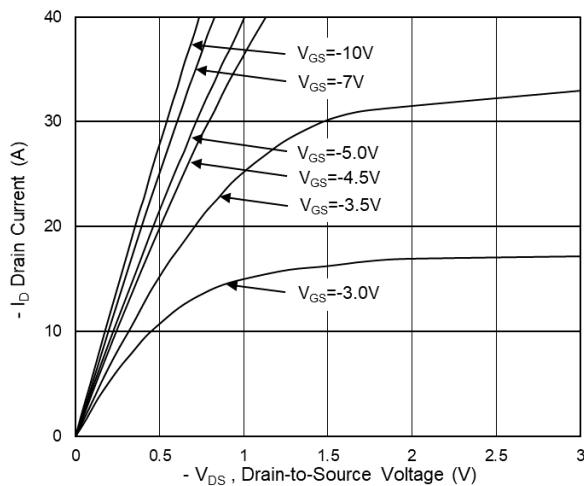
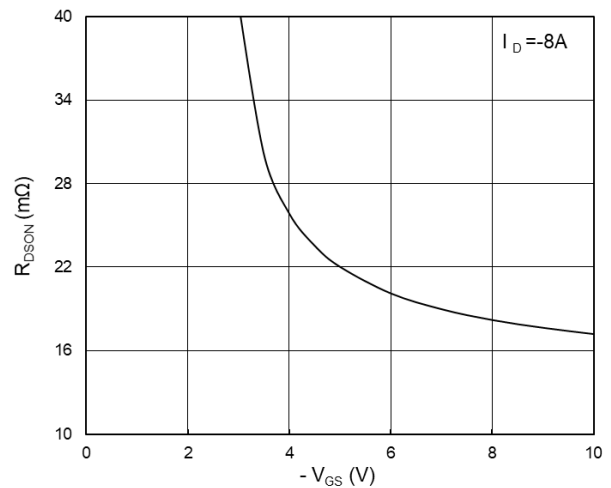
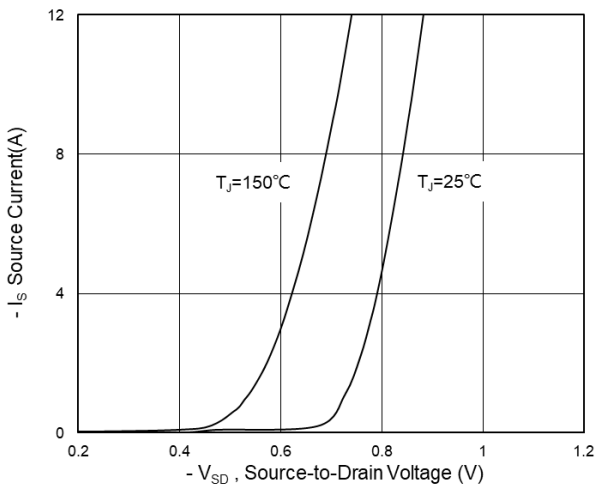
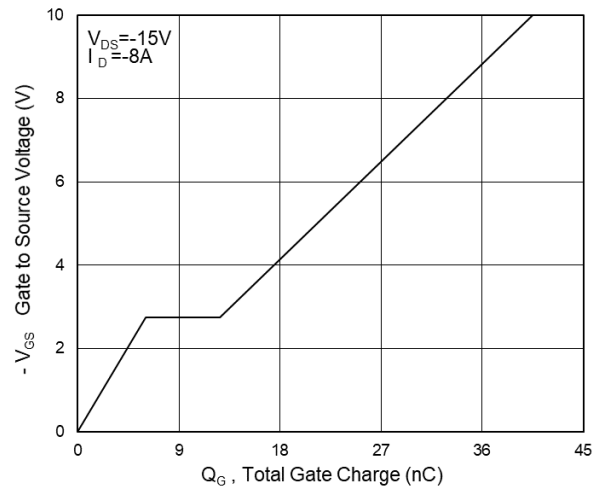
Figure 10 Safe Operation Area

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourctce 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	-2.2	V
R _{DS(ON)}	Drain-Source On Resistance ³	V _{GS} =-10V, I _D =-8A	---	14	18	m Ω
		V _{GS} =-4.5V, I _D =-6A	---	20	24	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1MHz	---	1430	---	pF
C _{oss}	Output Capacitance		---	150	---	
C _{rss}	Reverse Transfer Capacitance		---	135	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = -20V, I _D =-1A V _{GS} = -10V, R _{GEN} =6 Ω	---	13.6	---	ns
t _r	Rise Time		---	25.2	---	ns
t _{d(off)}	Turn-Off Delay Time		---	29.4	---	ns
t _f	Fall Time		---	24.1	---	ns
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-20V, I _D =-8A	---	20.4	---	nC
Q _{gs}	Gate-Source Charge		---	6.4	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	6.9	---	nC
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _D =V _G =0V	---	---	-35	A
I _{SM}	Pulsed Drain to Source Diode		---	---	-52	---
V _{SD}	Source-Drain Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A	---	---	-1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : $T_J=25^{\circ}\text{C}$, $V_{DD}=-20\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$

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

Fig.1 Typical Output Characteristics

Fig.2 On-Resistance vs G-S Voltage

Fig.3 Source Drain Forward Characteristics

Fig.4 Gate-Charge Characteristics

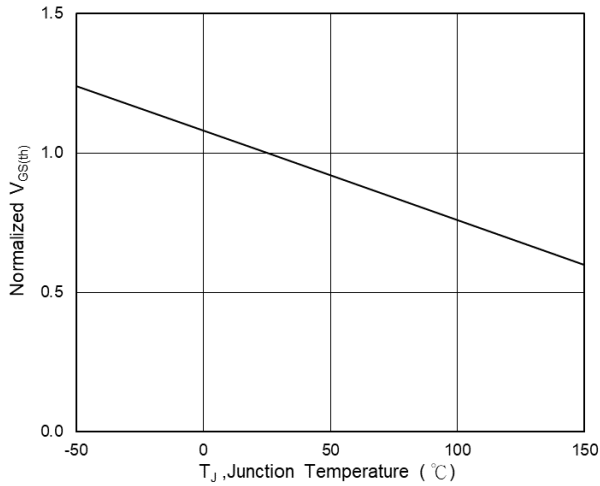


Fig.5 Normalized $V_{GS(th)}$ vs T_J

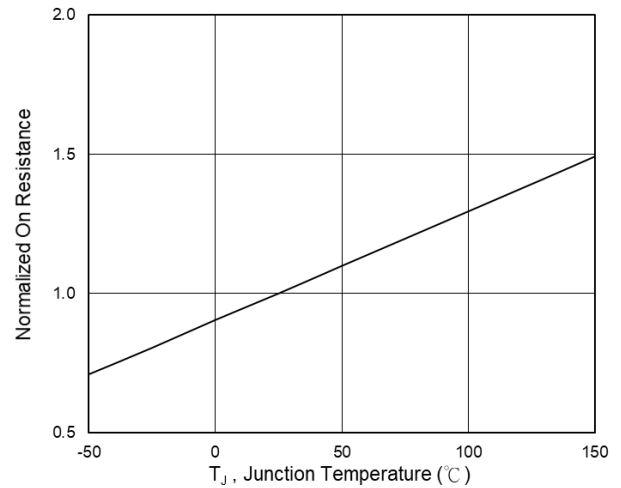


Fig.6 Normalized $R_{DS(on)}$ vs T_J

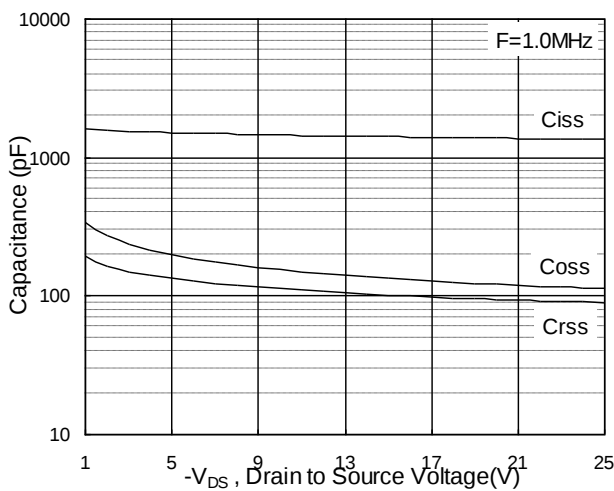


Fig.7 Capacitance

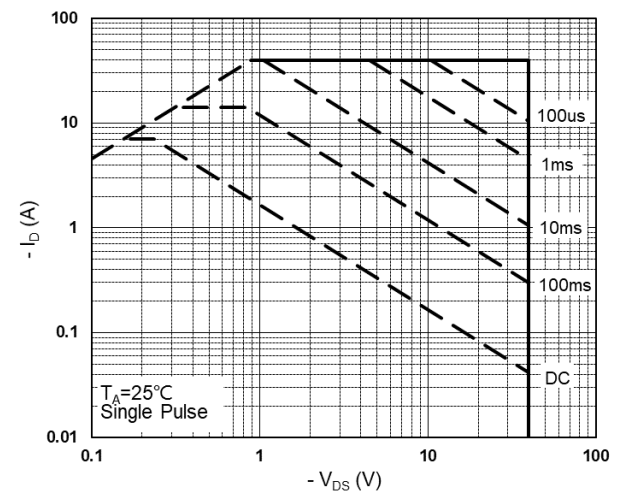


Fig.8 Safe Operating Area

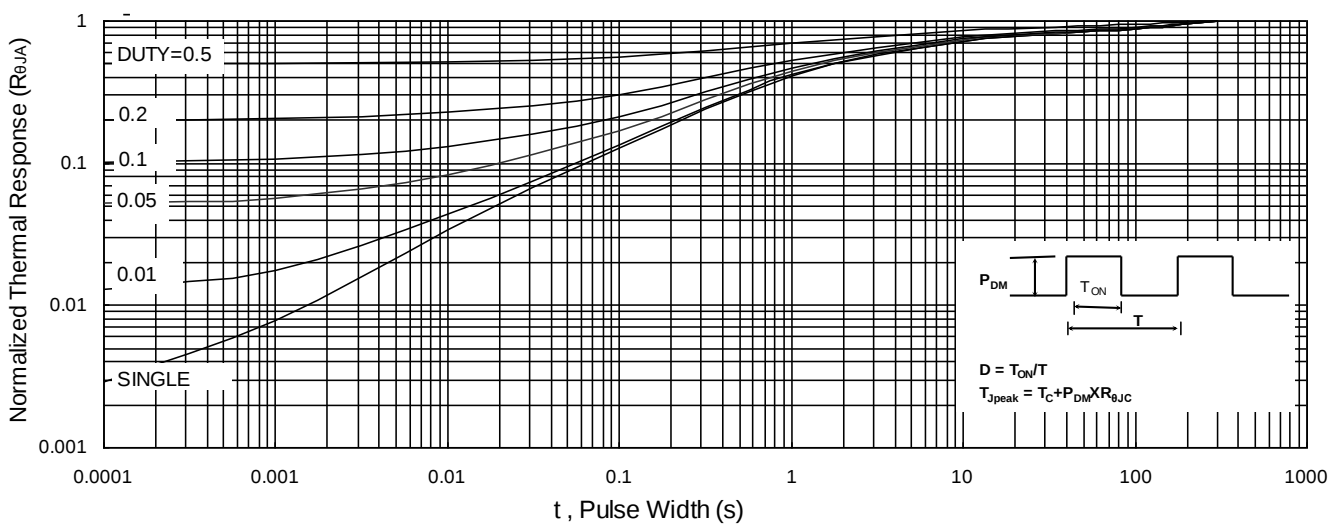


Fig.9 Normalized Maximum Transient Thermal Impedance

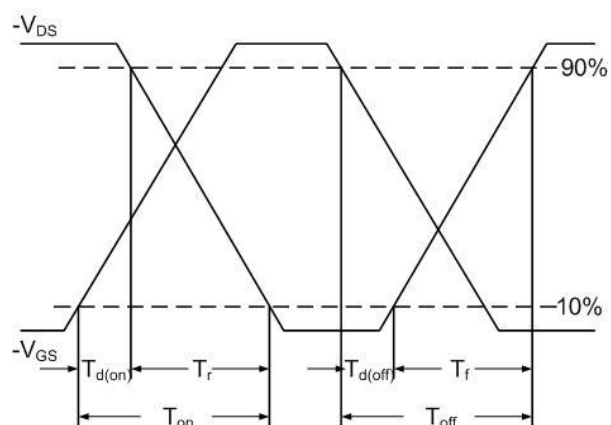


Fig.10 Switching Time Waveform

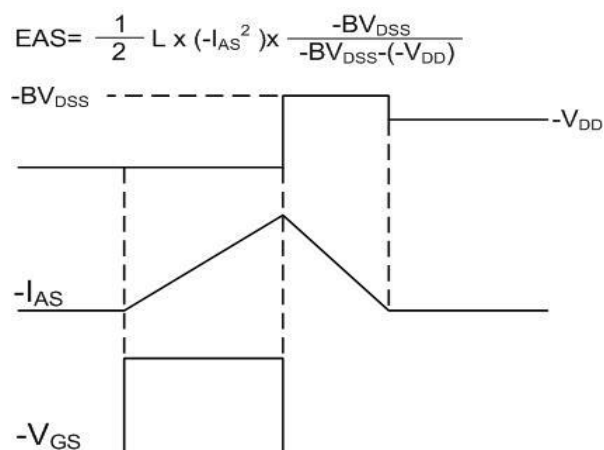
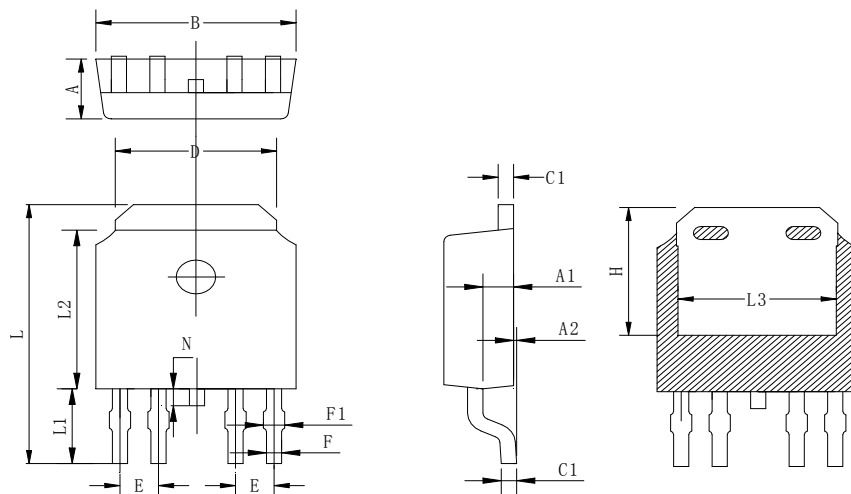


Fig.11 Unclamped Inductive Switching Waveform

TO-252-4 Package Outline Data

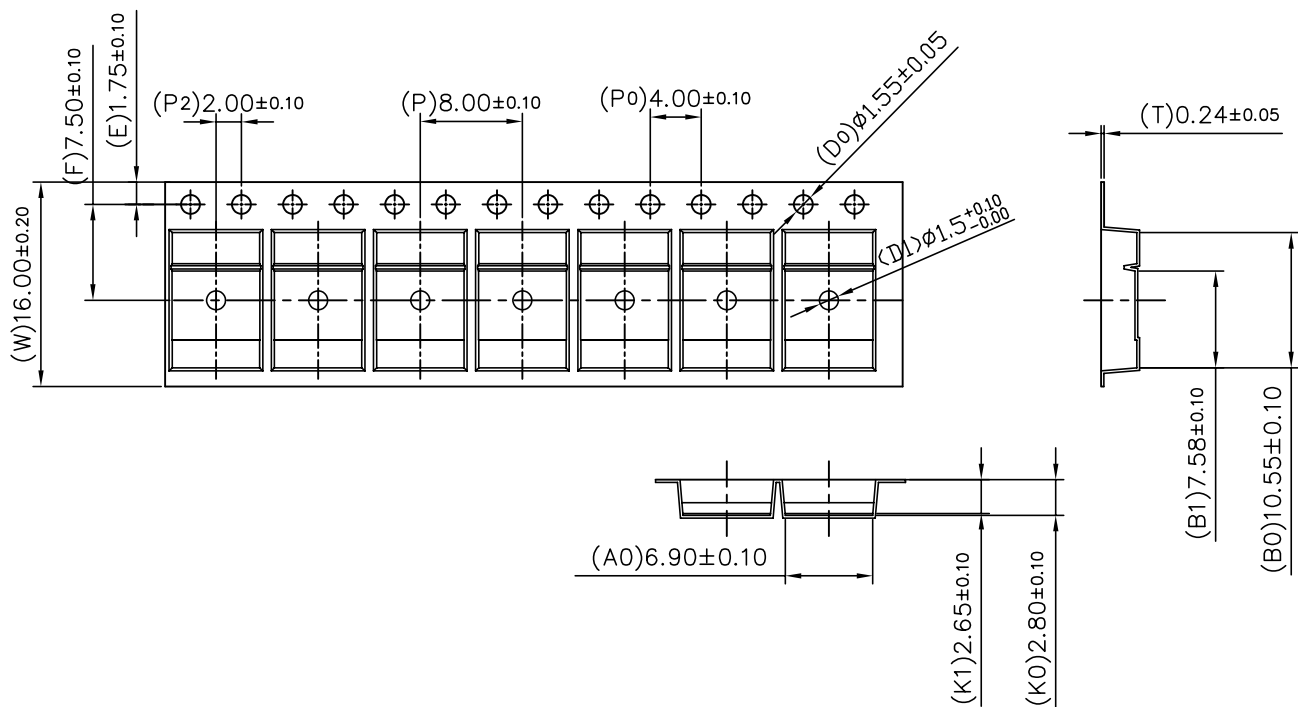
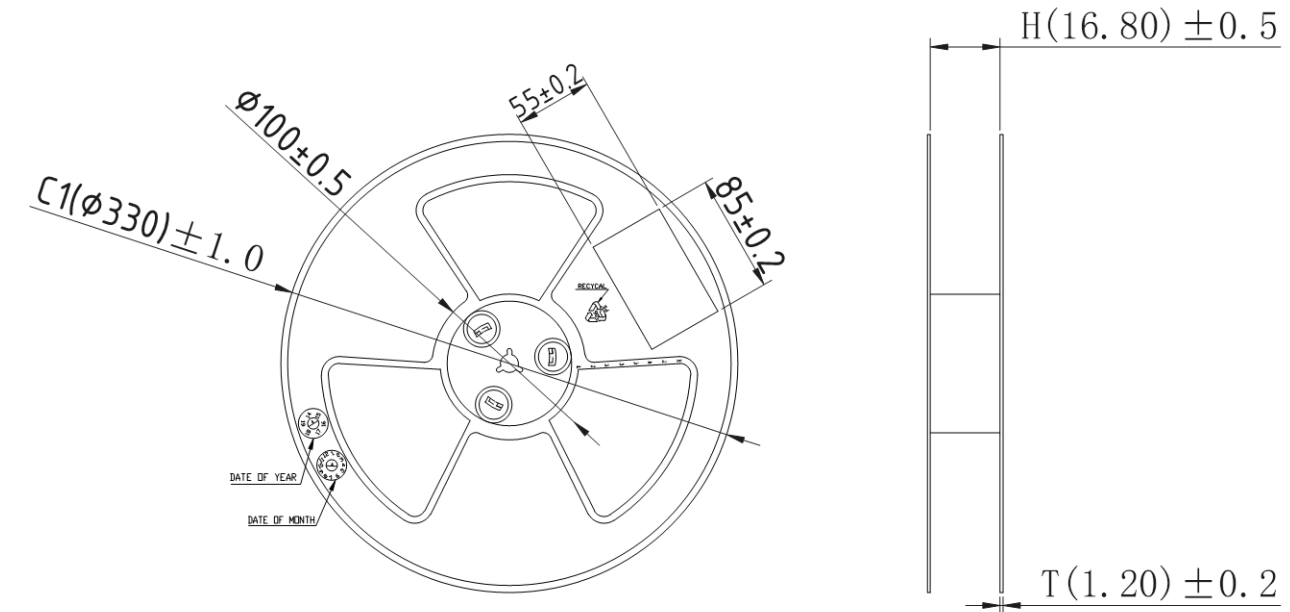
UNIT: mm



Symbol	Min	Typ	Max
A	2.20	2.30	2.40
A1	0.91	1.01	1.11
A2	0.05	0.15	0.25
B	6.45	6.60	6.75
C	0.45	0.50	0.58
C1	0.45	0.50	0.58
D	5.12	5.32	5.52
E	1.27 TYP		
F1	0.45	0.60	0.75
F	0.40	0.50	0.60
H	4.70	4.90	5.10
L	9.70	10.00	10.20
L1	2.6	2.8	3.0
L2	5.95	6.10	6.25
L3	5.00	5.20	5.40`
N	0.45	0.65	0.85

Tape & Reel Information

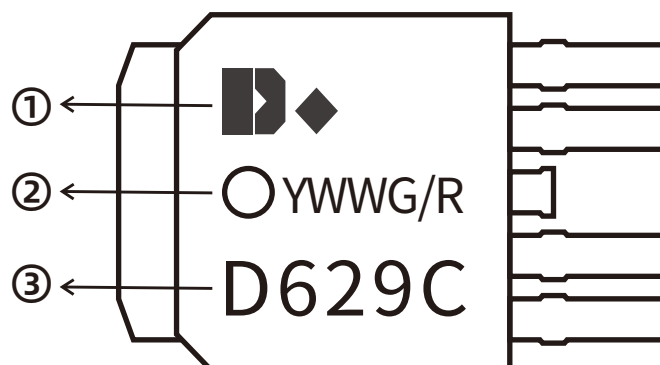
Dimensions in mm



Pulling direction →

Marking Information:

- ①: Doingter LOGO
②: Date Code (YWWG / R)
Y: Year Code , last digit of the year
WW : Week Code (01-53)
G/R: G(Green) /R(Lead Free)
③: Part NO.



Previous Version

Version	Date	Subjects (major changes since last revision)
1.0	2024-06-08	Release of final version

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