

Description:

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

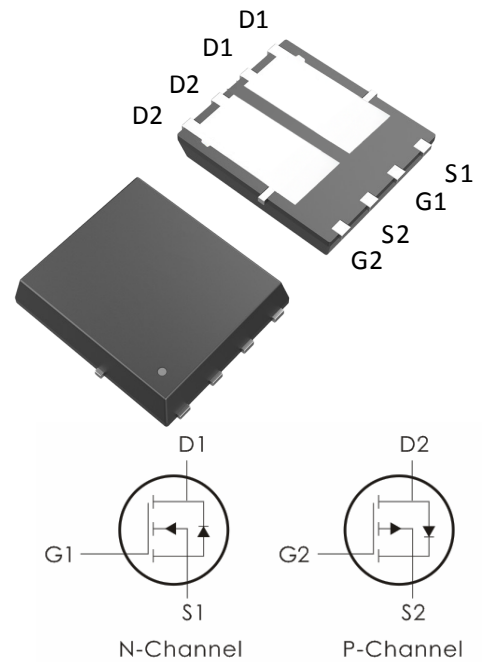
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=60V, I_D=35A, R_{DS(on)} < 15m\Omega @ V_{GS}=10V$ (Typ: $12m\Omega$)

P-Channel: $V_{DS}=-60V, I_D=-30A, R_{DS(on)} < 36m\Omega @ V_{GS}=-10V$ (Typ: $29m\Omega$)

- 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.
- 6) MSL3



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DON633	N633	DFN5*6-8D	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	60	-60	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current- $T_C=25^\circ C$	35	-30	A
	Continuous Drain Current- $T_C=100^\circ C$	26	-22	
I_{DM}	Pulsed Drain Current ¹	140	-125	A
P_D	Power Dissipation - $T_C=25^\circ C$	75	75	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	1.67	1.67	$^\circ C/W$

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-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	60	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =60V	---	---	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 =30A	---	12	15	m Ω
		V _{GS} =4.5V, I _D =20A	---	18	23	m Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	1928	---	pF
C _{Oss}	Output Capacitance		---	136	--	
C _{rss}	Reverse Transfer Capacitance		---	120	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DS} =30V, I _D =30A, R _{ENG} =1.8 Ω , V _{GS} =10V	---	10	---	ns
t _r	Rise Time		---	82	---	ns
t _{d(off)}	Turn-Off Delay Time		---	31	---	ns
t _f	Fall Time		---	101	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =30A	---	47	---	nc
Q _{gs}	Gate-Source Charge		---	8.4	---	nc
Q _{gd}	Gate-Drain “Miller” Charge		---	11.55	---	nc
Drain-Source Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _{SD} =30A	---	---	1.2	V
I _S	Continuous Drain Curren	V _D =V _G =0V	---	---	35	A
I _{SM}	Pulsed Drain Current		---	---	140	A
Trr	Reverse Recovery Time	I _F =30A, T _J =25 °C	---	14	---	ns
Qrr	Reverse Recovery Charge	dI/dt=100A/us	---	20	---	nc

Notes:

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

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

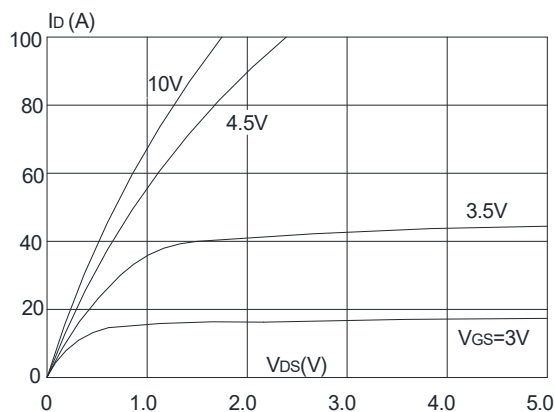


Figure 1: Output Characteristics

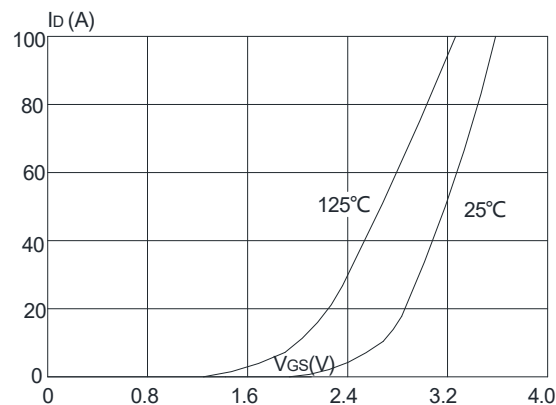


Figure 2: Typical Transfer Characteristics

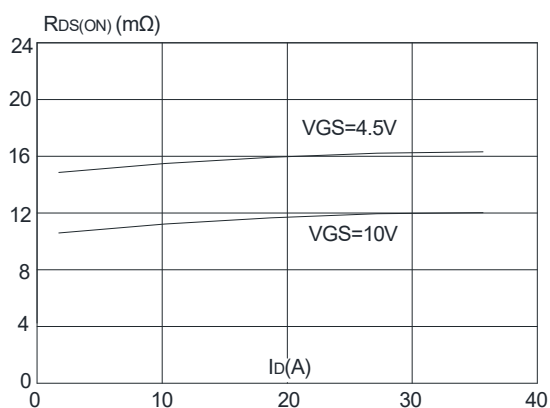


Figure 3: On-resistance vs. Drain Current

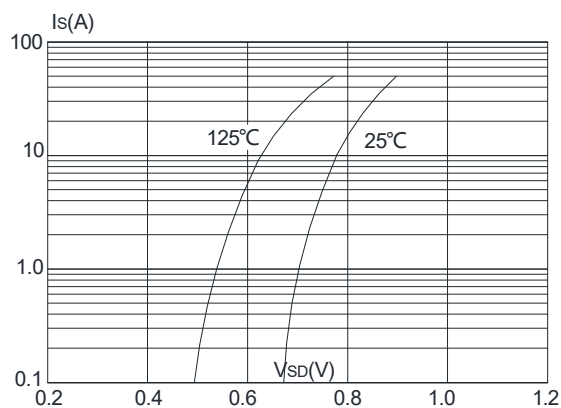


Figure 4: Body Diode Characteristics

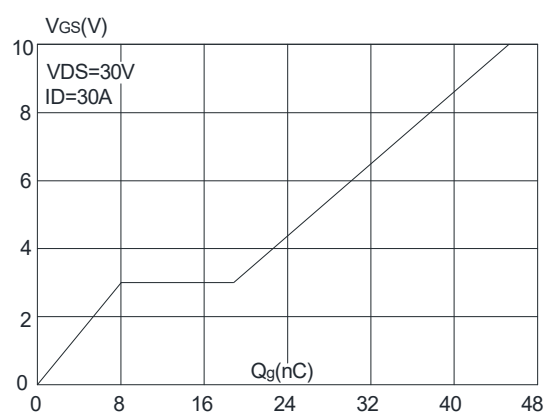


Figure 5: Gate Charge Characteristics

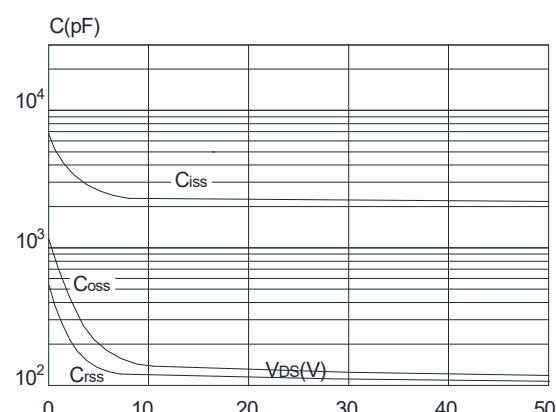


Figure 6: Capacitance Characteristics

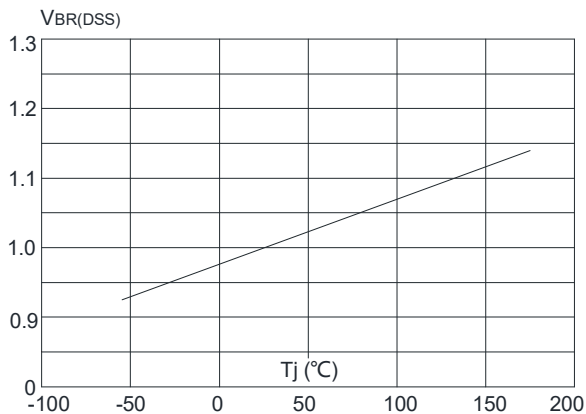


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

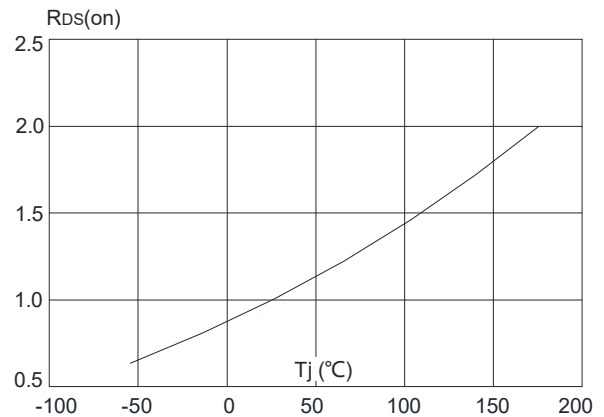


Figure 8: Normalized on Resistance vs. Junction Temperature

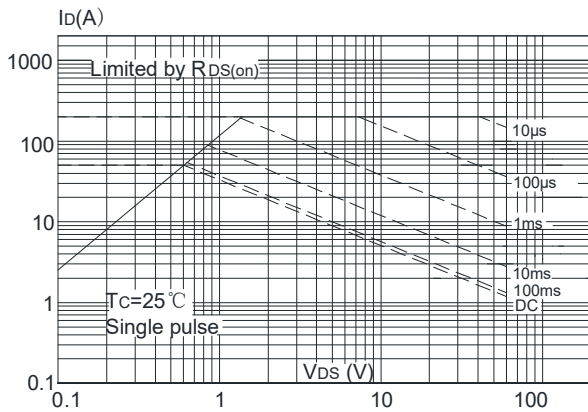


Figure 9: Maximum Safe Operating Area

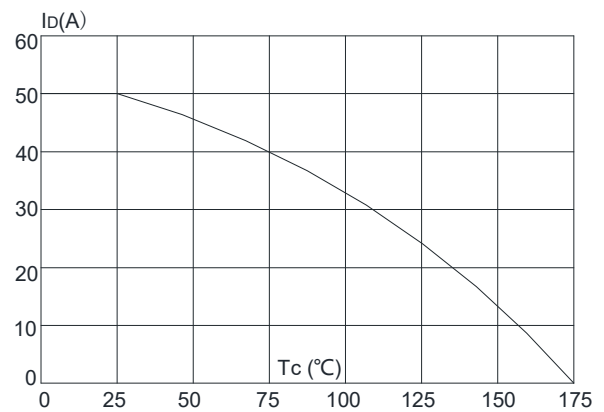


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

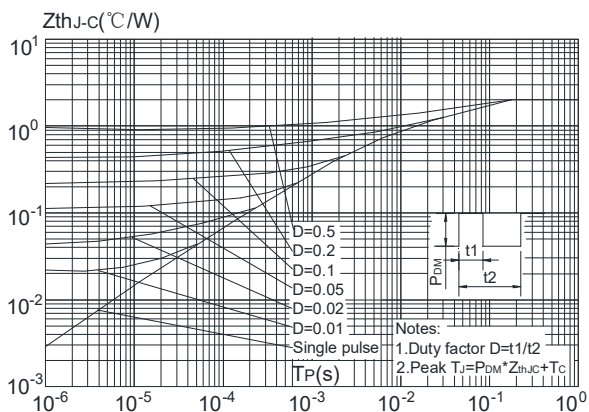


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

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-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	-60	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-60V	---	---	-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	-1.8	-2.5	V
R _{DS(ON)}	Drain-Source On Resistance ²	V _{GS} =-10V, I _D =-15A	---	29	36	m Ω
		V _{GS} =-4.5V, I _D =-10A	---	35	45	
G _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-15A	---	35	---	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-25V, V _{GS} =0V, f=1MHz	---	4025	---	pF
C _{oss}	Output Capacitance		---	133	---	
C _{rss}	Reverse Transfer Capacitance		---	97	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} =-30V R _{GEN} =3 Ω, V _{GS} =-10V	---	12	---	ns
t _r	Rise Time		---	9	---	ns
t _{d(off)}	Turn-Off Delay Time		---	63	---	ns
t _f	Fall Time		---	13	---	ns
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-30V, I _D =-20A	---	53	---	nC
Q _{gs}	Gate-Source Charge		---	10	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	12	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Source-Drain Diode Forward Voltage ³	V _{GS} =0V, I _S =-15A, T _J =25 °C	---	-0.88	-1.2	V
I _S	Continuous Drain Current	V _D =V _G =0V	---	---	-30	A
I _{SM}	Pulsed Drain Current	V _D =V _G =0V	---	---	-125	A
t _{rr}	Reverse Recovery Time	I _{sd} =-20A, V _{GS} =0V	---	26	---	ns
Q _{rr}	Reverse Recovery Charge	. dI/dt=-500A/μs	---	29	---	nc

Notes:

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

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

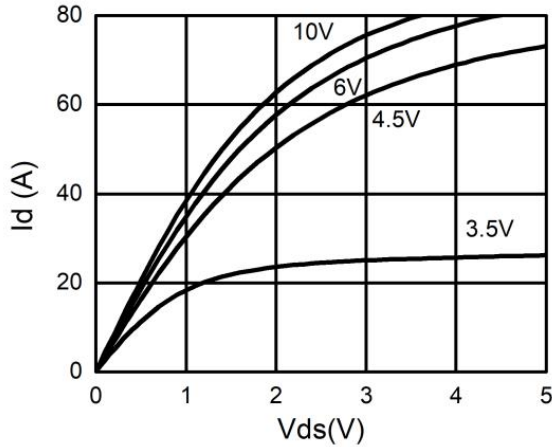


Figure 1. Output Characteristics

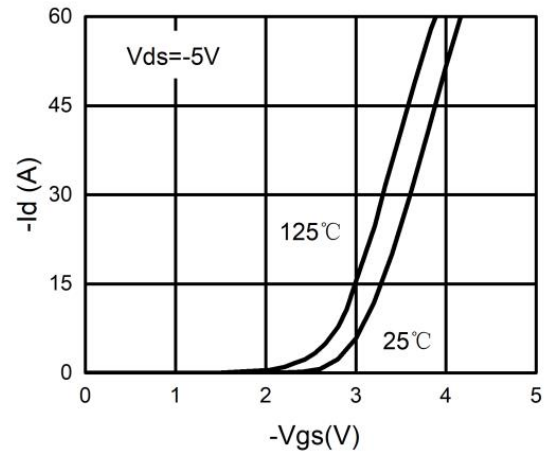


Figure 2. Transfer Characteristics

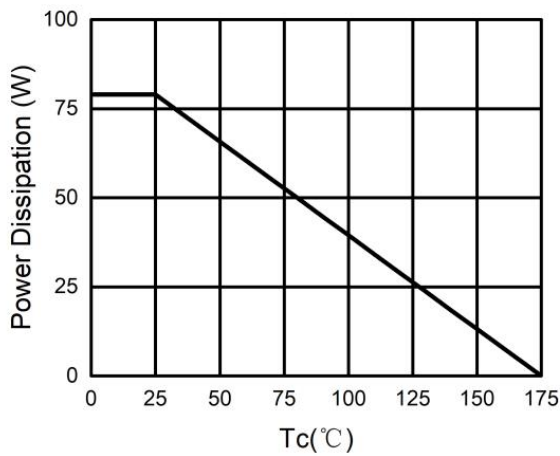


Figure 3. Power Dissipation

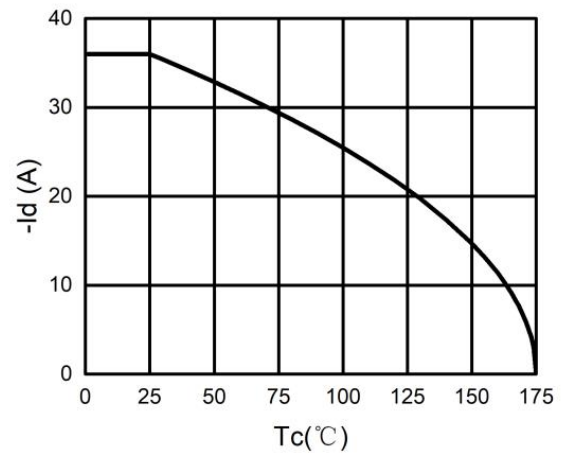


Figure 4. Drain Current

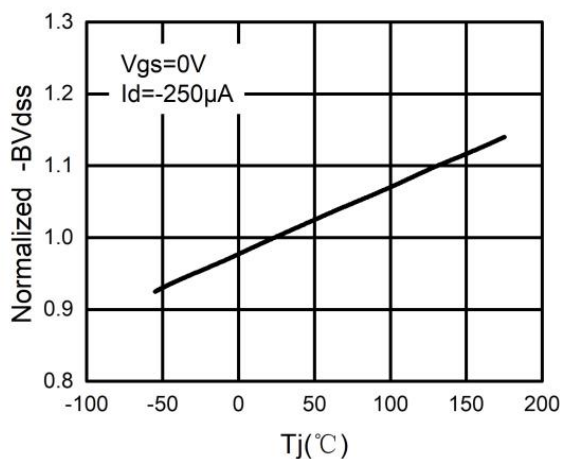


Figure 5. BV_{DSS} vs Junction Temperature

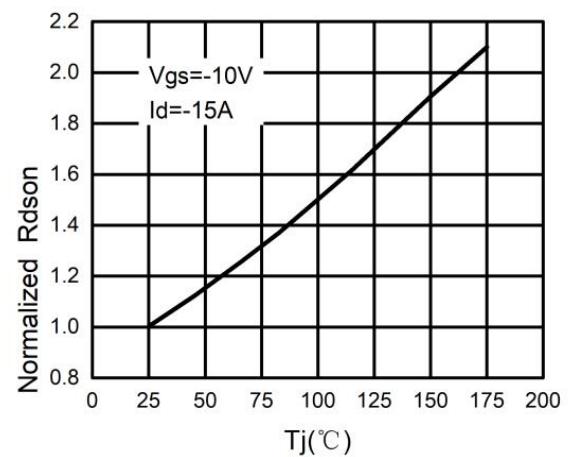


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

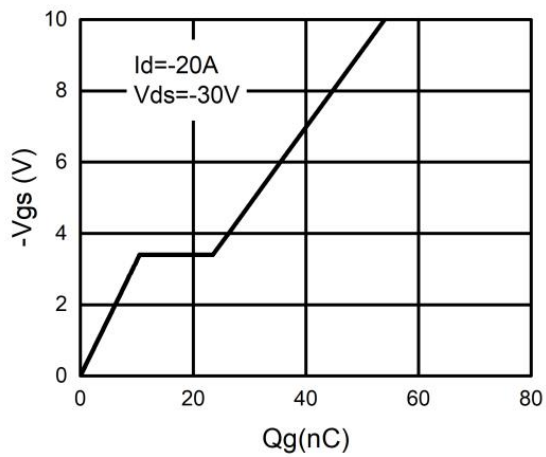


Figure 7. Gate Charge Waveforms

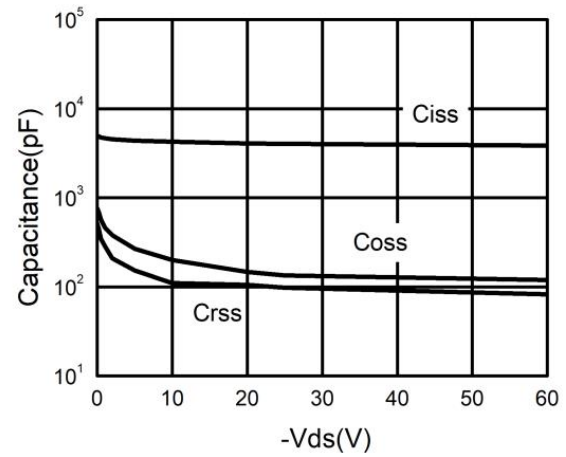


Figure 8. Capacitance

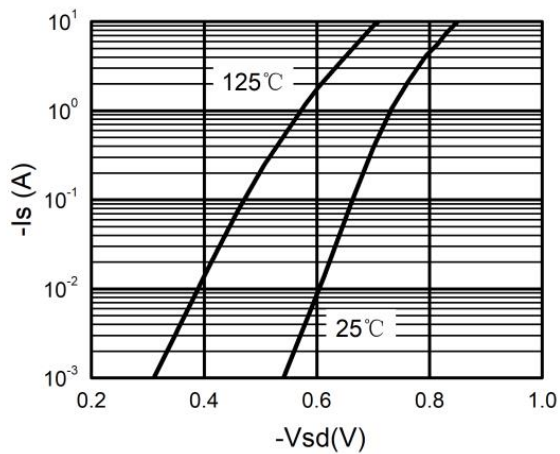


Figure 9. Body-Diode Characteristics

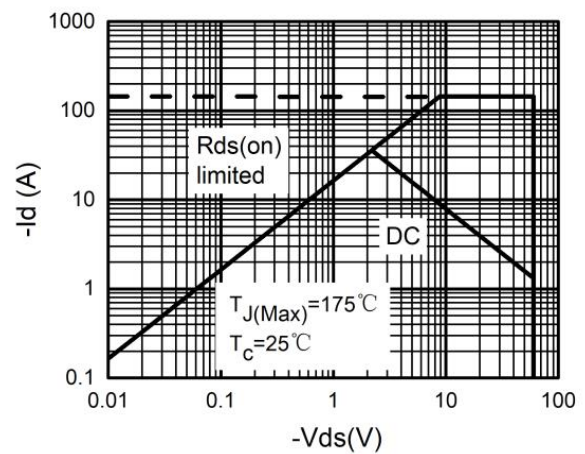
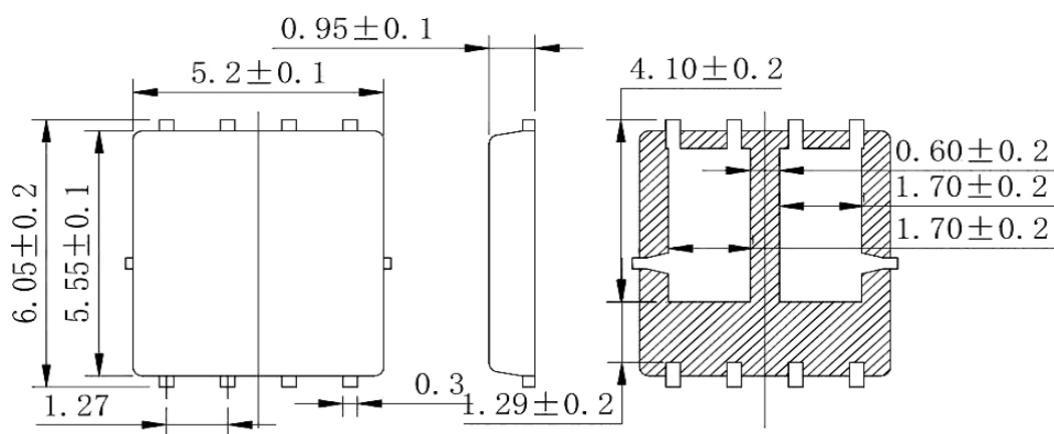
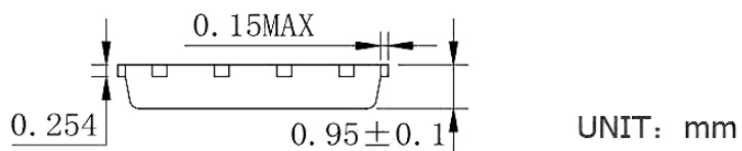


Figure 10. Maximum Safe Operating Area

DFN5×6-8D Package Information:



Marking Information:

①. Doingter LOGO

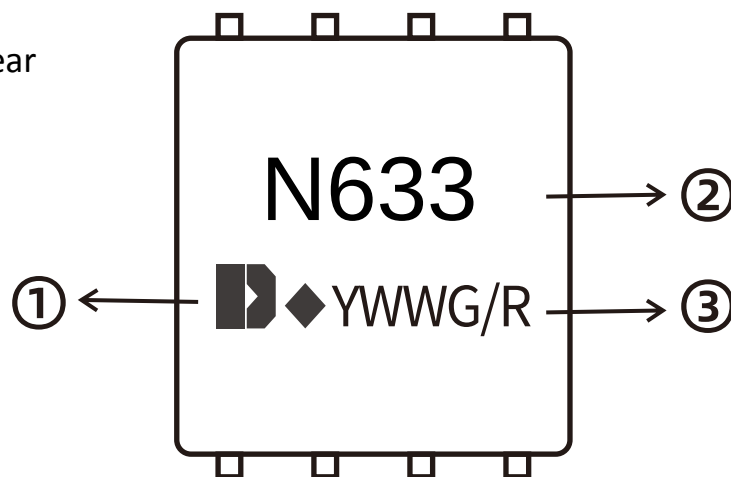
②. Part NO.

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)
1.0	2024-07-16	Release of final version

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