30V N Channel Enhancement Mode Power MOSFET

Feature

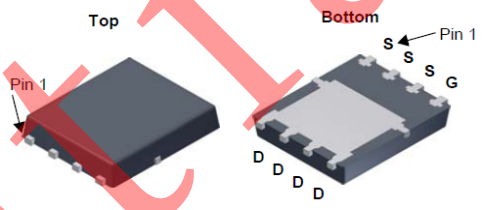
- Extra Low Rds-on
- 100% Avalanche Tested.
- Robust design with better EAS performance

Applications

- OR-ing
- E-Fuse
- Battery Proection
- Hot Swap

Product information

V_{DSS}	30	V
$R_{DS(ON)\text{-}Max}$	0.42	mΩ
I_D	399	A



PDFN5*6

Absolute Maximum Ratings (T_c=25°C Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		±20	
I_{DM}④	Pulse Drain Current Tested		1596	A
I_D④	Continuous Drain Current, Package Limited	Tc=25°C	399	A
		Tc=100°C	252	
P_D④	Maximum Power Dissipation		110	W
EAS③	Avalanche Energy, Single Pulse		378	mJ
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-50 to 150	°C

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$Rthj_C$	Thermal Resistance-Junction to Case max	Steady State	1.2	°C/W
$Rthj_A$①	Thermal Resistance-Junction to Ambient max	Steady State	57	°C/W

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Electrical Characteristics (T_c=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=1mA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V, V_{GS}=0V, Tj=25°C		0.1	1	uA
		V_{DS}=20V, V_{GS}=0V, Tj=125°C		11	100	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	1.2	1.6	2.0	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V		10	100	nA
$R_{DS(ON)}$ ②	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=30A		0.35	0.42	mΩ
		V_{GS}=7V, I_{DS}=30A		0.39	0.49	
		V_{GS}=4.5V, I_{DS}=30A		0.54	0.70	
R_G	Gate Resistance⑤	Open Drain, f=1MHz		0.30	0.80	Ω
gfs	Transconductance	V_D =5 V , I_D=30A		85		S
Dynamic Characteristics						
C_{iss}	Input Capacitance⑤	V_{GS}=0V, V_{DS}=15V, Frequency=1MHz		8603	14624	pF
C_{oss}	Output Capacitance⑤			3005	5108	
C_{rss}	Reverse Transfer Capacitance⑤			99	168	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V,I_D=20A, V_{GS}=10V, R_{GEN}=1Ω		19		nS
t_r	Turn-on Rise Time			50		
$t_{d(OFF)}$	Turn-off Delay Time			51		
t_f	Turn-off Fall Time			9		
Q_g	Total Gate Charge	V_{DD}=15V,V_{GS}=0…10V, I_D=30A		134	228	nC
Q_{gs}	Gate-Source Charge			27		
Q_{gd}	Gate-Drain Charge⑤			22		
Q_g	Total Gate Charge⑤	V_{DD}=15V,V_{GS}=0…4.5V, I_D=30A				nC
Source-Drain Characteristics						
Is	Diode continuous forward current	T_C =25°C			105	A
$I_{S,pulse}$	Diode pulse current	T_C =25°C			1596	A
V_{SD}	Diode Forward Voltage	I_S=30A, V_{GS}=0V		0.75	1.0	V
t_{rr}	Reverse Recovery Time	I_F=20A,V_R=15V, di_F/dt=100A/us		67		nS
Q_{rr}	Reverse Recovery Charge			125		nC

Note ① : The device mounted on 1in² FR4 board with 2oz copper.Drain current limited by maximum junction temperature and package limited.

Note ② : Pulse test: pulse width≦300us, duty cycle≦2%, Guaranteed by design, not subject to production testing.

Note ③ : I_{AS}= 130A, VDD= 50V, R_G= 25Ω, Starting T_J= 25

Note ④ : $P_{tot}=(T_j-T_c)/ R_{thjc}$; $I_D= P_{tot}/ R_{DS(ON)}$; $I_{DM}= I_D$x4

Note ⑤ : Defined by design. Not subject to production test.

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N-Channel Typical Characteristics

Fig.1 Power dissipation

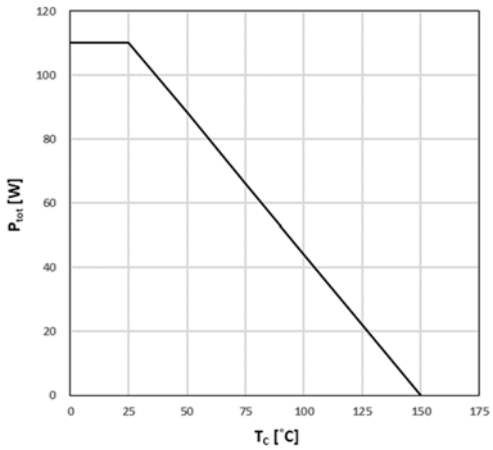


Fig.2 Drain current

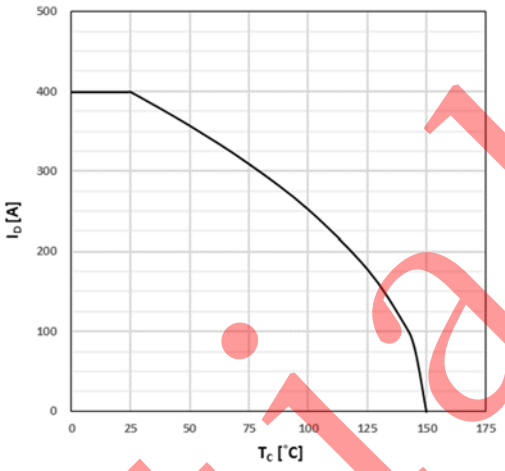


Fig.3 Maximum Safe Operating Area

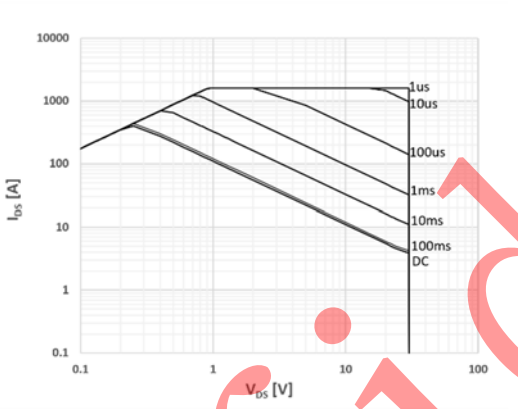


Fig.4 Max. Transient thermal impedance

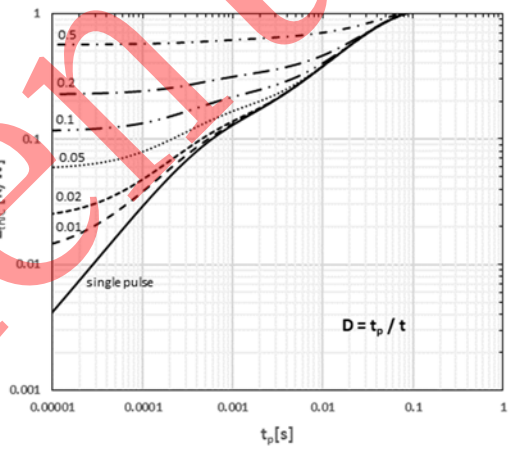


Fig.5 On-Region Characteristics

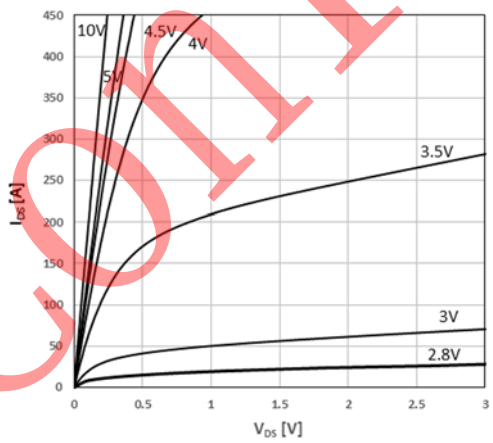
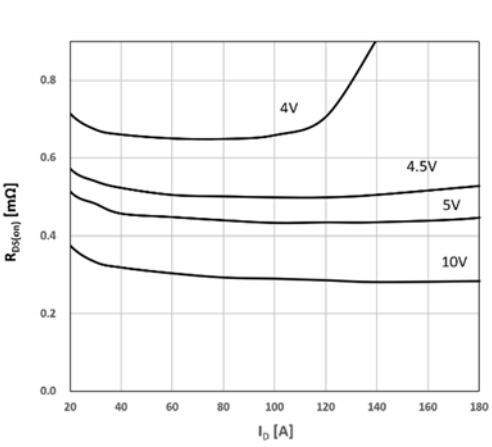


Fig.6 On-Resistance vs. Drain Current



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Fig.7 Transfer Characteristics

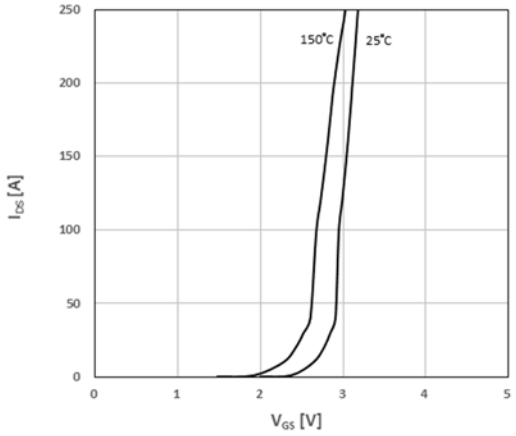


Fig.8 drain-source on resistance

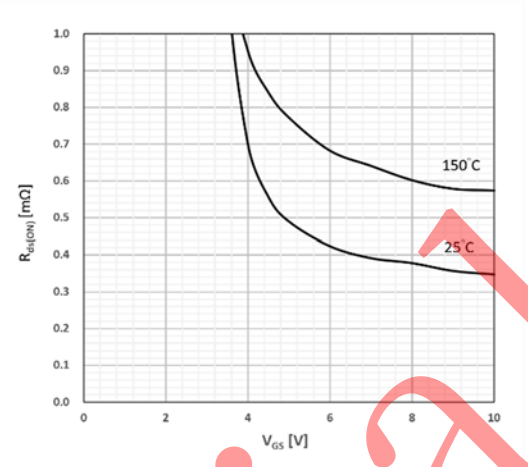


Fig.9 On-Resistance vs. Junction Temp

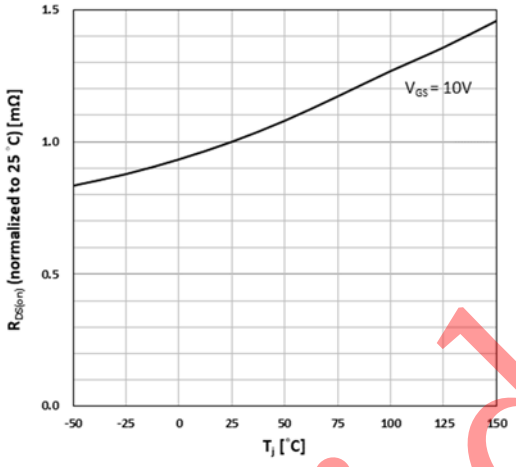


Fig.10 Threshold Voltage

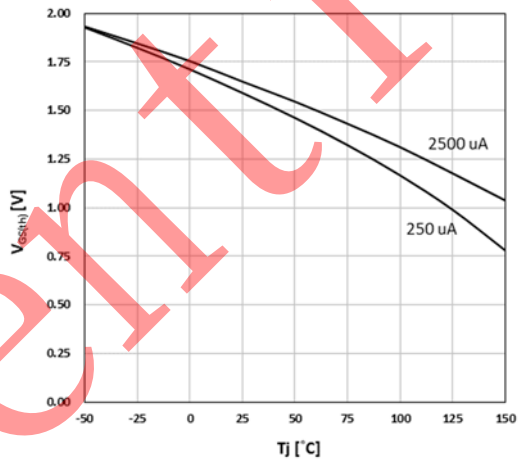


Fig.11 Capacitance

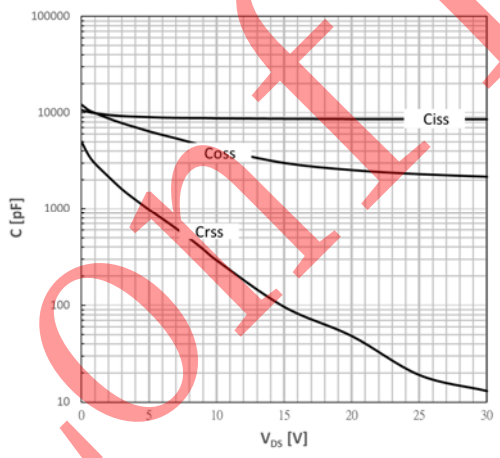
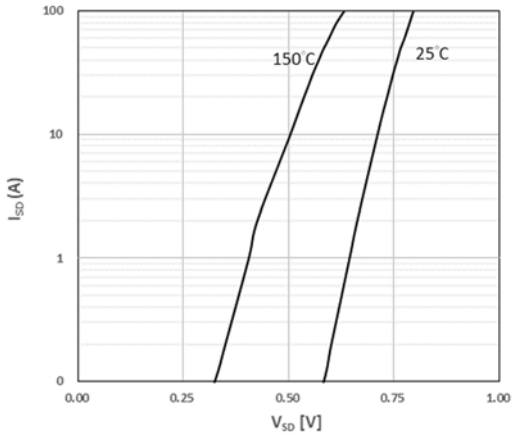


Fig. 12 Body-Diode Characteristics



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Fig. 13 Avalanche characteristics

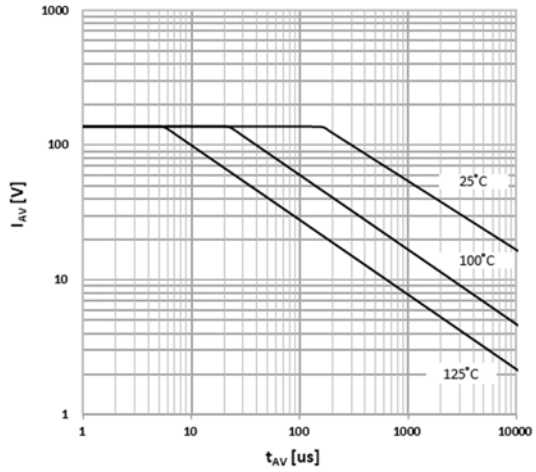


Fig. 14 Gate Charge

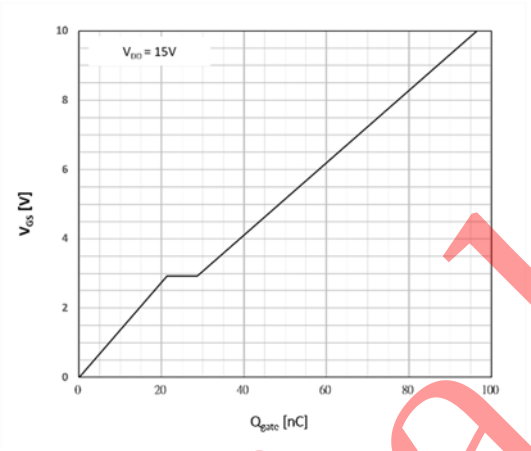
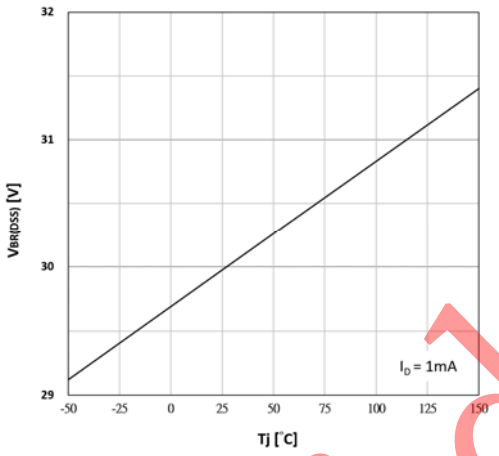
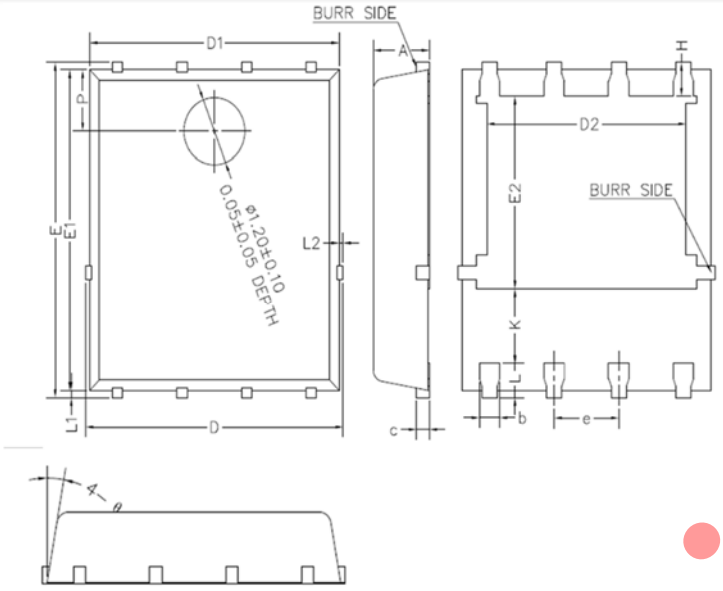


Fig. 15 Drain-source breakdown voltage



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Package Outline:



Symbol	Dimensions(mm)		
	Min.	Typ.	Max.
A	1.0	1.10	1.20
b	0.35	0.40	0.45
c	0.21	0.25	0.34
D			5.10
D1	4,80	4.90	5.00
D2	3.91	4.01	4.11
e	1.17	1.27	1.37
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.34	3.44	3.54
H	0.51	0.61	0.71
K	1.10		
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
L2			0.10
P	1.00	1.10	1.20
θ	8º	10º	12º

NOTES:

1. ALL DIMENSIONS REFER TO JEDEC STANDARDMO-240 AA

   MOLD FLASH OR PROTRUSIONS OF 0.13 MM MAXIMUM PER SIDE ARE NOT INCLUDED.

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Revision History:

Revision	Date	Description of change
P001	2024/07/17	New version
P002	2025/03/31	Update electrical diagram

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