

N-MOSFET 100V 5.0mΩ 122A

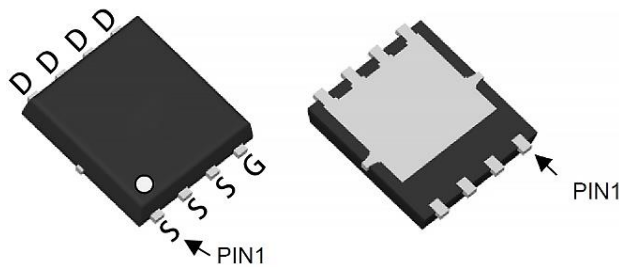
Product Summary

- V_{DS} 100V
- I_D 122A
- R_{DS(ON)} (at V_{GS}=10V) <6 mΩ (Typ: 5 mΩ)

Naming convention

M	G	C	0	5	0	N	1	0	A	N
Megain	B: PDFN3X3 C: PDFN5X6 P: TO220 H: TO263 S: SOP8 D: TO252	R _{DS(on)} Typ. @V _{GS} =10V	N: N P: P C: N+P D: N+N	10: 100V 08: 80V 06: 60V 04: 40V 03: 30V	A:V _{GS} 20/-12 w/o A:V _{GS} ±20	L:V _{IN} (1~2.5V) N:V _{IN} (2~4V)				

Pin configuration



Ordering Information

Order code	Package	Form	Quantity (PCS)	Marking
MGC050N10N	PDFN5*6	Tape & Reel	5000 / Tape & Reel	MGC050N10N

Absolute Maximum Ratings

T_J=25°C Unless Otherwise Noted.

Symbol	Parameter	Value	Units
V _{DSS}	Drain-Source Voltage	100	V
V _{GSS}	Gate-Source Voltage	±20	V
T _J	Maximum Junction Temperature	150	°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
I _{DM} (Note 1)	Pulse Drain Current Tested	142	A
I _D	Continuous Drain Current	122	A
	Continuous Drain Current (T _C =100°C)	77	
P _D	Maximum Power Dissipation	89	W
	Maximum Power Dissipation (T _C =100°C)	36	
I _{AS} (Note 2)	Avalanche Current, Single pulse (L=0.1mH)	41	A
E _{AS} (Note 2)	Avalanche Energy, Single pulse (L=0.1mH)	84	mJ

Note ①: Max. current is limited by bonding wire

Note ②: UIS tested and pulse width are limited by maximum junction temperature 150°C

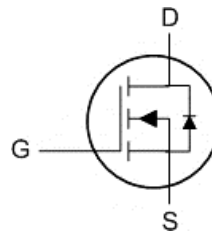
Features

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and R_g Tested

Application

- Power Management in DC/DC Converters
- USB Power Delivery (USB PD)

Symbol



■ Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance-Junction to Case (Steady State)	1.4	°C/W
$R_{\theta JA}$ (Note 3)	Thermal Resistance-Junction to Ambient (Steady State)	50	°C/W

■ Electrical Characteristics

$T_J=25^{\circ}\text{C}$ Unless Otherwise Noted.

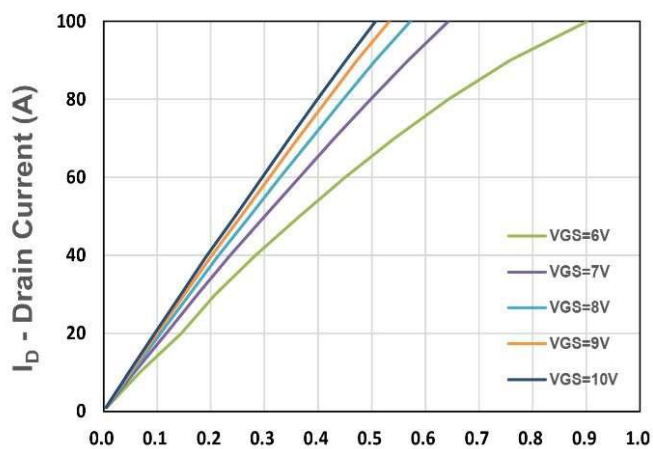
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Electrical Characteristics						
B _V D _{SS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =80V, V _{GS} =0V	-	-	1	uA
V _{GS} (th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	2	3	4	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS} (ON) ^(Note 4)	Drain-Source On-state Resistance ^(Note 4)	V _{GS} =10V, I _{DS} =20A	-	5	6	mΩ
		V _{GS} =4.5V, I _{DS} =10A	-	-	-	
g _{fs}	Forward Transconductance	V _{DS} =5V, I _{DS} =20A	-	21.8	-	S
Dynamic Characteristics ^(Note 5)						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	0.5	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, Freq.=1MHz	-	2867	-	pF
C _{oss}	Output Capacitance		-	920	-	
C _{rss}	Reverse Transfer Capacitance		-	57	-	
t _d (ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =50V, I _D =1A, R _{GEN} =3Ω	-	14.3	-	nS
t _r	Turn-on Rise Time		-	4.3	-	
t _d (OFF)	Turn-off Delay Time		-	32.1	-	
t _f	Turn-off Fall Time		-	90.7	-	
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =50V I _D =20A	-	35	-	nC
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =50V, I _D =20A	-	53.1	-	
Q _{gs}	Gate-Source Charge		-	15.8	-	
Q _{gd}	Gate-Drain Charge		-	15.1	-	
Source-Drain Characteristics						
V _{SD} ^(Note 4)	Diode Forward Voltage	I _{SD} =20A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _F =20A, V _R =50V dI _F /dt=100A/us	-	47.6	-	nS
Q _{rr}	Reverse Recovery Charge		-	66.6	-	nC

Note ③: Surface Mounted on 1in2 FR-4 board with 1oz.

Note ④: Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).

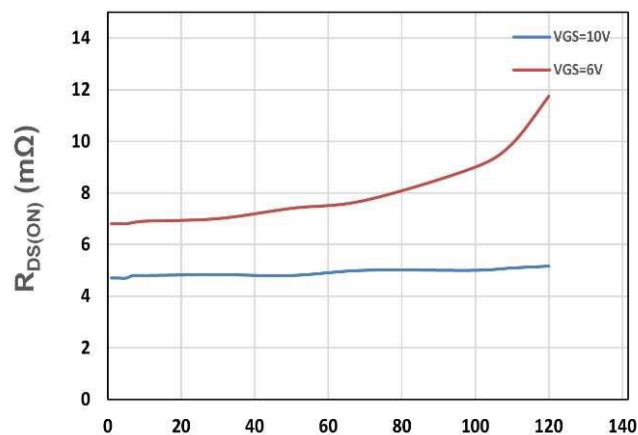
Note ⑤: Guaranteed by design, not subject to production testing.

■ Typical Characteristics



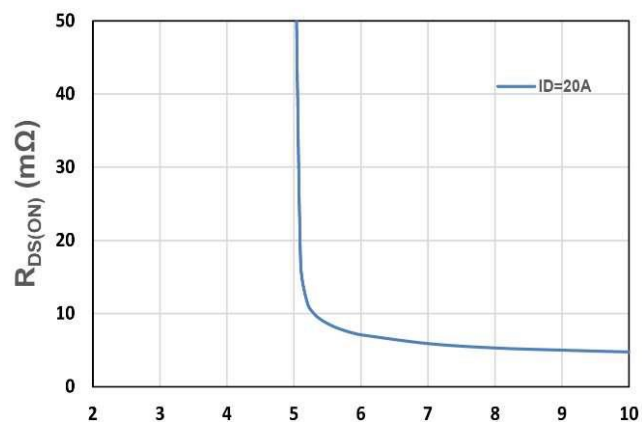
V_{DS} - Drain - Source Voltage (V)

Figure 1. Output Characteristics



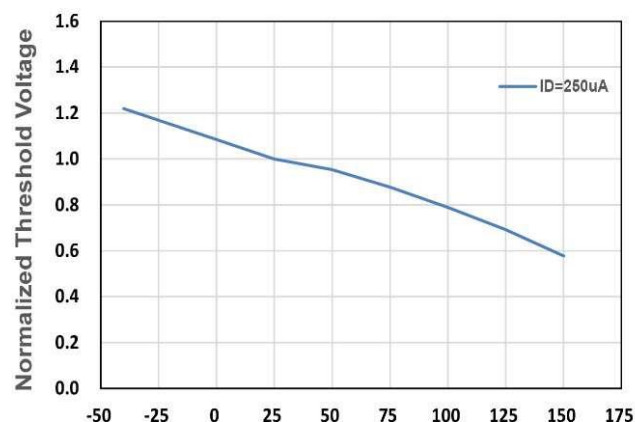
I_D - Drain Current (A)

Figure 2. On-Resistance vs. ID



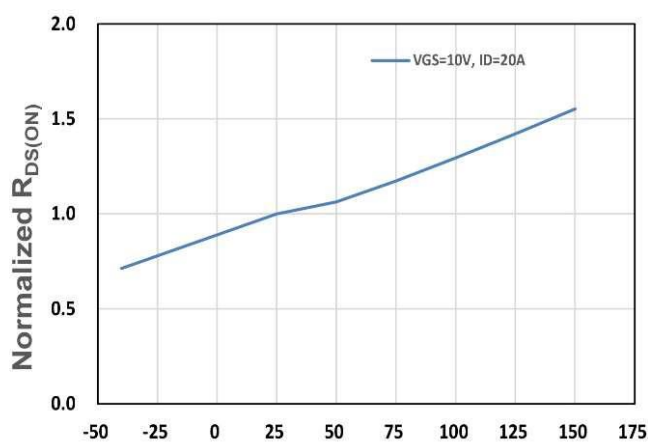
V_{GS} - Gate - Source Voltage (V)

Figure 3. On-Resistance vs. VGS



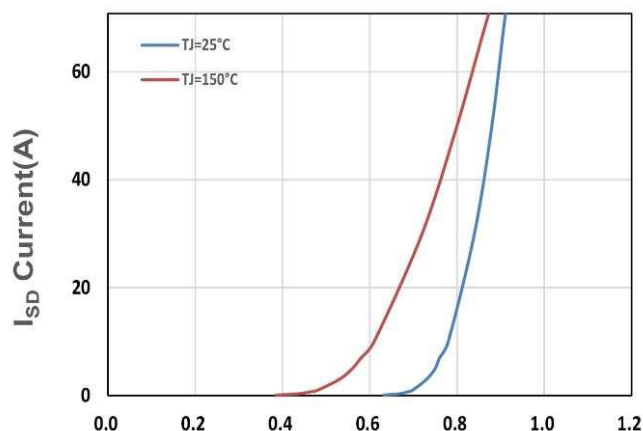
T_j , Junction Temperature(°C)

Figure 4. Gate Threshold Voltage



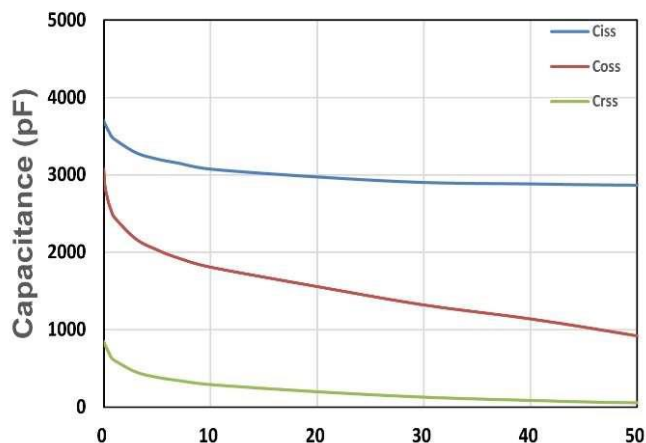
T_j , Junction Temperature(°C)

Figure 5. Drain-Source On Resistance

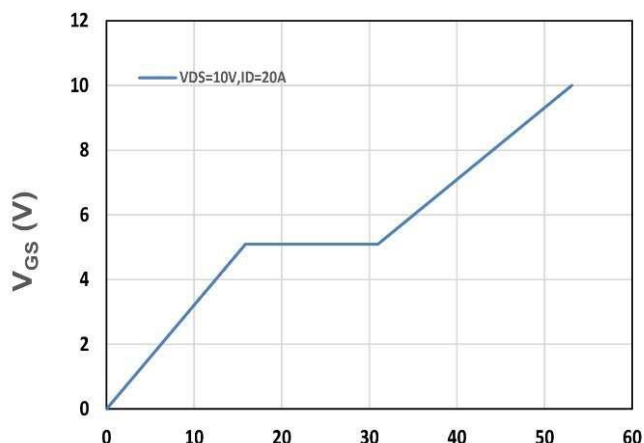


V_{SD} , Source-Drain Voltage(V)

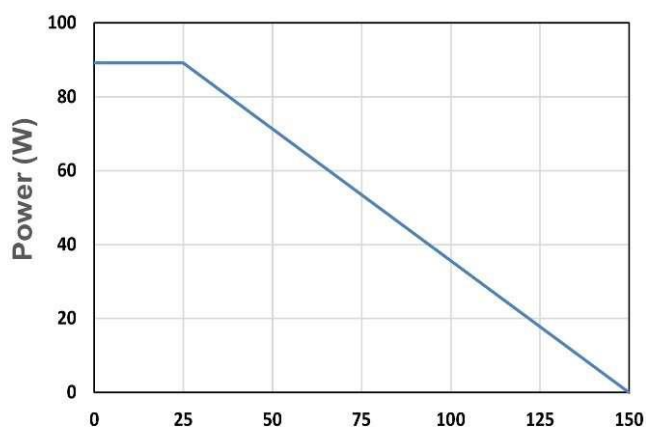
Figure 6. Source-Drain Diode Forward



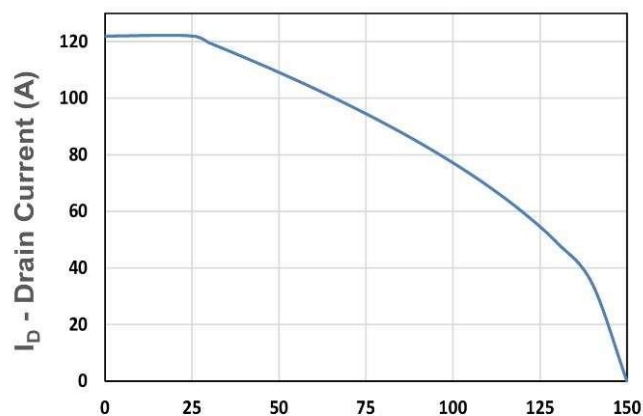
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



T_c - Case Temperature (°C)
Figure 9. Power Dissipation



T_c - Case Temperature (°C)
Figure 10. Drain Current

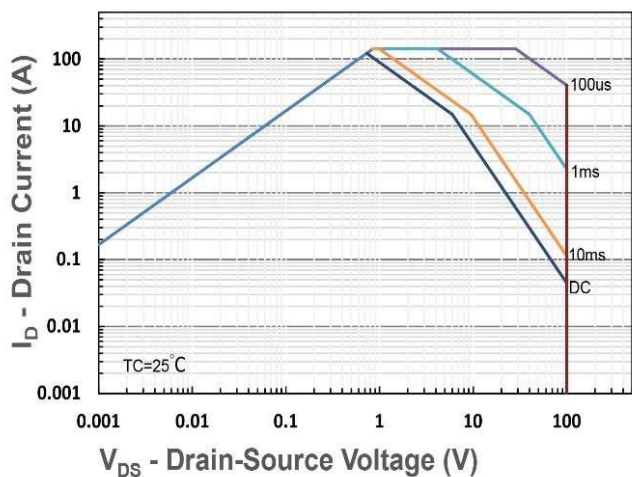


Figure 11. Safe Operating Area

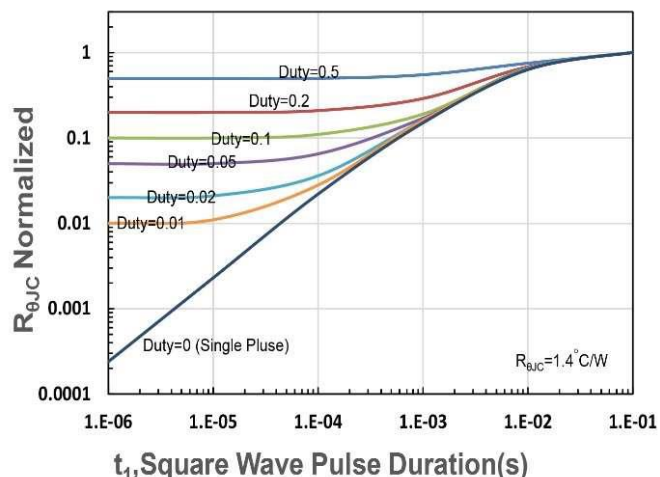
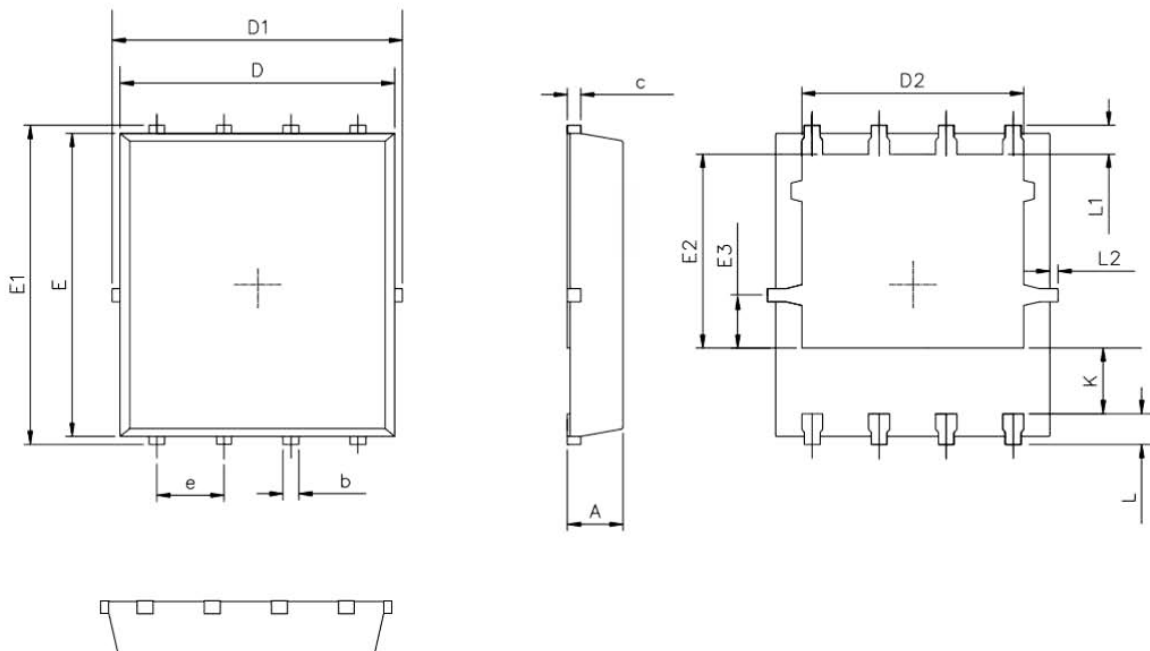


Figure 12. $R_{\theta JC}$ Transient Thermal Impedance

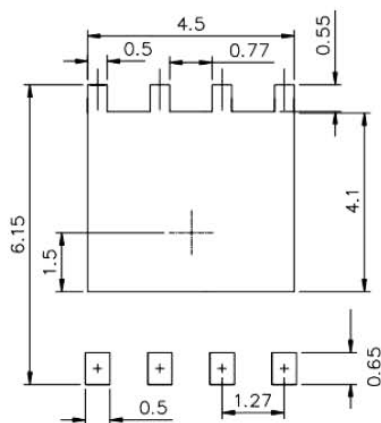
■ Package size

Unit: mm。

PDFN 5X6:



RECOMMENDED LAND PATTERN



UNIT:mm

	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.25	0.35	0.50
c	0.10	0.20	0.30
D	4.80	5.00	5.30
D1	4.90	5.10	5.50
D2	3.92	4.02	4.20
E	5.65	5.75	5.85
E1	5.90	6.05	6.20
E2	3.325	3.525	3.775
E3	0.80	0.90	1.00
e		1.27	
L	0.40	0.55	0.70
L1		0.65	
L2	0.00		0.15
K	1.00	1.30	1.50