

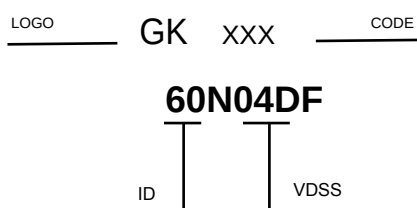
Features

Advanced Trench MOS Technology
100% EAS Guaranteed
Fast Switching Speed
Green Device Available

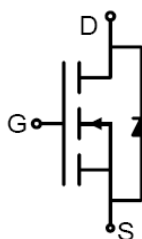
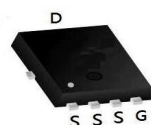
Application

High Frequency Switching and Synchronous Rectification.
DC/DC Converter.

V_{DS} 40 V
 I_D 60 A
 $R_{DS(ON)}$ 7.0 m Ω



PDFN3X3-8L top&bottom view Equivalent Circuit



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	40	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 20	V
I_D	Drain Current-Continuous($T_C=25^\circ C$)	60	A
	Drain Current-Continuous($T_C=100^\circ C$)	33	A
I_{DM} (pulse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	208	A
P_D	Maximum Power Dissipation($T_C=25^\circ C$)	38	W
	Maximum Power Dissipation($T_C=100^\circ C$)	15	W
E_{AS}	Avalanche energy (Note 2)	121	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ C$

Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		3.3	$^\circ C/W$

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V T _J =25℃			1	μA
		V _{DS} =40V, V _{GS} =0V T _J =125℃			100	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1		2.5	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		33		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A T _J =25℃		7	8.5	mΩ
		V _{GS} =4.5V, I _D =15A T _J =25℃		9	11	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =20V,V _{GS} =0V, f=1.0MHz		1670		pF
C _{oss}	Output Capacitance			127		pF
C _{rss}	Reverse Transfer Capacitance			113		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		1.5		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =20V, R _L =1Ω, R _{GEN} =3Ω		8.4		nS
t _r	Turn-on Rise Time			6.2		nS
t _{d(off)}	Turn-Off Delay Time			40.2		nS
t _f	Turn-Off Fall Time			7.8		nS
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =20A		32		nC
Q _{gs}	Gate-Source Charge			5.8		nC
Q _{gd}	Gate-Drain Charge			6		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				60	A
V _{SD}	Forward on Voltage ^(Note 3)	V _{GS} =0V, I _S =20A			1.2	V
t _{rr}	Reverse Recovery Time	I _F =20A, dI/dt=100A/μs		18.3		ns
Q _{rr}	Reverse Recovery Charge	I _F =20A, dI/dt=100A/μs		12.8		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=40V, V_G=10V, R_g=25\Omega, L=0.5\text{mH}$.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

RATING AND CHARACTERISTIC CURVES

Figure 1. Output Characteristics

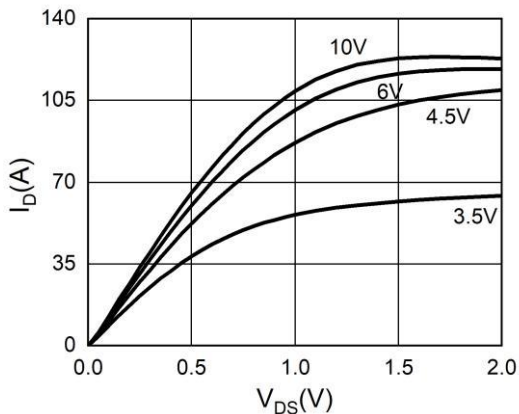


Figure 2. Transfer Characteristics

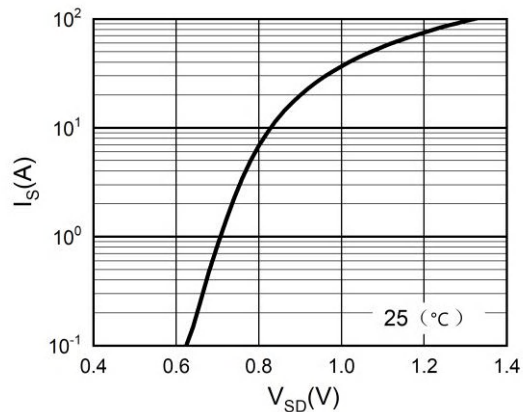


Figure 3. Power Dissipation

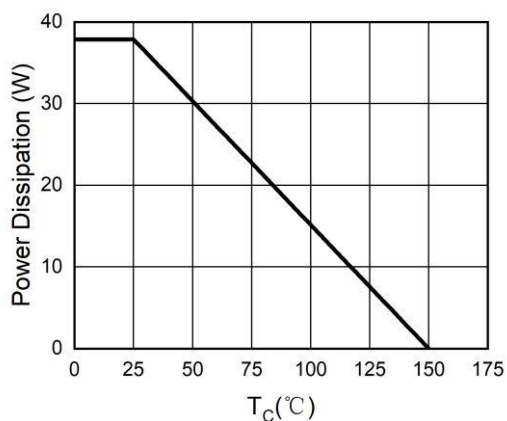


Figure 4. Drain Current

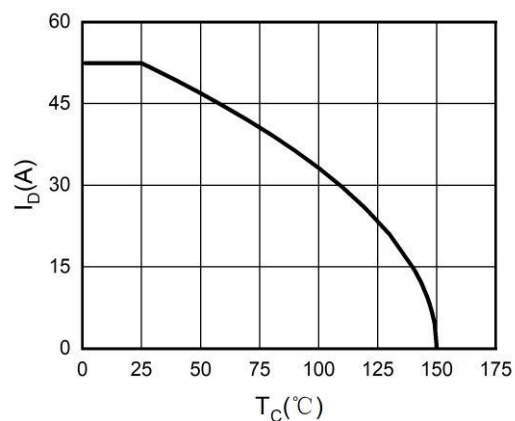


Figure 5. BV_{DSS} vs Junction Temperature

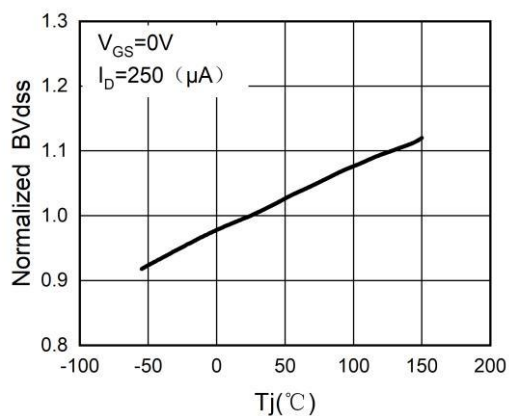
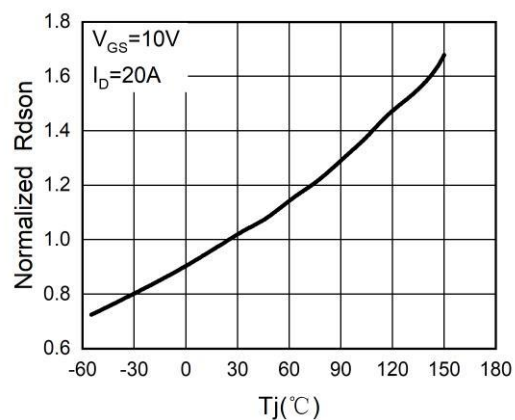


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



RATING AND CHARACTERISTIC CURVES

Figure 7. Gate Charge Waveforms

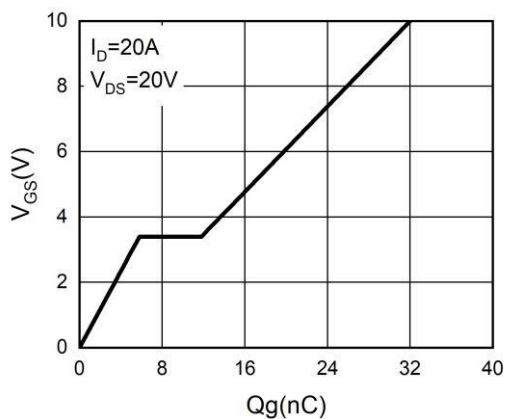


Figure 8. Capacitance

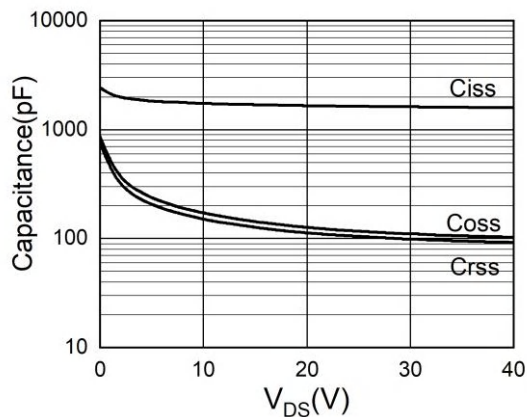


Figure 9. Body-Diode Characteristics

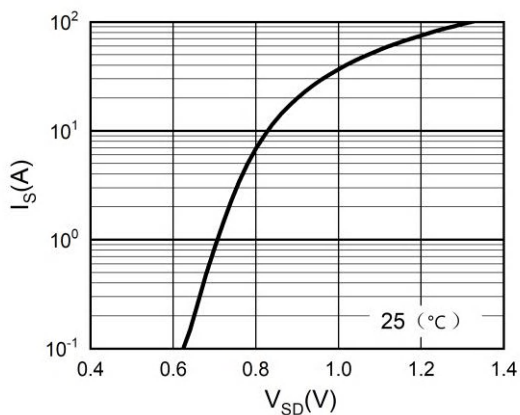
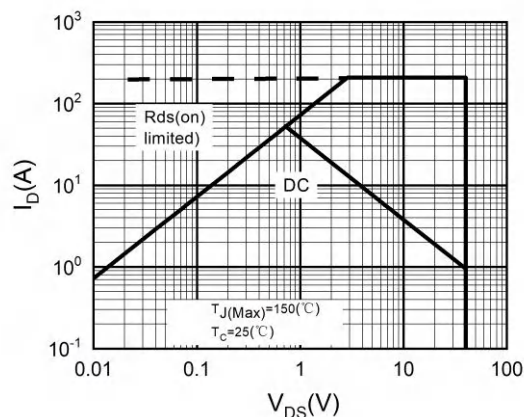
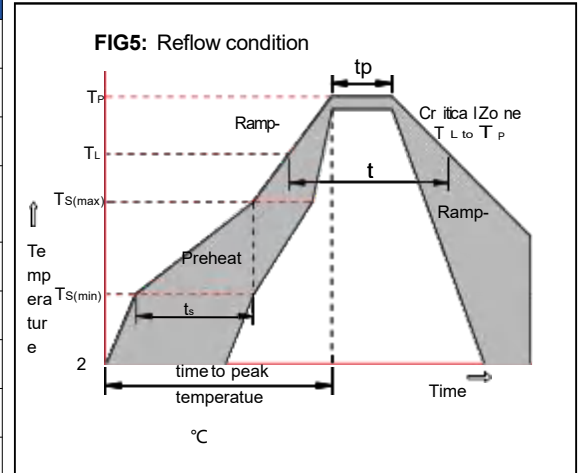


Figure 10. Maximum Safe Operating Area



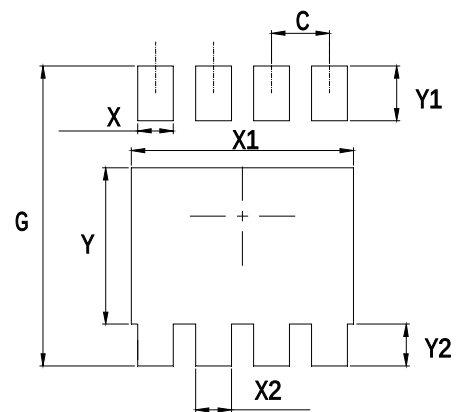
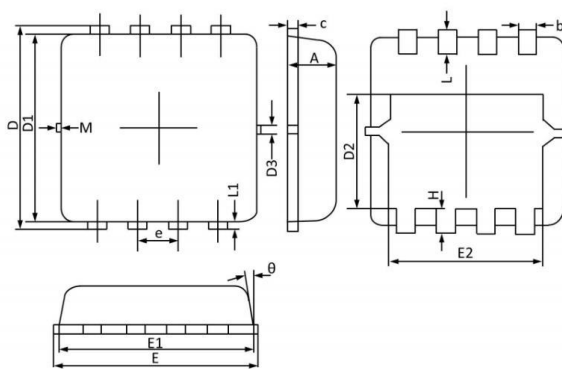
Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_P)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C



Package Dimensions & Suggested Pad Layout

PDFN3X3 Package Information



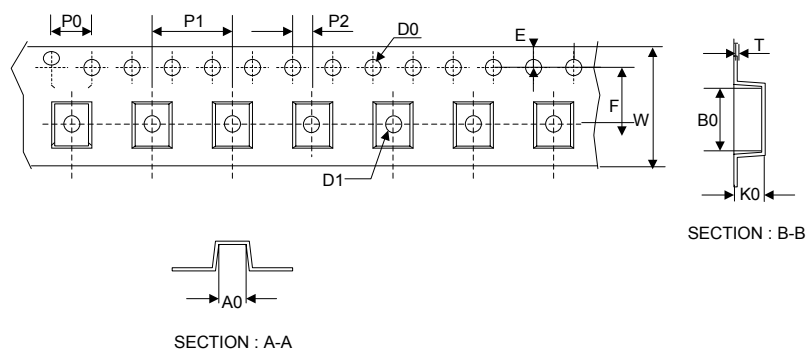
DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.70	0.75	0.80	b	0.25	0.30	0.35
C	0.10	0.15	0.25	D	3.25	3.35	3.45
D1	3.00	3.10	3.20	D2	1.78	1.88	1.98
D3	--	0.13	--	E	3.20	3.30	3.40
E1	3.00	3.15	3.20	E2	2.39	2.49	2.59
e	0.65BSC			H	0.30	0.39	0.50
L	0.30	0.40	0.50	L1	--	0.13	--
theta	--	10°	12°	M	*	*	0.15

Dimensions	Value (in mm)
C	0.65
G	3.60
X	0.40
X1	2.60
X2	0.40
Y	1.95
Y1	0.62
Y2	0.55

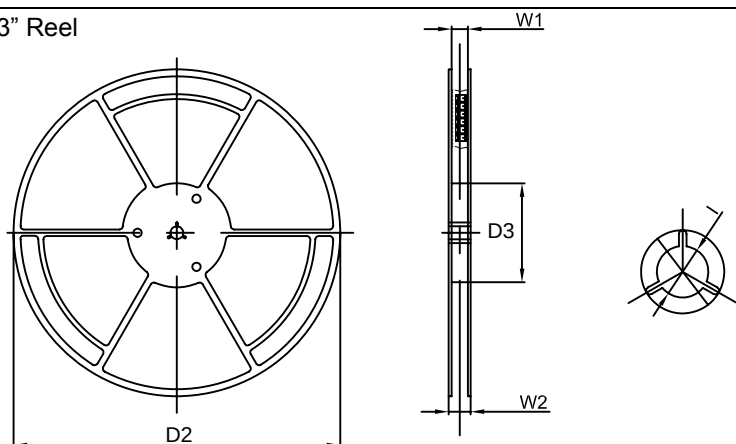
Tape & reel specification

Tape



Symbol	Dimension (mm)
P0	4.00±0.20
P1	8.00±0.20
P2	2.00±0.20
D0	1.55±0.20
D1	1.55±0.20
E	1.75±0.20
F	5.50±0.20
W	12.00±0.20
A0	3.90±0.20
B0	3.80±0.20
K0	1.20±0.20
T	0.20±0.20
D2	330.0±5.0
D3	100.0±4.0
W1	12.0±5.0
W2	14.0±5.0
I	13.0±2.0

13" Reel



Quantity: 5000PCS