

Features

V_{DS} = 60 V, I_D = 50 A
Ultra-low R_{DS(ON)}: 8.8 mΩ (typ) @ V_{GS}=10V
Low R_{DS(ON)}: <17 mΩ @ V_{GS}=4.5V
Split Gate Trench technology
100% UIS & ΔV_{DS} tested
RoHS compliant

Application

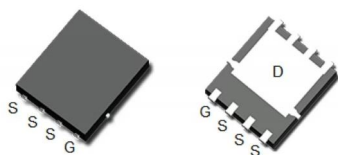
DC-DC Converters
Power management
Industrial and motor drives

V_{DS} 60 V
I_D 50 A
R_{DS(ON)} 8.8 mΩ

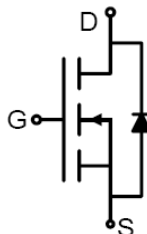
GK XXX
50N06NF

LOGO GK XXX CODE
50N06NF
ID VDSS

PDFN5X6-8L top&bottom view



Equivalent Circuit



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (T_c=25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V _{DS}	60	V
Gate-source Voltage		V _{GS}	±20	V
Drain Current (Silicon limited)	T _c =25°C	I _D	50	A
	T _c =100°C		15	
Pulsed Drain Current ^A		I _{DM}	200	A
Avalanche energy ^B		E _{AS}	66	mJ
Total Power Dissipation ^C	T _c =25°C	P _D	83	W
	T _c =100°C		28	
Junction and Storage Temperature Range		T _J , T _{STG}	-55~+150	°C

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient ^D	t ≤ 10S	R _{θJA}	10	12	°C/W
Thermal Resistance Junction-to-Ambient ^D	Steady-State		20	30	
Thermal Resistance Junction-to-Case	Steady-State	R _{θJC}	1.3	1.8	

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	$T_J=25^{\circ}\text{C}$		1	μA
			$T_J=55^{\circ}\text{C}$		5	
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		3.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		8.8	11	m Ω
		$V_{GS}=4.5V, I_D=10A$		12	17	
Diode Forward Voltage	V_{SD}	$I_S=20A, V_{GS}=0V$		0.85	1.3	V
Maximum Body-Diode Continuous Current	I_S				50	A
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=35V, V_{GS}=0V, f=1\text{MHz}$		1072		pF
Output Capacitance	C_{oss}			192		
Reverse Transfer Capacitance	C_{rss}			8		
Gate Resistance	R_g	$f=1\text{MHz}, \text{Open drain}$		1.6		Ω
Switching Parameters						
Total Gate Charge	$Q_g(10V)$	$V_{DS}=30V, I_D=20A$		34		nC
Total Gate Charge	$Q_g(4.5V)$			15.8		
Gate-Source Charge	Q_{gs}			7.8		
Gate-Drain Charge	Q_{gd}			5.2		
Reverse Recovery Charge	Q_{rr}	$I_F=20A, di/dt=200A/\mu s$		36		ns
Reverse Recovery Time	t_{rr}			27		
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=30V, I_D=12A$ $R_{GEN}=3\Omega$		10		
Turn-on Rise Time	t_r			36		
Turn-off Delay Time	$t_{D(off)}$			30		
Turn-off fall Time	t_f			57		

A. Repetitive rating; pulse width limited by max. junction temperature.

B. $V_{DD}=50V, R_G=25\Omega, L=1\text{mH}, I_{AS}=18A, \dots$

C. P_d is based on max. junction temperature, using junction-case thermal resistance.

D. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. The Power dissipation P_{DSM} is based on $R_{\theta JA} \leq 10s$ and the maximum allowed junction temperature of 150°C . The value in any given application depends on the user's specific board design.

RATING AND CHARACTERISTIC CURVES

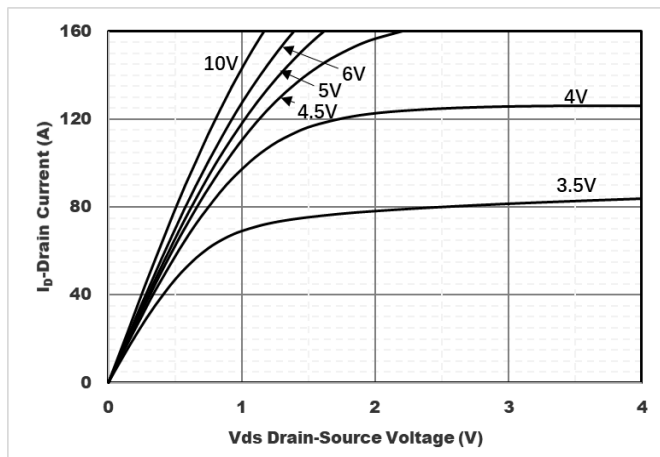


Figure1. Output Characteristics

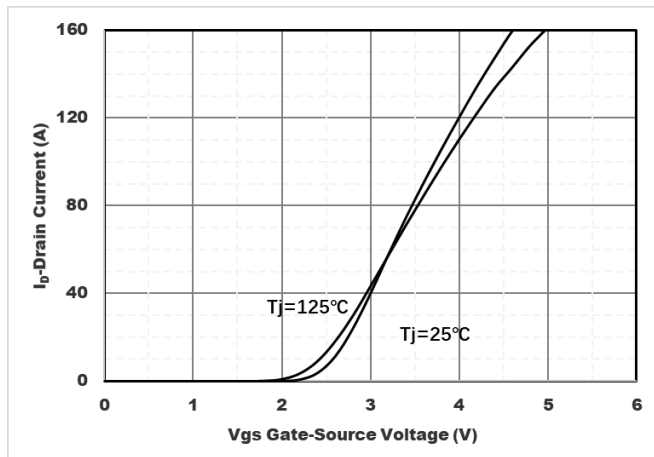


Figure2. Transfer Characteristics

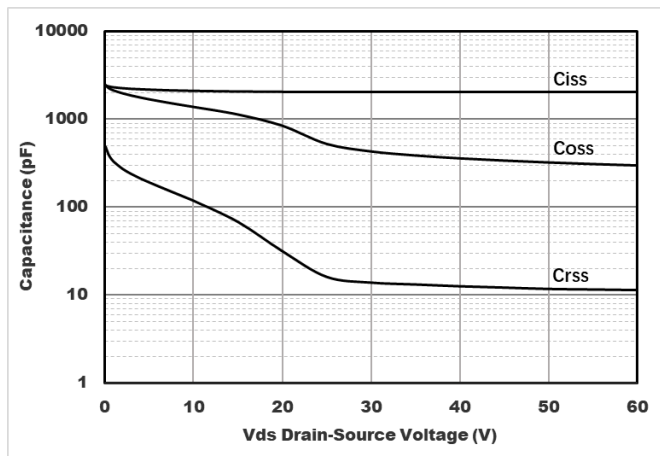


Figure3. Capacitance Characteristics

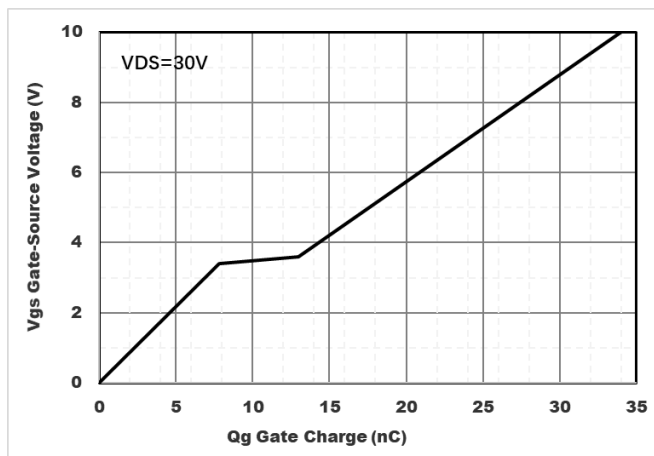


Figure4. Gate Charge

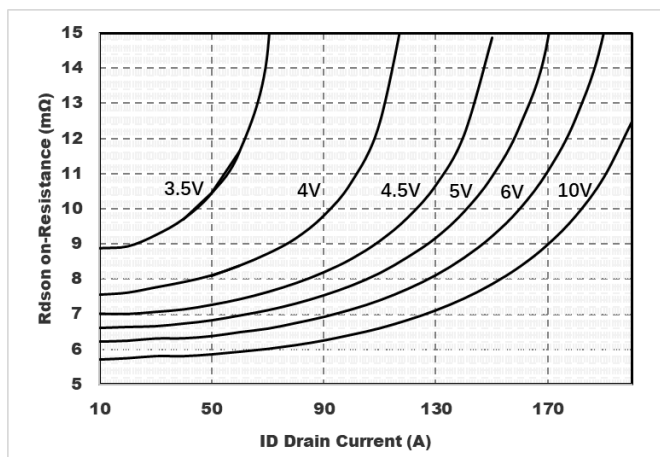


Figure5. Drain-Source on Resistance

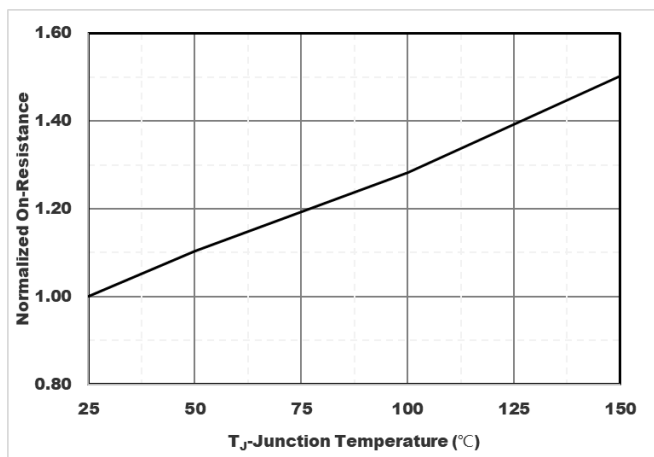


Figure6. Normalized On-Resistance

RATING AND CHARACTERISTIC CURVES

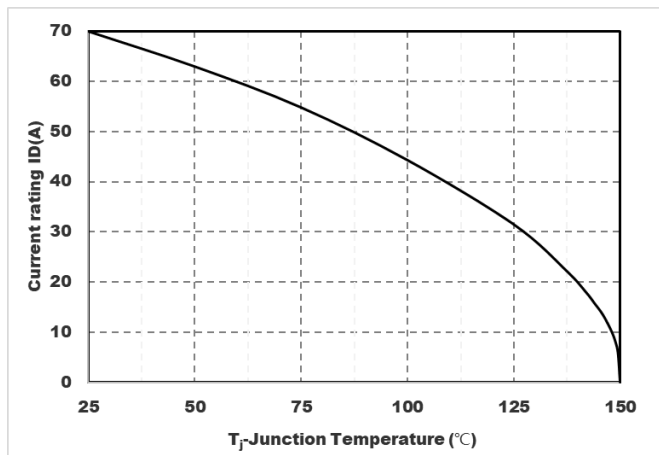


Figure7. Drain current

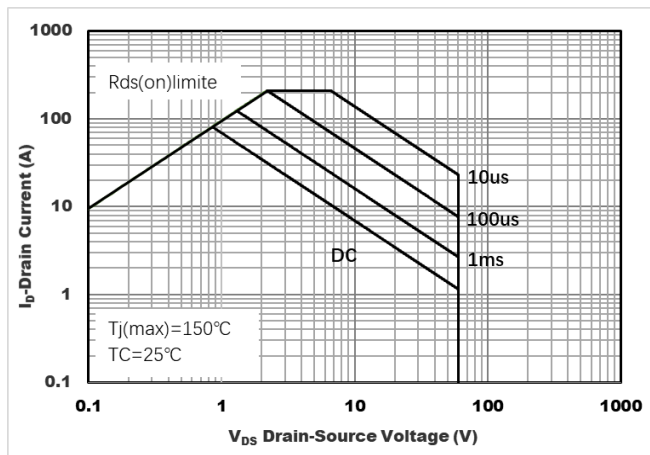


Figure8. Safe Operation Area

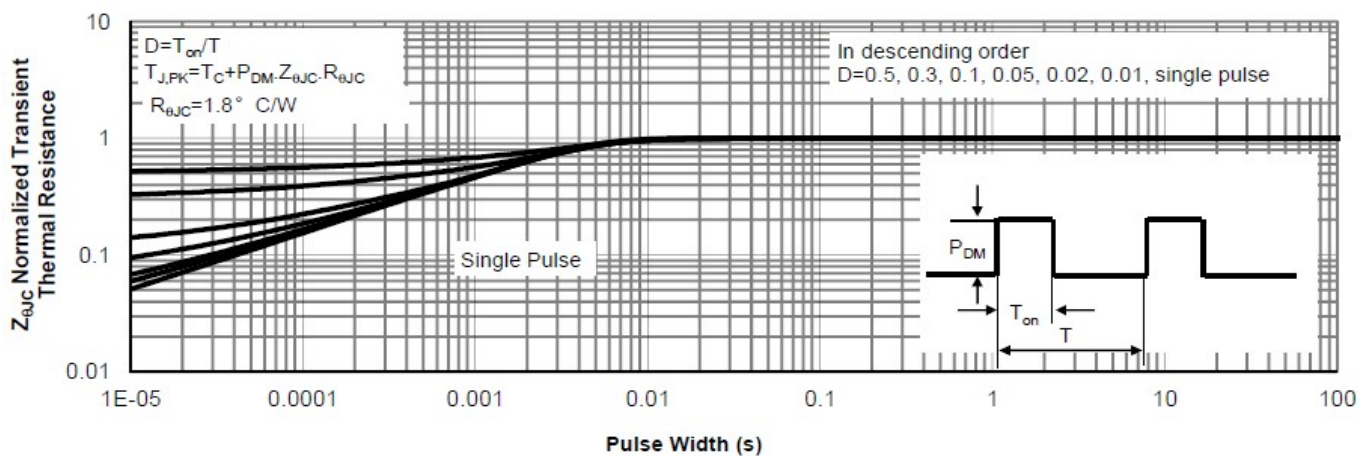
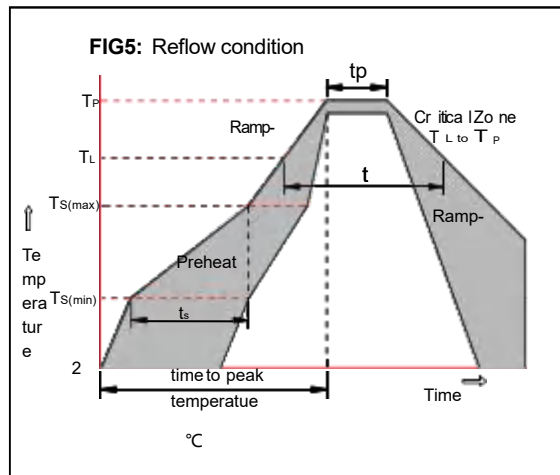


Figure8. Normalized Maximum Transient Thermal Impedance

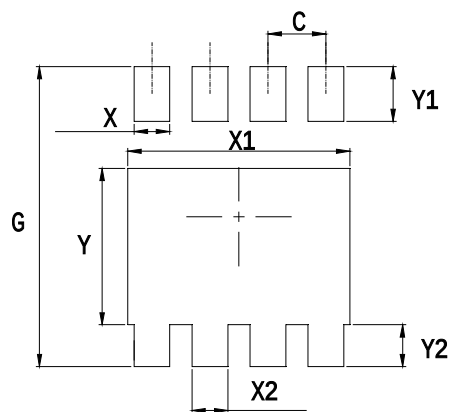
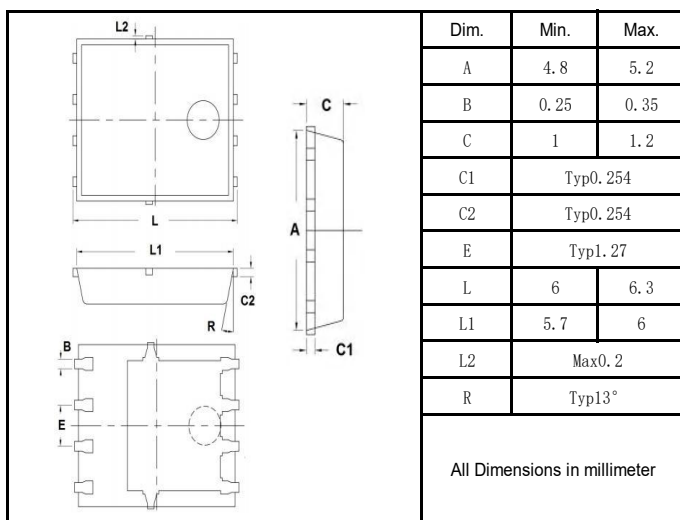
Soldering parameters

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



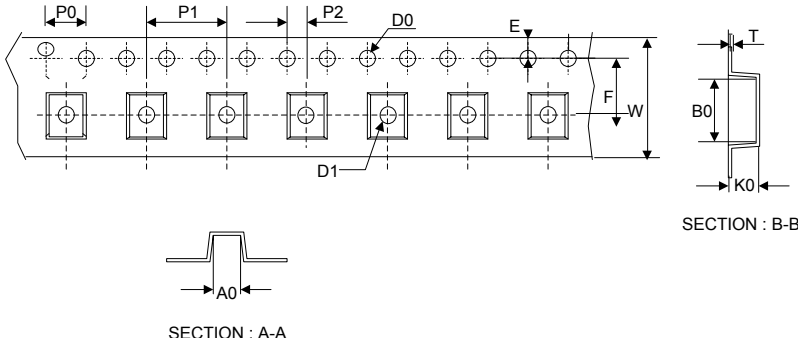
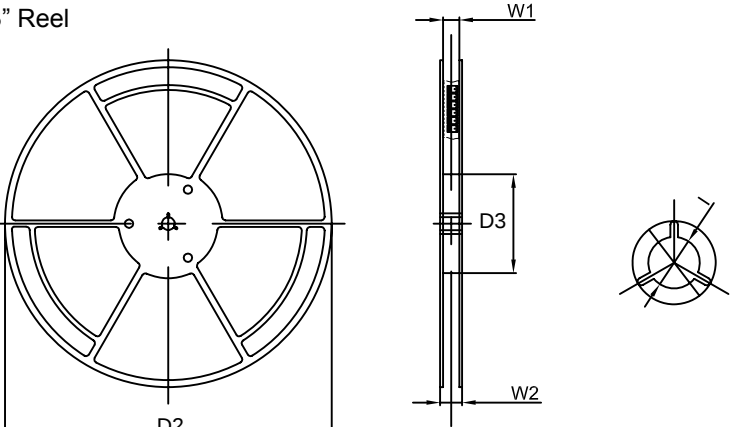
Package Dimensions & Suggested Pad Layout

PDFN5*6



Dimensions	Value (in mm)
C	1.27
G	6.45
X	0.62
X1	4.50
X2	0.62
Y	3.70
Y1	1.05
Y2	0.80

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	6.60±0.20
		B0	5.70±0.20
		K0	1.30±0.20
		T	0.20±0.20
		D2	330.0±5.0
13" Reel		D3	100.0±4.0
		W1	12.0±5.0
		W2	14.0±5.0
		I	13.0±2.0
		Quantity: 5000PCS	