

N-channel Enhancement Mode Power MOSFET

Features

- Advanced Trench Technology
- Provide Excellent RDS(ON) and Low Gate Charge
- Lead free product is acquired
- 100% UIS TESTED!, 100% Rg TESTED!

Product Summary

Parameters	Value	Unit
V_{DSS}	60	V
$V_{GS(th_Typ)}$	1.6	V
$I_D(@V_{GS}=10V)$	50	A
$R_{DS(ON)_Typ}(@V_{GS}=10V)$	15	mΩ
$R_{DS(ON)_Typ}(@V_{GS}=4.5V)$	21	mΩ

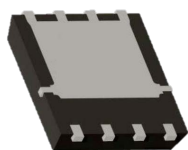
Applications

- Load Switch
- PWM Application
- Power management

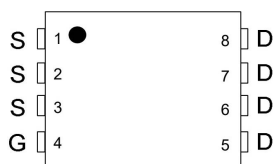
Top View



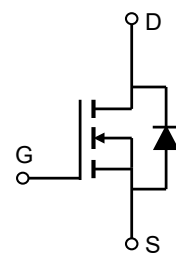
Bottom View



PDFN5x6-8L



Marking



Schematic Diagram

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK60N50G	60N50	DFN5x6	Reel	N/A	N/A	5000

MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}\text{C}$	I_D	50	A
	$T_C = 100^{\circ}\text{C}$		33	
Pulsed Drain Current		I_{DM}	200	A
Single Pulsed Avalanche Energy		E_{AS}	81	mJ
Power Dissipation		P_D	75	W
Thermal Resistance Junction to Case		$R_{\theta JC}$	2	$^{\circ}\text{C/W}$
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	$^{\circ}\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS

$T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0V$			1.0	μA
Gate-body leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA
On characteristics ④						
Gate-threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.6	2.5	V
Static drain-source on-state resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$		12	15	m Ω
		$V_{GS} = 4.5V, I_D = 20A$		16	21	m Ω
Dynamic characteristics ④ ⑤						
Input capacitance	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V$ $f = 1MHz$		2030		pF
Output capacitance	C_{oss}			130		
Reverse transfer capacitance	C_{rss}			115		
Switching characteristics ④ ⑤						
Total gate charge	Q_g	$V_{GS} = 0 \text{ to } 10V$ $V_{DS} = 30V, I_D = 30A$		45		nC
Gate-source charge	Q_{gs}			8		
Gate-drain charge	Q_{gd}			11		
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 30V, I_D = 30A$ $V_{GS} = 10V, R_{GEN} = 1.8\Omega$		11		ns
Turn-on rise time	t_r			79		
Turn-off delay time	$t_{d(off)}$			33		
Turn-off fall time	t_f			107		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V_{SD} ④	$V_{GS} = 0V, I_S = 30A$			1.2	V
Continuous drain-source diode forward current	I_S ①	$T_C = 25^\circ C$			50	A
Pulsed drain-source diode forward current	I_{SM}				200	
Reverse recovery time	t_{rr}	$di/dt = 100A/\mu s, I_F = 20A$		14		ns
Reverse recovery charge	Q_{rr}			10		nC

Notes:

- 1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : $T_J = 25^\circ\text{C}, V_{DD} = 30V, V_G = 10V, L = 0.5mH, R_g = 25\Omega, I_{AS} = 18A$
- 3.Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Figure1: Output Characteristics

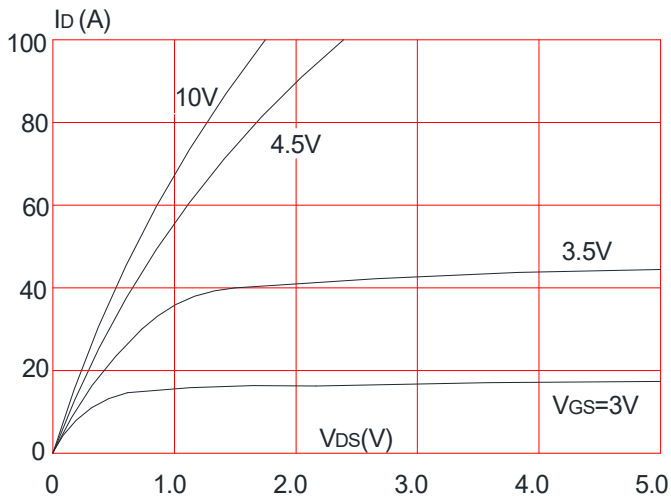


Figure 2: Typical Transfer Characteristics

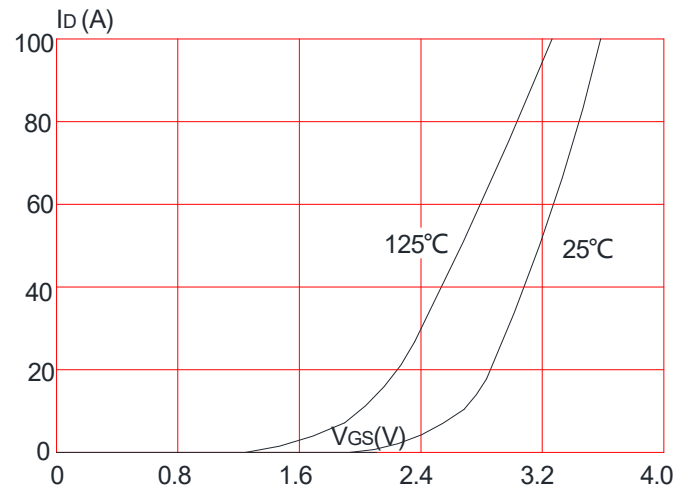


Figure 3: On-resistance vs. Drain Current

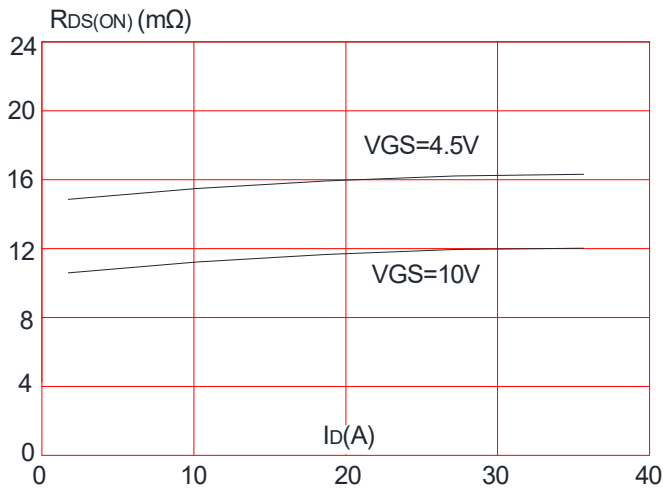


Figure 4: Body Diode Characteristics

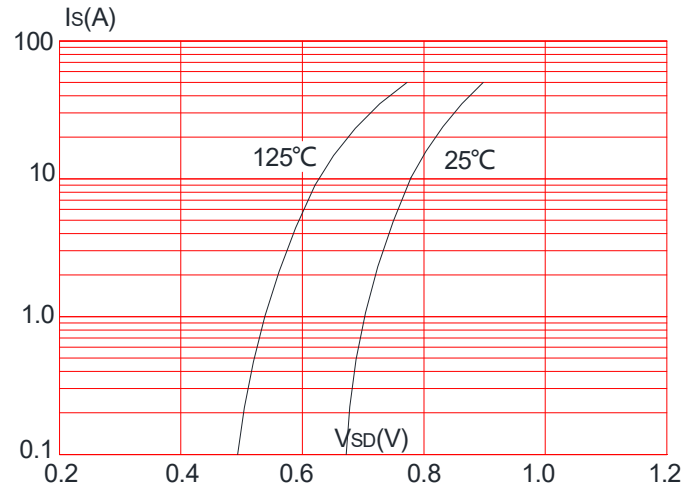


Figure 5: Gate Charge Characteristics

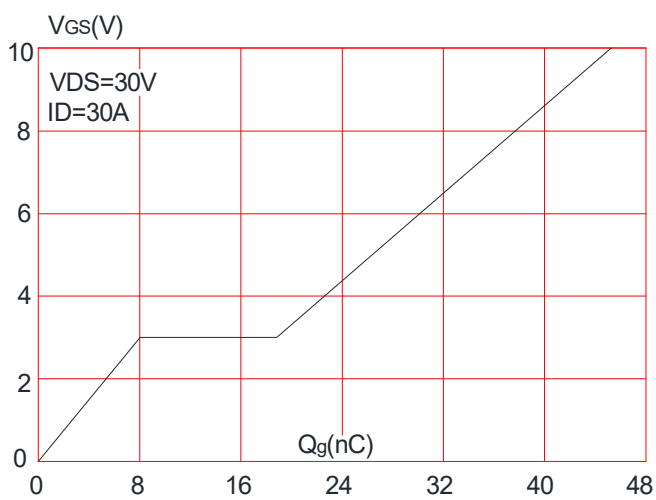
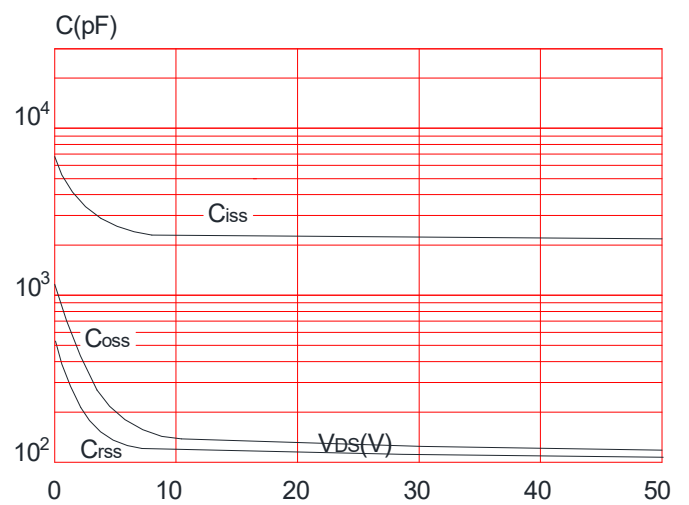


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

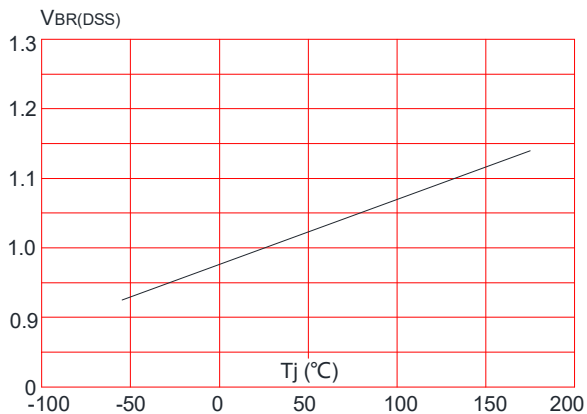


Figure 8: Normalized on Resistance vs. Junction Temperature

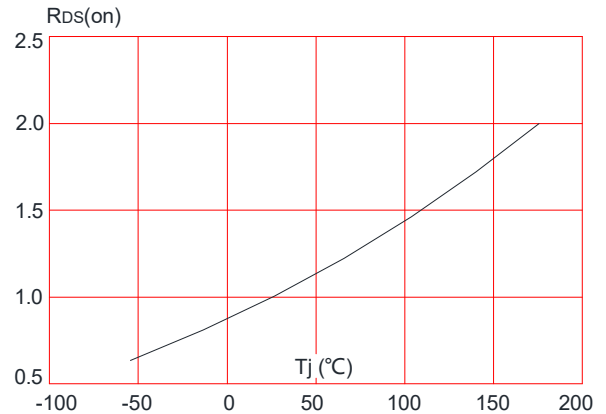


Figure 9: Maximum Safe Operating Area

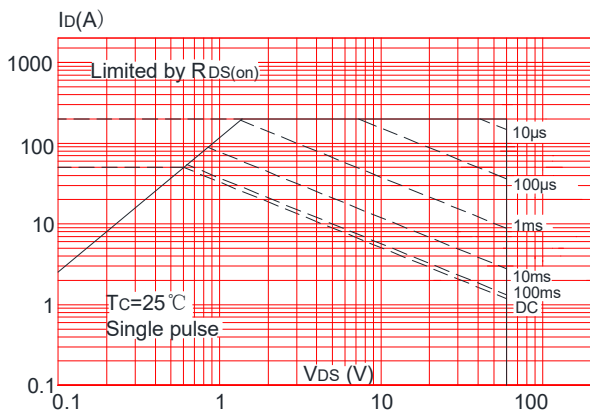


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

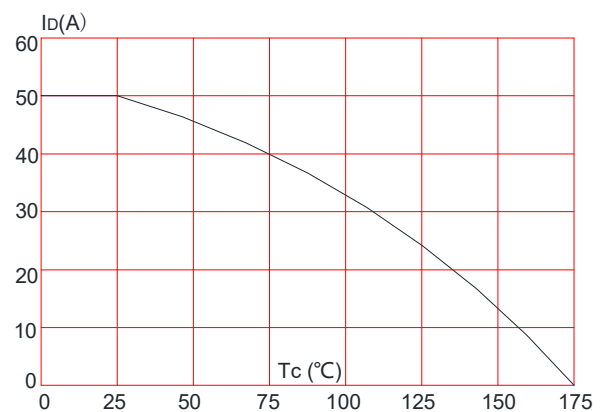
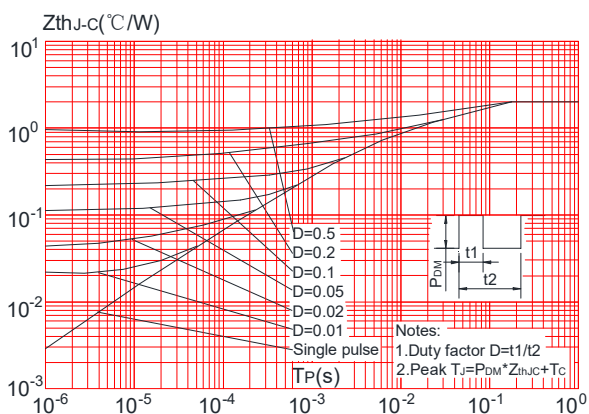


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



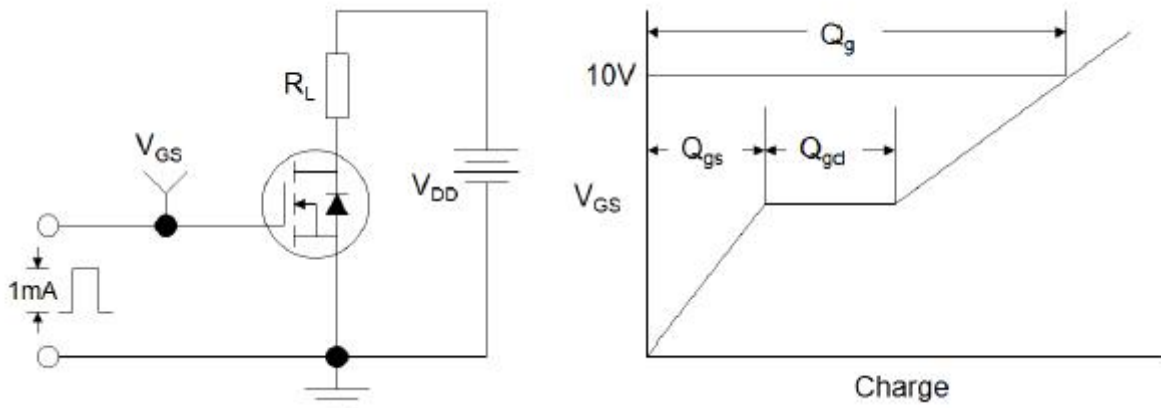


Figure1:Gate Charge Test Circuit & Waveform

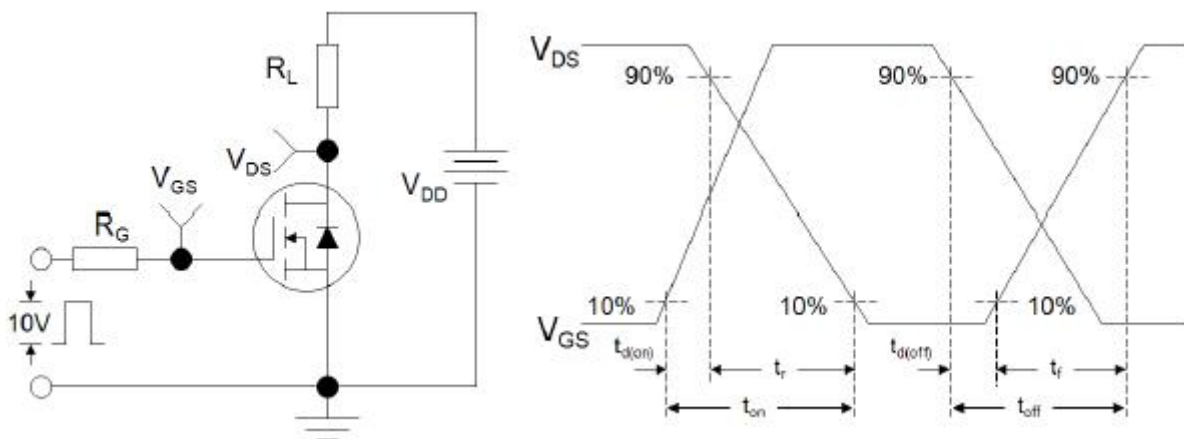
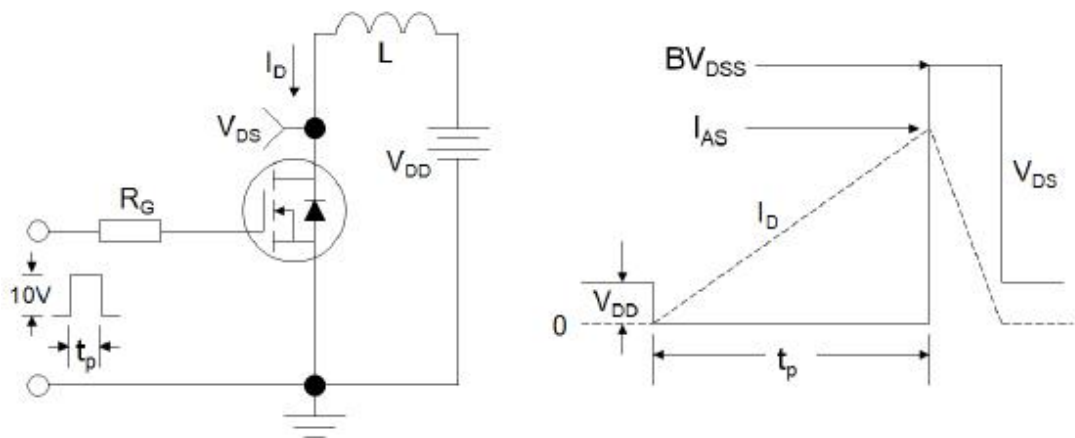
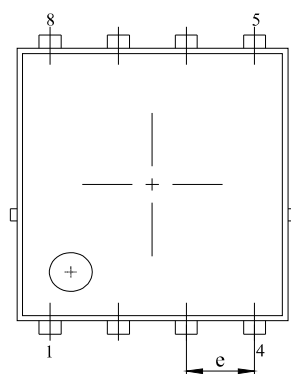
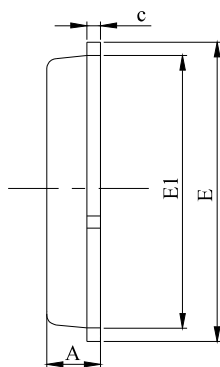


Figure 2: Resistive Switching Test Circuit & Waveforms

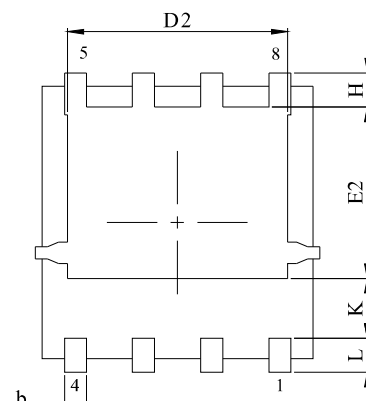




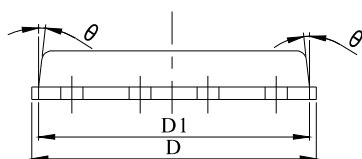
Top View



Side View



Bottom View



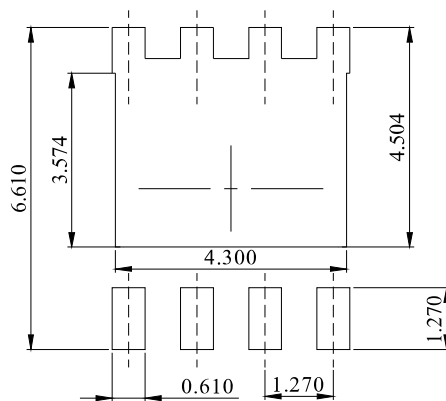
Front View

NOTES:

1. Dimension and tolerance per ASME Y14.5M, 1994.
2. All dimensions in millimeter (angle in degree).
3. Dimensions D1 and E1 do not include mold flash protrusions or gate burrs.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.31	0.41	0.51
c	0.20	0.25	0.30
D	5.00	5.20	5.40
D1	4.95	5.05	5.15
D2	4.00	4.10	4.20
E	6.05	6.15	6.25
E1	5.50	5.60	5.70
E2	3.42	3.53	3.63
e	1.27BSC		
H	0.60	0.70	0.80
L	0.50	0.70	0.80
K	1.23 REF		
θ	-	-	10°

Recommended Soldering Footprint



DIMENSIONS:MILLIMETERS