

N-channel Enhancement Mode Power MOSFET

Features

- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired
- 100% UIS TESTED!
- 100% ΔV_d s TESTED!

Applications

- Load Switch
- PWM Application
- Power Management

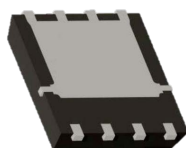
Product Summary

Parameters	Value	Unit
V_{DSS}	30	V
$V_{GS(th_Typ)}$	1.9	V
$I_D(@V_{GS}=10V)$	180	A
$R_{DS(ON)_Typ}(@V_{GS}=10V)$	2.6	m Ω
$R_{DS(ON)_Typ}(@V_{GS}=4.5V)$	4.2	m Ω

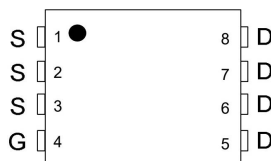
Top View



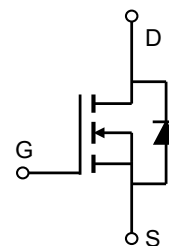
Bottom View



PDFN5x6-8L



Marking



Schematic Diagram

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK30N180G	30N180	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}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}\text{C}$	I_D	180	A
	$T_C = 100^{\circ}\text{C}$		114	
Pulsed Drain Current		I_{DM}	720	A
Single Pulsed Avalanche Energy		E_{AS}	306	mJ
Power Dissipation		P_D	96	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	27	$^{\circ}\text{C/W}$
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 = 250uA	30			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 30V, V _{GS} =0V			1.0	μA
Gate-body leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} =±20V			±100	nA
On characteristics ④						
Gate-threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.3	1.9	2.5	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =10V, I _D =30A		2.0	2.6	mΩ
		V _{GS} =4.5V, I _D =20A		3.2	4.2	mΩ
Dynamic characteristics ④ ⑤						
Input capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V f =1MHz		5065		pF
Output capacitance	C _{oss}			574		
Reverse transfer capacitance	C _{rss}			472		
Switching characteristics ④ ⑤						
Total gate charge	Q _g	V _{GS} =0 to 10V V _{DS} =15V, I _D =30A		97		nC
Gate-source charge	Q _{gs}			20		
Gate-drain charge	Q _{gd}			23		
Turn-on delay time	t _{d(on)}	V _{DD} =15V, I _D =30A V _{GS} =10V, R _{GEN} =3Ω		16		ns
Turn-on rise time	t _r			30		
Turn-off delay time	t _{d(off)}			54		
Turn-off fall time	t _f			19		
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				180	A
Pulsed drain-source diode forward current	I _{SM} ②				720	A
Reverse recovery time	t _{rr}	di/dt = 100A/μs, I _F = 30A		23		ns
Reverse recovery charge	Q _{rr}			14		nC

Notes:

- 1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
- 2.EAS condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 15V$, $V_G = 10V$, $R_G = 25\Omega$, $L = 0.5mH$, $I_{AS} = 35A$
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
- 4.Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$.

Figure 1: Output Characteristics

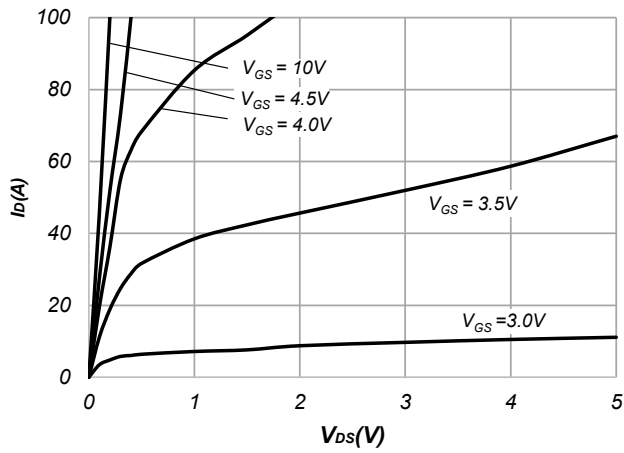


Figure 2: Typical Transfer Characteristics

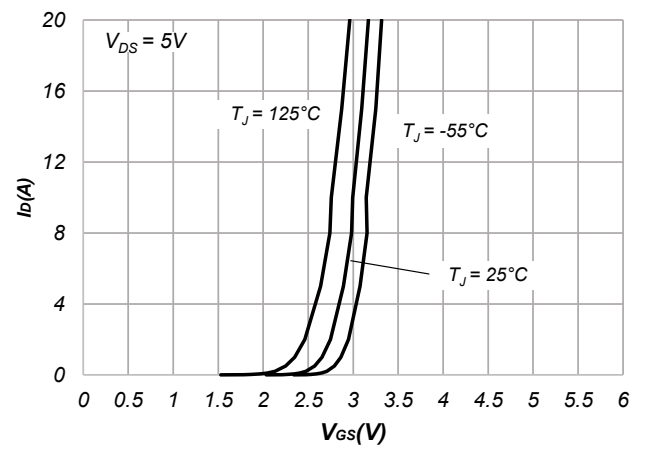


Figure 3: On-resistance vs. Drain Current

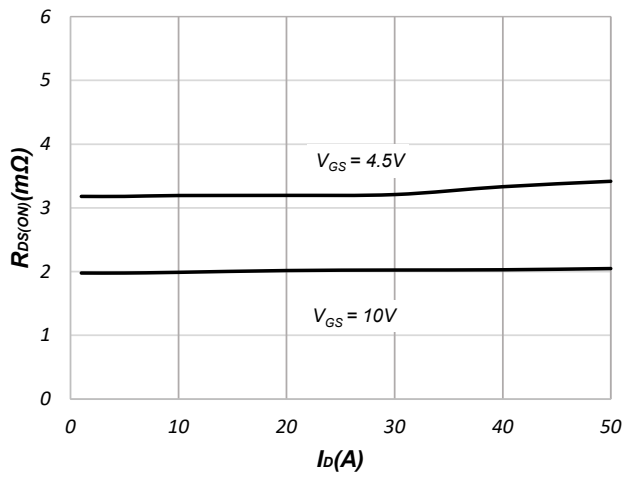


Figure 4: Body Diode Characteristics

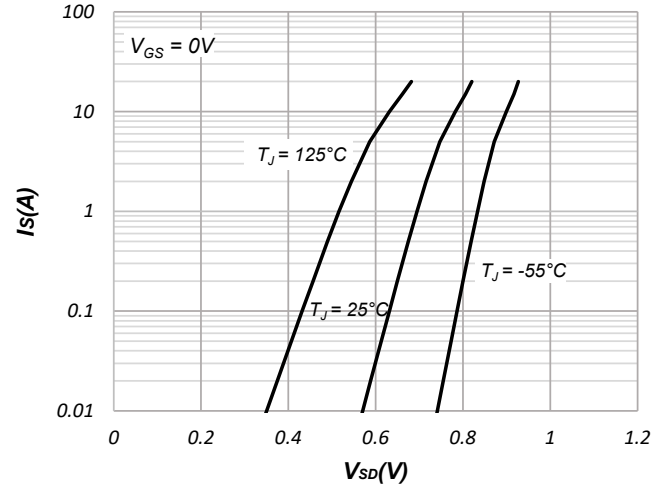


Figure 5: Gate Charge Characteristics

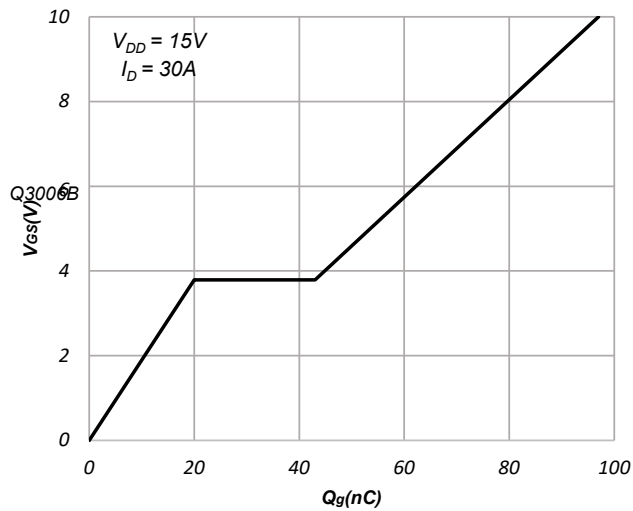
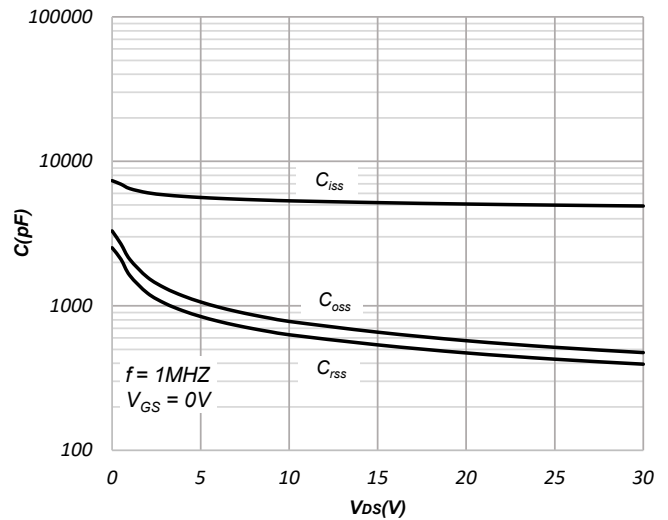


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

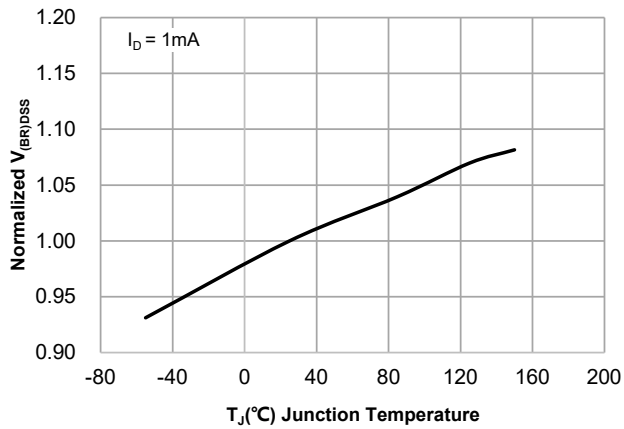


Figure 8: Normalized on Resistance vs. Junction Temperature

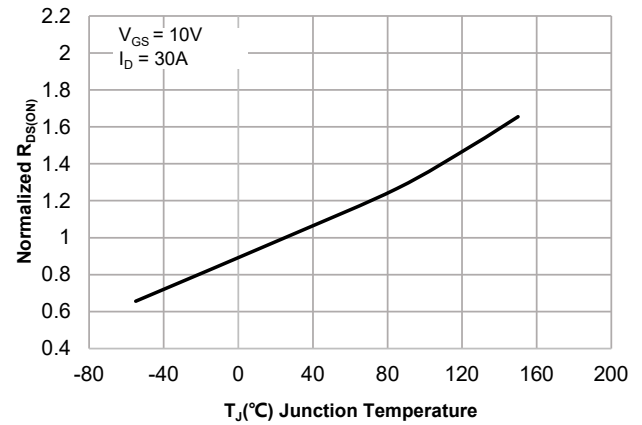


Figure 9: Maximum Safe Operating Area

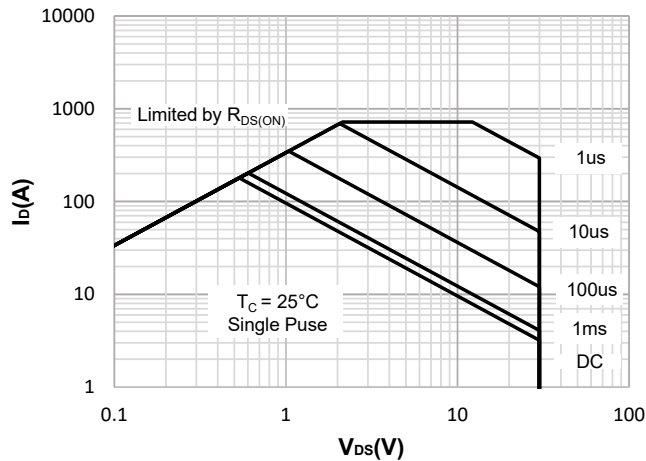


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

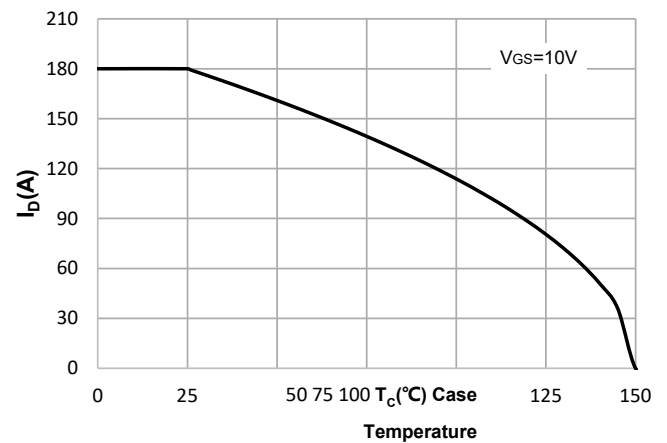


Figure 11: Normalized Maximum Transient Thermal Impedance

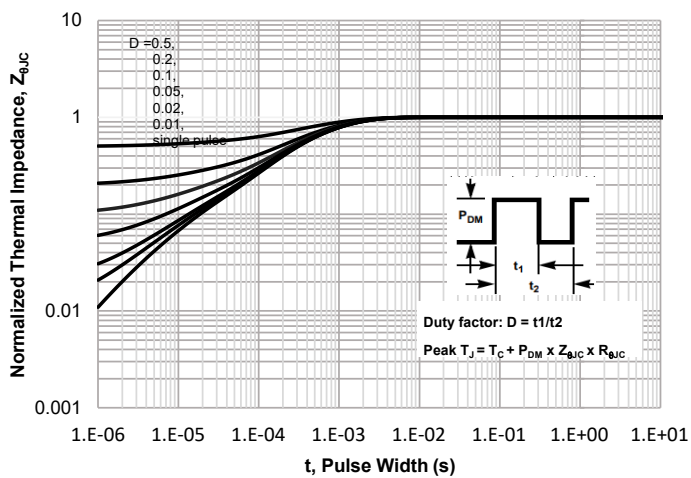
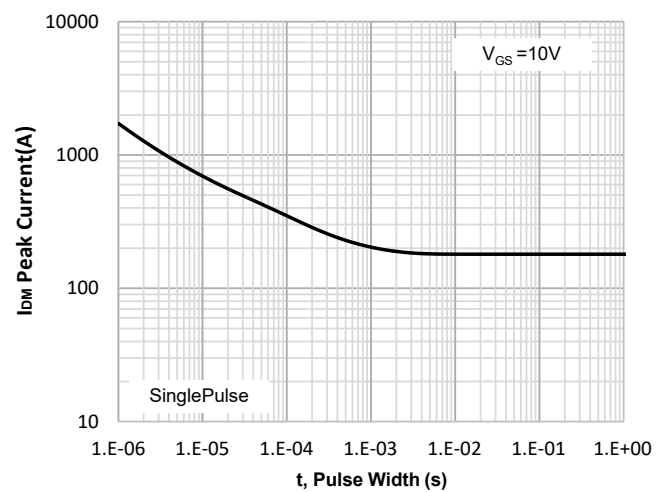


Figure 12: Peak Current Capacity



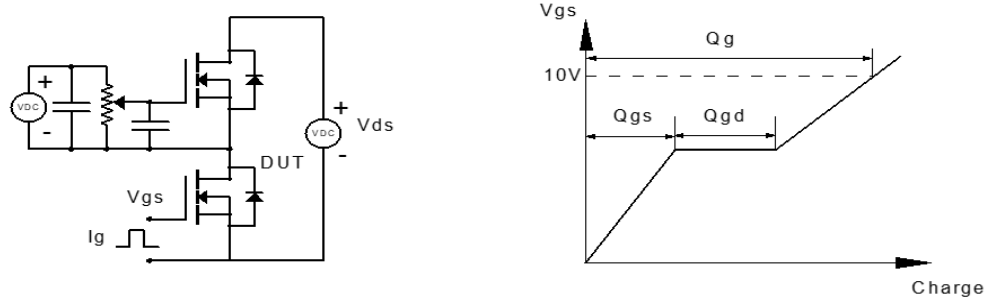


Figure 1: Gate Charge Test Circuit & Waveform

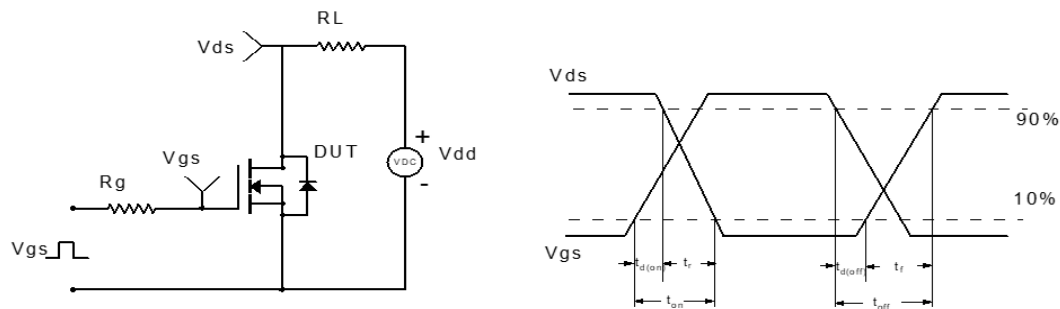


Figure 2: Resistive Switching Test Circuit & Waveform

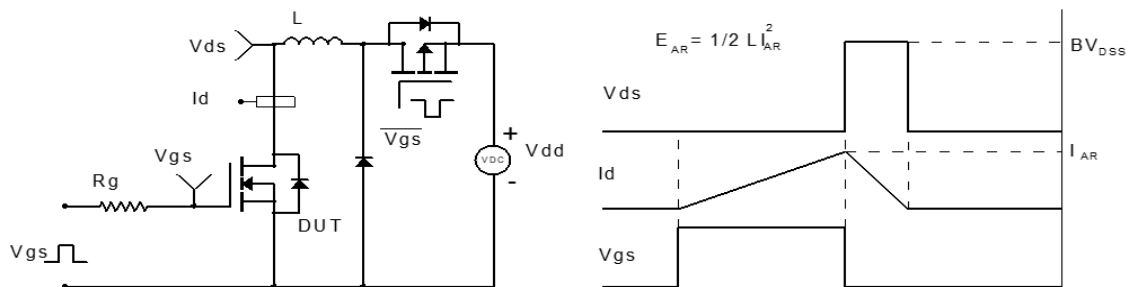


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

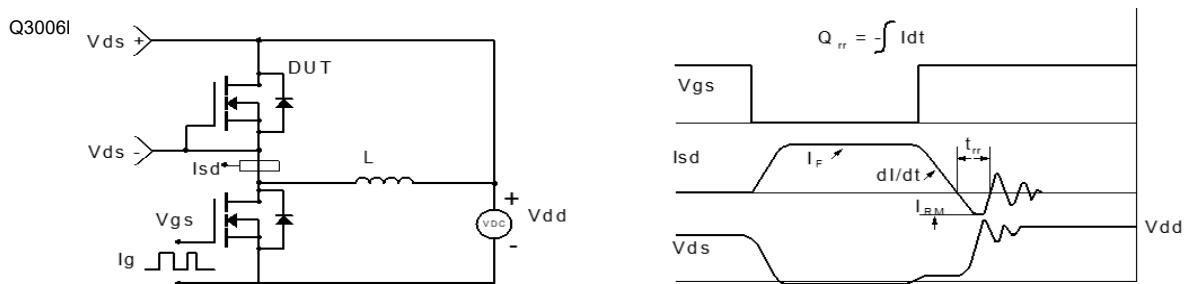
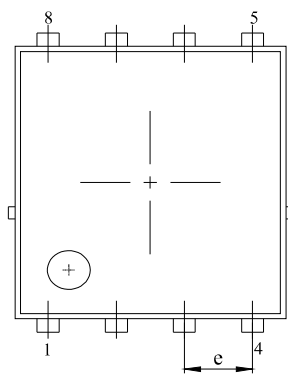
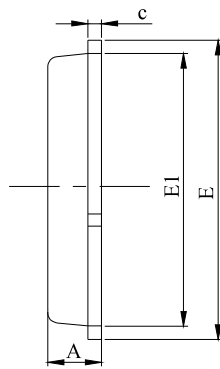


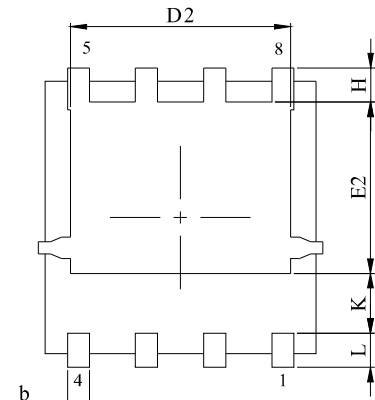
Figure 4: Diode Recovery Test Circuit & Waveform



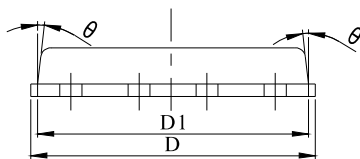
Top View



Side View



Bottom View



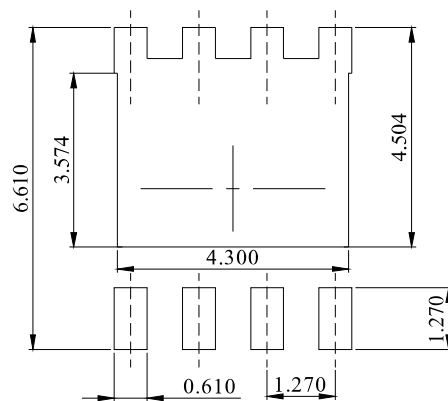
Front View

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