

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



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PLED

## NTTFS015N04C-MS

Product specification

## Description

The NTTFS015N04C-MS uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

## Features

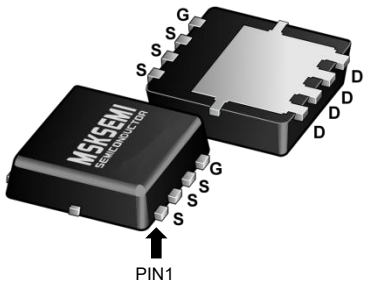
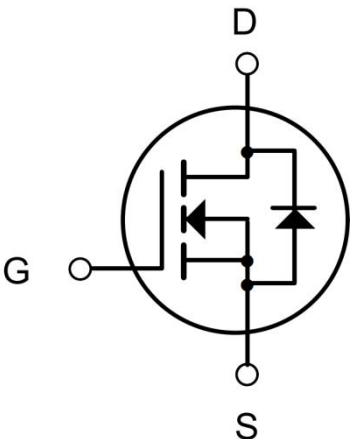

$V_{DS} = 40V$   $I_D = 50A$

$R_{DS(ON)} < 14m\Omega$   $V_{GS} = 10V$

## Application

- Battery protection
- Load switch
- Uninterruptible power supply

## Reference News

PACKAGE OUTLINE	N-Channel MOSFET	Marking
 <p>DFN5X6-8L</p>		

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain- Source Voltage	40	V
$V_{GS}$	Gate- Source Voltage	$\pm 20$	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ <sup>1</sup>	50	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ <sup>1</sup>	38	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	160	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	50	mJ
$T_{STG}$	Storage Temperature Range	-55 to 175	°C
$T_J$	Operating Junction Temperature Range	-55 to 175	°C

## Thermal Characteristic

Thermal Resistance, Junction-to-Case <sup>(Note 2)</sup>	R <sub>θJC</sub>	1.76	°C/W
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## Electrical Characteristics (TA=25°C unless otherwise noted)

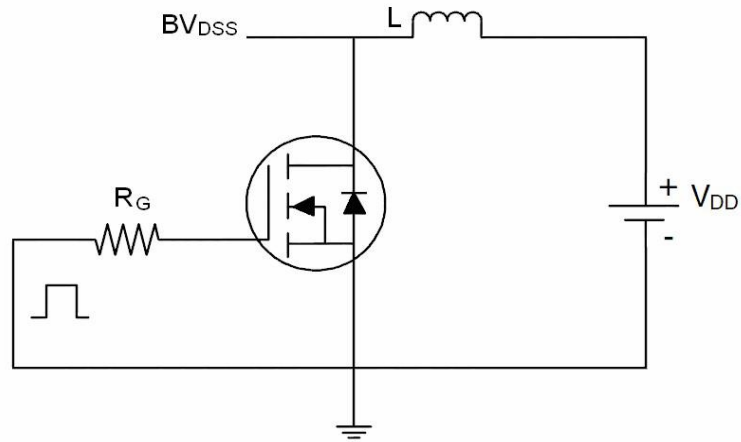
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	40	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =40V, V <sub>GS</sub> = 0V,	-	-	1	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V	-	-	±100	μA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.6	2.5	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	-	11	14	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	30	-	-	S
<b>Dynamic Characteristics</b> <sup>(Note 4)</sup>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz	-	1540	-	pF
C <sub>oss</sub>	Output Capacitance		-	171	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	115	-	pF
<b>Switching Characteristics</b> <sup>(Note 4)</sup>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =20V, I <sub>D</sub> =20A, R <sub>L</sub> =1Ω	-	5	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	24	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	38	-	ns
t <sub>f</sub>	Turn-off Fall Time	V <sub>GS</sub> =10V, R <sub>GEN</sub> =3Ω	-	12	-	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =30V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V	-	24	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	5.9	-	nC
Q <sub>gd</sub>	Gate-Drain Charge		-	3.6	-	nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Drain Forward Current <sup>(Note 2)</sup>		-	-	48	A
V <sub>SD</sub>	Drain Forward Current <sup>(Note 3)</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =30A	-	-	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	T <sub>J</sub> =25°C, I <sub>F</sub> =30A	-	9	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs <sup>(Note 3)</sup>	-	15	-	nC
t <sub>on</sub>	Forward Turn-On Time	Intrinsic turn-on time is negligible(turn-on is dominated br LS+LD)				

### Notes:

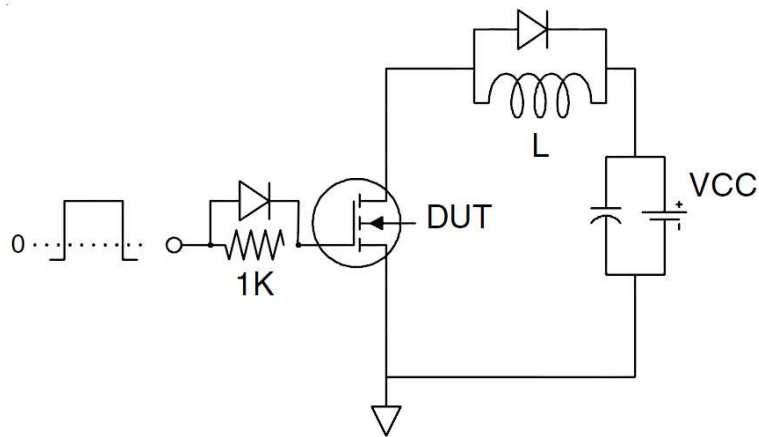
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t<sub>s</sub>≤10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle≤2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=30V, V<sub>G</sub>=10V, L=0.5mH, R<sub>g</sub>=25Ω

**Test circuit**

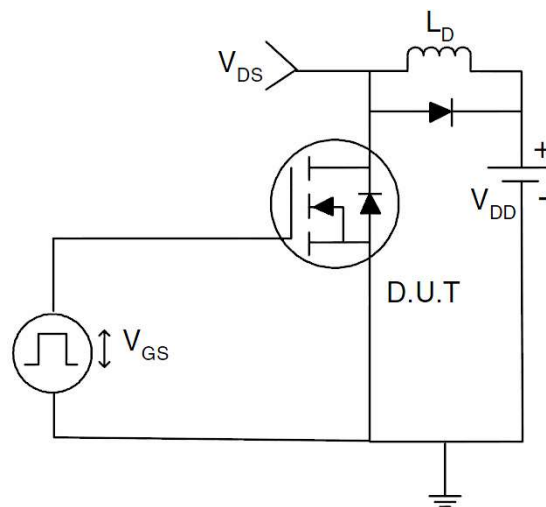
**1)  $E_{AS}$  test Circuits**



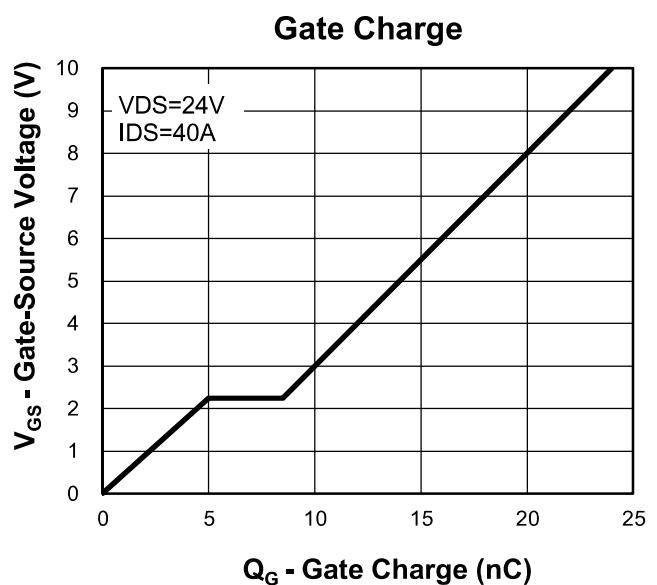
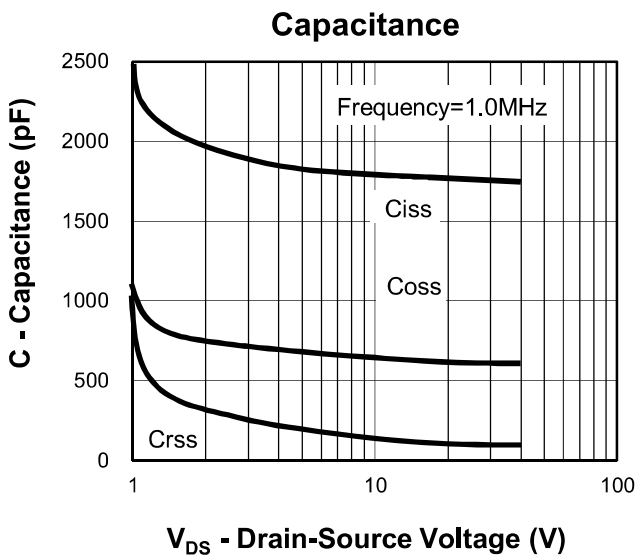
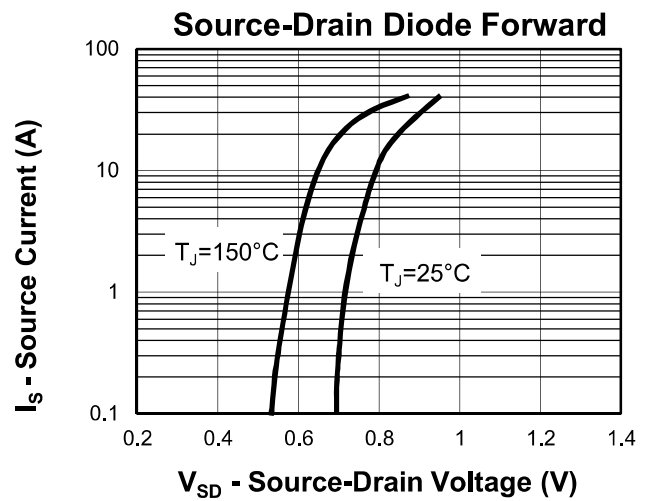
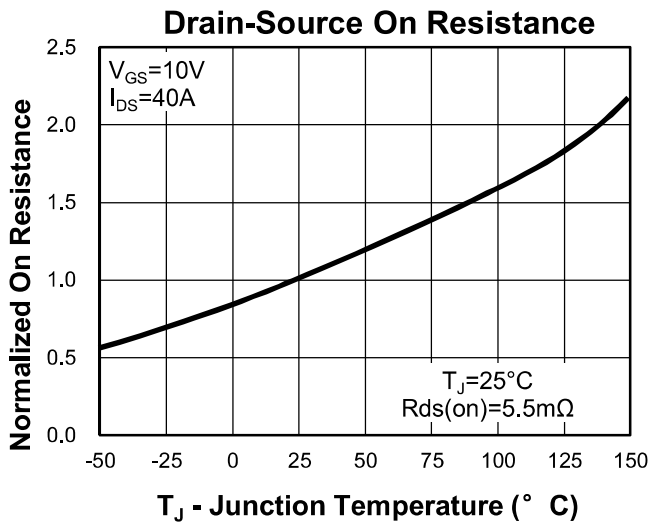
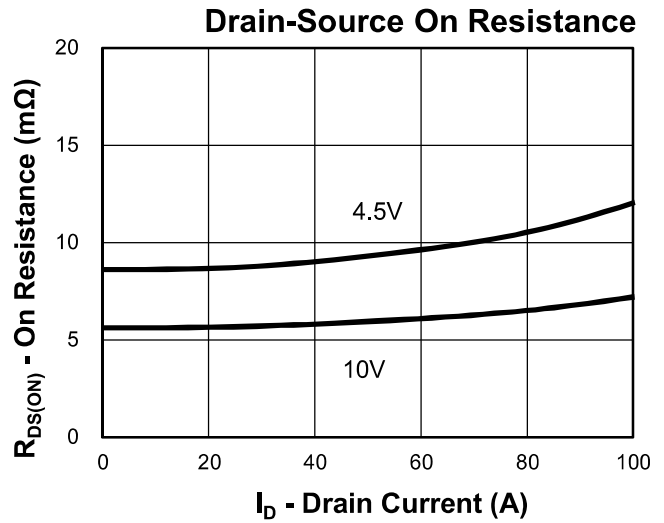
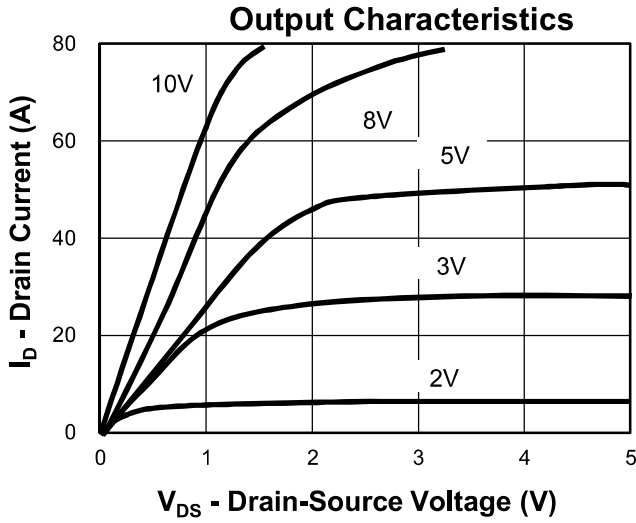
**2) Gate charge test Circuit**



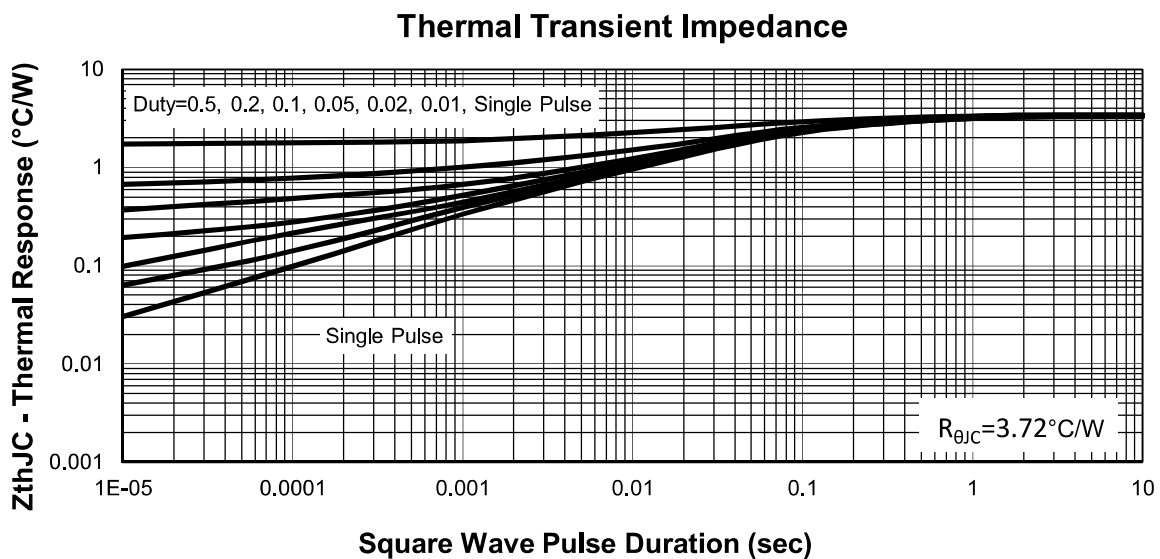
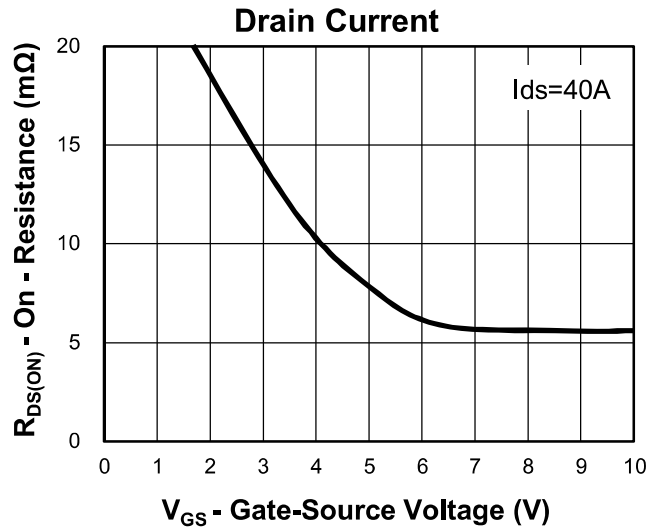
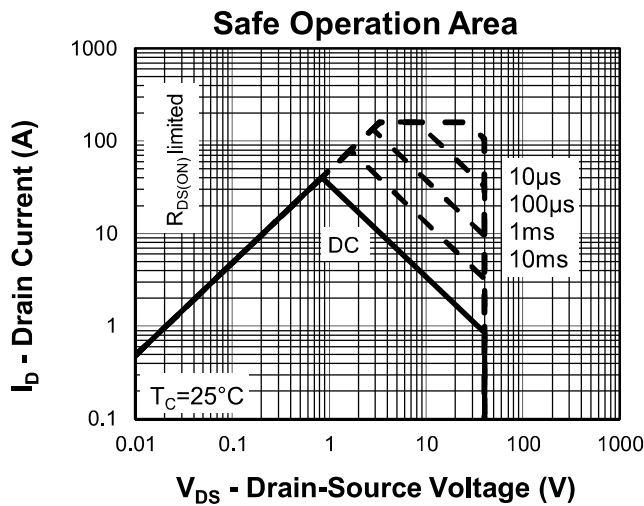
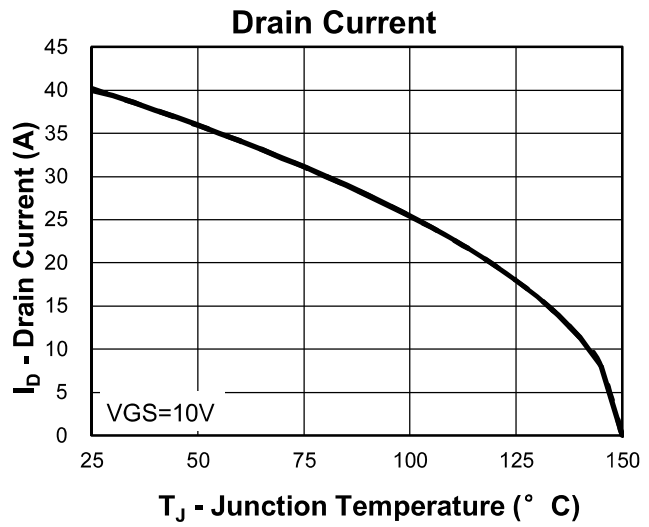
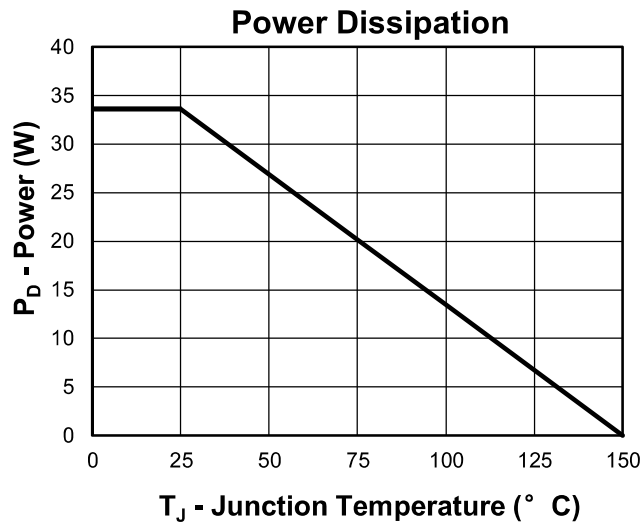
**3) Switch Time Test Circuit**

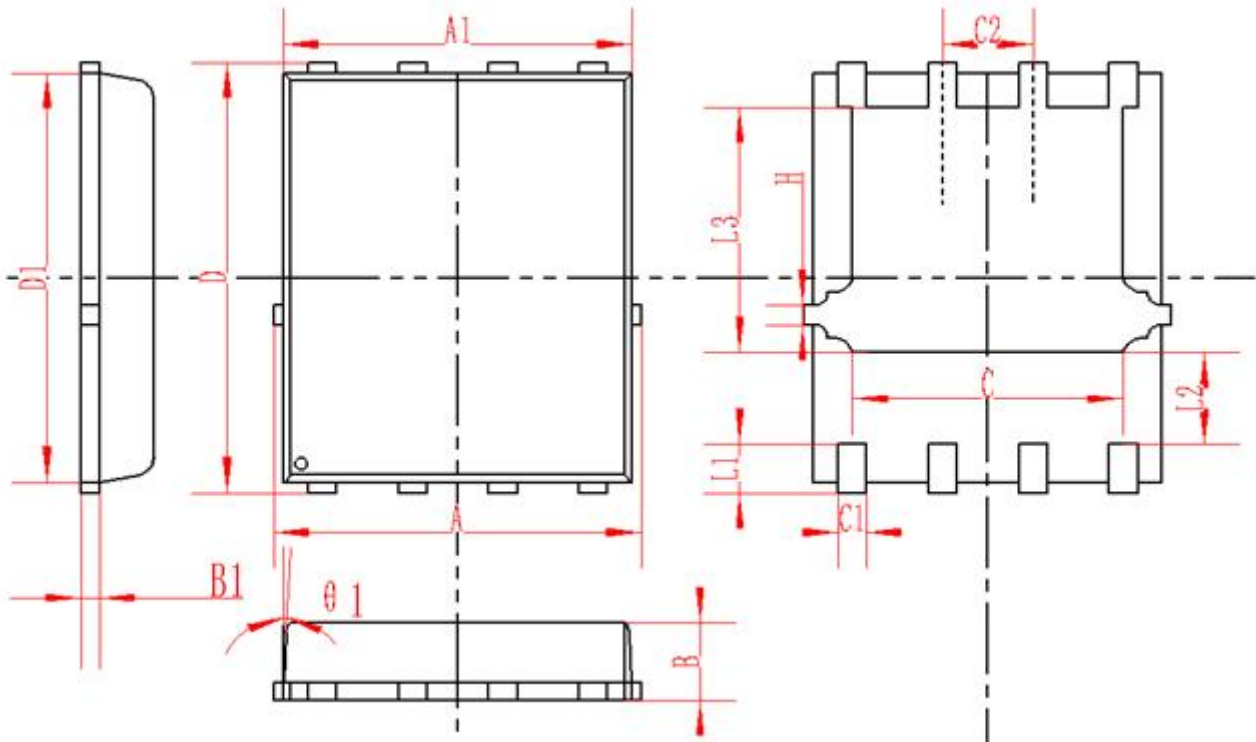


**Typical Characteristics**



**Typical Characteristics**



**DFN5X6-8L Package Information**


SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
$\theta 1$	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010

**REEL SPECIFICATION**

P/N	PKG	QTY
NTTFS015N04C-MS	DFN5X6-8L	5000

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