

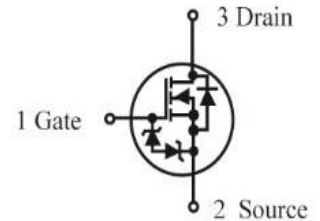
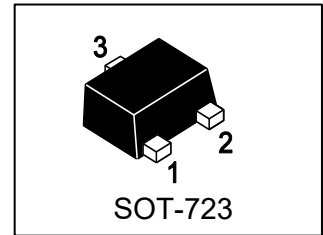
# NTK4003M

## S-NTK4003M

30 V, 0.56 A, Single, N-Channel,  
Gate ESD Protection

### 1. FEATURES

- Low gate voltage threshold(VGS(th))to facilitate drive circuit design
- Low gate charge for fast switching
- ESD protected gate
- Minimum breakdown voltage rating of 30 V
- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- S- prefix for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.



### 2. APPLICATIONS

- Level shifters
- Level switches
- Low side load switches
- Portable applications

### 3. DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
NTK4003M	KM	8000/Tape&Reel

### 4. MAXIMUM RATINGS(Ta = 25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	VDSS	30	V
Gate-to-Source Voltage – Continuous	VGS	±20	V
Current (Note 1) Steady State	ID	TA = 25°C	A
		TA = 85°C	
Continuous Drain Current (Note 1) t<10s		TA = 25°C	0.56
		TA = 85°C	0.4
Pulsed Drain Current(tp=10µs)	IDM	1.7	A
Continuous Source Current (Body Diode)	IS	1	A
Maximum Power Dissipation(Note 1) Steady State	PD		W
		t<5s	
Junction and Storage temperature	TJ,Tstg	-55 ~ +150	°C
Maximum Temperature for Soldering Purposes	TL	260	°C



## 5. THERMAL CHARACTERISTICS

Parameter	Symbol	Limits	Unit
Thermal Resistance, Junction-to-Ambient Steady State(Note 1)	R $\theta$ JA	280	°C/W
t = 5s(Note 1)		228	

## 6. ELECTRICAL CHARACTERISTICS (Ta= 25°C)

### OFF CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage (VGS = 0, ID = 100 $\mu$ Adc)	V(BR)DSS	30	-	-	Vdc
Drain-to-Source Breakdown Voltage Temperature Coefficient	V(BR)DSS/ TJ	-	40	-	mV/°C
Zero Gate Voltage Drain Current (VDS=30V, VGS=0V)	IDSS	-	-	1.0	$\mu$ Adc
Gate-Body Leakage Current, Forward (VDS = 0 V, VGS = $\pm$ 10 V)	IGSS	-	-	$\pm$ 1.0	$\mu$ Adc

### ON CHARACTERISTICS (Note 2)

Gate Threshold Voltage (VDS = VGS, ID = 250 $\mu$ Adc)	VGS(th)	0.8	-	1.6	Vdc
Negative Threshold Temperature Coefficient	VGS(TH)/TJ	-	3.4	-	mV/°C
Static Drain-Source On-State Resistance (VGS = 4.0 V, ID = 10 mA)	RDS(on)	-	1	1.5	$\Omega$
(VGS = 2.5 V, ID = 10 mA)		-	1.5	2	
Forward Transconductance (VDS = 3.0 V, ID = 10 mA)	gfs	-	0.33	-	S

### DYNAMIC CHARACTERISTICS

Input Capacitance (VGS = 0 V, f = 1.0MHz, VDS= 5 V)	Ciss	-	41	-	pF
Output Capacitance (VGS = 0 V, f = 1.0MHz, VDS= 5 V)	Coss	-	12	-	pF
Reverse Transfer Capacitance (VGS = 0 V, f = 1.0MHz, VDS= 5 V)	Crss	-	8.1	-	pF

### SWITCHING CHARACTERISTICS

Turn-On Delay Time	(VGS = 4.5 V, VDD = 5.0 V, ID = 0.1 A, RG = 50 $\Omega$ )	td(on)	-	16.7	-	ns
Rise Time		tr	-	47.9	-	
Turn-Off Delay Time		td(off)	-	65.1	-	
Fall Time		tf	-	64.2	-	

### SOURCE-DRAIN DIODE CHARACTERISTICS

Forward Voltage (VGS = 0 Vdc, ISD = 10 mAdc)	VSD	-	0.65	0.7	V
Reverse Recovery Time (VGS = 0 V, dIS/dt = 8A/ $\mu$ s, IS = 10 mA)	trr	-	14	-	ns

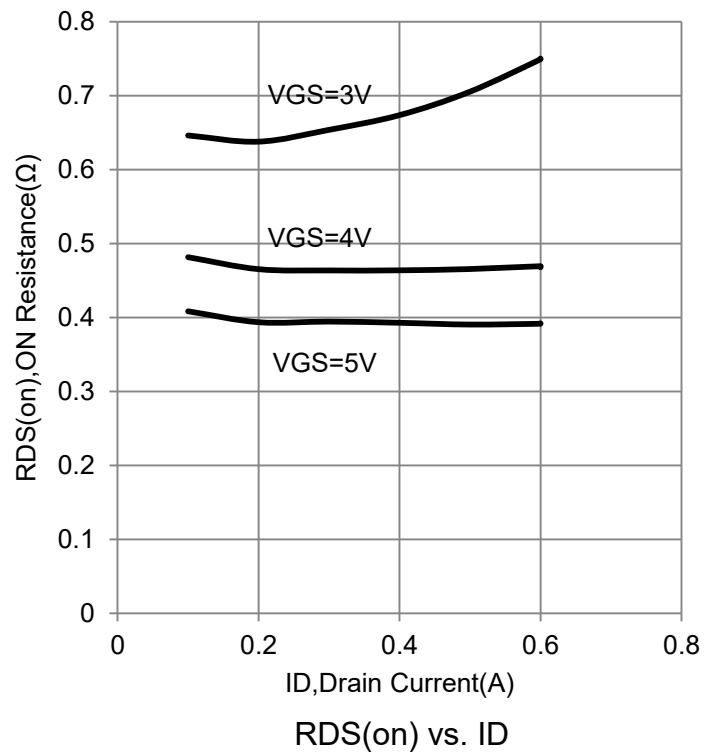
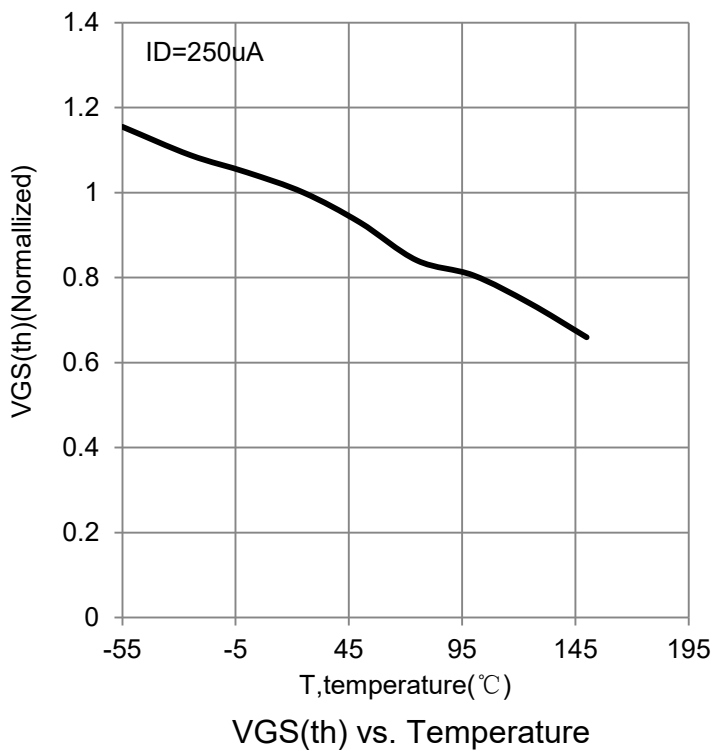
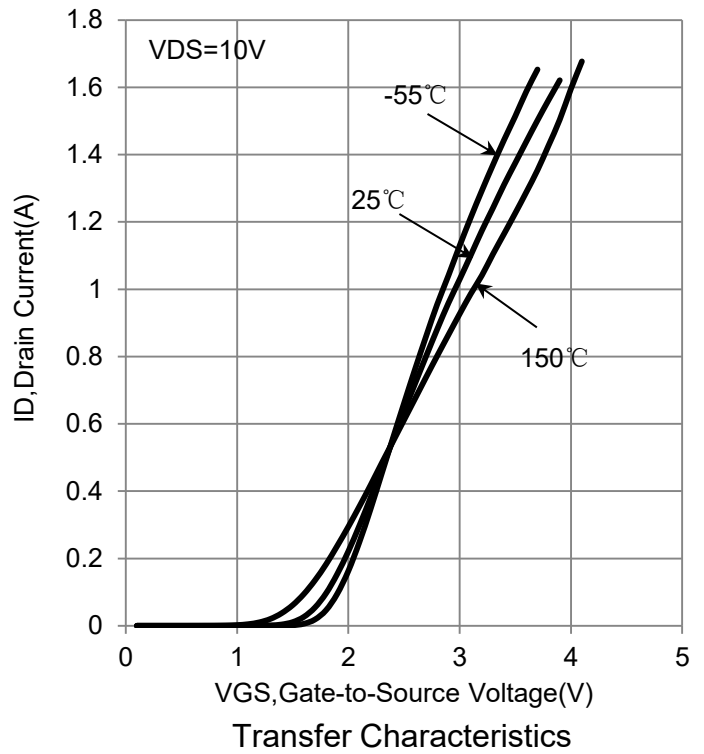
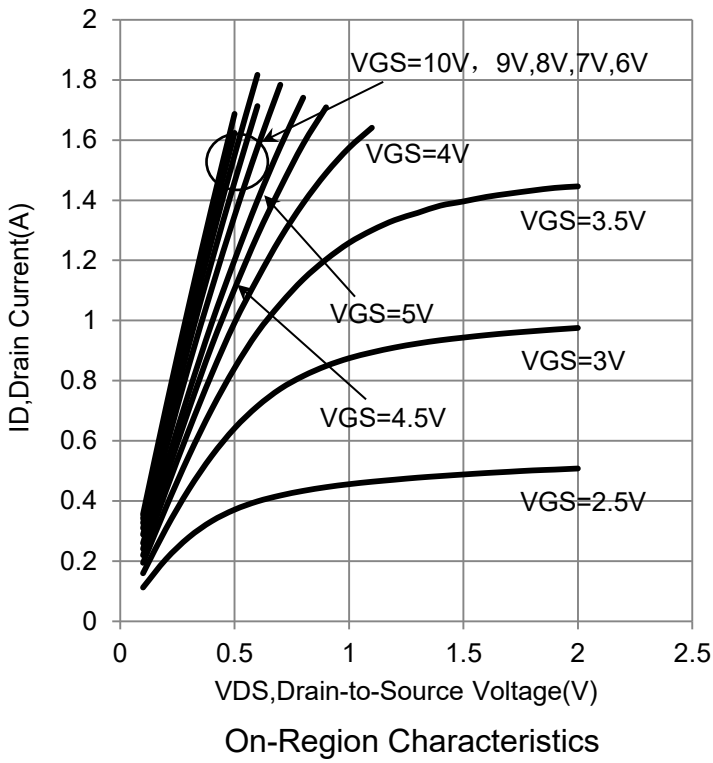
1. Surface-mounted on FR4 board using 1 in sq pad size

(Cu area = 1.127 in sq [1 oz] including traces).

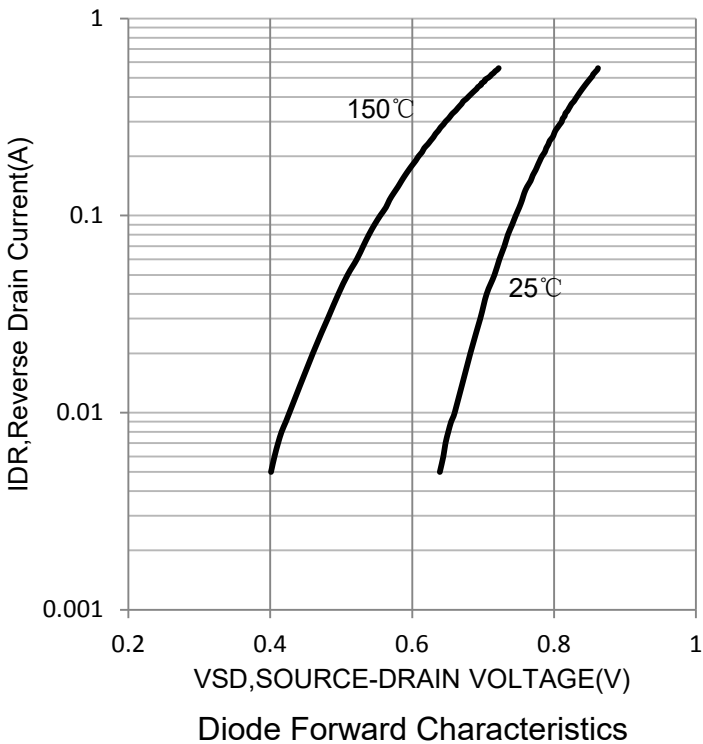
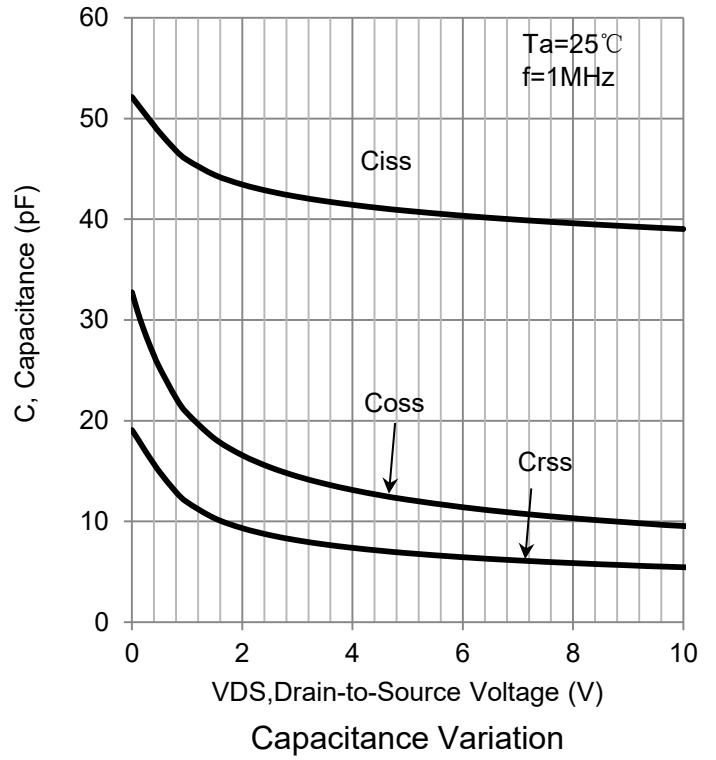
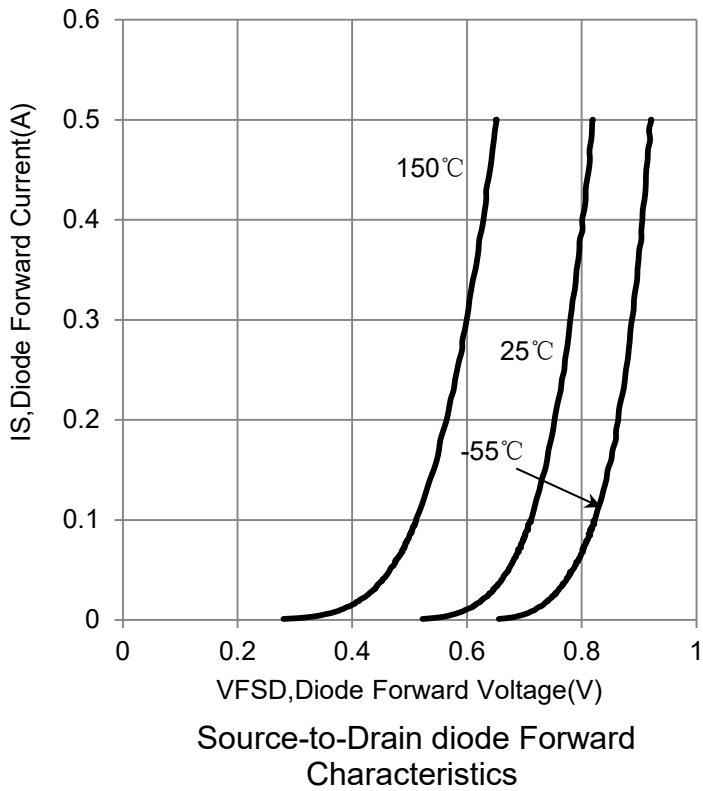
2. Pulse Test: Pulse Width  $\leq$  300  $\mu$ s, Duty Cycle  $\leq$  2.0%.



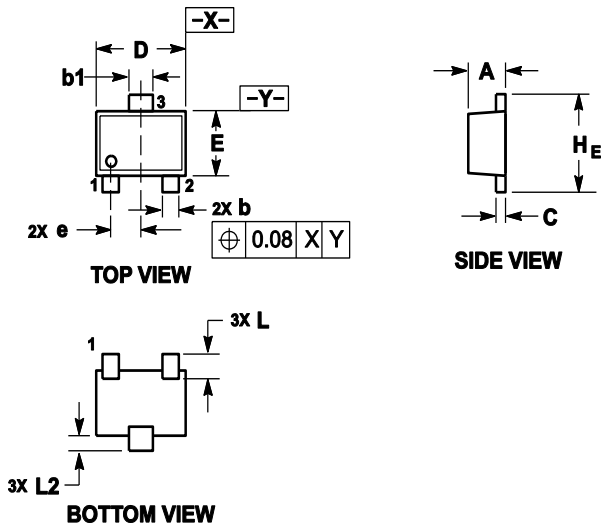
## 7. ELECTRICAL CHARACTERISTICS CURVES



## 7. ELECTRICAL CHARACTERISTICS CURVES (Con.)



## 8. OUTLINE AND DIMENSIONS



### Notes:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	0.50	0.55	0.018	0.020	0.039
b	0.15	0.21	0.27	0.006	0.008	0.011
b1	0.25	0.31	0.37	0.010	0.012	0.015
C	0.07	0.12	0.17	0.003	0.005	0.007
D	1.15	1.20	1.25	0.045	0.047	0.049
E	0.75	0.80	0.85	0.030	0.031	0.033
e	0.40REF			0.016REF		
H <sub>E</sub>	1.15	1.20	1.25	0.045	0.047	0.049
L	0.29REF			0.011REF		
L <sub>2</sub>	0.15	0.20	0.25	0.006	0.008	0.010

## 9. SOLDERING FOOTPRINT

