

• General Description

The TF020N03NG uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications.

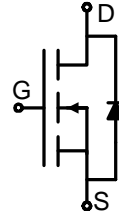
• Features

- Advance device constructure
- Low R_{DS(ON)} to minimize conduction loss
- Low Gate Charge for fast switching
- Low Thermal resistance

• Application

- Synchronous Rectification for AC-DC/DC-DC converter
- Power Tools

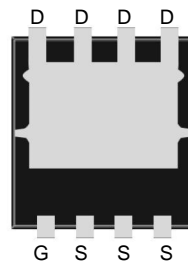
• Product Summary



V_{DS} = 30V I_D = 145A

R_{DS(ON)(10V typ)} = 1.7mΩ

R_{DS(ON)(4.5V typ)} = 2.3mΩ



PDFN5x6-8L

• Package Marking and Ordering Information:

Part NO.	TF020N03NG
Marking1	020N03NG
Marking2	TF:tuofeng; AA:device code; Y:year code; X:Week
MOQ	5000

• Absolute Maximum Ratings (T_C = 25°C)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V _{DS}	30	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current	I _{D@TC=25°C}	145	A
	I _{D@TC=75°C}	102	A
	I _{D@TC=100°C}	87	A
Pulsed Drain Current ①	I _{DM}	500	A
Total Power Dissipation	P _{D@TC=25°C}	50	W
Total Power Dissipation	P _{D@TA=25°C}	1.0	W
Operating Junction Temperature	T _J	-55 to 150	°C
Storage Temperature	T _{STG}	-55 to 150	°C
Single Pulse Avalanche Energy	E _{AS}	210	mJ



TUO FENG

Shenzhen Tuofeng Semiconductor Technology Co., Ltd

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

SGT MOS、低内阻、低结电容开关损耗小

TF020N03NG

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.0	$^{\circ}C/W$
Thermal resistance, junction - ambient	R_{thJA}	-	-	52	$^{\circ}C/W$
Soldering temperature, wavesoldering for 8 s	T_{sold}	-	-	265	$^{\circ}C$

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	1.0	1.6	2.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 20A$	-	1.7	3.0	m Ω
		$V_{GS} = 4.5V, I_D = 15A$	-	2.3	4.0	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 10V, I_D = 20A$	-	60	-	S
Source-drain voltage	V_{SD}	$I_s = 20A$	-	0.75	1.2	V

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$f = 1MHz$ $V_{DS} = 15V$ $V_{GS} = 0V$	-	1980	-	pF
Output capacitance	C_{oss}		-	768	-	
Reverse transfer capacitance	C_{rss}		-	75.0	-	

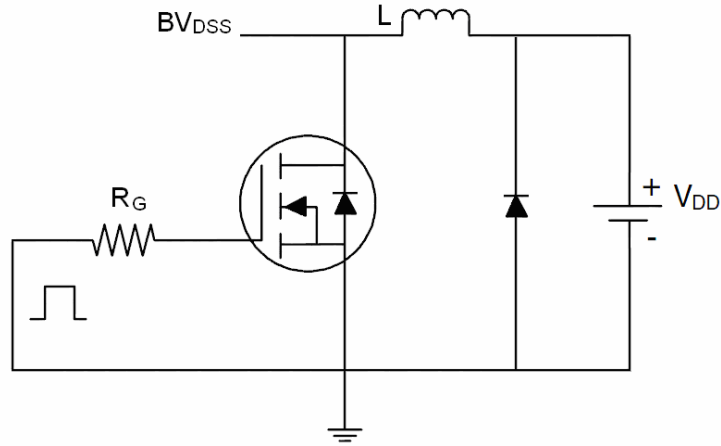
●Gate Charge characteristics($T_a = 25^{\circ}C$)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	R_g	$f = 1MHz$		1.8		Ω
Total gate charge	Q_g	$V_{DD} = 15V$ $I_D = 20A$ $V_{GS} = 10V$	-	33	-	nC
Gate - Source charge	Q_{gs}		-	5.0	-	
Gate - Drain charge	Q_{gd}		-	5.9	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS} = 10V, V_{DS} = 15V$ $R_G = 3.0\Omega, I_D = 20A$		7.60		ns
Turn-ON Rise time	t_r			5.50		ns
Turn-Off Delay time	$t_{D(off)}$			31.5		ns
Turn-Off Fall time	t_f			9.00		ns
Reverse Recovery Time	t_{rr}	$V_{GS} = 0V, I_f = 20A$ $dI_S/dt = 100A/\mu s$		42.0		ns
Reverse Recovery Charge	Q_{rr}			16.8		nC

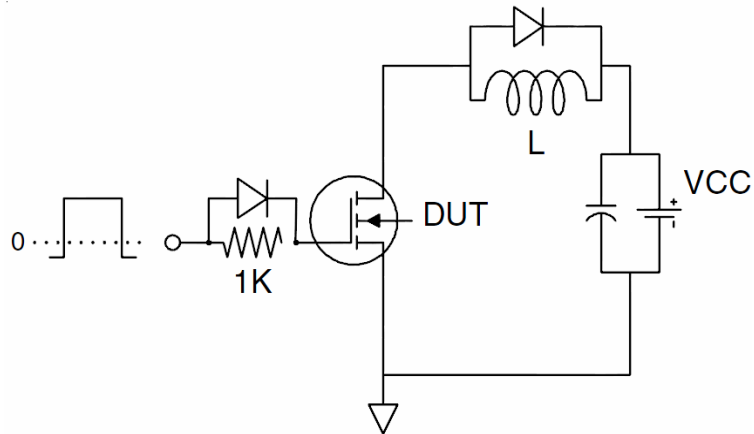
Note: ① Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;

Test Circuit

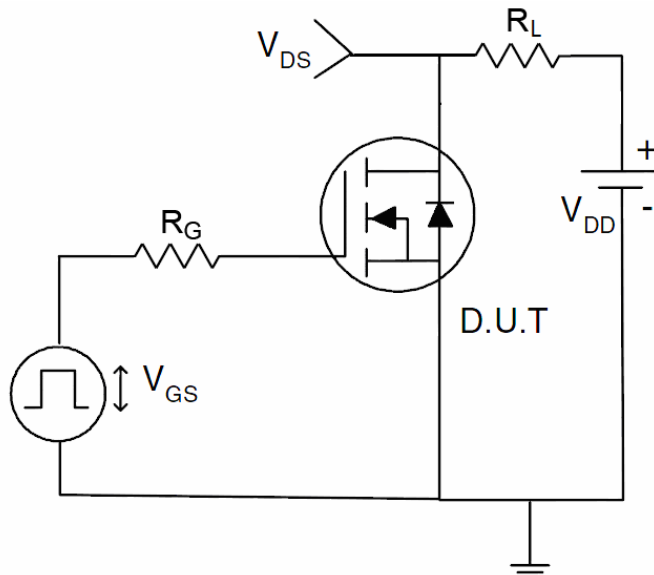
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

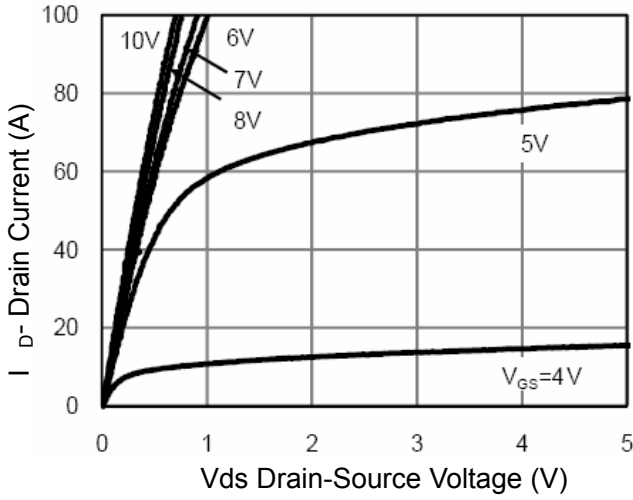


Figure 1 Output Characteristics

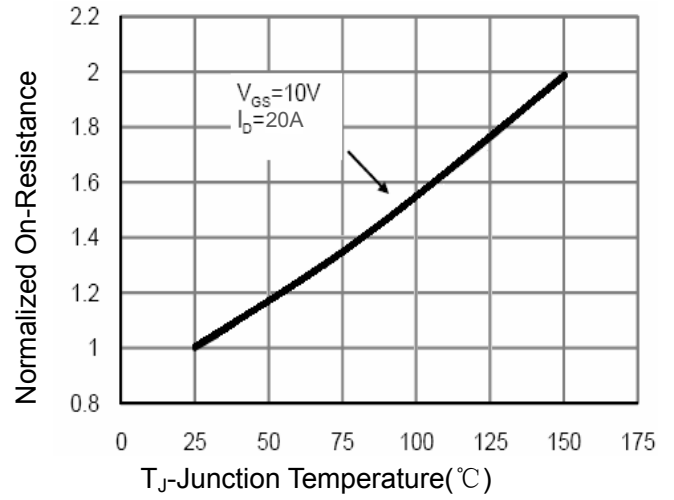


Figure 4 Rdson-Junction Temperature

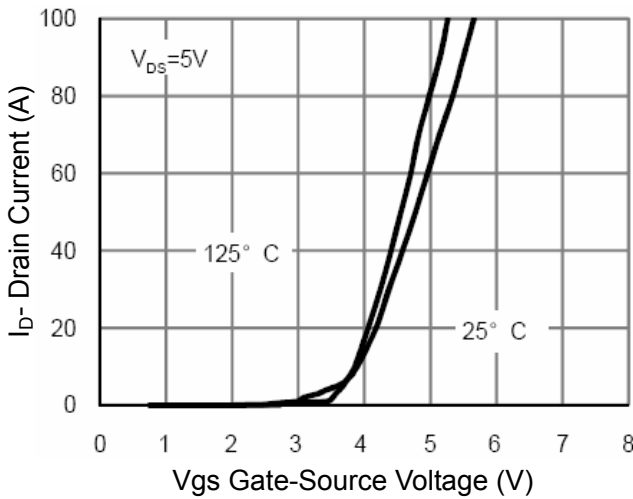


Figure 2 Transfer Characteristics

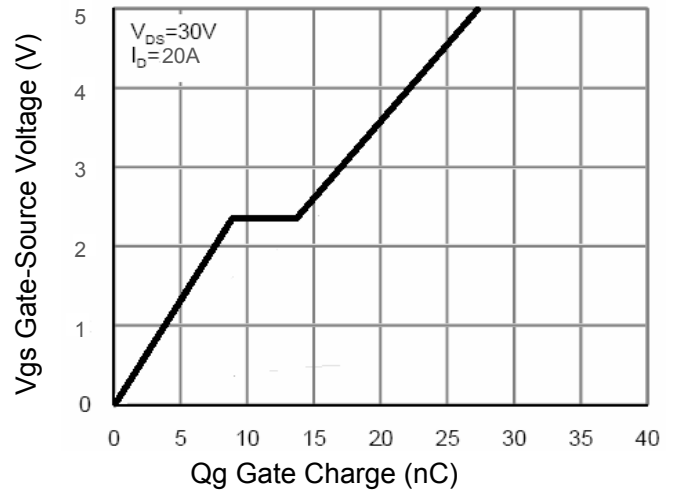


Figure 5 Gate Charge

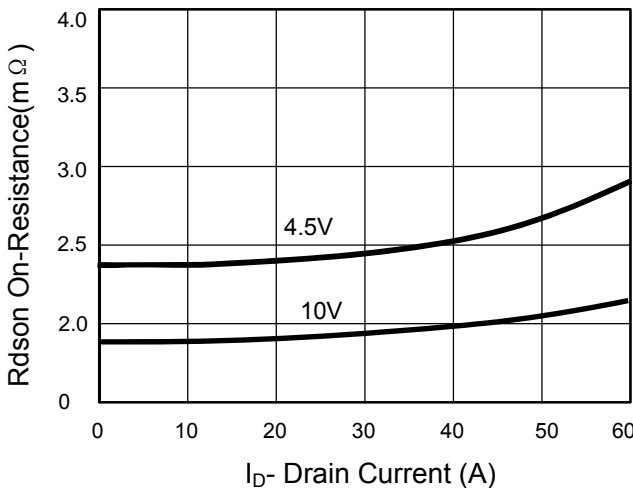


Figure 3 Rdson- Drain Current

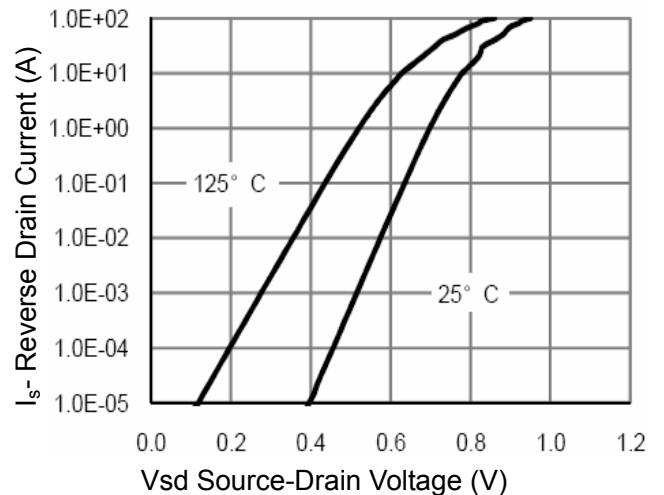


Figure 6 Source- Drain Diode Forward

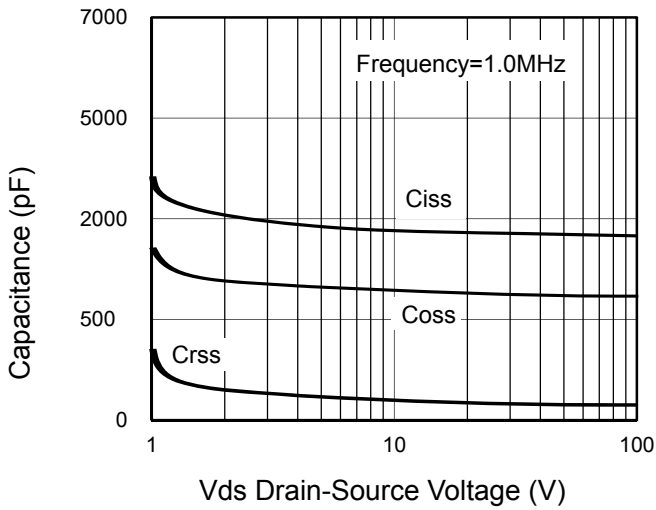


Figure 7 Capacitance vs Vds

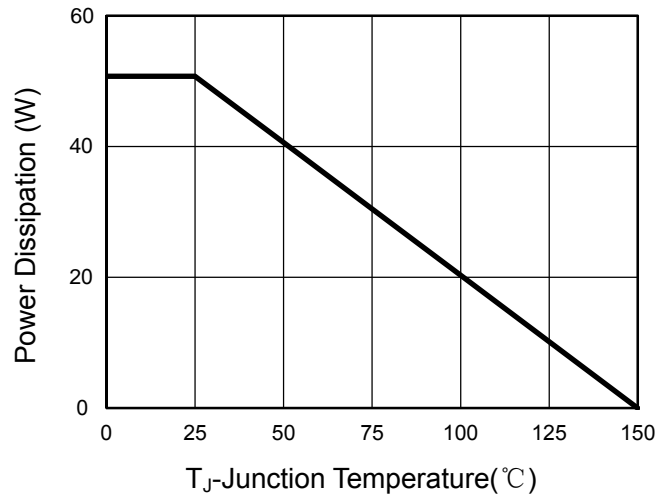


Figure 9 Power De-rating

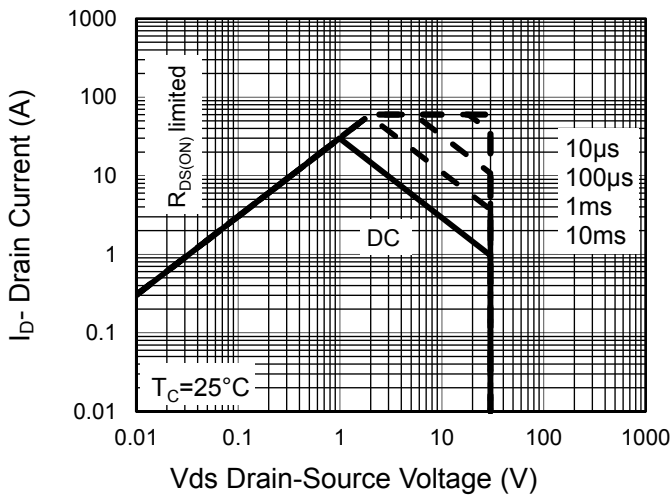


Figure 8 Safe Operation Area

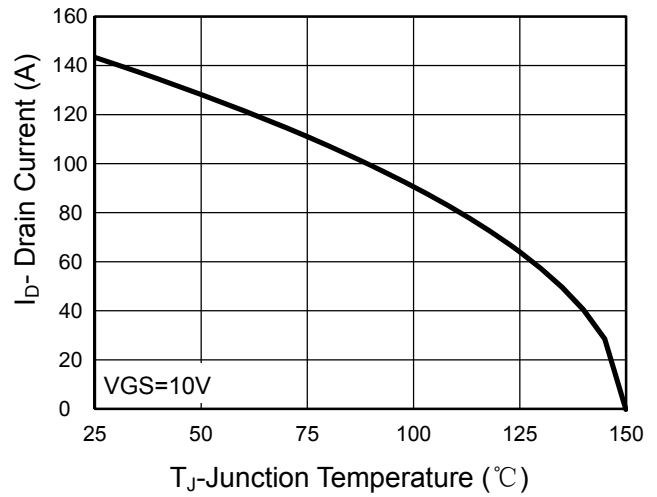


Figure 10 Current De-rating

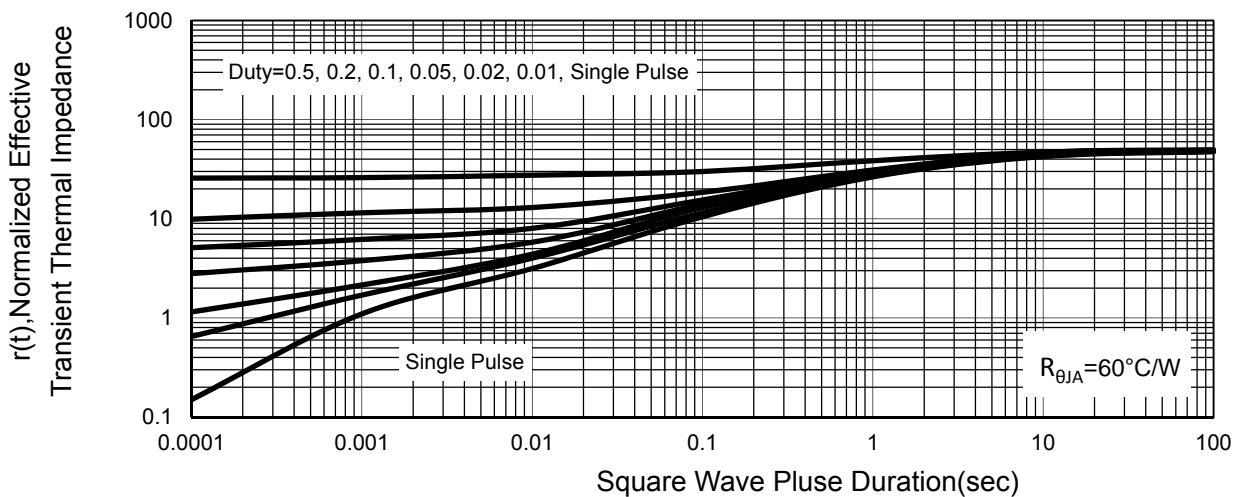
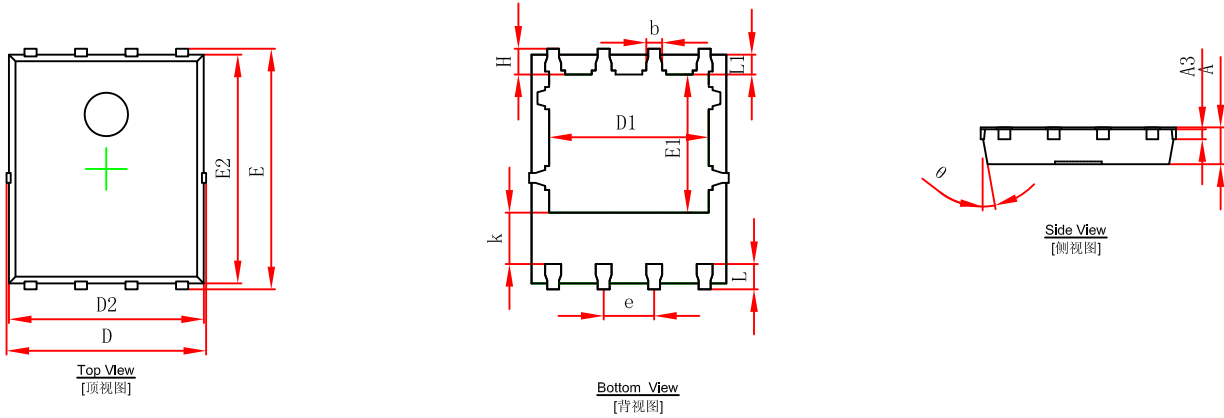


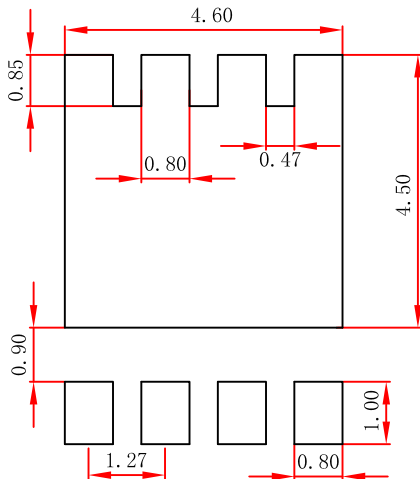
Figure 11 Normalized Maximum Transient Thermal Impedance

PDFN5x6-8L Package Outline Dimenslons



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

PDFN5x6-8L Suggested Pad Layout



- Note:
1. Controlling dimension: in millimeters.
 2. General tolerance: $\pm 0.05\text{mm}$.
 3. The pad layout is for reference purposes only.