

N-Channel Enhancement Mode Power MOSFET

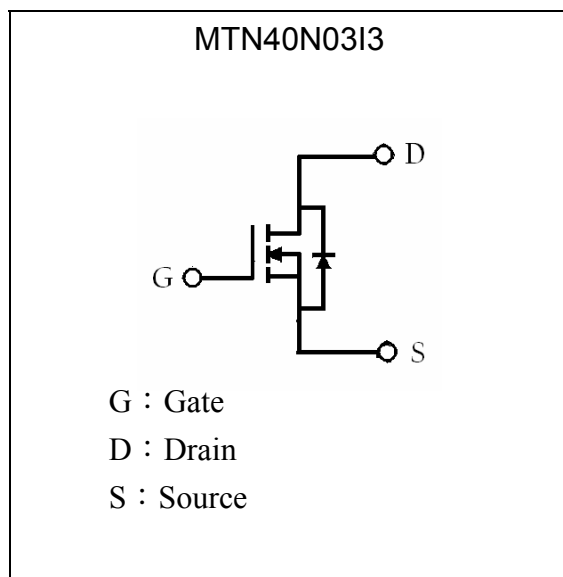
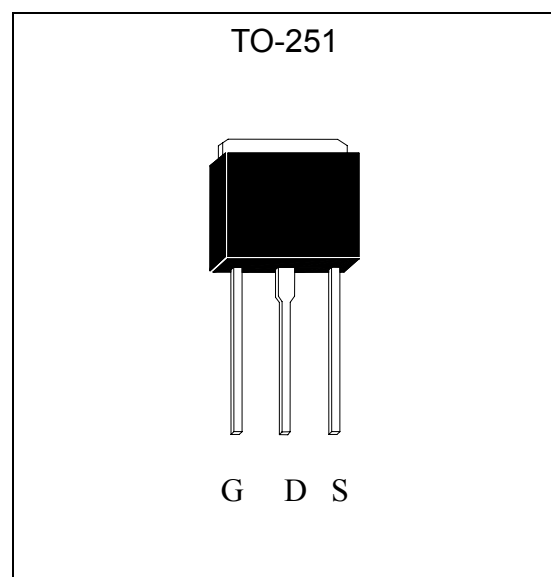
MTN40N03I3

 $BV_{DSS} : 30V$ **$R_{DS(ON)} : 21m\Omega$** **$I_D : 36A$** **Description**

The MTN40N03I3 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-251 package is universally preferred for all commercial-industrial applications

Features

- Simple Drive Requirement
- Dynamic dv/dt Rating
- Fast Switching Characteristic
- RoHS compliant package

Symbol**Outline**



Absolute Maximum Ratings (Tc=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V _{DS}	30	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current @ Tc=25°C, VGS=10V	I _D	36	A
Continuous Drain Current @Tc=100°C, VGS=10V	I _D	25	A
Pulsed Drain Current (Note 1)	I _{DM}	150	A
Total Power Dissipation (Tc=25°C)	P _D	50	W
Linear Derating Factor		0.4	W/°C
Operating Junction and Storage Temperature	T _j , T _{stg}	-55~+150	°C

Note : 1.Repetitive rating; pulse width limited by maximum junction temperature.

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	R _{th,j-c}	2.5	°C/W
Thermal Resistance, Junction-to-ambient, max	R _{th,j-a}	110	°C/W



Characteristics (T_j=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	30	-	-	V	V _{GS} =0, I _D =250μA, T _j =25°C
ΔBV _{DSS} /ΔT _j	-	0.037	-	V/°C	Reference to 25°C, I _D =250μA
V _{GS(th)}	1	-	3	V	V _{DS} = V _{GS} , I _D =250μA
*G _{FS}	-	26	-	S	V _{DS} =10V, I _D =18A
I _{GSS}	-	-	±100	nA	V _{GS} =±20
I _{DSS}	-	-	25	μA	V _{DS} =30V, V _{GS} =0
	-	-	250	μA	V _{DS} =24V, V _{GS} =0, T _C =125°C
*R _{DS(ON)}	-	18	21	mΩ	V _{GS} =10V, I _D =18A
	-	24	30		V _{GS} =4.5V, I _D =14A
Dynamic					
*Q _g	-	17	-	nC	I _D =18A, V _{DS} =24V, V _{GS} =5V
*Q _{gs}	-	3	-		
*Q _{gd}	-	10	-		
*t _{d(ON)}	-	7.2	-	ns	V _{DS} =15V, I _D =18A, V _{GS} =10V, R _G =3.3Ω, R _D =0.83Ω
*t _r	-	60	-		
*t _{d(OFF)}	-	22.5	-		
*t _f	-	10	-		
C _{iss}	-	800	-	pF	V _{GS} =0V, V _{DS} =25V, f=1MHz
C _{oss}	-	380	-		
C _{rss}	-	133	-		
Source-Drain Diode					
*V _{SD}	-	-	1.3	V	I _S =36A, V _{GS} =0V
*I _S	-	-	36	A	V _D =V _G =0V, V _S =1.3V
*I _{SM}	-	-	150		

*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Ordering Information

Device	Package	Shipping	Marking
MTN40N03I3	TO-251 (RoHS compliant)	80 pcs / tube, 50 tubes / box	40N03

Characteristic Curves

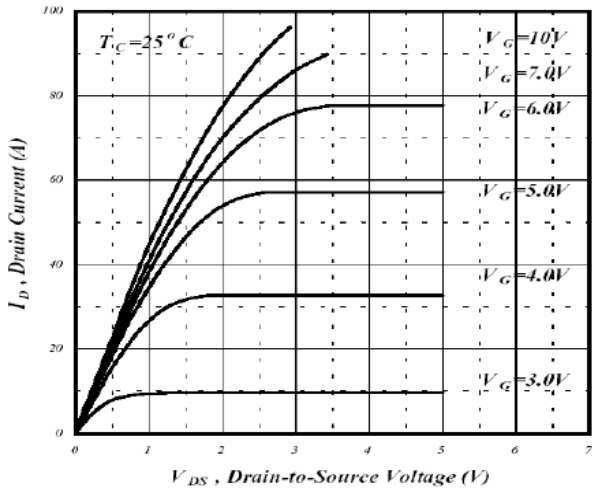


Fig 1. Typical Output Characteristics

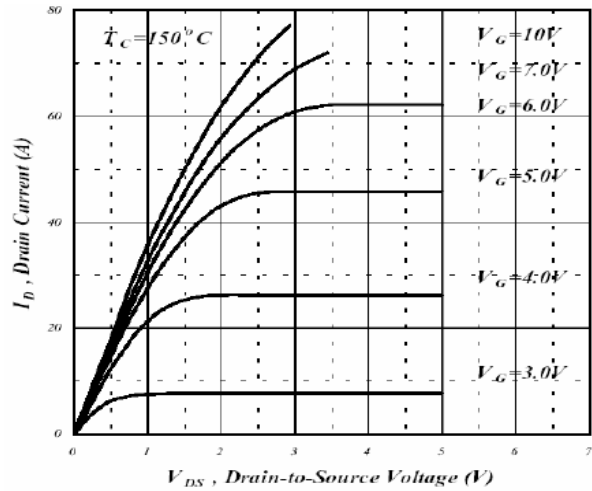


Fig 2. Typical Output Characteristics

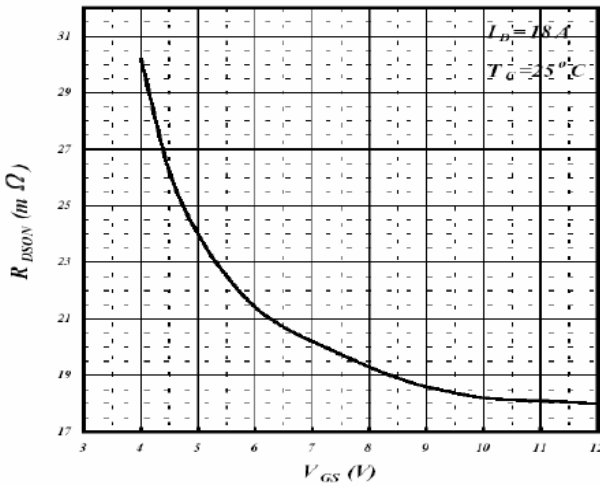


Fig 3. On-Resistance v.s. Gate Voltage

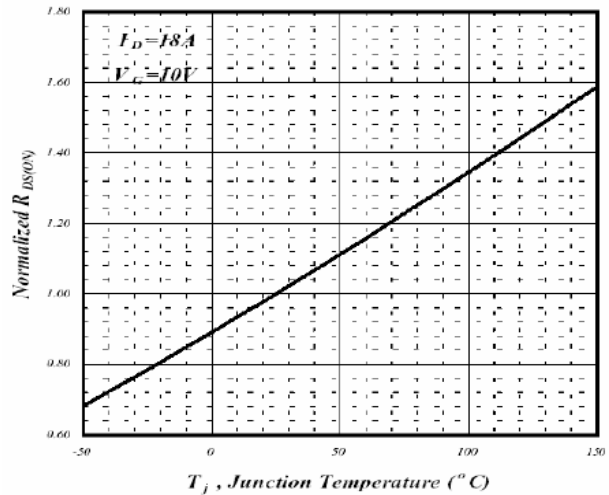


Fig 4. Normalized On-Resistance v.s. Junction Temperature

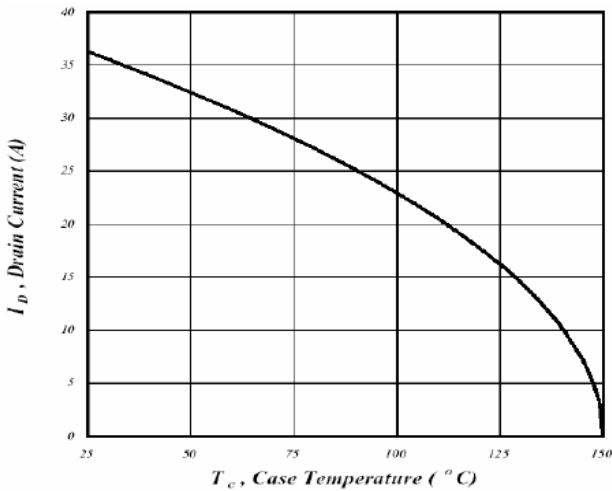


Fig 5. Maximum Drain Current v.s. Case Temperature

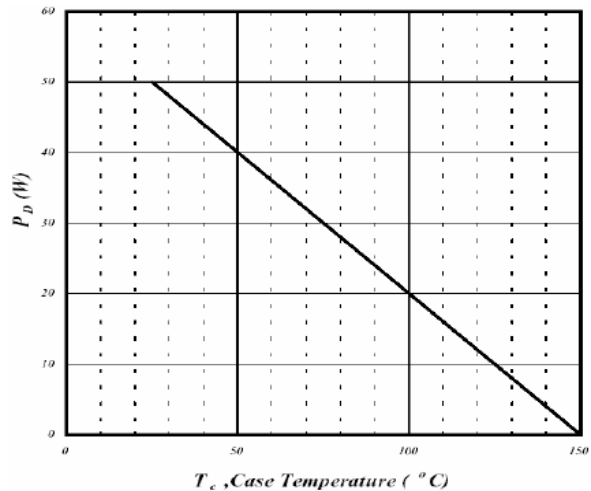


Fig 6. Type Power Dissipation

Characteristic Curves(Cont.)

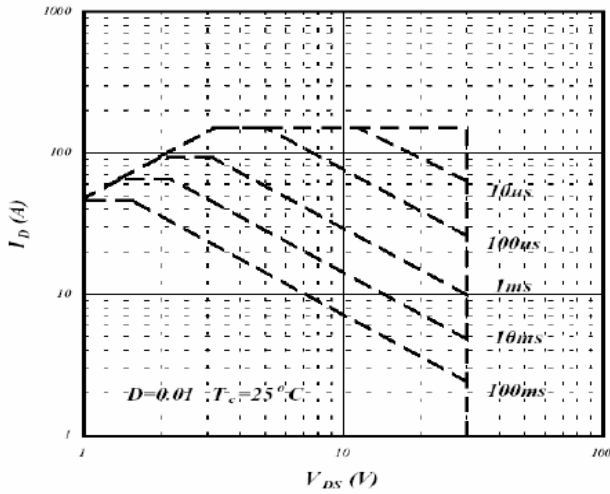


Fig 7. Maximum Safe Operating Area

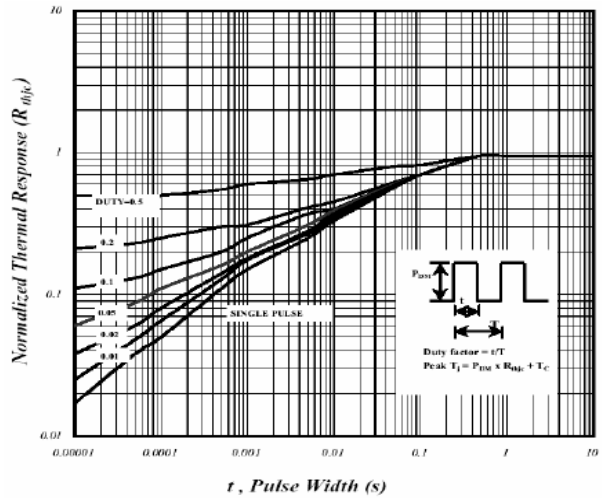


Fig 8. Effective Transient Thermal Impedance

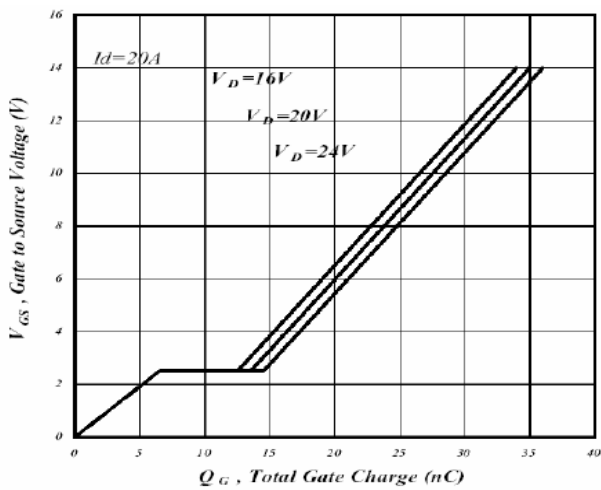


Fig 9. Gate Charge Characteristics

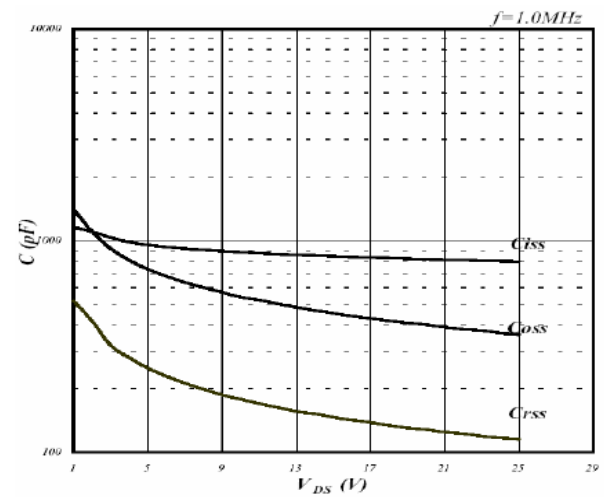


Fig 10. Typical Capacitance Characteristics

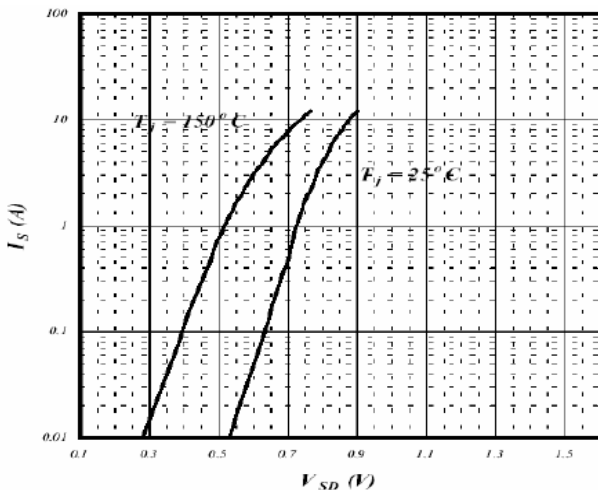


Fig 11. Forward Characteristics of Reverse Diode

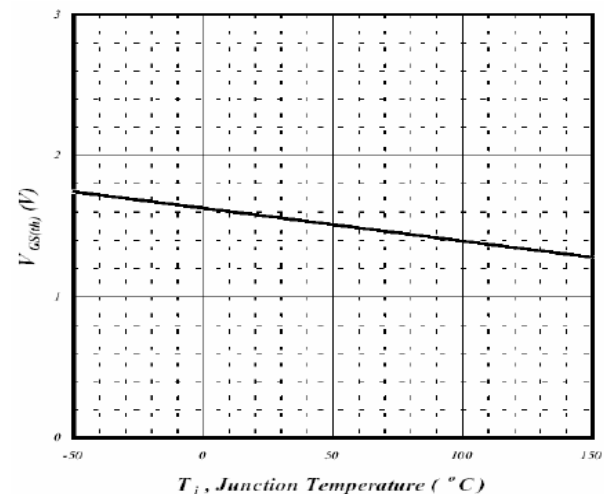


Fig 12. Gate Threshold Voltage v.s. Junction Temperature

Test Circuits and Waveforms

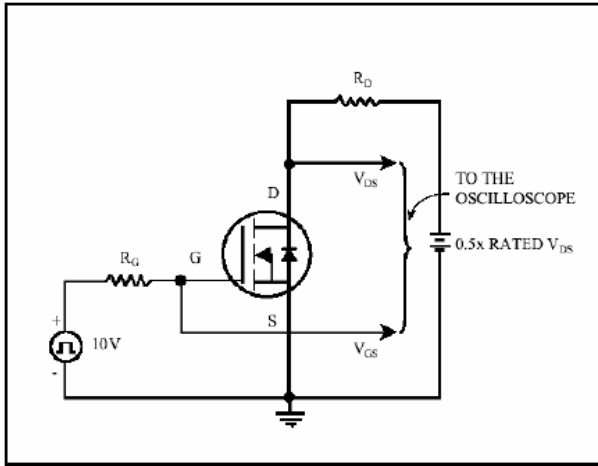


Fig 13. Switching Time Circuit

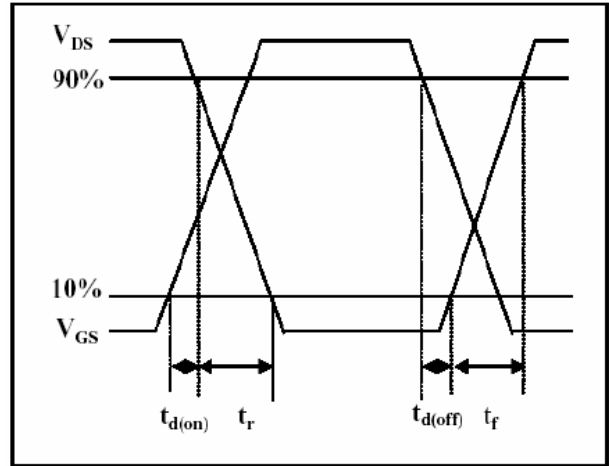


Fig 14. Switching Time Waveform

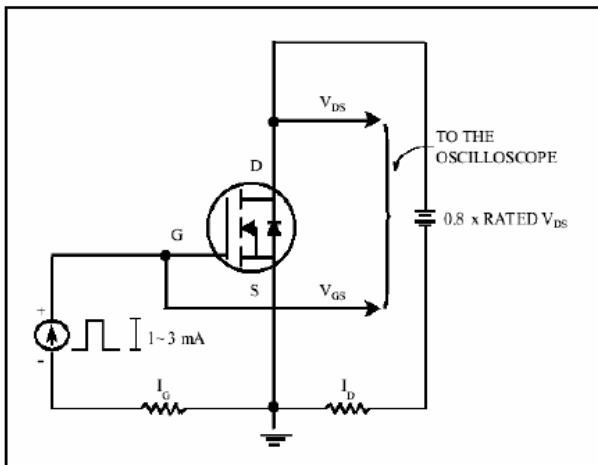


Fig 15. Gate Charge Circuit

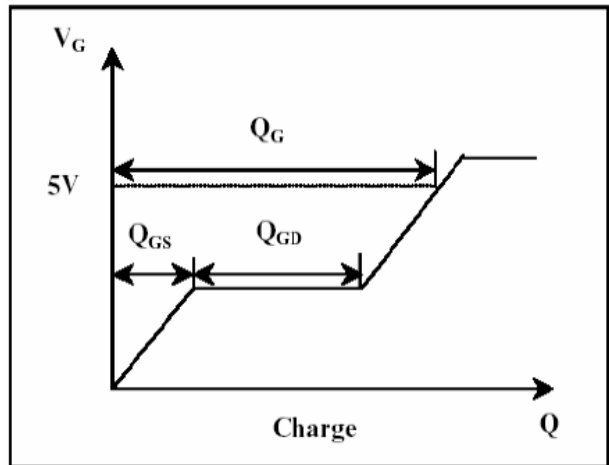
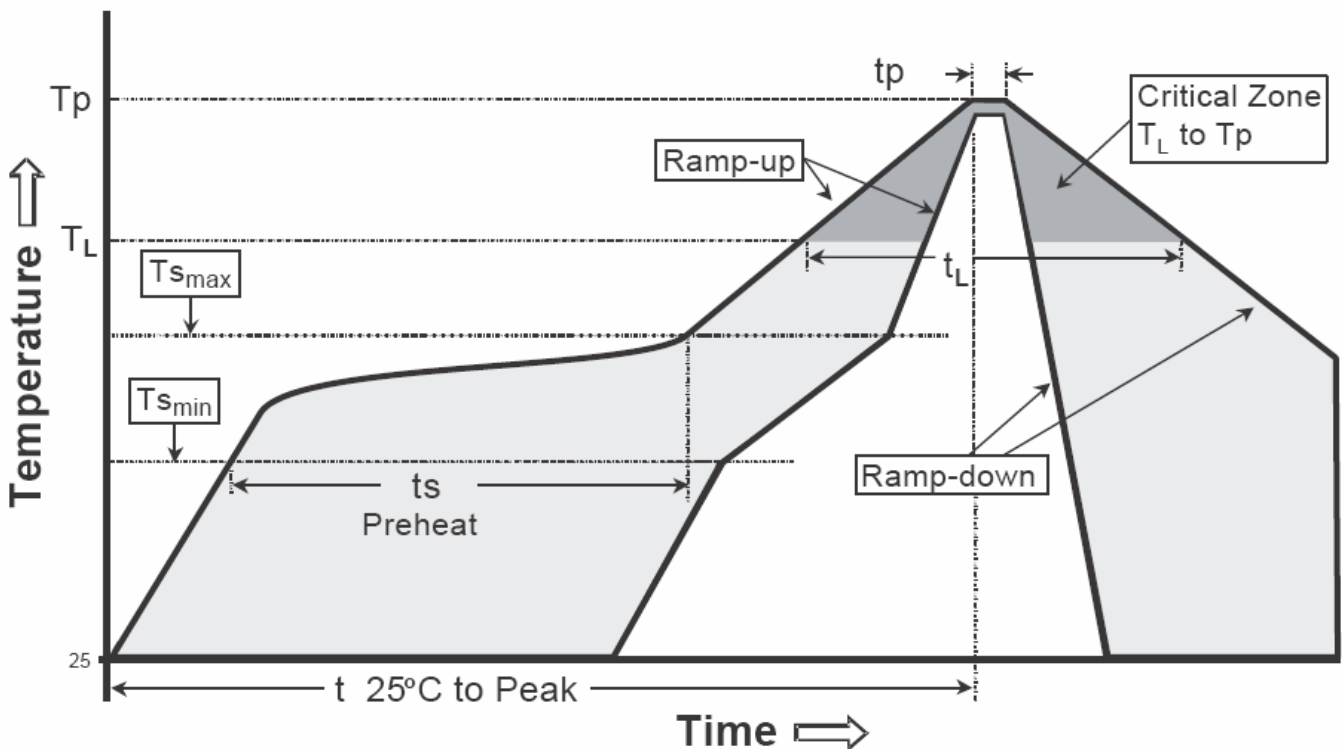


Fig 16. Gate Charge Waveform

Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

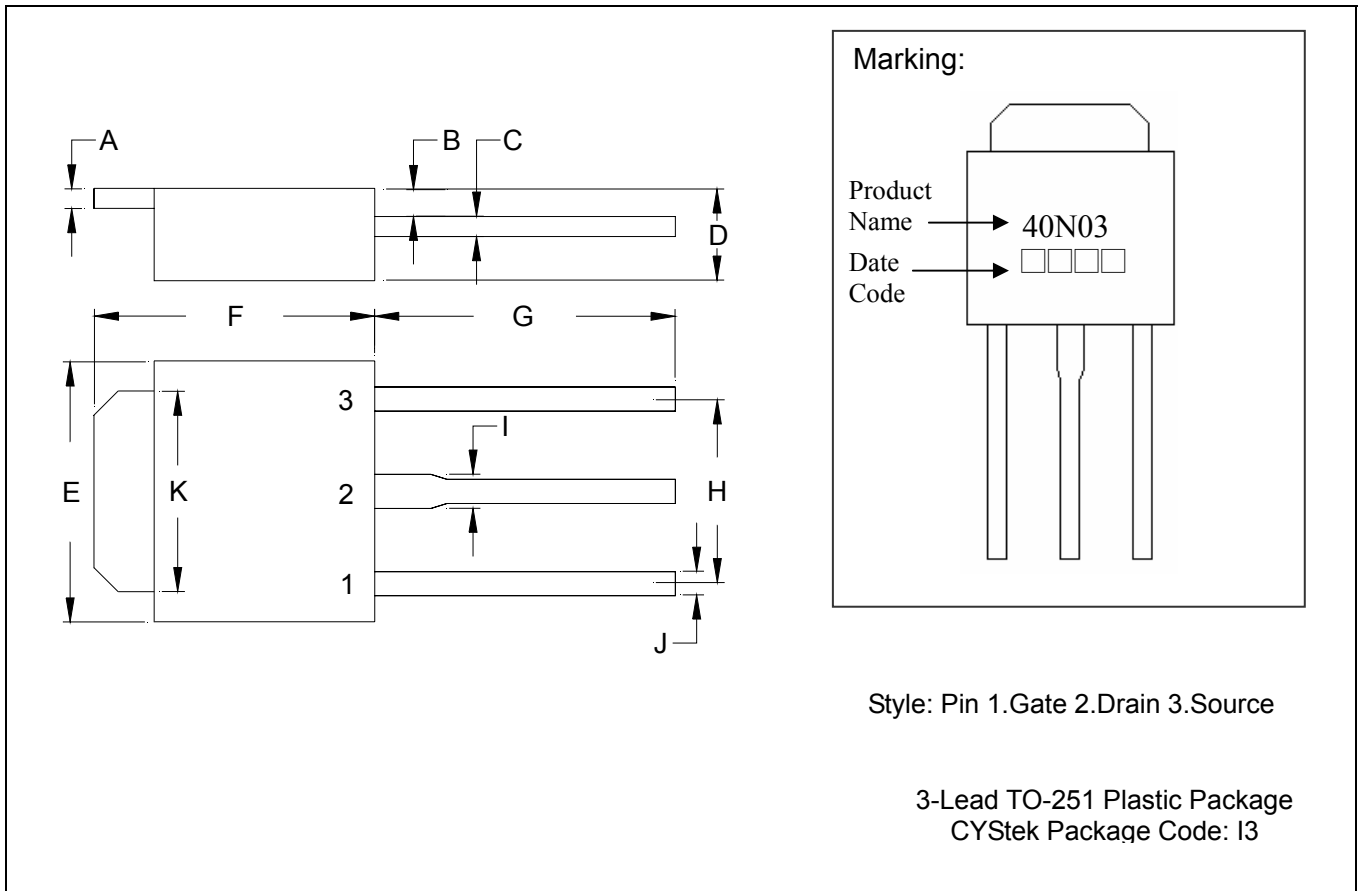
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T _{s min})	100°C	150°C
-Temperature Max(T _{s max})	150°C	200°C
-Time(t _{s min} to t _{s max})	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T _L)	183°C	217°C
- Time (t _L)	60-150 seconds	60-150 seconds
Peak Temperature(T _P)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(t _p)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

TO-251 Dimension



Marking:

Product Name → 40N03
 Date Code → □□□□

Style: Pin 1.Gate 2.Drain 3.Source

3-Lead TO-251 Plastic Package
 CYStek Package Code: I3

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.0177	0.0217	0.45	0.55	G	0.2559	-	6.50	-
B	0.0354	0.0591	0.90	1.50	H	-	*0.1811	-	*4.60
C	0.0177	0.0236	0.45	0.60	I	-	0.0449	-	1.14
D	0.0866	0.0945	2.20	2.40	J	-	0.0346	-	0.88
E	0.2441	0.2677	6.20	6.80	K	0.2047	0.2165	5.20	5.50
F	0.2677	0.2835	6.80	7.20					

Notes: 1.Controlling dimension: millimeters.
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

- Lead: Pure tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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