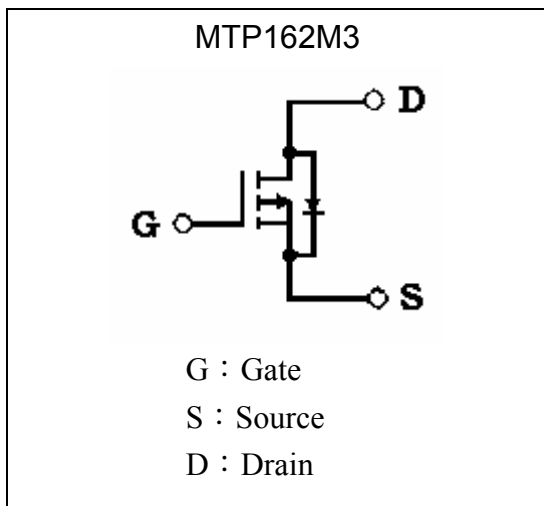
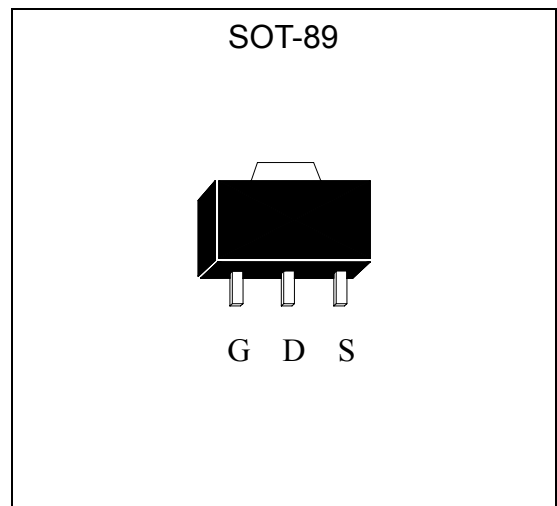


30V P-CHANNEL Enhancement Mode MOSFET

MTP162M3

Features

- Single Drive Requirement
- Low On-resistance, $R_{DS(ON)}=80m\Omega @ V_{GS}=-4.5V, I_D=-3.0A$
- Ultra High Speed Switching
- Pb-free package

Symbol

Outline

Absolute Maximum Ratings ($T_A=25^\circ C$)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current @ $T_A=25^\circ C$	I_D	-5	A
Continuous Drain Current @ $T_A=70^\circ C$	I_D	-4	A
Pulsed Drain Current	I_{DM}	-20 *1, 3	A
Total Power Dissipation ($T_A=25^\circ C$)	P_d	2 *2	W
Linear Derating Factor		0.02	W/ $^\circ C$
Thermal Resistance, Junction to Ambient	$R_{th,ja}$	62.5 *2	$^\circ C/W$
Operating Junction and Storage Temperature	T_j, T_{stg}	-55~+150	$^\circ C$

Note : *1. Pulse width limited by maximum junction temperature

 *2. Surface mounted on 1 in² copper pad of FR-4 board; 270 $^\circ C/W$ when mounted on min. copper pad

 *3. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$



Electrical Characteristics (Tj=25°C, unless otherwise noted)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	-30	-	-	V	V _{GS} =0, I _D =-250μA
ΔBV _{DSS} /ΔT _j	-	-0.1	-	V/°C	Reference to 25°C, I _D =-1mA
V _{GS(th)}	-0.5	-	-1.2	V	V _{DS} =V _{GS} , I _D =-250μA
G _{FS}	-	9	-	S	V _{DS} =-5V, I _D =-3A
I _{GSS}	-	-	±100	nA	V _{GS} =±12V, V _{DS} =0
I _{DSS}	-	-	-1	μA	V _{DS} =-30V, V _{GS} =0
	-	-	-25	μA	V _{DS} =-24V, V _{GS} =0 (Tj=70°C)
*R _{DS(ON)}	-	50	60	mΩ	I _D =-3.2A, V _{GS} =-10V
	-	56	75		I _D =-3.0A, V _{GS} =-4.5V
	-	70	90		I _D =-2.0A, V _{GS} =-2.5V
Dynamic					
C _{iss}	-	1075	1325	pF	V _{DS} =-25V, V _{GS} =0, f=1MHz
C _{oss}	-	54	-		
C _{rss}	-	60	-		
*t _{d(ON)}	-	7	-	ns	V _{DS} =-15V, I _D =-1A, V _{GS} =-10V, R _G =3.3Ω
*t _r	-	5	-		
*t _{d(OFF)}	-	27	-		
*t _f	-	9	-		
*Q _g	-	7	-	nC	V _{DS} =-24V, I _D =-5A, V _{GS} =-4.5V
*Q _{gs}	-	1.8	-		
*Q _{gd}	-	2.3	-		
Source-Drain Diode					
*V _{SD}	-	-	-1.2	V	V _{GS} =0V, I _S =-1.2A
*t _{rr}	-	25	-	ns	I _S =-5A, V _{GS} =0, dI/dt=100A/μs
*Q _{rr}	-	20	-	nC	

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

Ordering Information

Device	Package	Shipping	Marking
MTP162M3	SOT-89 (Pb-free)	1000 pcs / Tape & Reel	162

Characteristic Curves

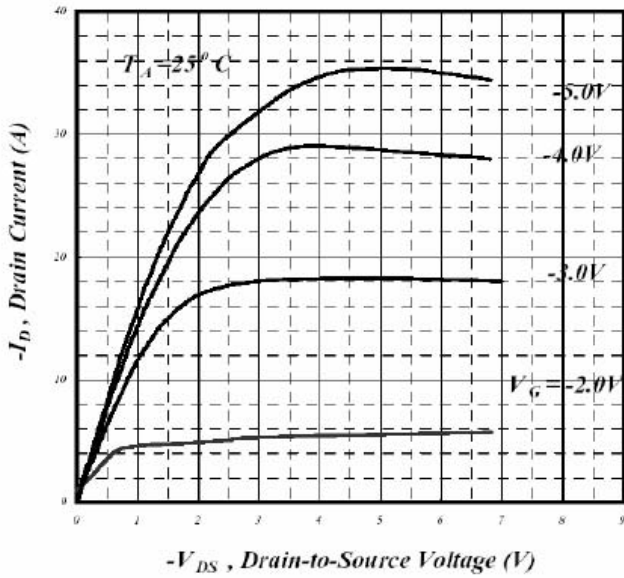


Fig 1. Typical Output Characteristics

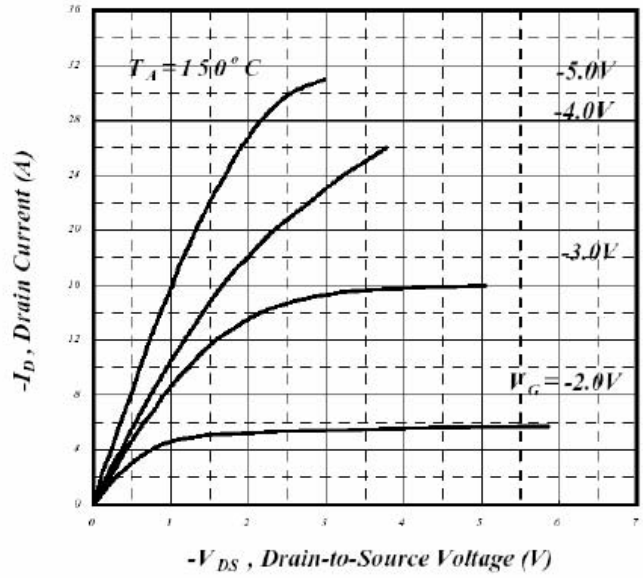


Fig 2. Typical Output Characteristics

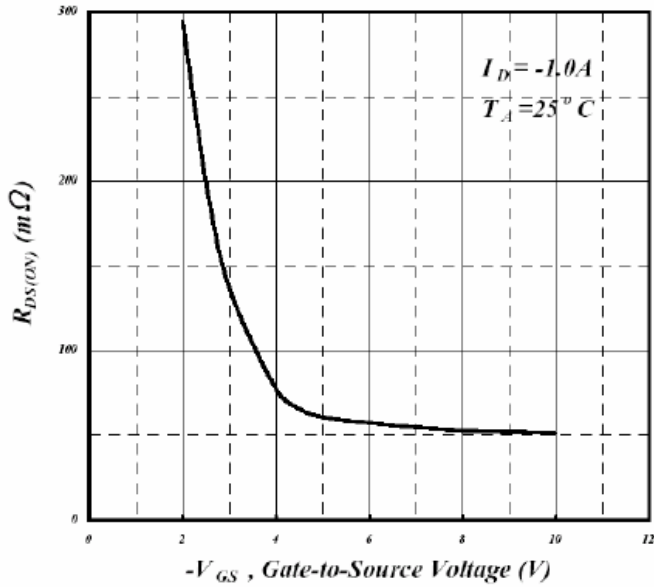


Fig 3. On-Resistance v.s. Gate Voltage

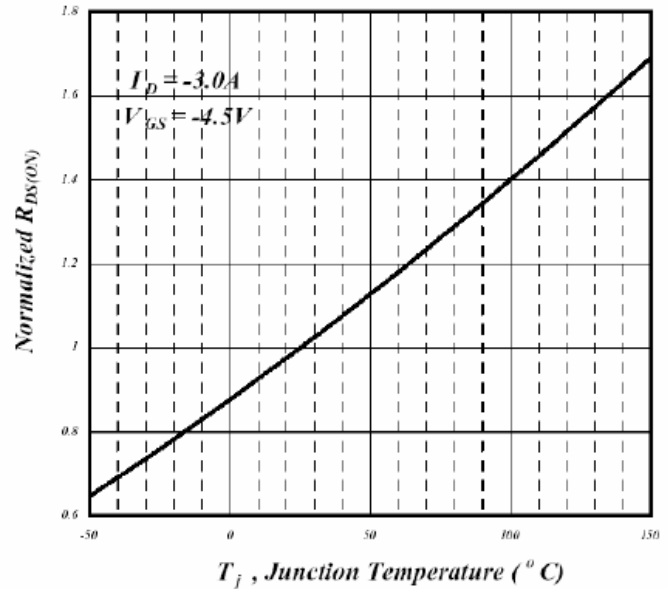


Fig 4. Normalized On-Resistance

Characteristic Curves(Cont.)

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

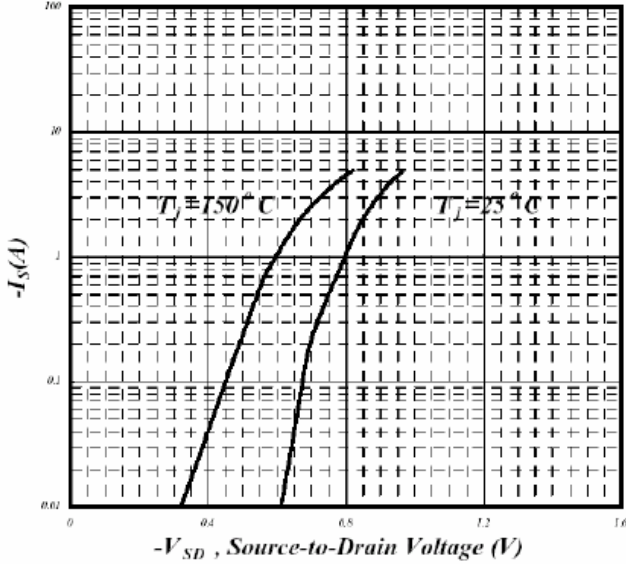


Fig 4. Normalized On-Resistance

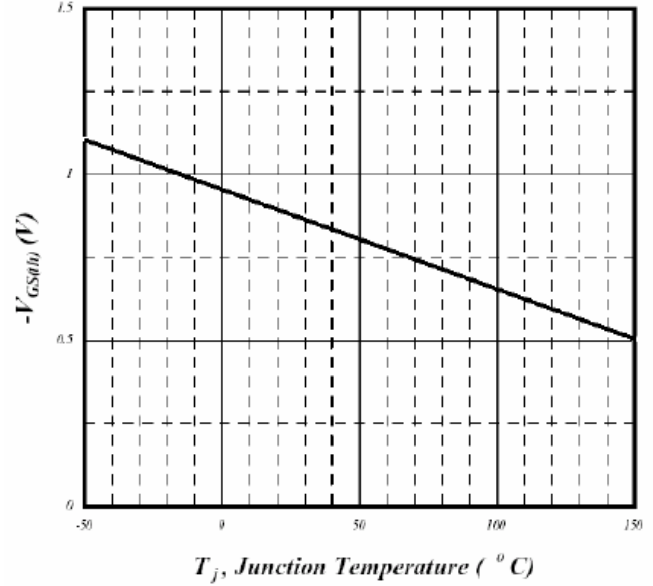


Fig 5. Forward Characteristic of Reverse Diode

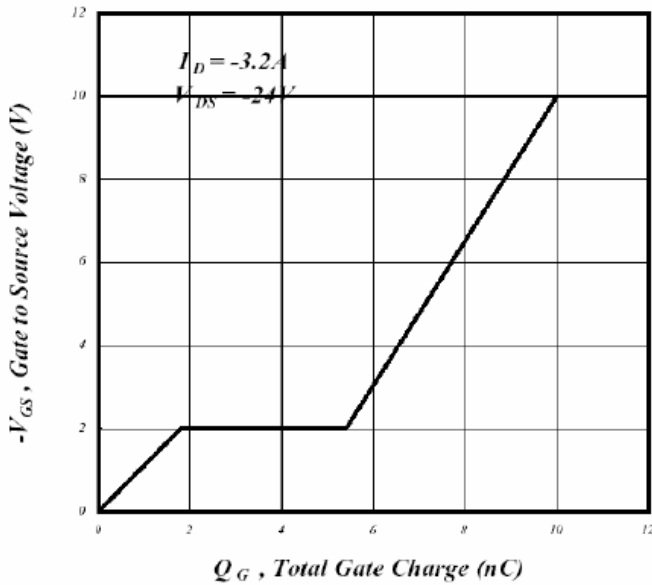


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

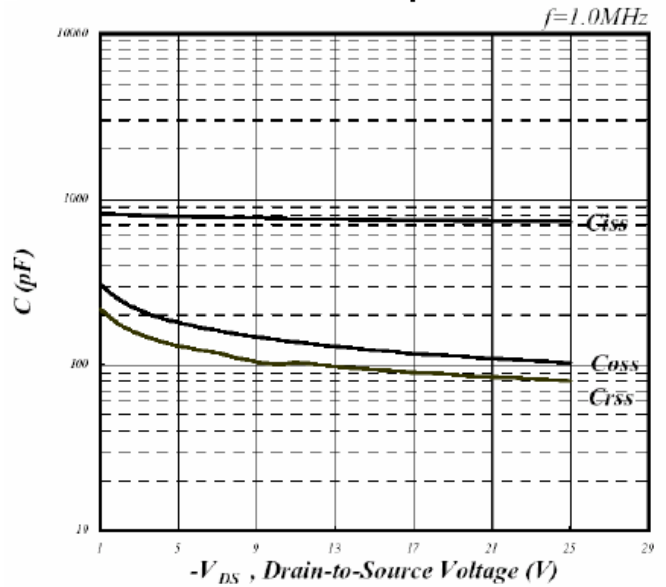


Fig 7. Gate Charge Characteristics

Fig 8. Typical Capacitance Characteristics

Characteristic Curves(Cont.)

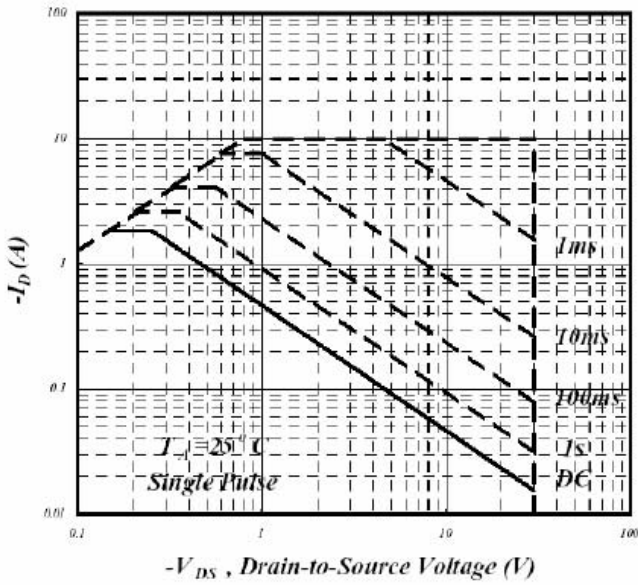


Fig 9. Maximum Safe Operating Area

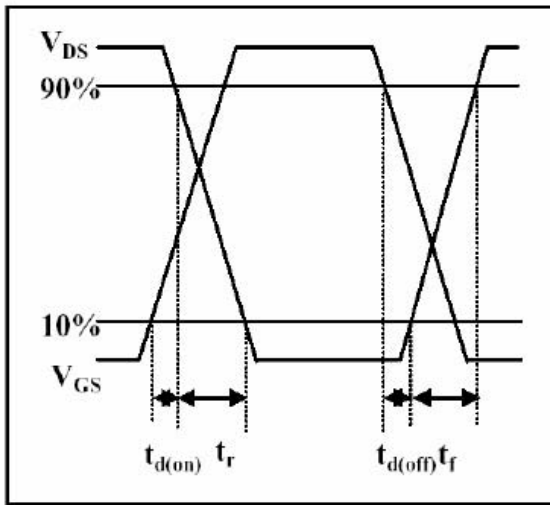


Fig 11. Switching Time Waveform

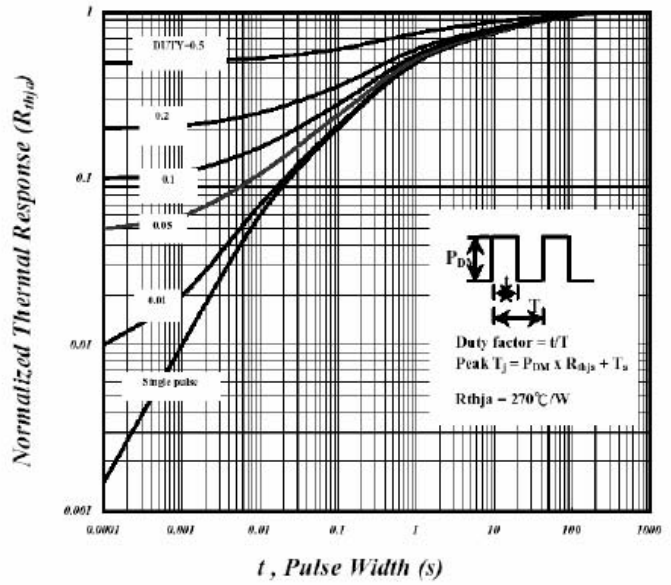


Fig 10. Effective Transient Thermal Impedance

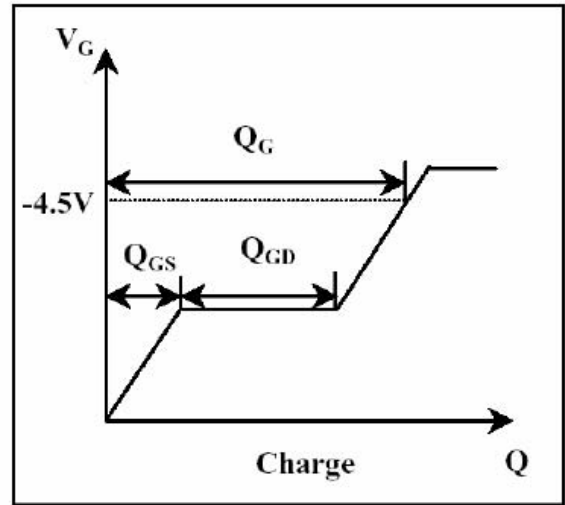
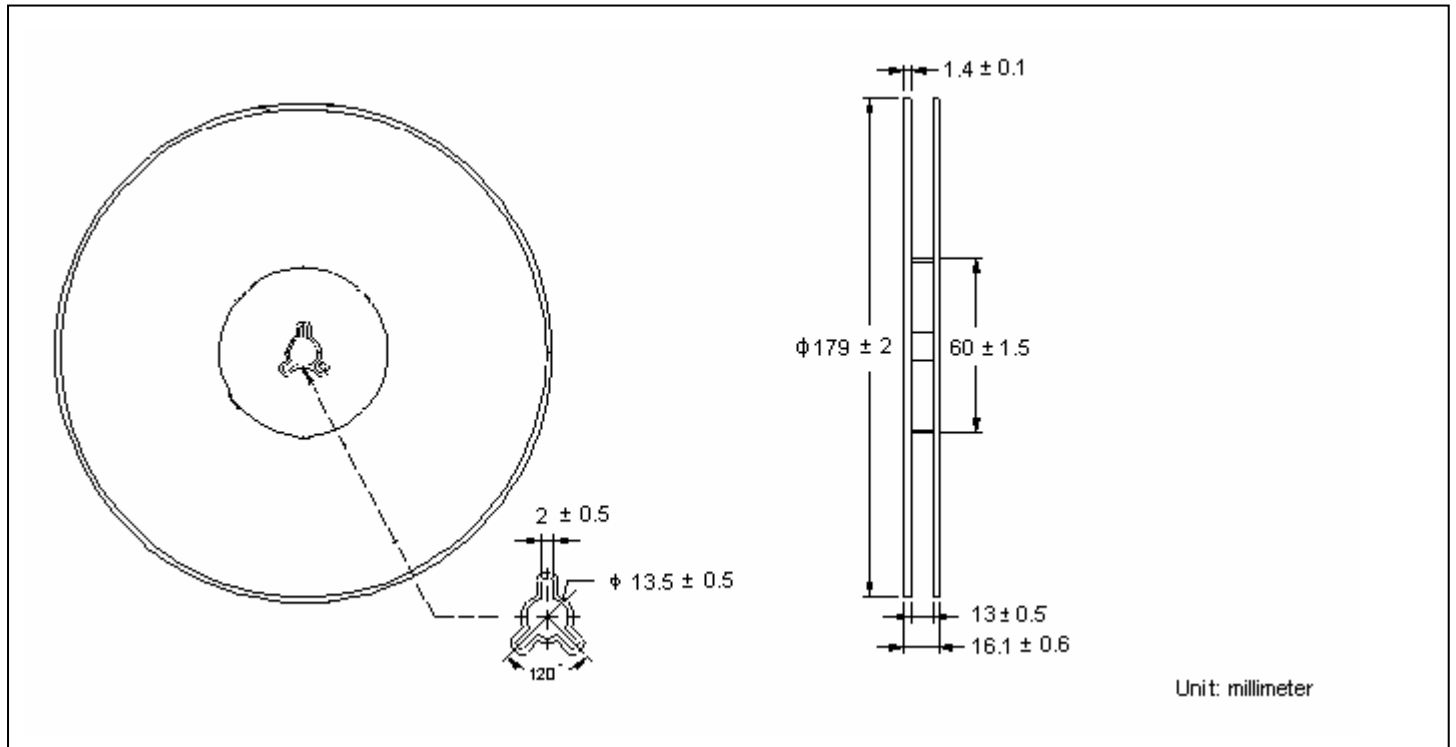
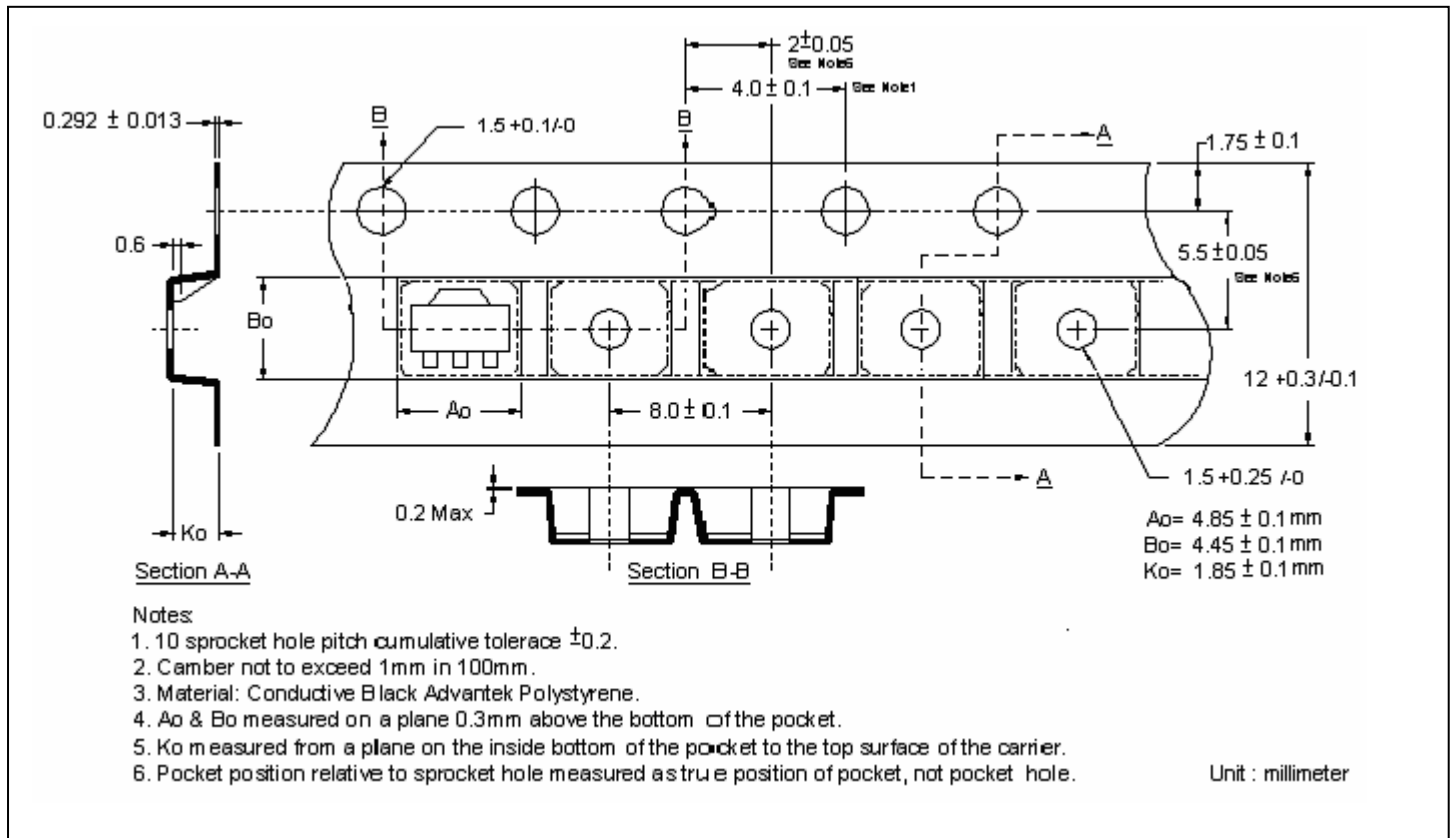


Fig 12. Gate Charge Waveform

Reel Dimension



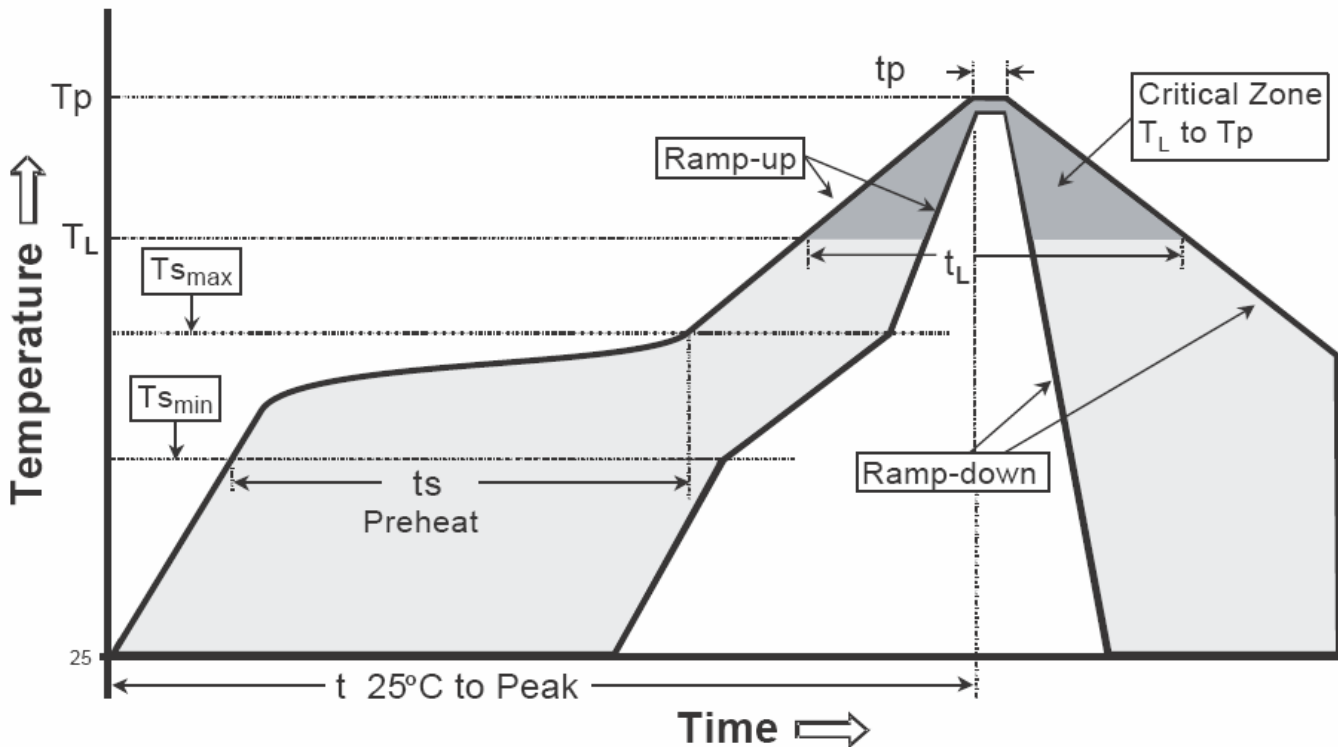
Carrier Tape Dimension



Recommended wave soldering condition

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

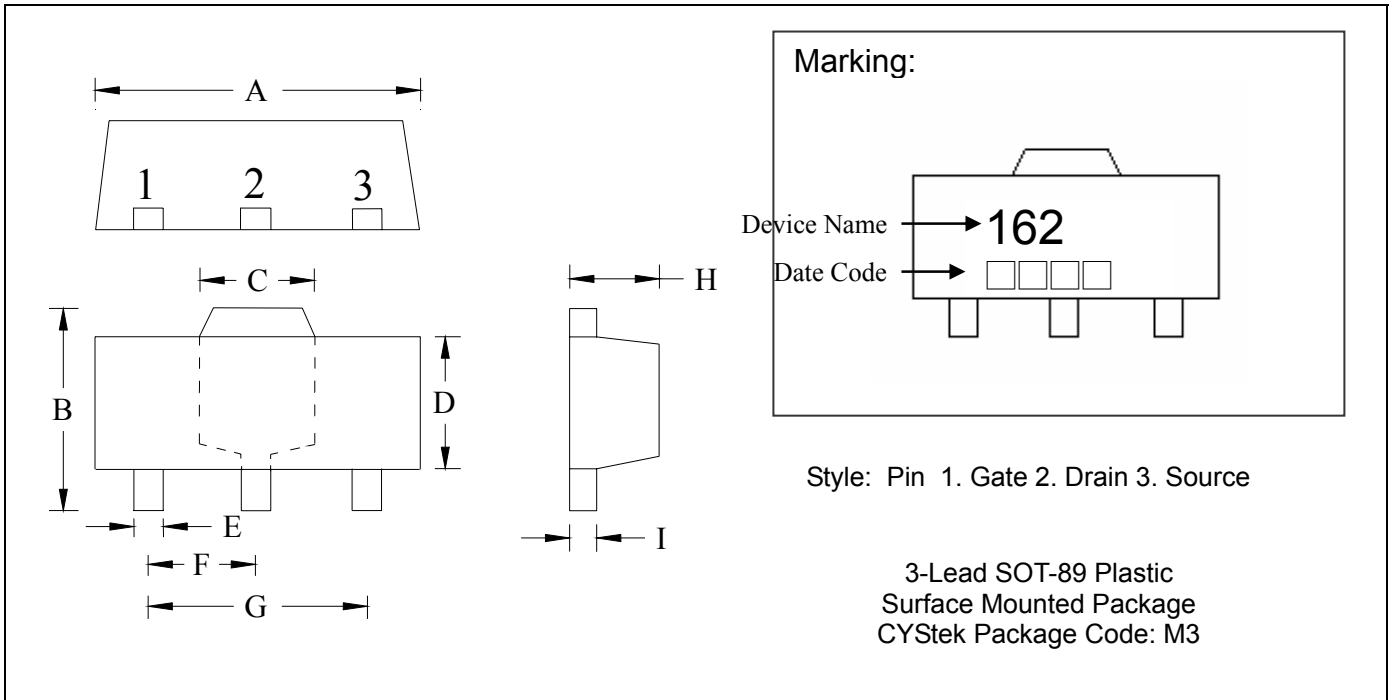
Recommended temperature profile for IR reflow



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(tp)	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.

SOT-89 Dimension



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1732	0.1811	4.40	4.60	F	0.0591	TYP	1.50	TYP
B	0.1551	0.1673	3.94	4.25	G	0.1181	TYP	3.00	TYP
C	0.0610	REF	1.55	REF	H	0.0551	0.0630	1.40	1.60
D	0.0906	0.1024	2.30	2.60	I	0.0138	0.0173	0.35	0.44
E	0.0126	0.0205	0.32	0.52					

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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