



N-Channel Enhancement Mode Power MOSFET MTN3607E3

BV_{DSS} : 75V
R_{DS(ON)} : 6 mΩ (typ.)
I_D : 80A

Description

The MTN3607E3 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-220 package is universally preferred for all commercial-industrial applications

Features

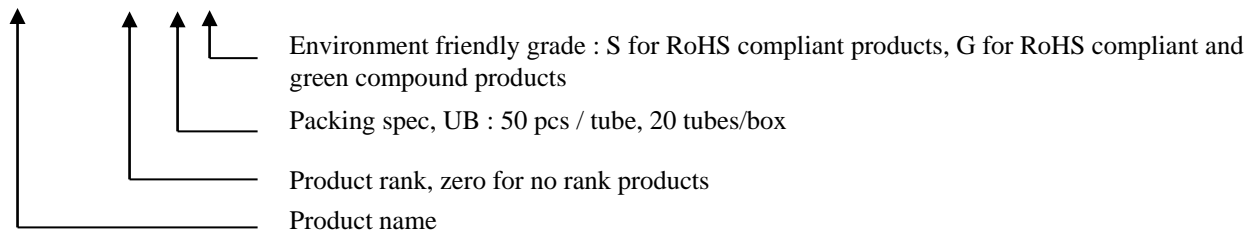
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

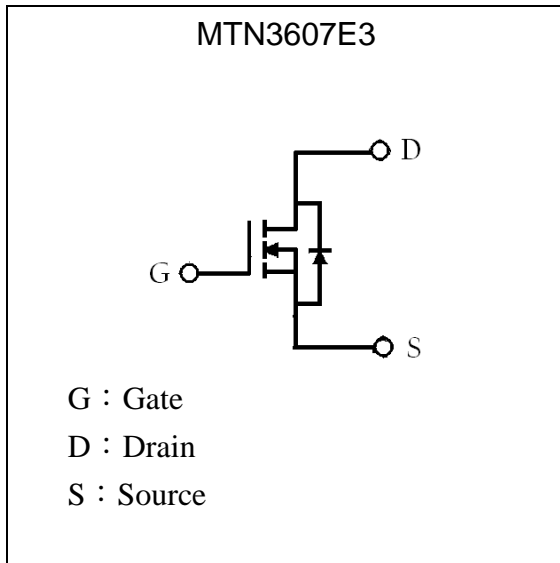
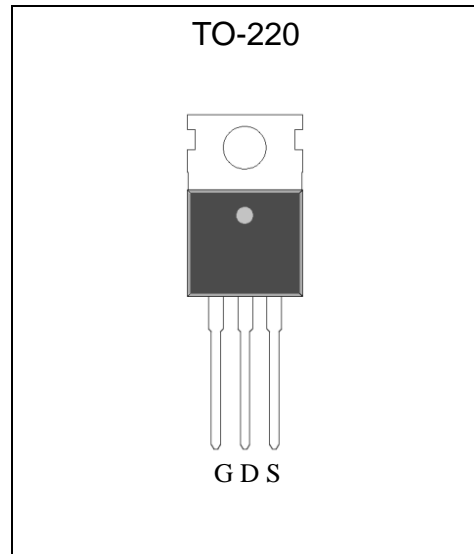
Applications

- Switching Mode Power Supply
- Uninterruptible Power Supply
- High Speed Power Switching
- Hard Switched and High Frequency Circuits

Ordering Information

Device	Package	Shipping
MTN3607E3-0-UB-X	TO-220 (RoHS compliant package)	50 pcs/tube, 20 tubes/box, 4 boxes / carton



Symbol

Outline

Absolute Maximum Ratings (T_C=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage (Note 1)	V _{DS}	75	V
Gate-Source Voltage	V _{GS}	±20	
Continuous Drain Current @ V _{GS} =10V, T _C =25°C (silicon limit)	I _D	122*	A
Continuous Drain Current @ V _{GS} =10V, T _C =25°C (package limit)		80*	
Continuous Drain Current @ V _{GS} =10V, T _C =100°C(silicon limit)		86*	
Pulsed Drain Current @ V _{GS} =10V (Note 2)	I _{DM}	320*	
Single Pulse Avalanche Energy (Note 3)	E _{AS}	450	mJ
Single Pulse Avalanche Current @ L=0.1mH (Note 3)	I _{AS}	50	A
Repetitive Avalanche Energy (Note 2)	E _{AR}	23	mJ
ESD susceptibility (Note 4)	V _{ESD}	1500	V
Maximum Temperature for Soldering @ Lead at 0.125in(3.175mm) from case for 10 seconds	T _L	300	°C
Total Power Dissipation (T _C =25°C)	P _D	230	W
Linear Derating Factor above 25°C		1.53	W/°C
Operating Junction and Storage Temperature	T _J , T _{stg}	-55~+175	°C

* Calculated continuous drain current based on maximum allowable junction temperature.

- Note : 1. T_J=+25°C to +150°C.
 2. Repetitive rating; pulse width limited by maximum junction temperature.
 3. I_{AS}=30A, V_{DD}=25V, L=1mH, R_G=25Ω, starting T_J=+25°C.
 4. Human body model, 1.5kΩ in series with 100pF.



Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	R _{θJC}	0.65	°C/W
Thermal Resistance, Junction-to-ambient, max	R _{θJA}	62	

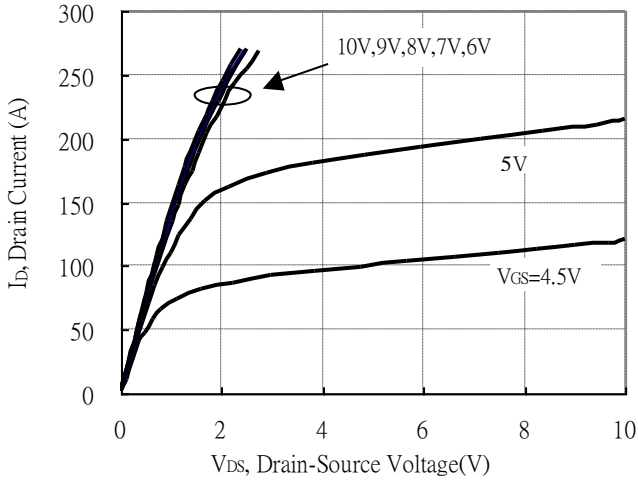
Characteristics (T_j=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	75	-	-	V	V _{GS} =0V, I _D =250μA
V _{GS(th)}	2.0	-	4.0		V _{DS} = V _{GS} , I _D =250μA
*G _F S	-	26.4	-	S	V _{DS} =10V, I _D =20A
I _{GSS}	-	-	±100	nA	V _{GS} =±20V, V _{DS} =0V
I _{DSS}	-	-	1	μA	V _{DS} =60V, V _{GS} =0V
	-	-	10		V _{DS} =50V, V _{GS} =0V, T _j =125°C
*R _{DS(ON)}	-	6	8	mΩ	V _{GS} =10V, I _D =37.5A
Dynamic					
*Q _g	-	78.8	-	nC	I _D =37.5A, V _{DD} =38V, V _{GS} =10V
*Q _{gs}	-	15.7	-		
*Q _{gd}	-	22.4	-		
*t _{d(ON)}	-	30.2	-	ns	V _{DD} =38V, I _D =75A, V _{GS} =10V, R _G =3.3Ω
*t _r	-	9.2	-		
*t _{d(OFF)}	-	67.8	-		
*t _f	-	13.8	-		
C _{iss}	-	3944	-	pF	V _{GS} =0V, V _{DS} =25V, f=1MHz
C _{oss}	-	365	-		
C _{rss}	-	208	-		
R _g	-	0.9	-	Ω	f=1MHz
Source-Drain Diode					
*I _S	-	-	80	A	I _S =37.5A, V _{GS} =0V
*I _{SM}	-	-	320		
*V _{SD}	-	0.85	1.5	V	V _{GS} =0, I _F =75A, dI _F /dt=100A/μs
*t _{rr}	-	22.4	-	ns	
*Q _{rr}	-	17.5	-	nC	

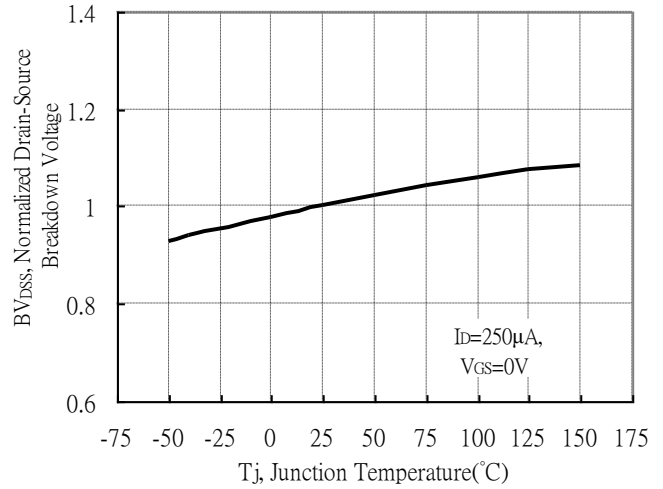
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

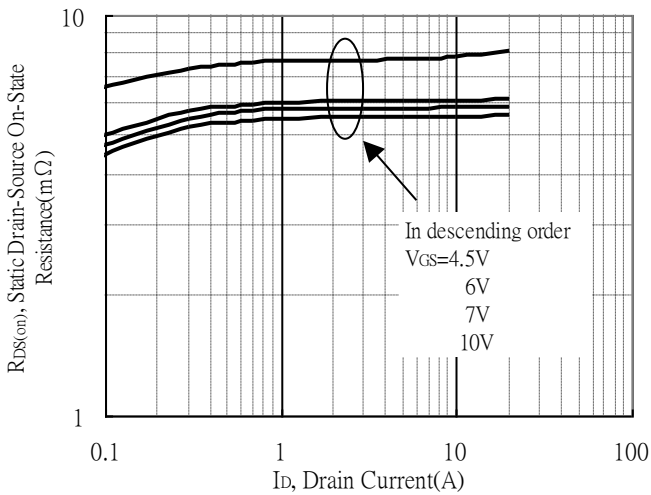
Typical Output Characteristics



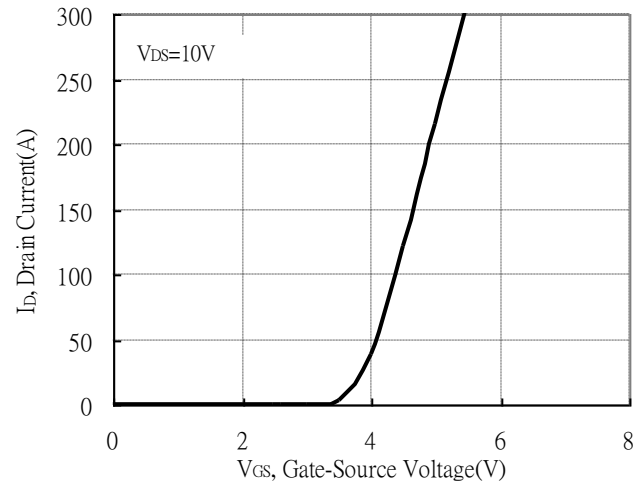
Brekdown Voltage vs Ambient Temperature



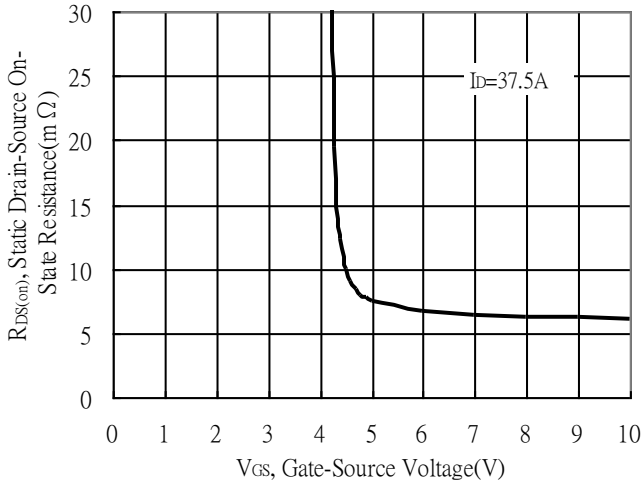
Static Drain-Source On-State resistance vs Drain Current



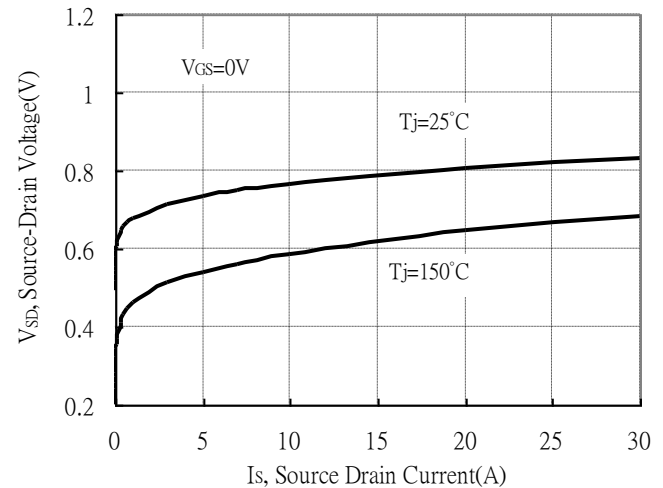
Typical Transfer Characteristics



Static Drain-Source On-State Resistance vs Gate-Source Voltage

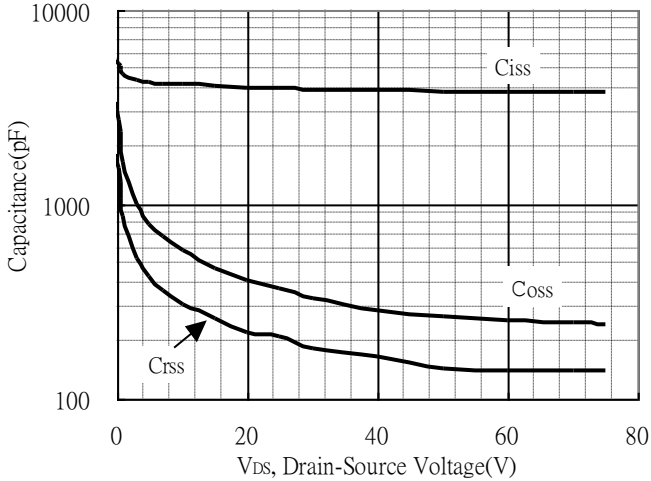


Source Drain Current vs Source-Drain Voltage

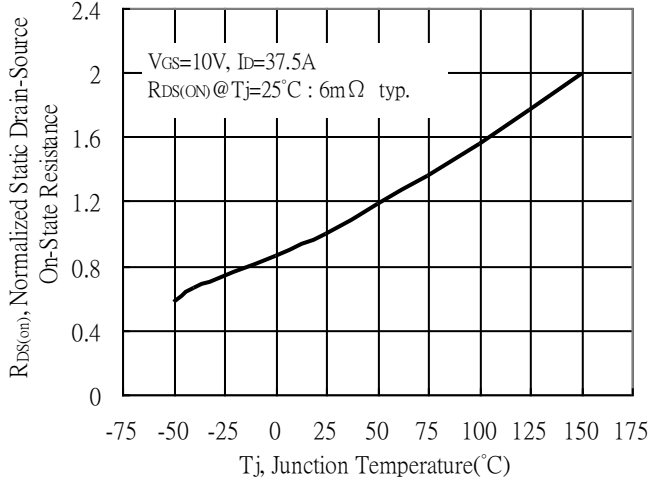


Typical Characteristics(Cont.)

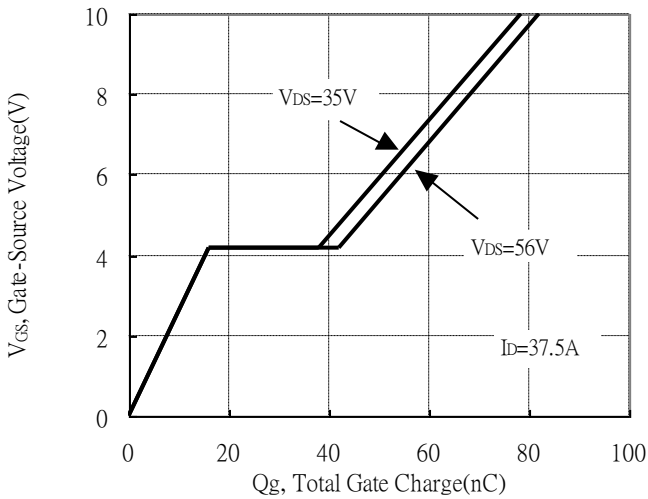
Capacitance vs Drain-to-Source Voltage



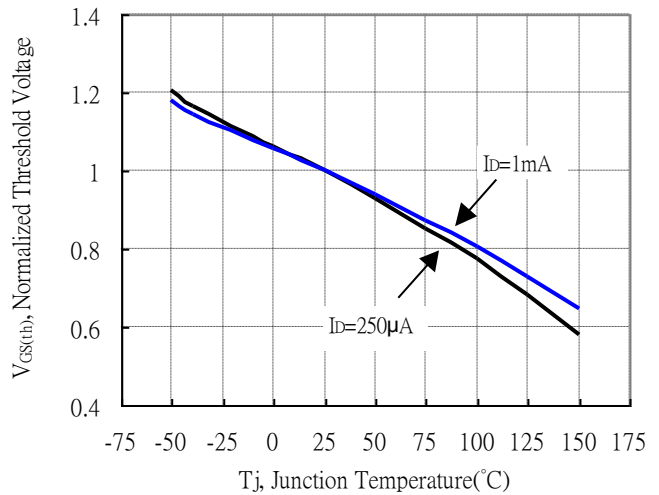
Drain-Source On-State Resistance vs Junction Temperature



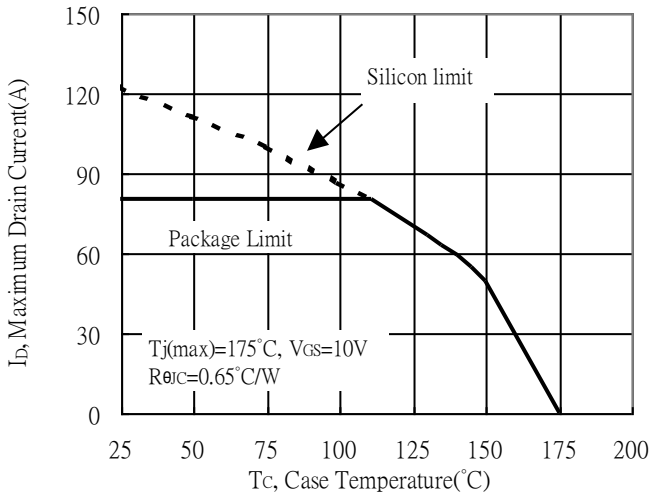
Gate Charge Characteristics



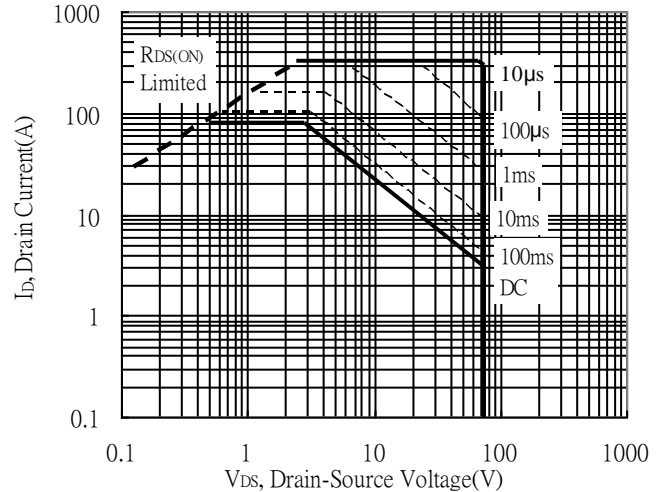
Threshold Voltage vs Junction Temperature



Maximum Drain Current vs Case Temperature

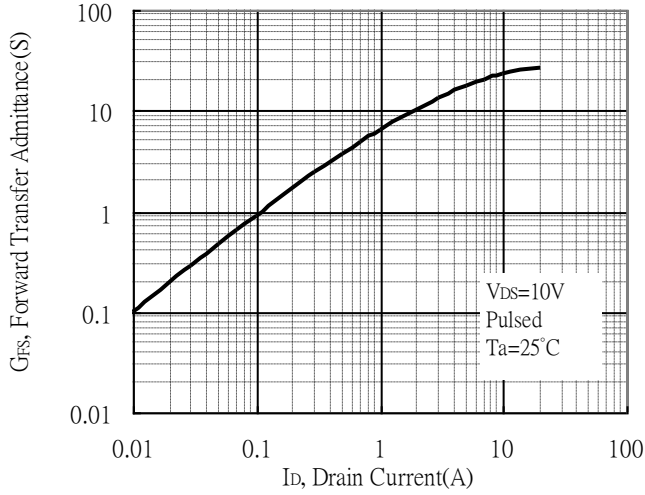


Maximum Safe Operating Area

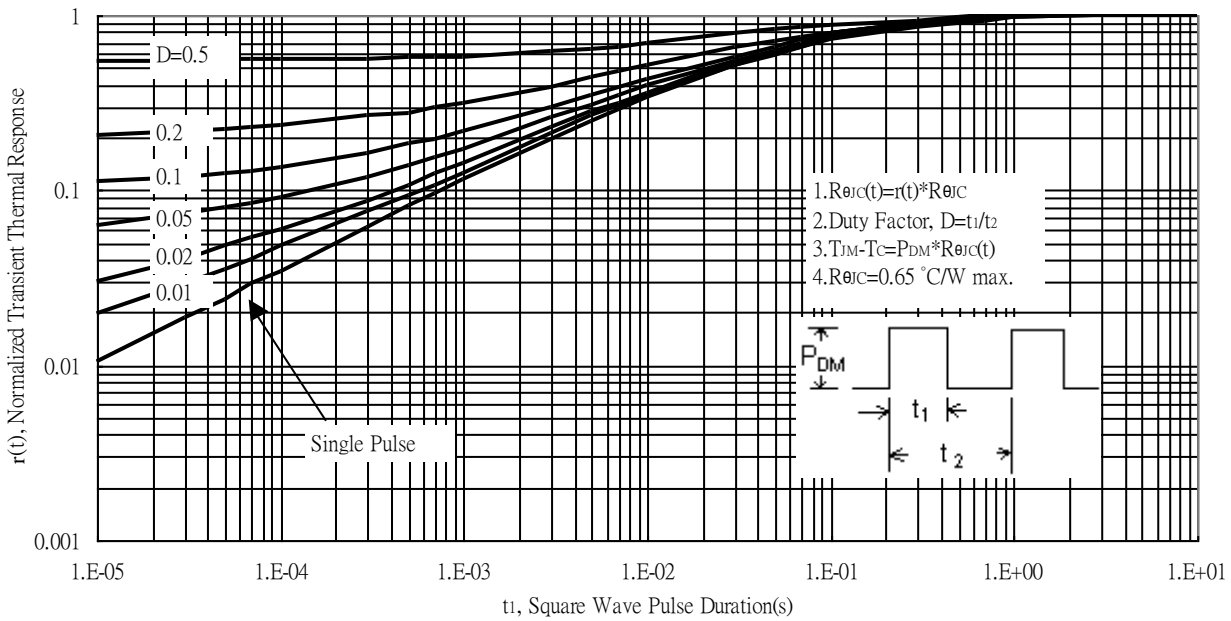


Typical Characteristics(Cont.)

Forward Transfer Admittance vs Drain Current



Transient Thermal Response Curves



Recommended wave soldering condition

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

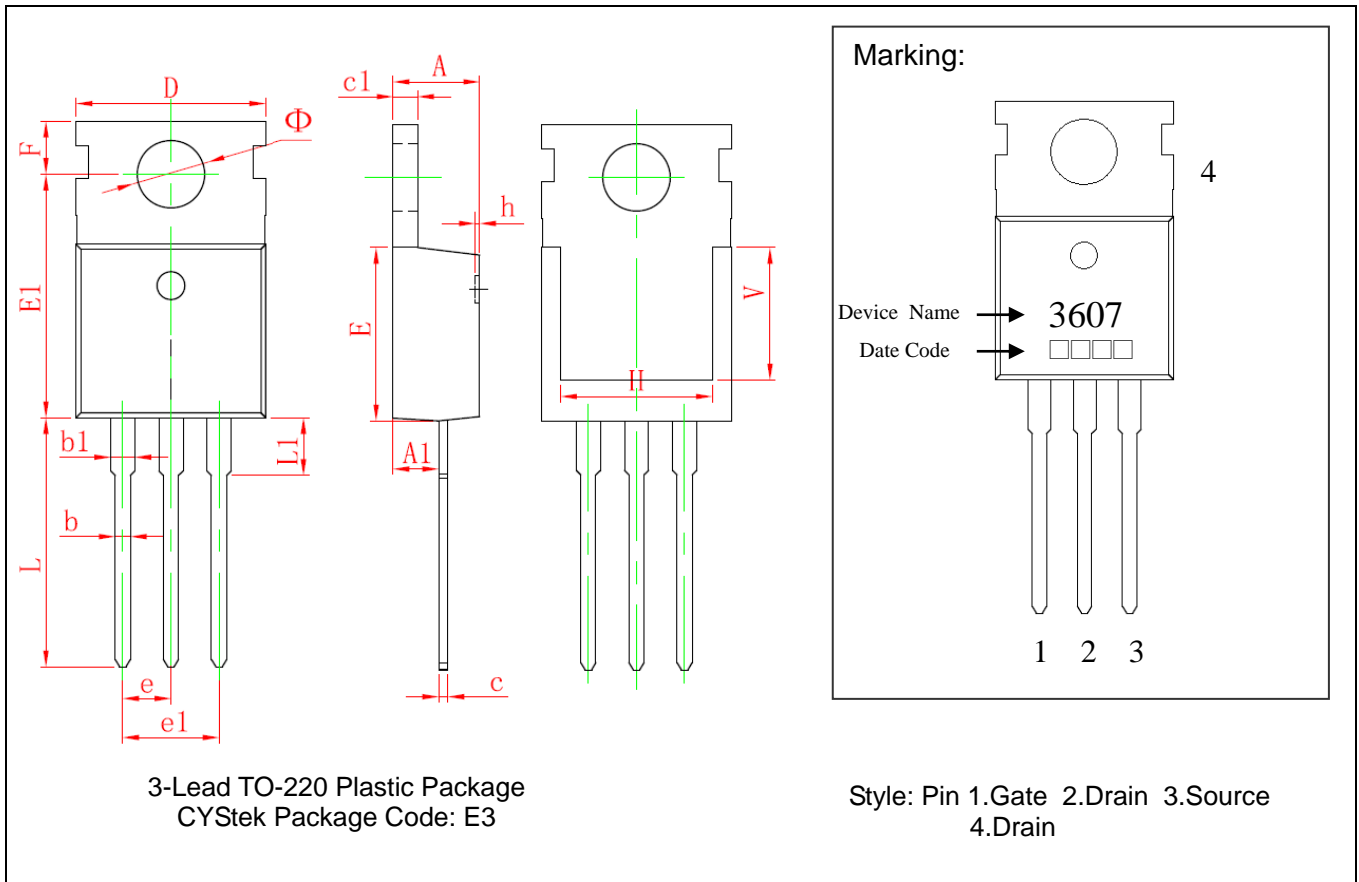
Recommended temperature profile for IR reflow



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.

TO-220 Dimension



*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181	e	2.540*		0.100*	
A1	2.250	2.550	0.089	0.100	e1	4.980	5.180	0.196	0.204
b	0.710	0.910	0.028	0.036	F	2.650	2.950	0.104	0.116
b1	1.170	1.370	0.046	0.054	H	7.900	8.100	0.311	0.319
c	0.330	0.650	0.013	0.026	h	0.000	0.300	0.000	0.012
c1	1.200	1.400	0.047	0.055	L	12.900	13.400	0.508	0.528
D	9.910	10.250	0.390	0.404	L1	2.850	3.250	0.112	0.128
E	8.950	9.750	0.352	0.384	V	7.500	REF	0.295	REF
E1	12.650	12.950	0.498	0.510	Φ	3.400	3.800	0.134	0.150

- 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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