N-Channel Enhancement Mode Power MOSFET

MTN3205E3

BV_{DSS}	55V
I_D	128A
$R_{DSON(TYP)}$ @ V_{GS}=10V, I_D=62A	3.9 mΩ
$R_{DSON(TYP)}$ @ V_{GS}=6V, I_D=30A	4.5 mΩ

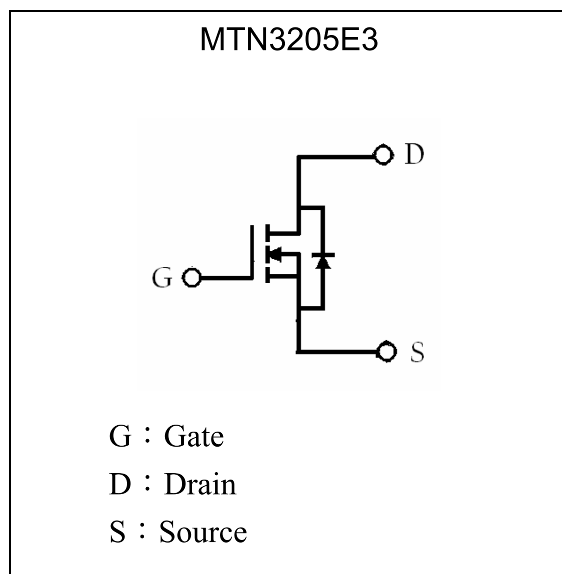
Description

The MTN3205E3 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

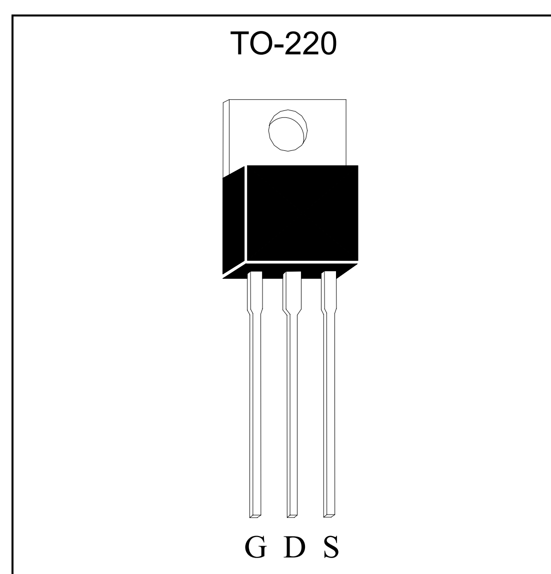
Features

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- Pb-free lead plating and RoHS compliant package

Symbol



Outline



Absolute Maximum Ratings (T_C=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage (Note 1)	V_{DS}	55	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @T_C=25˚C, V_{GS}=10V (silicon limit)	I_D	128*	A
Continuous Drain Current @T_C=100°C, V_{GS}=10V (silicon limit)		90*	
Continuous Drain Current @T_C=25˚C, V_{GS}=10V (package limit)		75	
Pulsed Drain Current (Note 2)	I_{DM}	390*	
Single Pulse Avalanche Energy (Note 3)	E_{AS}	343	mJ
Repetitive Avalanche Energy (Note 2)	E_{AR}	20	
Peak Diode Recovery dv/dt (Note 4)	dv/dt	4.5	V/ns
ESD susceptibility (Note 5)		2000	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℃)	P_D	200	W
Linear Derating Factor above 25℃		1.33	W/°C
Operating Junction and Storage Temperature	Tj, Tstg	-55~+175	°C

*Drain current limited by maximum junction temperature

Note : 1. T_J=+25℃ to +150℃.
2. Repetitive rating; pulse width limited by maximum junction temperature.
3. I_{AS}=70A, V_{DD}=25V, L=0.14mH, R_G=25Ω, starting T_J=+25℃.
4. I_{SD}=40A, dI/dt<100A/µs, V_{DD}<BV_{DSS}, T_J=+150℃.
5. Human body model, 1.5kΩ in series with 100pF.

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	0.75	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	62	°C/W

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

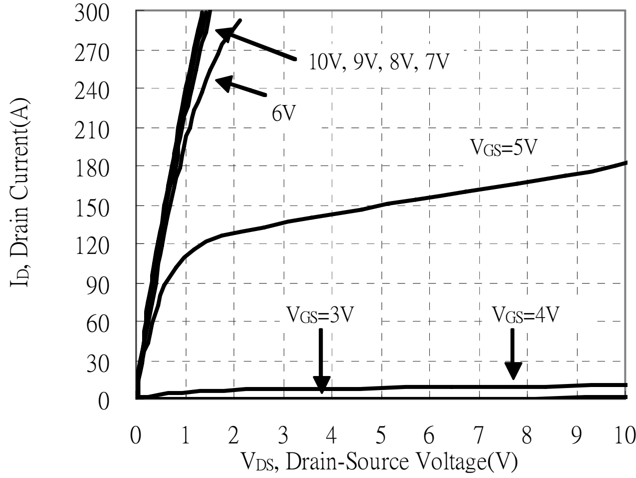
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	55	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	2.0	2.8	4.0	V	V_{DS} = V_{GS}, I_D=250μA
*G_{FS}	-	40	-	S	V_{DS} =10V, I_D=40A
I_{GSS}	-	-	±100	nA	V_{GS}=±20
I_{DSS}	-	-	1	μA	V_{DS} =55V, V_{GS} =0
	-	-	10		V_{DS} =44V, V_{GS} =0, Tj=125°C
*$R_{DS(ON)}$	-	3.9	8	mΩ	V_{GS} =10V, I_D=62A
	-	4.5	14		V_{GS} =6V, I_D=30A
Dynamic					
*Qg	-	91	-	nC	I_D=62A, V_{DD}=44V, V_{GS}=10V
*Qgs	-	28	-		
*Qgd	-	29	-		
*$t_{d(ON)}$	-	25	-	ns	V_{DD}=28V, I_D=62A, V_{GS}=10V, R_G=4.5Ω
*tr	-	116	-		
*$t_{d(OFF)}$	-	78	-		
*t_f	-	53	-		
Ciss	-	5409	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	580	-		
Crss	-	460	-		
Source-Drain Diode					
*I_S	-	-	128	A	
*I_{SM}	-	-	390		
*V_{SD}	-	0.91	1.3	V	I_S=62A, V_{GS}=0V
*trr	-	110	-	ns	V_{GS}=0, I_F=62A, dI/dt=100A/μs
*Qrr	-	240	-	nC	

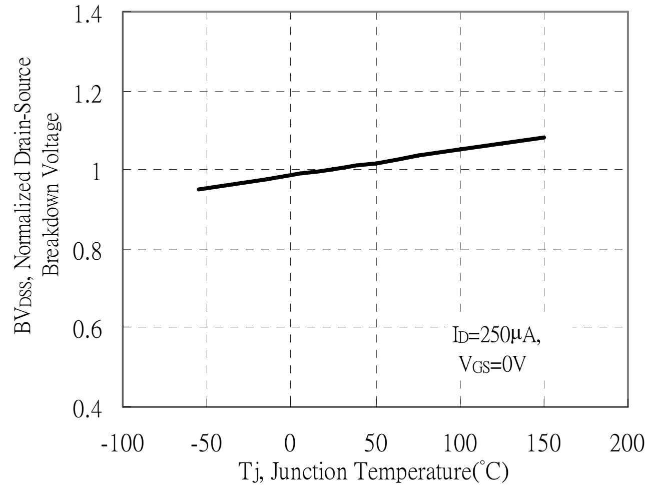
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

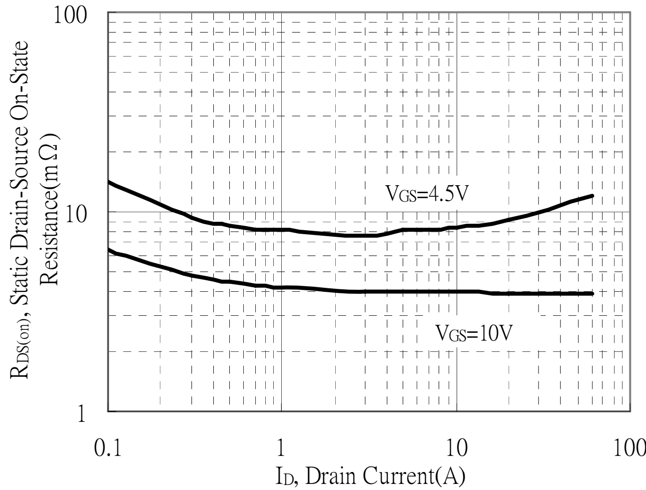
Ordering Information

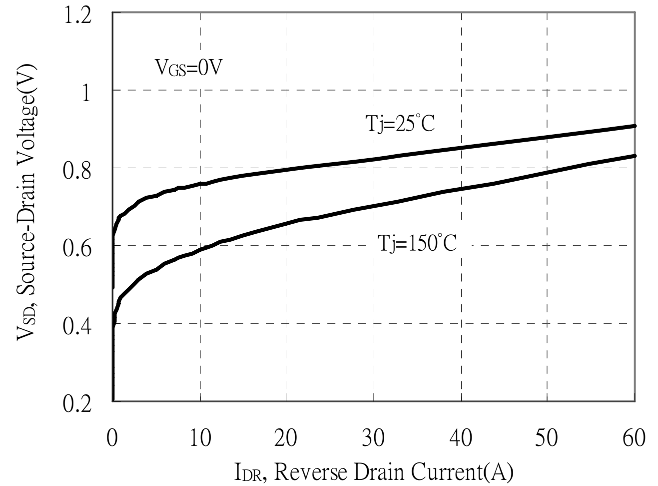
Device	Package	Shipping
MTN3205E3-0-UB-S	TO-220 (Pb-free lead plating and RoHS compliant package)	50 pcs/tube, 20 tubes/box, 4 boxes / carton

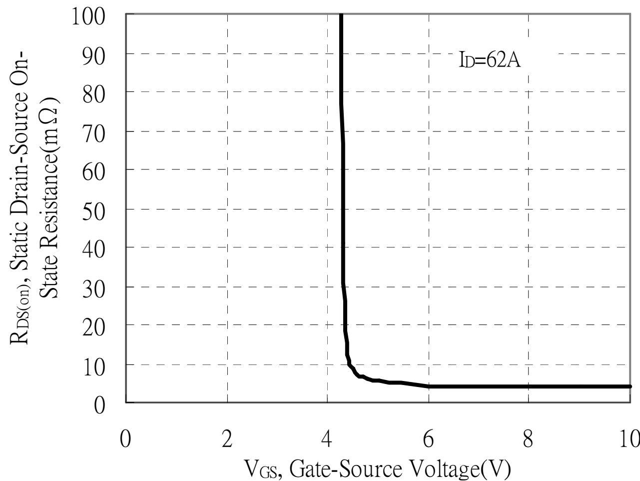
Typical Characteristics

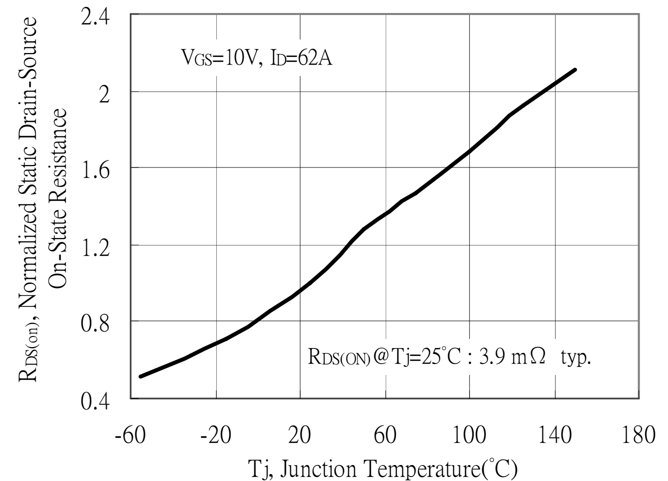




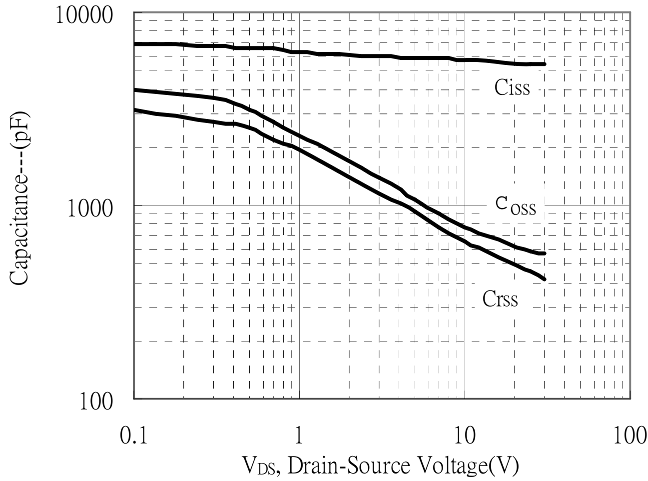


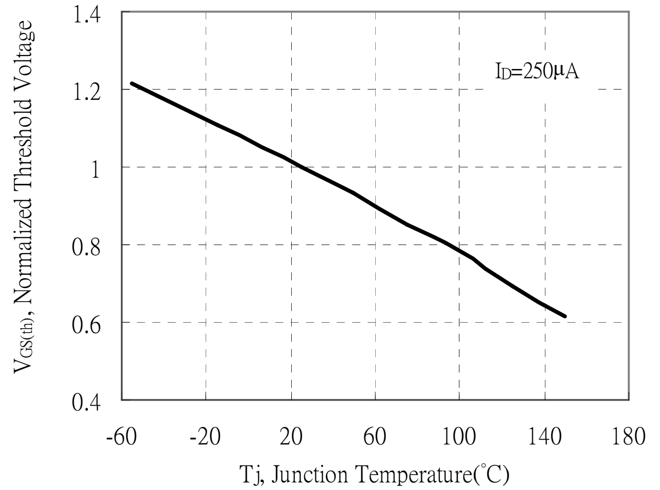


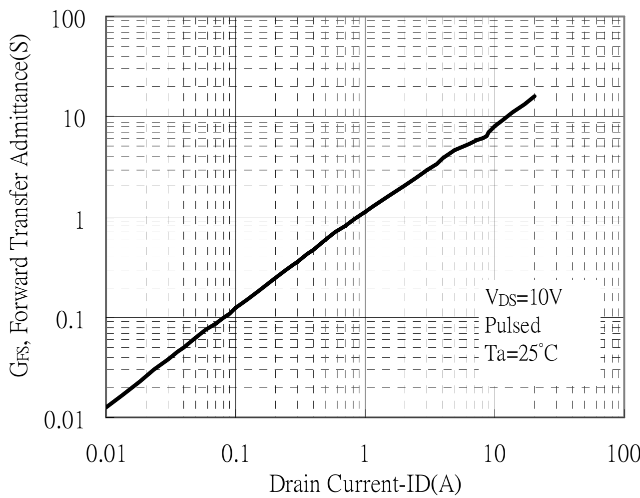


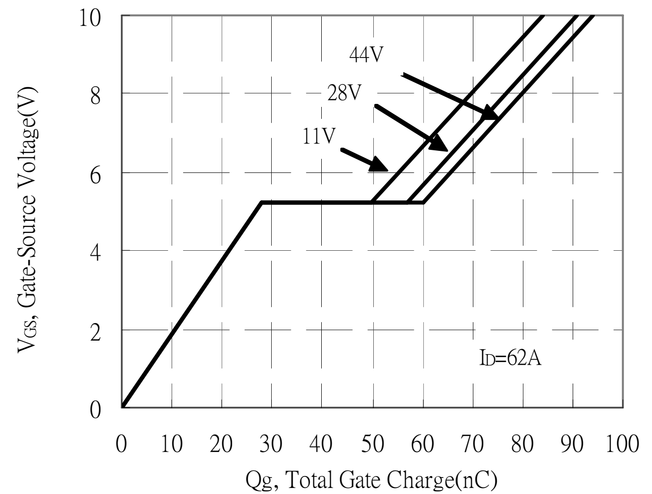


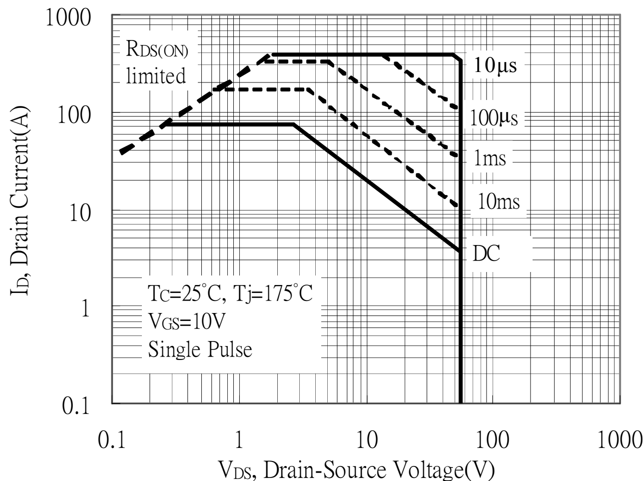
Typical Characteristics(Cont.)

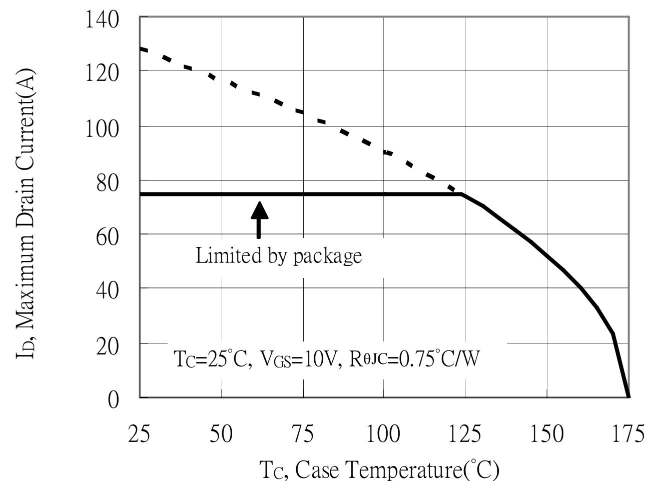












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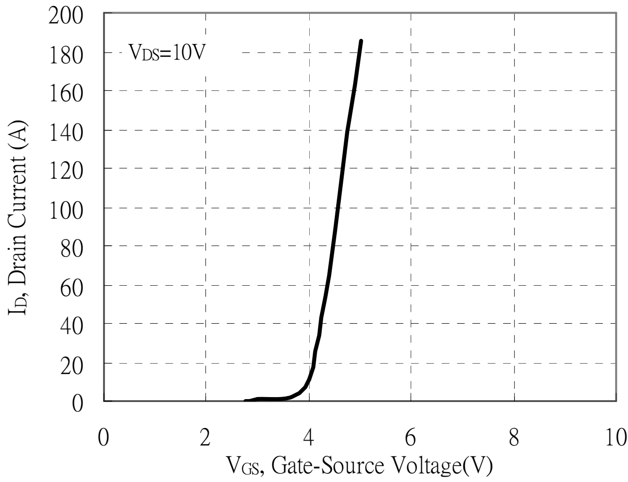
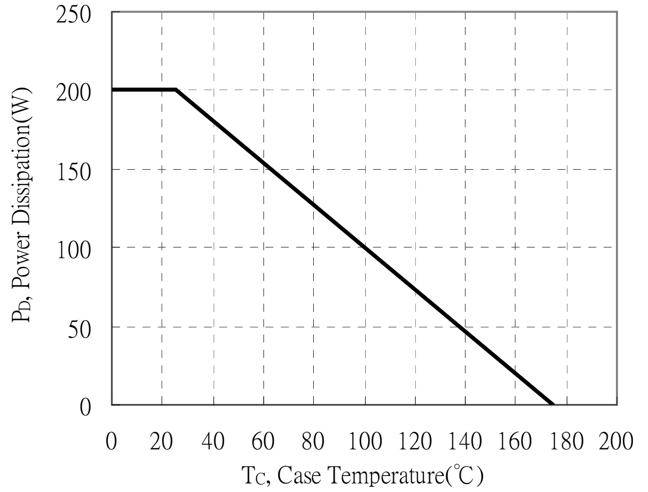
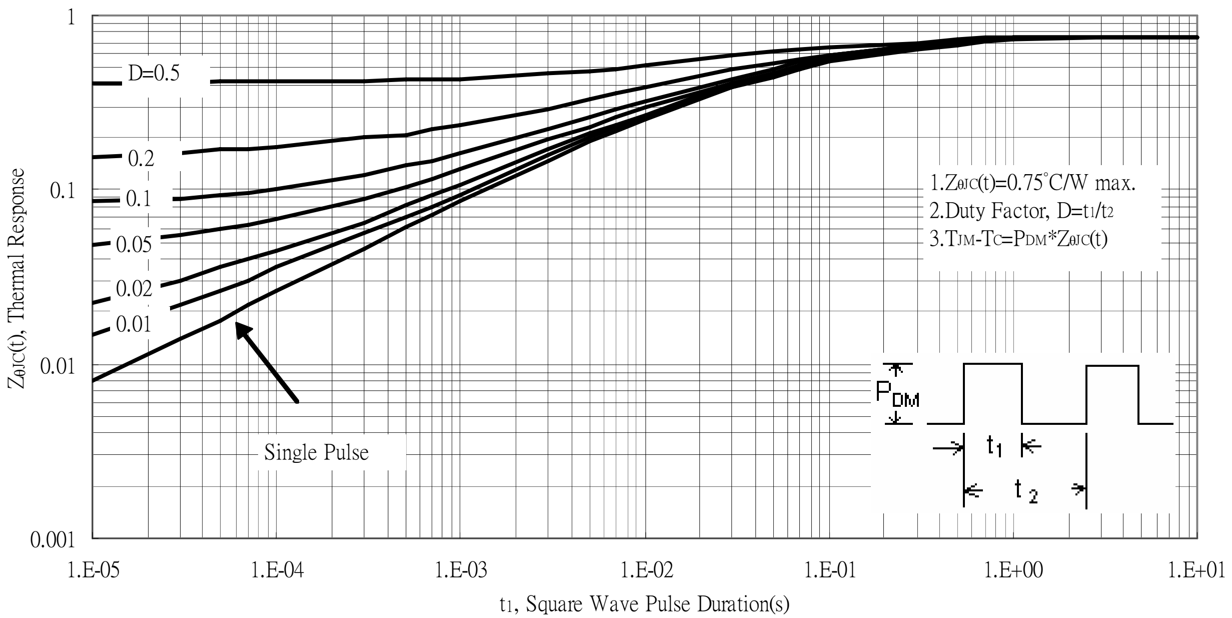


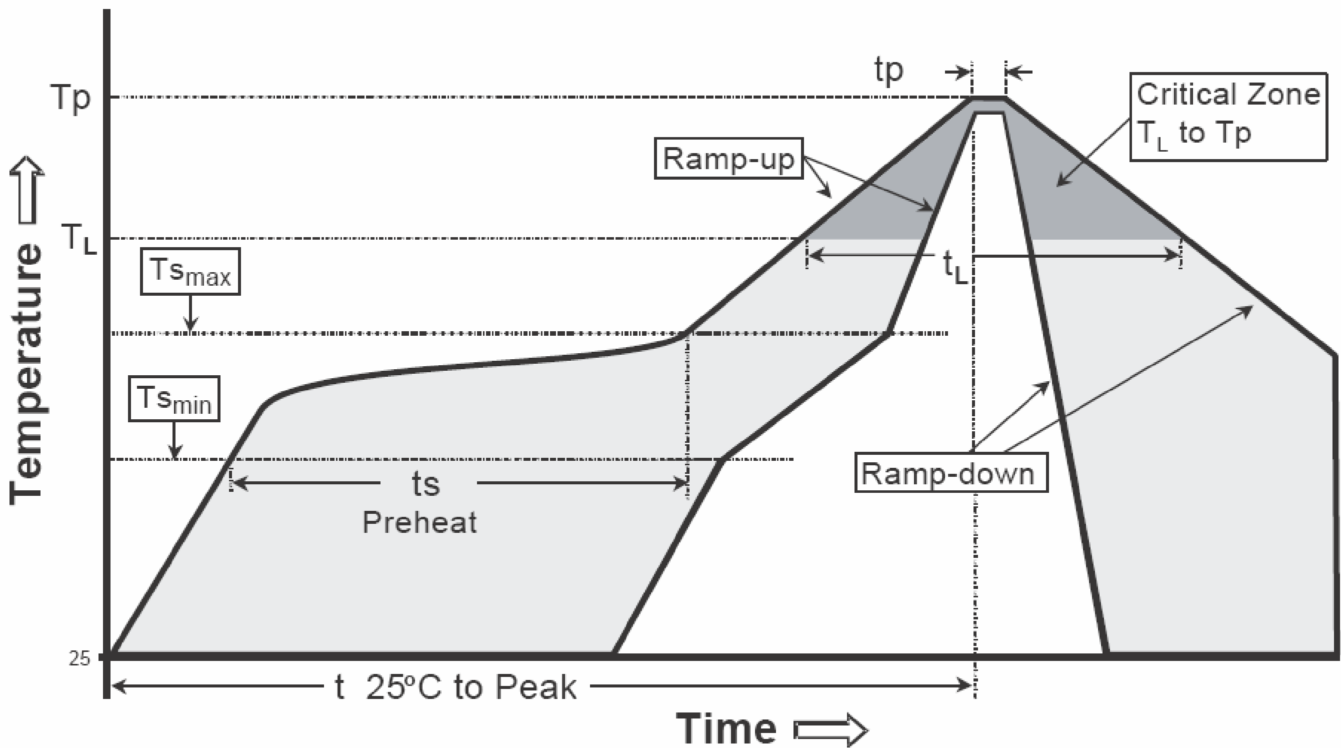




Recommended wave soldering condition

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

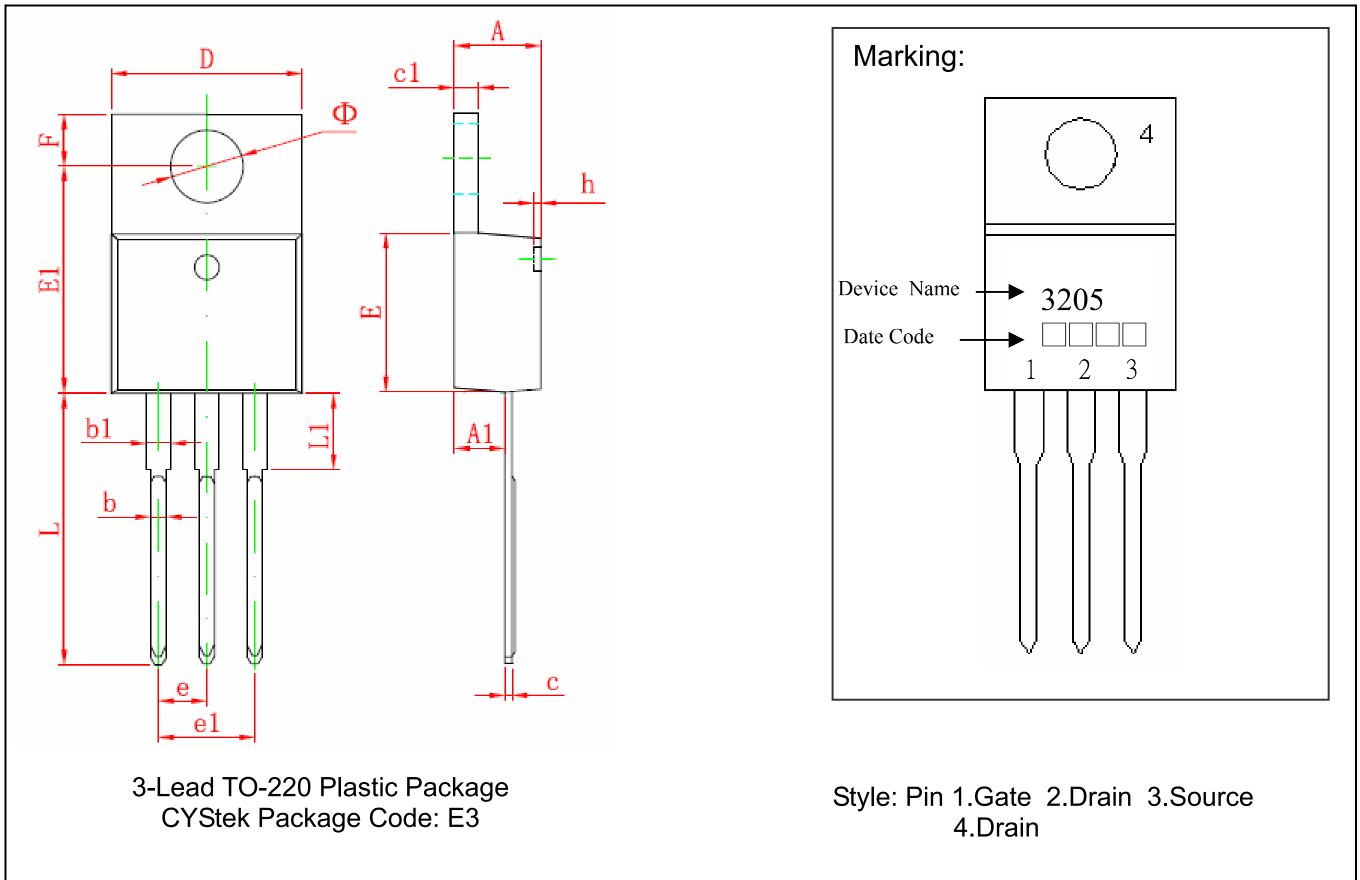
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − Time (tL)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature(TP)	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



3-Lead TO-220 Plastic Package
CYStek Package Code: E3

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

*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184	E1	12.060	12.460	0.475	0.491
A1	2.520	2.820	0.099	0.111	e	2.540*		0.100*	
b	0.710	0.910	0.028	0.036	e1	4.980	5.180	0.196	0.204
b1	1.170	1.370	0.046	0.054	F	2.590	2.890	0.102	0.114
c	0.310	0.530	0.012	0.021	h	0.000	0.300	0.000	0.012
c1	1.170	1.370	0.046	0.054	L	13.400	13.800	0.528	0.543
D	10.010	10.310	0.394	0.406	L1	3.560	3.960	0.140	0.156
E	8.500	8.900	0.335	0.350	Φ	3.735	3.935	0.147	0.155

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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