

**N-Channel Enhancement Mode MOSFET**

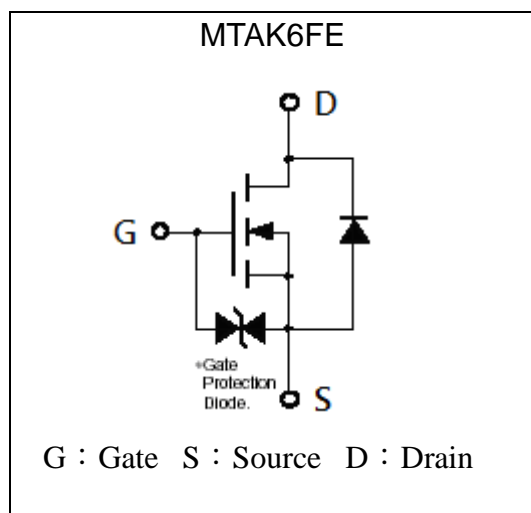
# MTAK6FE

BV <sub>DSS</sub>		60V
I <sub>D</sub> @ V <sub>GS</sub> =4.5V, T <sub>A</sub> =25°C		215mA
R <sub>DS(on)(TYP)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =200mA	1.3Ω
	V <sub>GS</sub> =2.5V, I <sub>D</sub> =100mA	1.7Ω

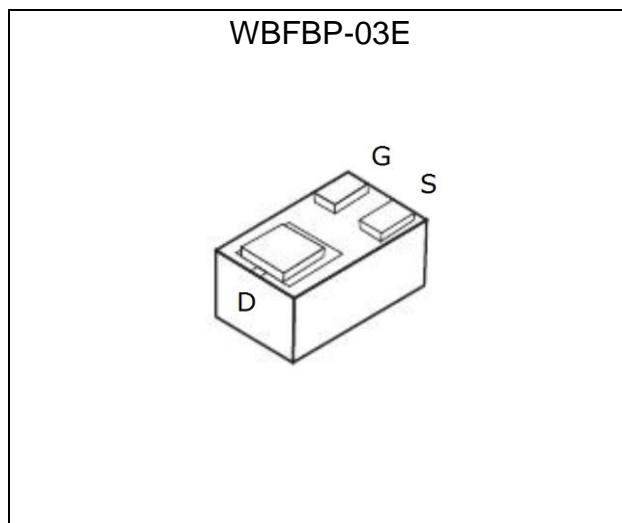
**Description**

- Low voltage drive(2.5V drive) makes this device ideal for portable equipment.
- The MOSFET elements are independent, eliminating mutual interference.
- Mounting cost and area can be cut in half.
- High speed switching
- ESD protected device, HBM ≥ 2kV
- Pb-free lead plating & halogen-free package

**Symbol**

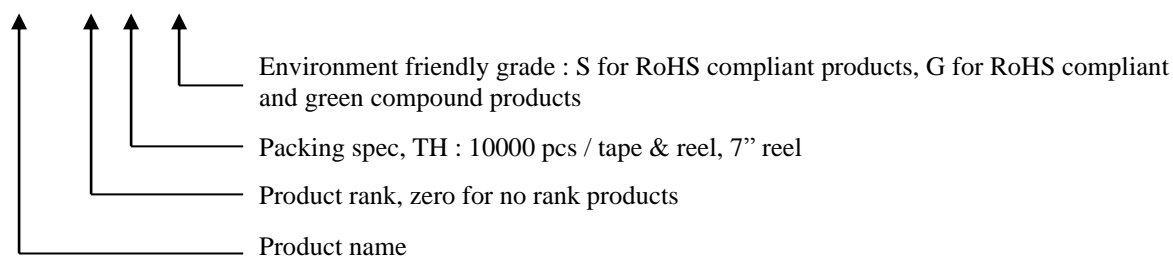


**Outline**



**Ordering Information**

Device	Package	Shipping
MTAK6FE-0-TH-G	WBFBP-03E (Pb-free lead plating & halogen-free package)	10000 pcs / Tape & Reel





**Absolute Maximum Ratings (Ta=25°C)**

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	BV <sub>DSS</sub>	60	V
Gate-Source Voltage	V <sub>GS</sub>	±20	
Continuous Drain Current	I <sub>D</sub>	215	mA
Pulsed Drain Current	I <sub>DM</sub>	860 *1	
Total Power Dissipation	P <sub>D</sub>	150 *2	mW
ESD susceptibility	V <sub>ESD</sub>	2000 *3	V
Operating Junction and Storage Temperature Range	T <sub>j</sub> ; T <sub>stg</sub>	-55~+150	°C

Note : \*1. Pulse Width ≤ 10μs, Duty cycle ≤ 1%  
 \*2. With each pin mounted on the recommended lands.  
 \*3. Human body model, 1.5kΩ in series with 100pF

**Thermal Data**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	*R <sub>θJC</sub>	270	°C/W
Thermal Resistance, Junction to Ambient, max	*R <sub>θJA</sub>	833	

Note : With each pin mounted on the recommended lands.

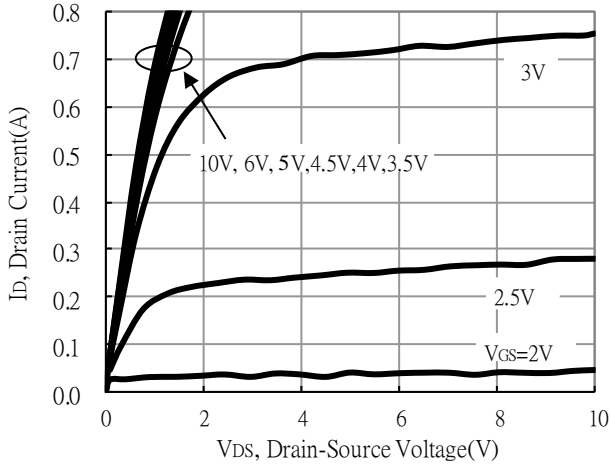
**Electrical Characteristics (Ta=25°C)**

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	60	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
V <sub>GS(th)</sub>	0.5	-	1.5		I <sub>D</sub> =250μA, V <sub>DS</sub> =V <sub>GS</sub>
I <sub>GSS</sub>	-	-	±10	μA	V <sub>GS</sub> =±16V, V <sub>DS</sub> =0V
I <sub>DSS</sub>	-	-	1		V <sub>DS</sub> =60V, V <sub>GS</sub> =0V
R <sub>DS(ON)</sub>	-	1.3	3	Ω	V <sub>GS</sub> =4.5V, I <sub>D</sub> =200mA
	-	1.7	5.1		V <sub>GS</sub> =2.5V, I <sub>D</sub> =100mA
G <sub>FS</sub>	100	322	-	mS	V <sub>DS</sub> =5V, I <sub>D</sub> =100mA
<b>Dynamic</b>					
C <sub>iss</sub>	-	25.8	-	pF	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz
C <sub>oss</sub>	-	8.6	-		
C <sub>rss</sub>	-	7	-		
t <sub>d(on)</sub>	-	3.1	-	ns	V <sub>DD</sub> =30V, I <sub>D</sub> =200mA, V <sub>GS</sub> =10V, R <sub>G</sub> =25Ω
t <sub>r</sub>	-	15.1	-		
t <sub>d(off)</sub>	-	11.4	-		
t <sub>f</sub>	-	18	-		
*Q <sub>g</sub>	-	1.6	-	nC	V <sub>DS</sub> =30V, I <sub>D</sub> =200mA, V <sub>GS</sub> =10V
*Q <sub>gs</sub>	-	0.4	-		
*Q <sub>gd</sub>	-	0.2	-		
R <sub>g</sub>	-	3	-	Ω	f=1MHz
<b>Source-Drain Diode</b>					
*V <sub>SD</sub>	-	0.79	1.2	V	V <sub>GS</sub> =0V, I <sub>S</sub> =100mA
*t <sub>rr</sub>	-	8.3	-	ns	I <sub>F</sub> =0.5A, dI <sub>F</sub> /dt=100A/μs
*Q <sub>rr</sub>	-	2.7	-	nC	

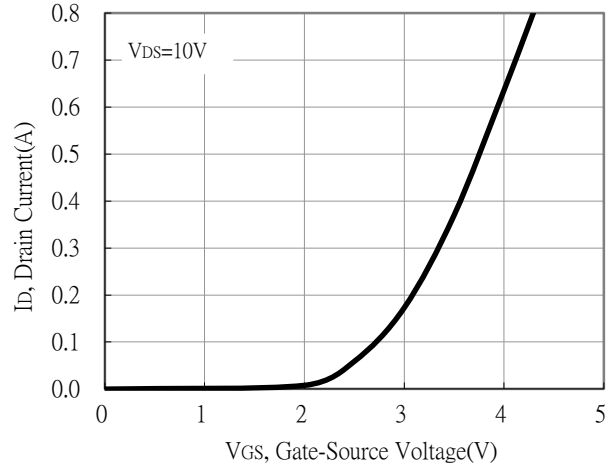
\*Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

## Typical Characteristics

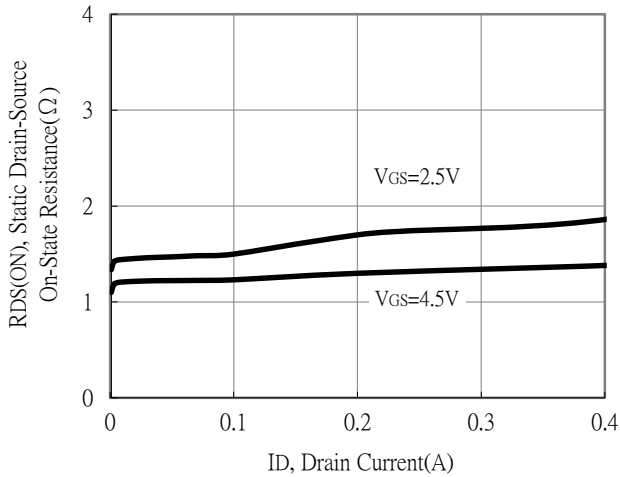
Typical Output Characteristics



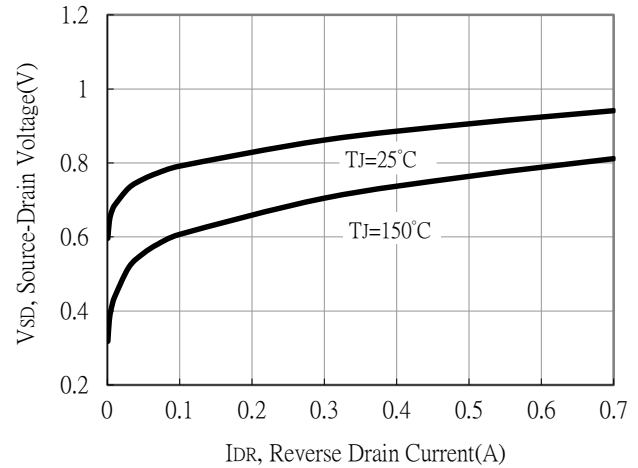
Typical Transfer Characteristics



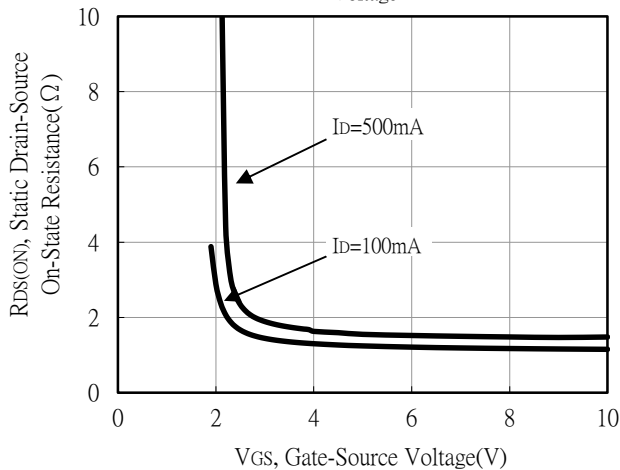
Static Drain-Source On-State resistance vs Drain Current



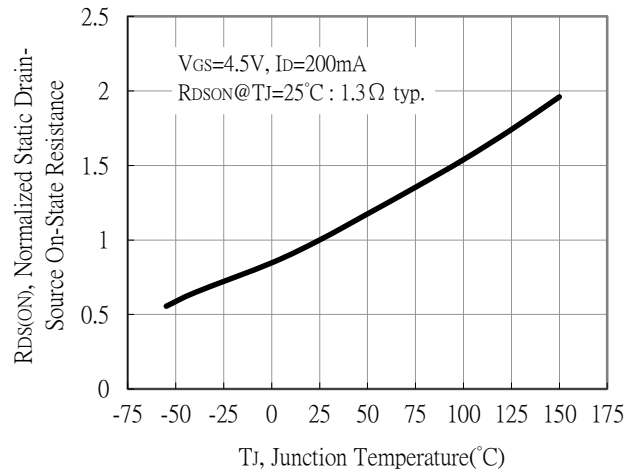
Reverse Drain Current vs Source-Drain Voltage



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

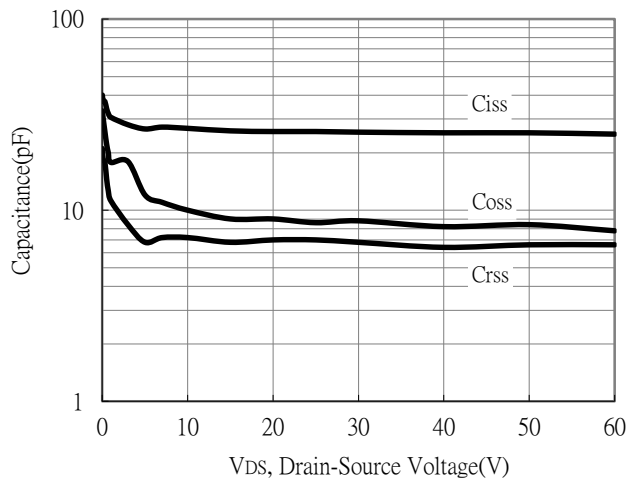


Drain-Source On-State Resistance vs Junction Temperature

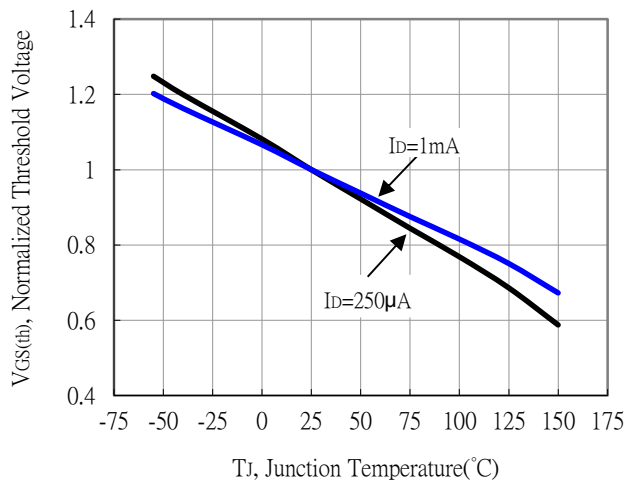


## Typical Characteristics(Cont.)

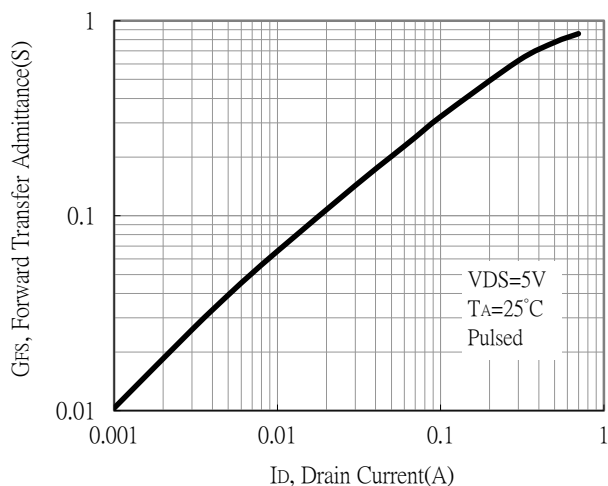
Capacitance vs Drain-to-Source Voltage



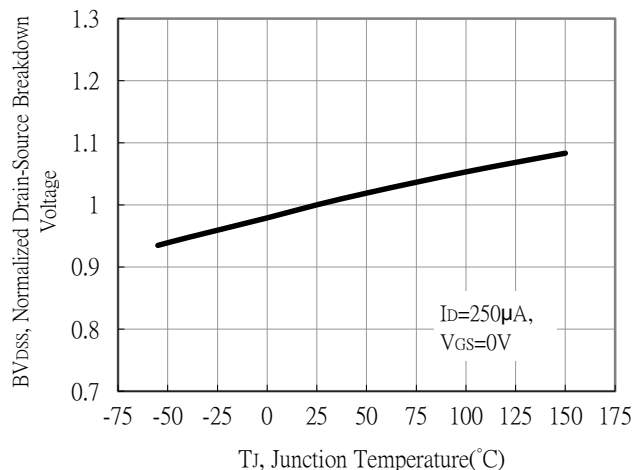
Threshold Voltage vs Junction Temperature



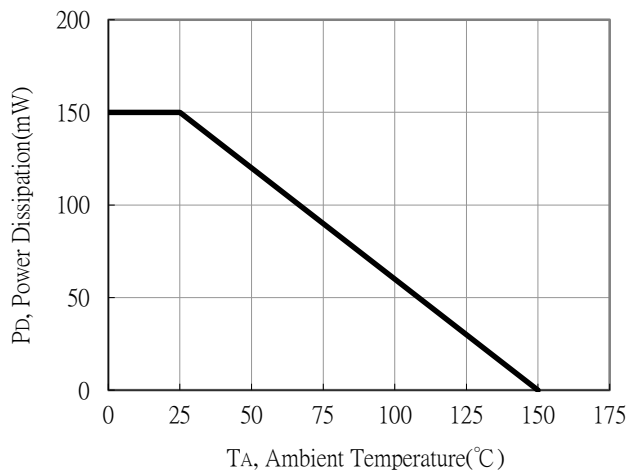
Forward Transfer Admittance vs Drain Current



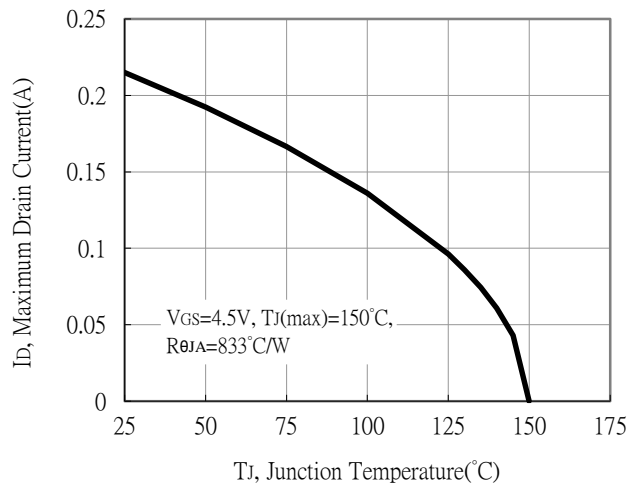
Brekdown Voltage vs Ambient Temperature



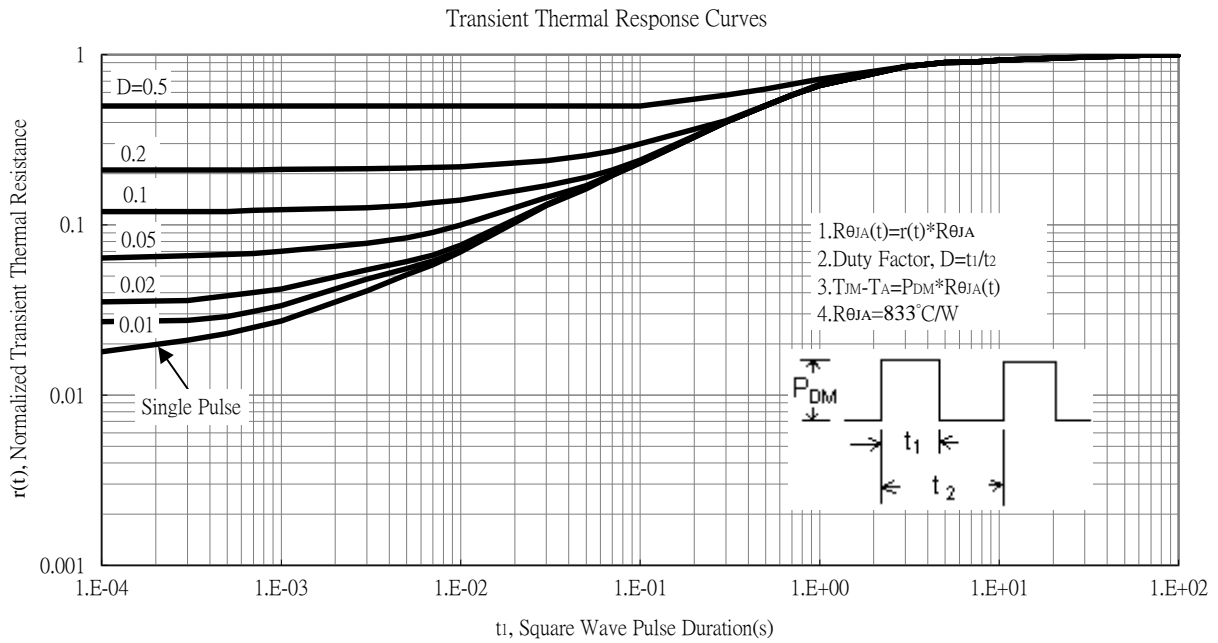
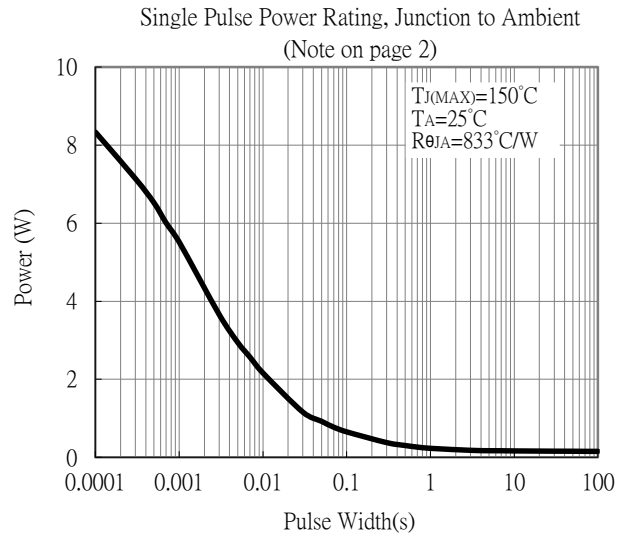
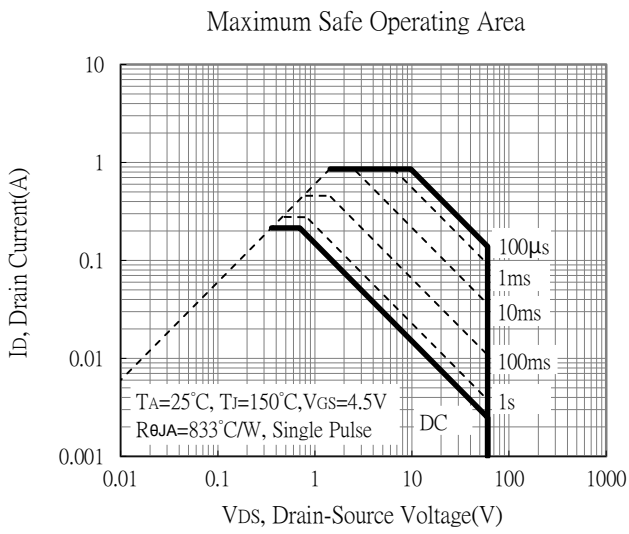
Power Derating Curve



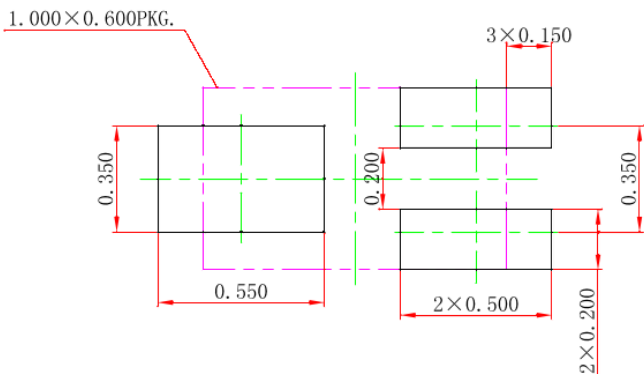
Maximum Drain Current vs Junction Temperature



**Typical Characteristics(Cont.)**



**Recommended Soldering Footprint**



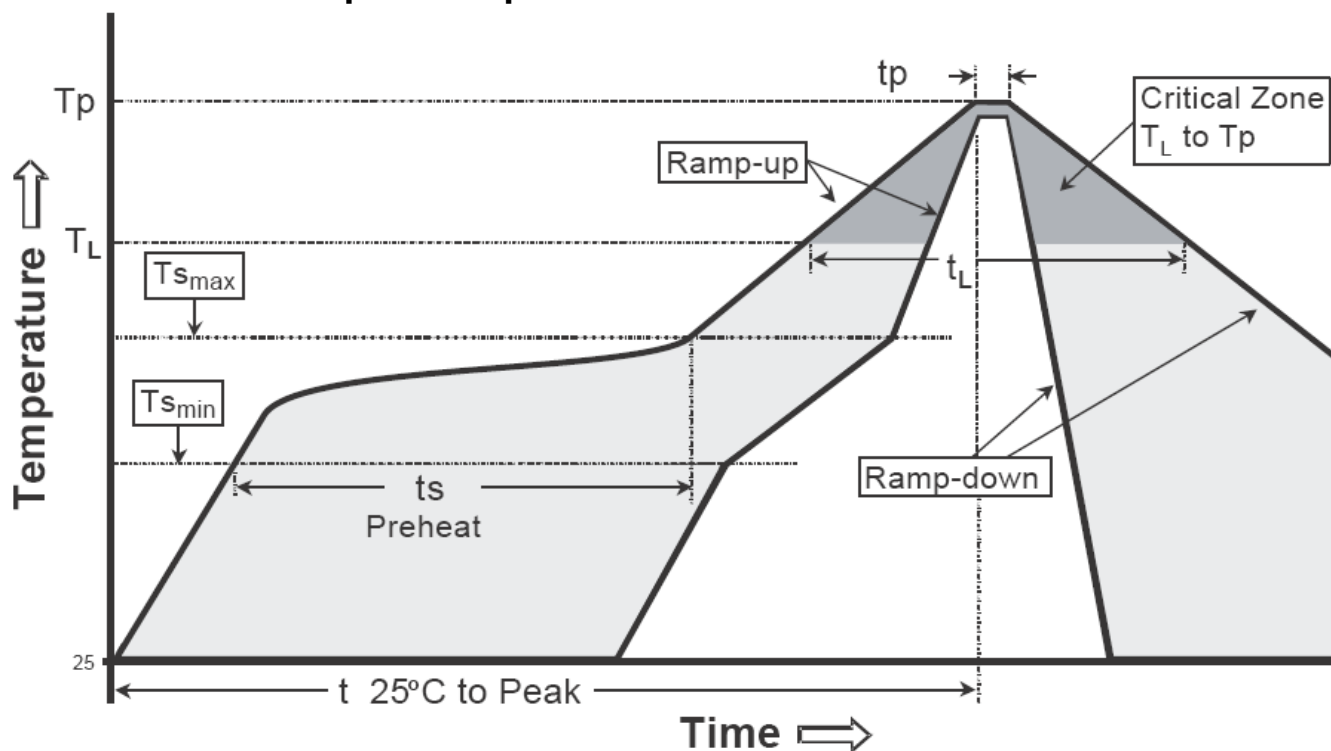
**Note:**

- Controlling dimension: in millimeters.
- General tolerance:  $\pm 0.050\text{mm}$ .
- The pad layout is for reference purposes only.



**Recommended wave soldering condition**

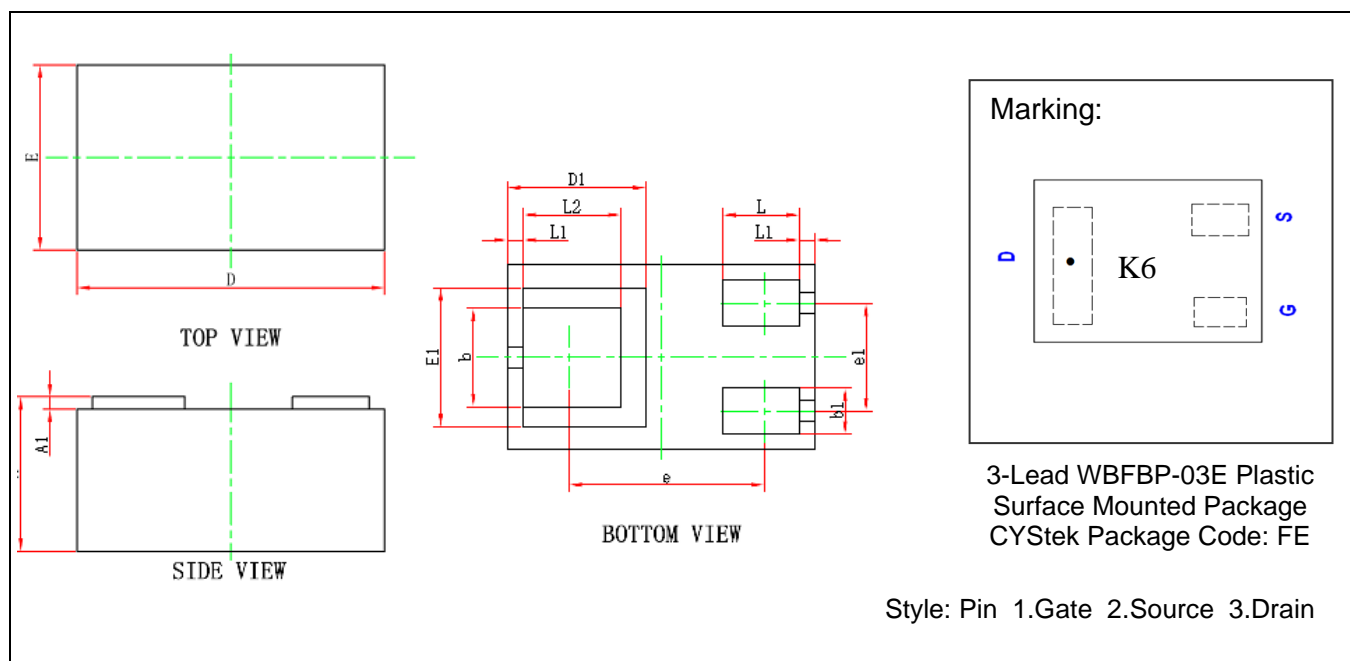
Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

**Recommended temperature profile for IR reflow**


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s min</sub> )	100°C	150°C
-Temperature Max(T <sub>s max</sub> )	150°C	200°C
-Time(t <sub>s min</sub> to t <sub>s max</sub> )	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>P</sub> )	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.

**WBFBP-03E Dimension**



\*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.018	0.022	0.450	0.550	b1	0.004	0.008	0.100	0.200
A1	0.000	0.004	0.010	0.100	e	0.025REF		0.635REF	
D	0.037	0.041	0.950	1.050	e1	0.012	0.016	0.300	0.400
E	0.022	0.026	0.550	0.650	L	0.008	0.012	0.200	0.300
D1	0.018REF		0.450REF		L1	0.002REF		0.050REF	
E1	0.018REF		0.450REF		L2	0.011	0.015	0.270	0.370
b	0.011	0.015	0.270	0.370					

**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

**Important Notice:**

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of CYStek.
- CYStek reserves the right to make changes to its products without notice.
- CYStek **semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.**
- CYStek assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.