N-Channel Enhancement Mode Power MOSFET

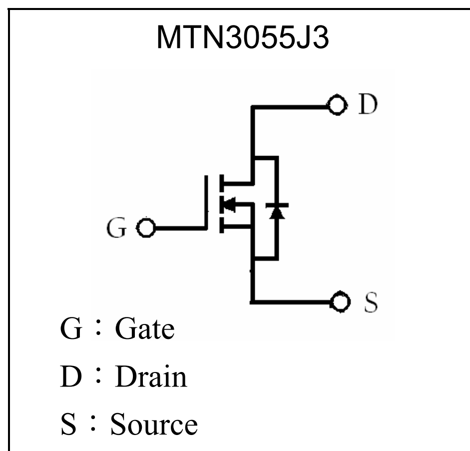
MTN3055J3

BV_{DSS}	30V
I_D	15A
R_{DSON}	26mΩ

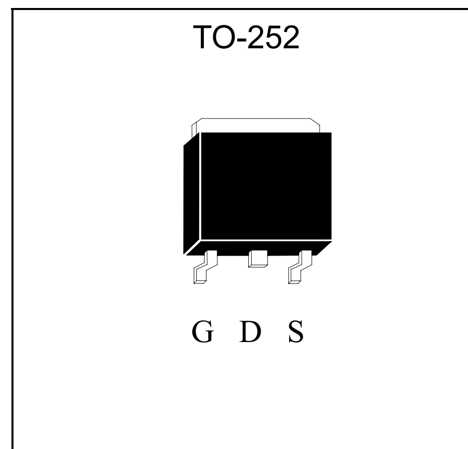
Features

- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- RoHS compliant package

Symbol



Outline



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current @V_{GS}=10V, T_C=25°C	I_D	15	A
Continuous Drain Current @V_{GS}=10V, T_C=100°C	I_D	9	A
Pulsed Drain Current	I_{DM}	50 *1	A
Total Power Dissipation (T_C=25℃)	Pd	28	W
Linear Derating Factor		0.22	W/°C
Operating Junction and Storage Temperature	Tj, Tstg	-55~+150	°C

Note : *1. Pulse width limited by safe operating area

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	4.8	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	110	°C/W

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0, I_D=250μA
$\Delta BV_{DSS}/\Delta T_j$	-	0.037	-	V/°C	Reference to 25°C, I_D=1mA
$V_{GS(th)}$	1.0	-	3.0	V	V_{DS} = V_{GS}, I_D=250μA
G_{FS}	-	4	-	S	V_{DS} =10V, I_D=6A
I_{GSS}	-	-	±100	nA	V_{GS}=±20
I_{DSS}	-	-	1	μA	V_{DS} =30V, V_{GS} =0
I_{DSS}	-	-	25	μA	V_{DS} =24V, V_{GS} =0, Tj=150°C
*$R_{DS(ON)}$	-	-	26	mΩ	V_{GS} =10V, I_D=8A
*$R_{DS(ON)}$	-	-	40	mΩ	V_{GS} =4.5V, I_D=6A
Dynamic					
*Qg	-	4.6	-	nC	I_D=8A, V_{DS}=24V, V_{GS}=5V
*Qgs	-	1.1	-		
*Qgd	-	3	-		
*$t_{d(ON)}$	-	4.9	-	ns	V_{DS}=15V, I_D=8A, V_{GS}=10V, R_G=3.4Ω, R_D=1.9Ω
*tr	-	22.5	-		
*$t_{d(OFF)}$	-	12.2	-		
*t_f	-	3.3	-		
Ciss	-	160	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	107	-		
Crss	-	32	-		
Source-Drain Diode					
*V_{SD}	-	-	1.3	V	I_S=15A, V_{GS}=0V
*I_S	-	-	15	A	V_D=V_G=0, V_S=1.3V

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

Ordering Information

Device	Package	Shipping	Marking
MTN3055J3	TO-252 (RoHS compliant)	2500 pcs / Tape & Reel	3055

Characteristic Curves

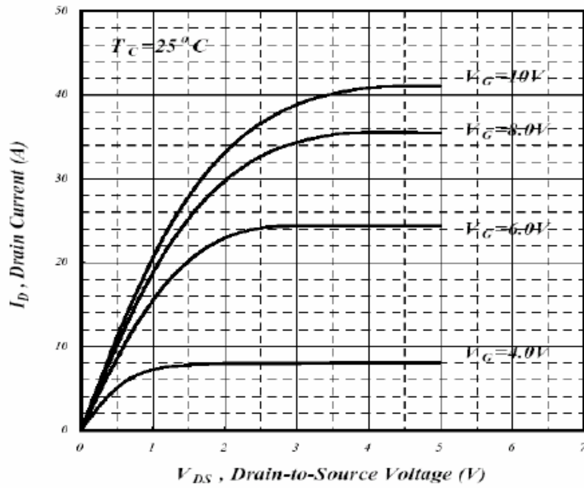


Fig 1. Typical Output Characteristics

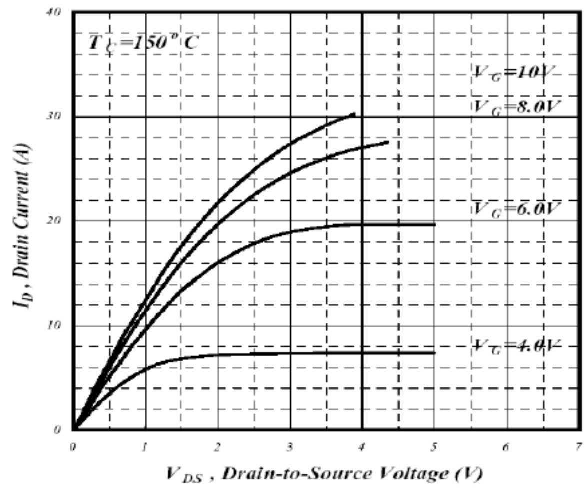


Fig 2. Typical Output Characteristics

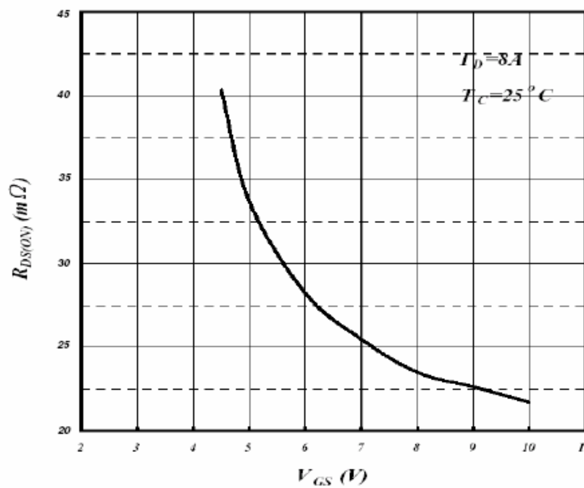


Fig 3. On-Resistance v.s. Gate Voltage

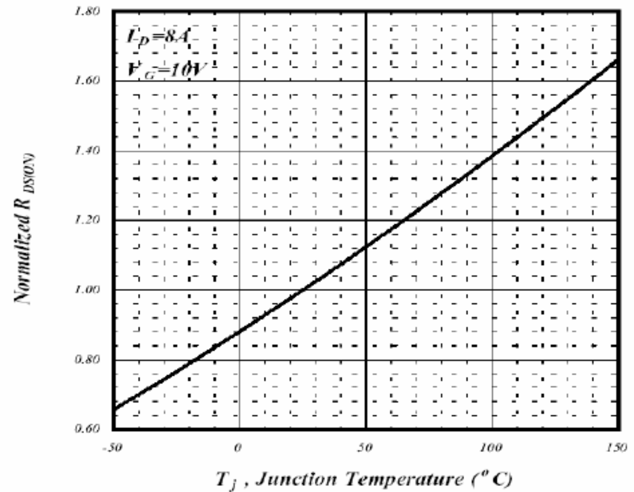


Fig 4. Normalized On-Resistance v.s. Junction Temperature

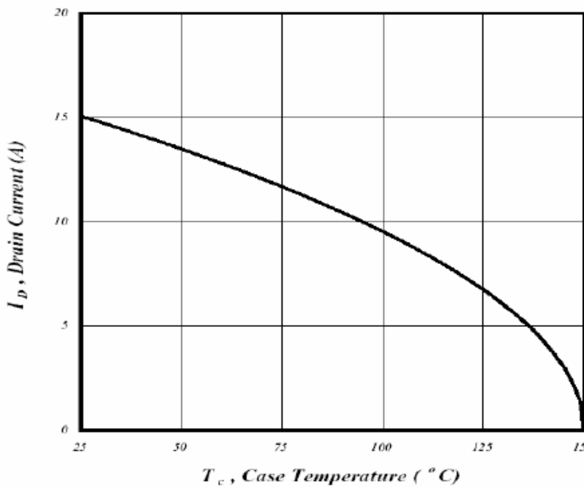


Fig 5. Maximum Drain Current v.s. Case Temperature

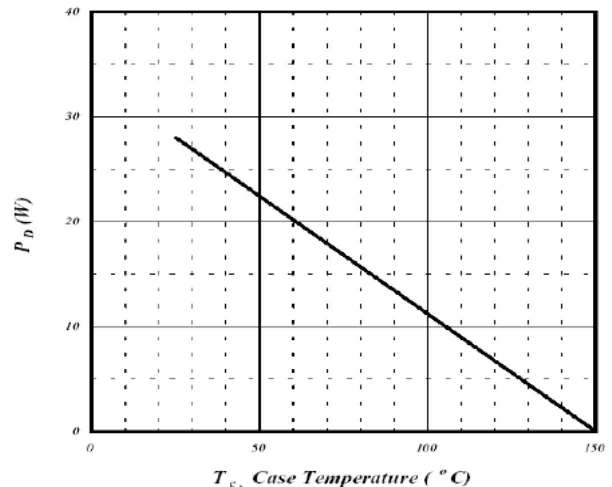


Fig 6. Type Power Dissipation

Characteristic Curves(Cont.)

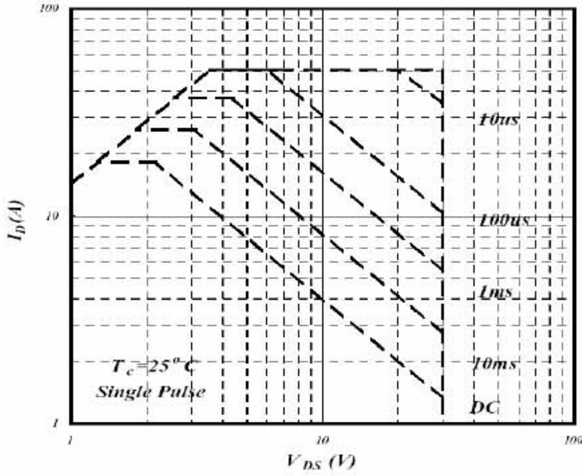


Fig 7. Maximum Safe Operating Area

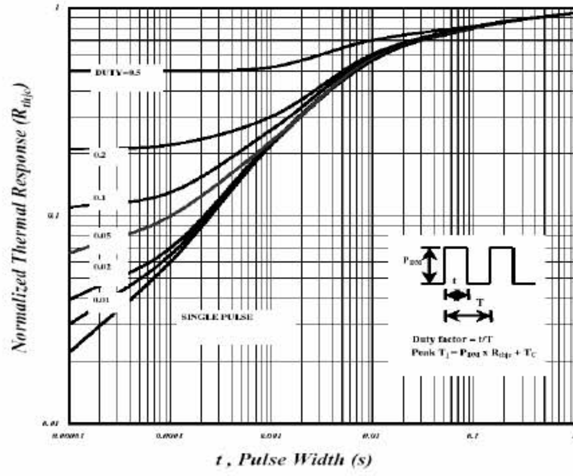


Fig 8. Effective Transient Thermal Impedance

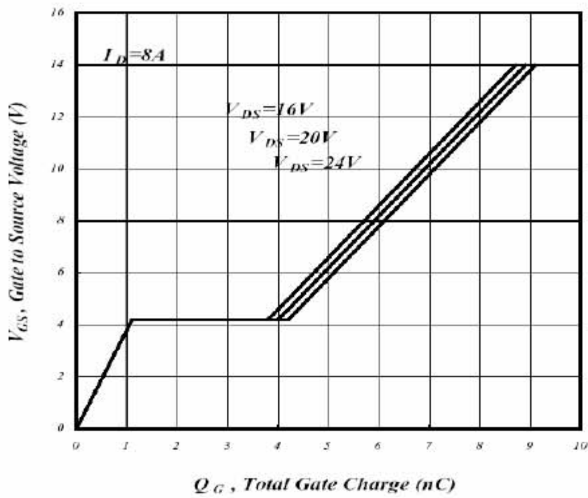


Fig 9. Gate Charge Characteristics

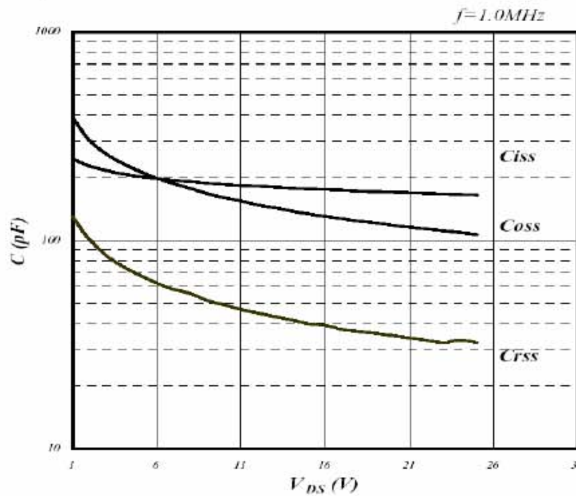


Fig 10. Typical Capacitance Characteristics

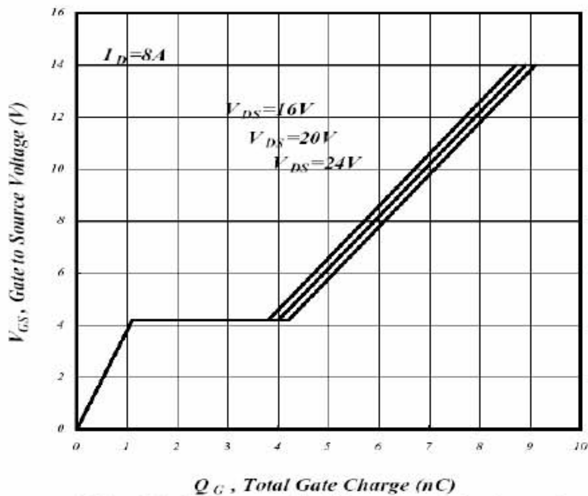


Fig 11. Forward Characteristics of Reverse Diode

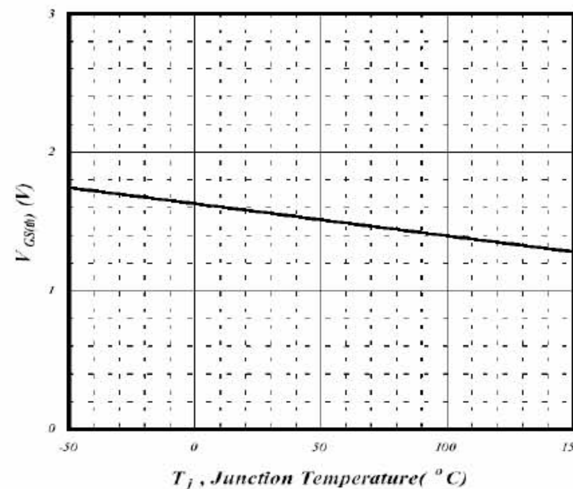


Fig 12. Gate Threshold Voltage v.s. Junction Temperature

Characteristic Curves(Cont.)

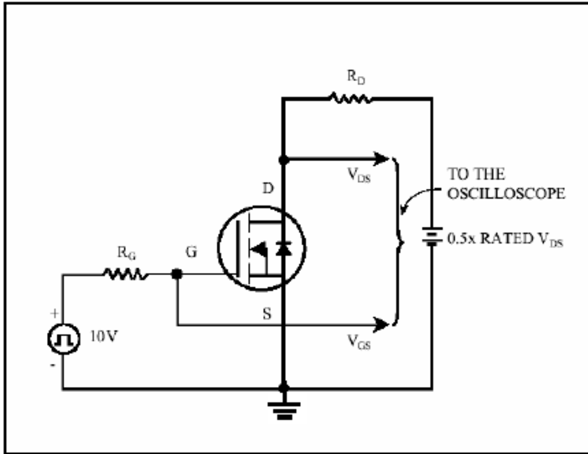


Fig 13. Switching Time Circuit

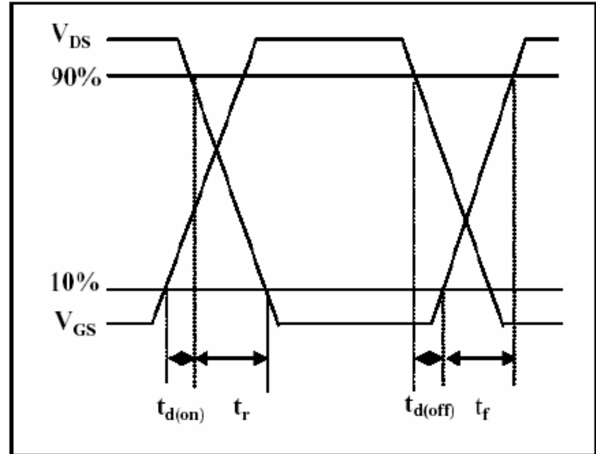


Fig 14. Switching Time Waveform

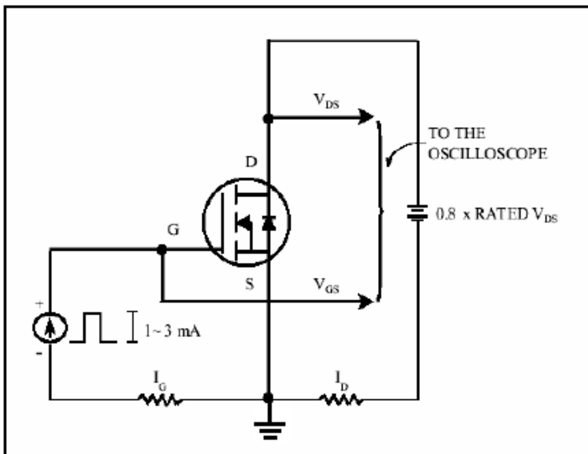


Fig 15. Gate Charge Circuit

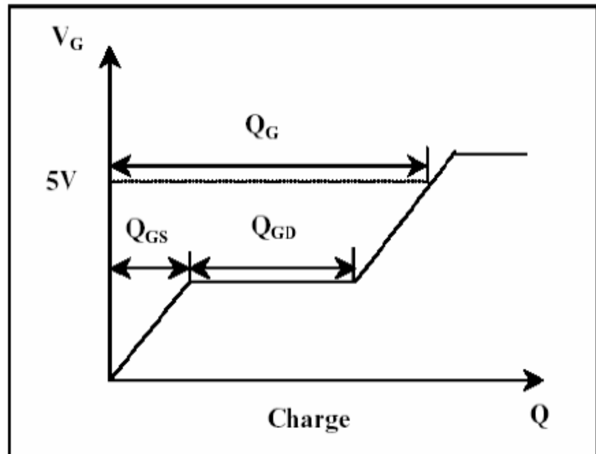
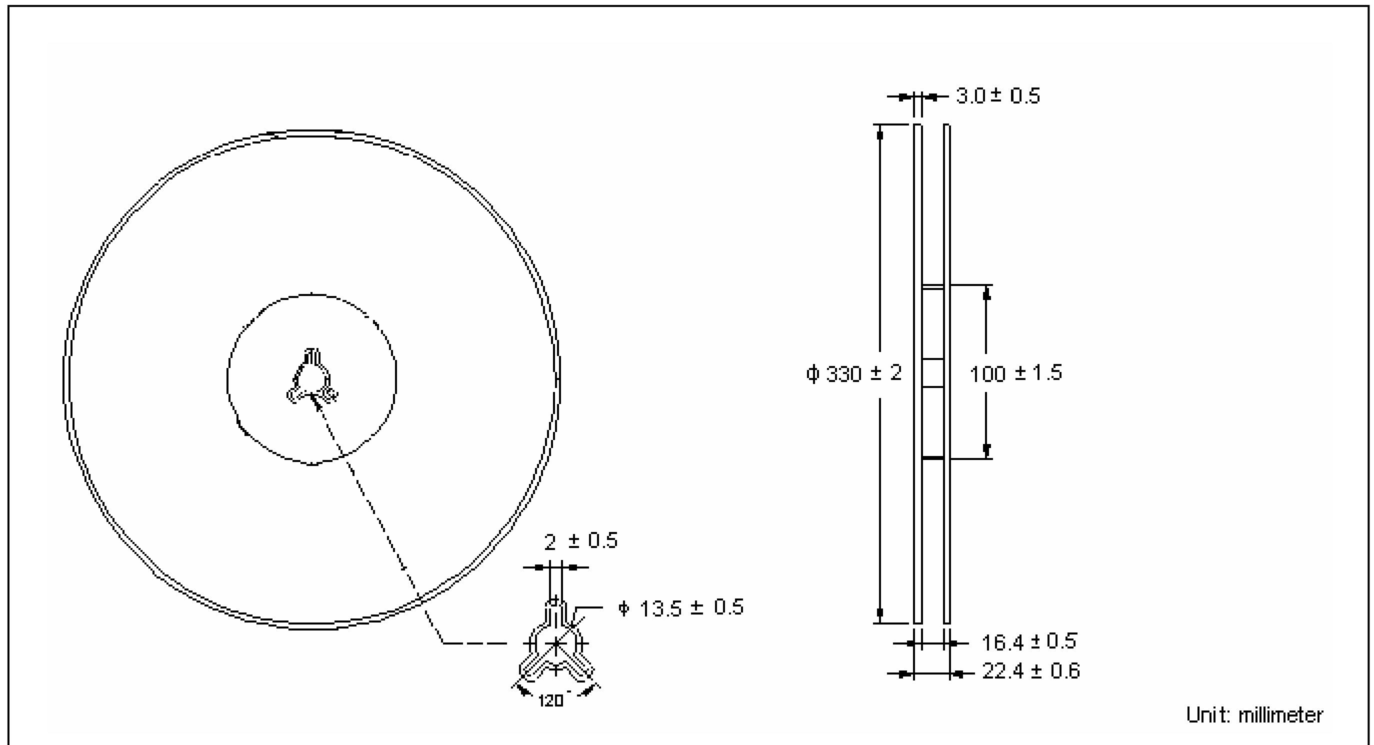
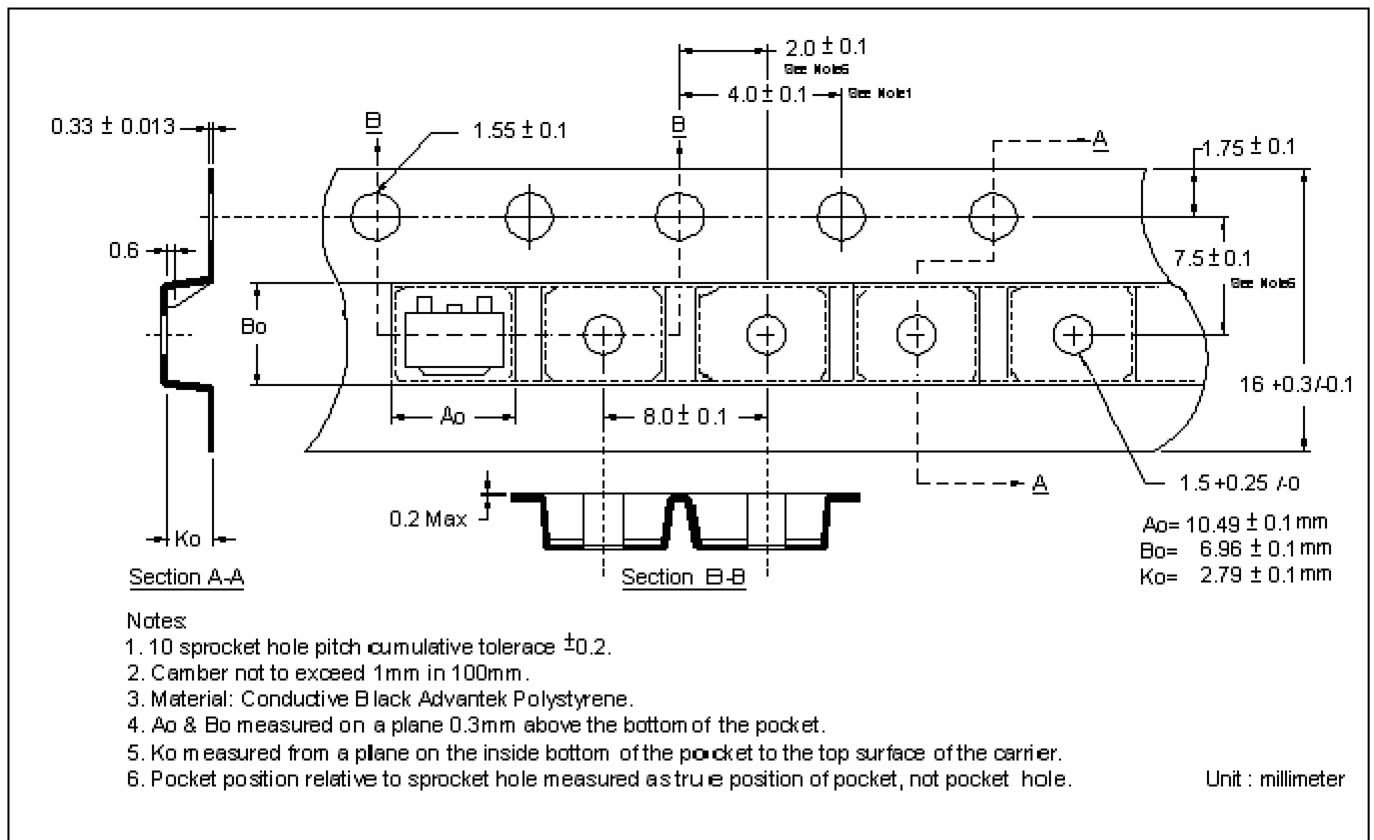


Fig 16. Gate Charge Waveform

Reel Dimension



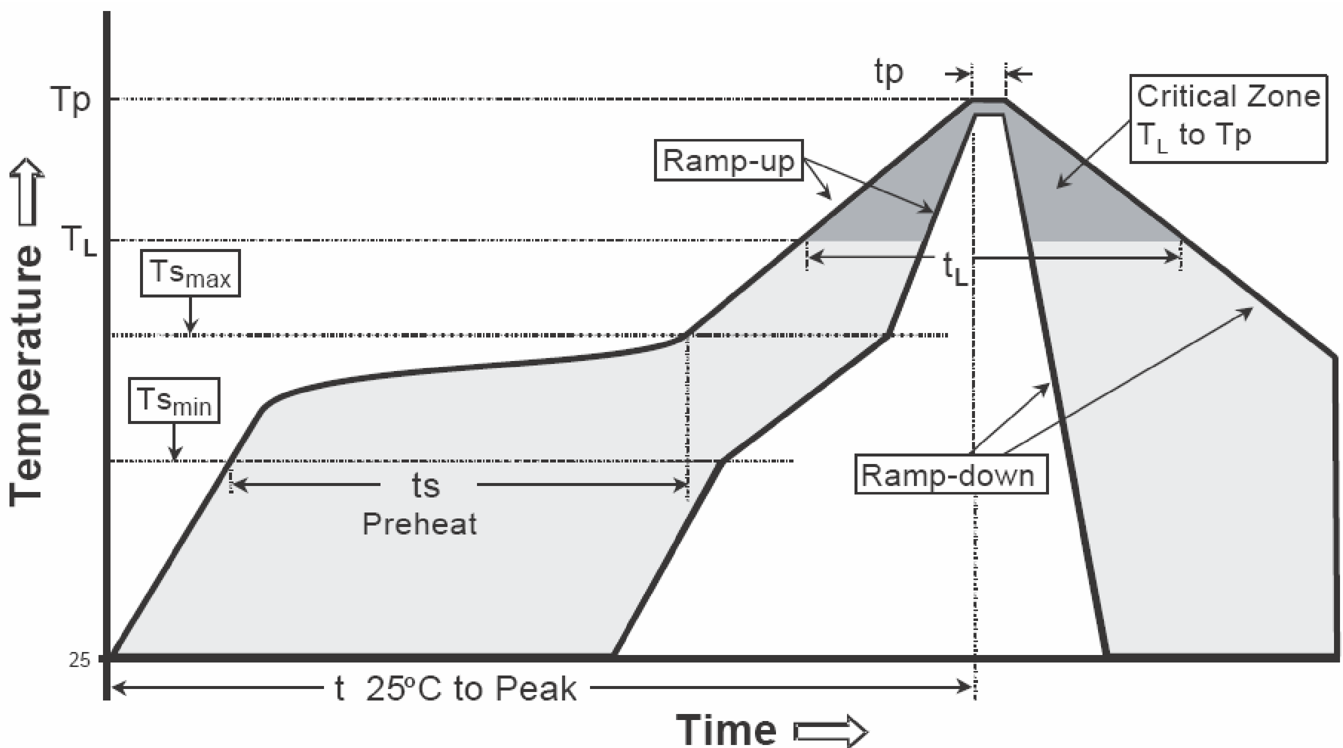
Carrier Tape Dimension



Recommended wave soldering condition

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

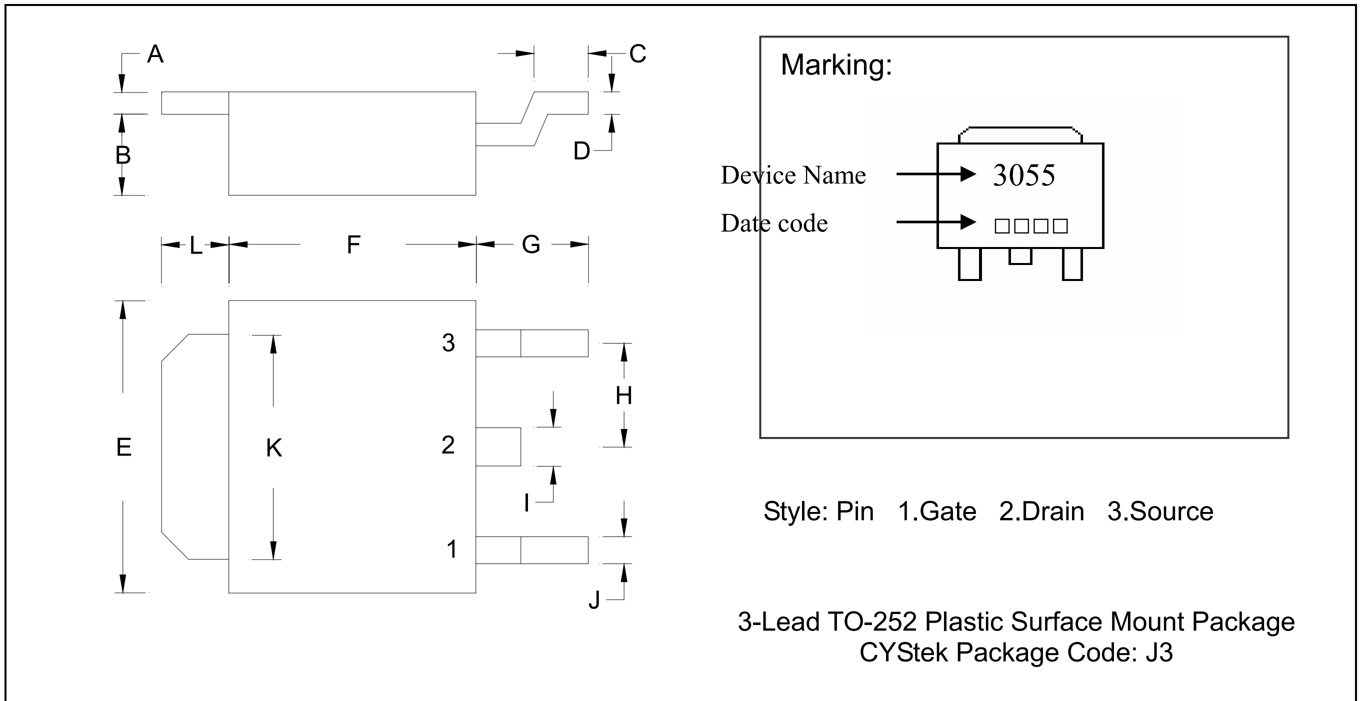
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (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 (T_L) − Time (t_L)	183°C 60-150 seconds	217°C 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-252 Dimension



*: 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	0.0866	0.1102	2.20	2.80
B	0.0650	0.0768	1.65	1.95	H	-	*0.0906	-	*2.30
C	0.0354	0.0591	0.90	1.50	I	-	0.0449	-	1.14
D	0.0177	0.0236	0.45	0.60	J	-	0.0346	-	0.88
E	0.2441	0.2677	6.20	6.80	K	0.2047	0.2165	5.20	5.50
F	0.2125	0.2283	5.40	5.80	L	0.0551	0.0630	1.40	1.60

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: KFC; pure tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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