N-Channel Logic Level Enhancement Mode Power MOSFET

MTB02N03H8

BV_{DSS}	**30V**
I_D	**75A**
$R_{DS(ON)}$@V_{GS}=10V, I_D=30A	**2.6 mΩ(typ)**
$R_{DS(ON)}$@V_{GS}=4.5V, I_D=25A	**3.5 mΩ(typ)**

Description

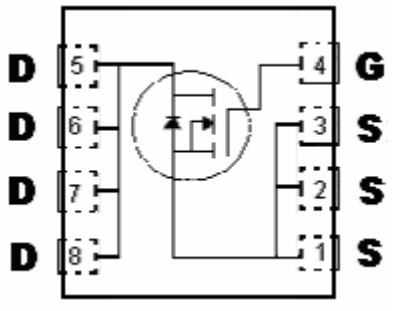
The MTB02N03H8 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness.

Features

- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- Dynamic dv/dt rating
- Repetitive Avalanche Rated
- Pb-free lead plating and Halogen-free package

Symbol

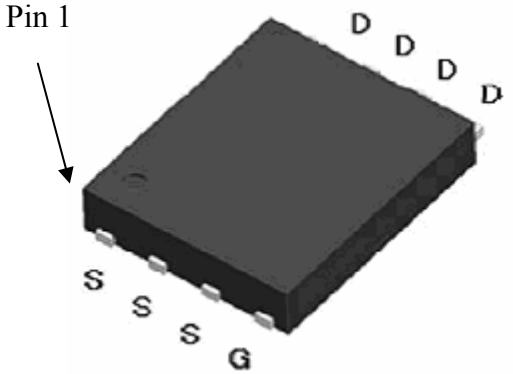
MTB02N03H8



G：Gate
D：Drain
S：Source

Outline

DFN5×6



Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @ T_C=25°C, V_{GS}=10V		I_D	75	A
Continuous Drain Current @ T_C=100°C, V_{GS}=10V			47	
Pulsed Drain Current		I_{DM}	160 *1	
Avalanche Current		I_{AS}	53	
Avalanche Energy @ L=0.1mH, I_D=53A, R_G=25Ω		E_{AS}	140	mJ
Repetitive Avalanche Energy @ L=0.05mH		E_{AR}	40 *2	
Total Power Dissipation	T_C=25℃	P_D	50	W
	T_C=100℃		20	
Operating Junction and Storage Temperature Range		Tj, Tstg	-55~+150	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	2.5	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	50 *3	°C/W

Note : 1. Pulse width limited by maximum junction temperature.
2. Duty cycle≤1%.
3. Surface mounted on 1 in² copper pad of FR-4 board, t≤10s; 125°C/W when mounted on minimum copper pad.

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	1.0	1.7	3.0	V	V_{DS} = V_{GS}, I_D=250μA
G_{FS} *1	-	32	-	S	V_{DS} =10V, I_D=20A
I_{GSS}	-	-	±100	nA	V_{GS}=±20
I_{DSS}	-	-	1	μA	V_{DS} =24V, V_{GS} =0
	-	-	25		V_{DS} =20V, V_{GS} =0, Tj=125°C
$R_{DS(ON)}$ *1	-	2.6	3	mΩ	V_{GS} =10V, I_D=30A
	-	3.5	5	mΩ	V_{GS} =4.5V, I_D=25A
Dynamic					
Ciss	-	7032	-	pF	V_{GS}=0V, V_{DS}=15V, f=1MHz
Coss	-	898	-		
Crss	-	843	-		

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

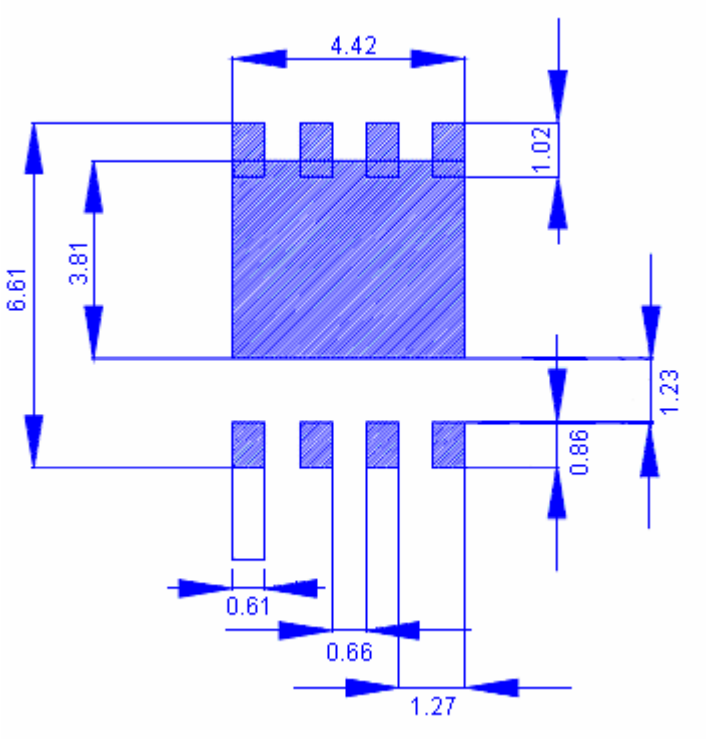
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Qg (V_{GS}=10V) *1, 2	-	80	-	nC	V_{DS}=15V, V_{GS}=10V, I_D=30A
Qg (V_{GS}=4.5V) *1, 2	-	27	-		
Qgs *1, 2	-	19	-		
Qgd *1, 2	-	38	-		
$t_{d(ON)}$ *1, 2	-	20	-	ns	V_{DS}=15V, I_D=24A, V_{GS}=10V, R_{GS}=2.7Ω
tr *1, 2	-	36	-		
$t_{d(OFF)}$ *1, 2	-	80	-		
t_f *1, 2	-	33	-		
Rg	-	1.2	-	Ω	V_{GS}=15mV, V_{DS}=0V, f=1MHz
Source-Drain Diode					
I_S *1	-	-	75	A	
I_{SM} *3	-	-	150		
V_{SD} *1	-	-	1.3	V	I_F=30A, V_{GS}=0V
trr	-	35	-	ns	I_F=I_S, dI_F/dt=100A/μs
Qrr	-	15	-	nC	

Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Ordering Information

Device	Package	Shipping
MTB02N03H8	DFN5x6 (Pb-free lead plating)	3000 pcs / Tape & Reel

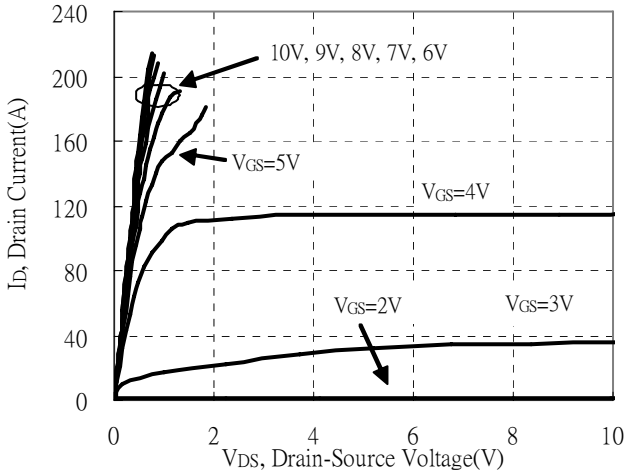
Recommended Soldering Footprint



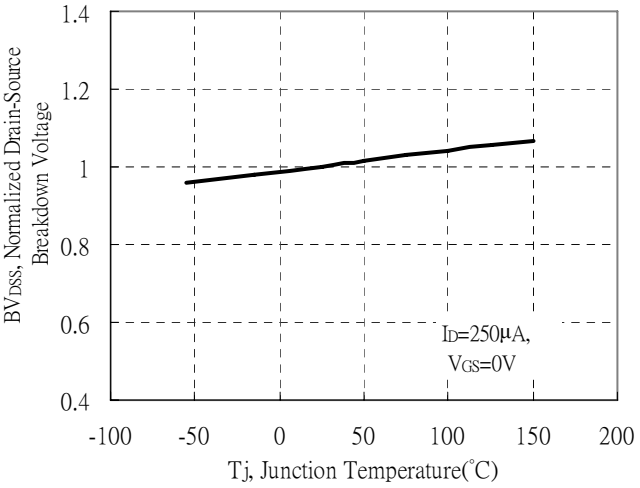
unit : mm

Typical Characteristics

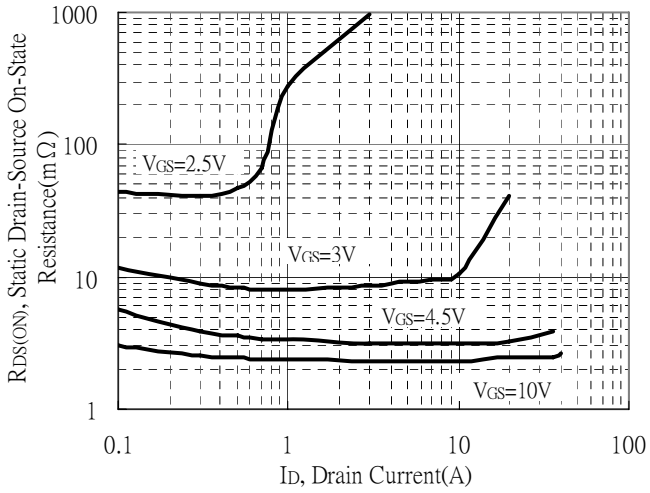
Typical Output Characteristics



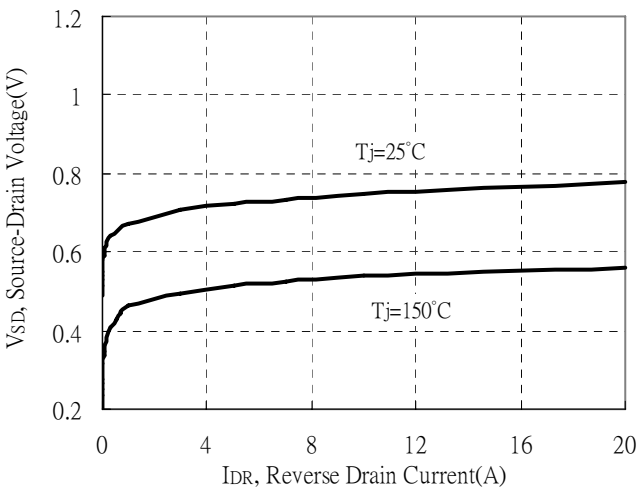
Brekdown Voltage vs Ambient Temperature



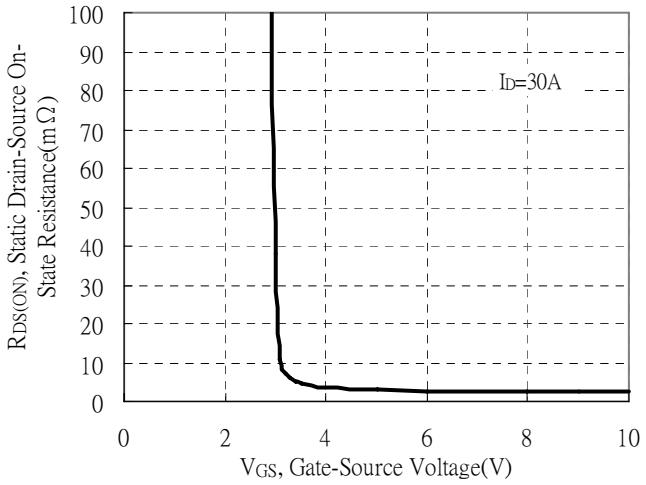
Static Drain-Source On-State resistance vs Drain Current



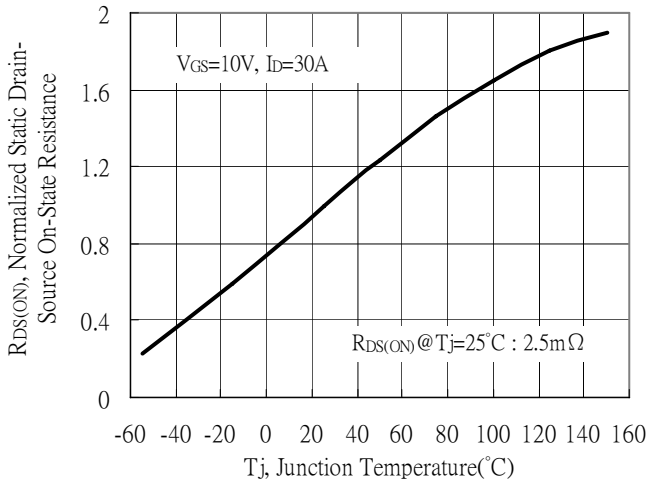
Reverse Drain Current vs Source-Drain Voltage



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

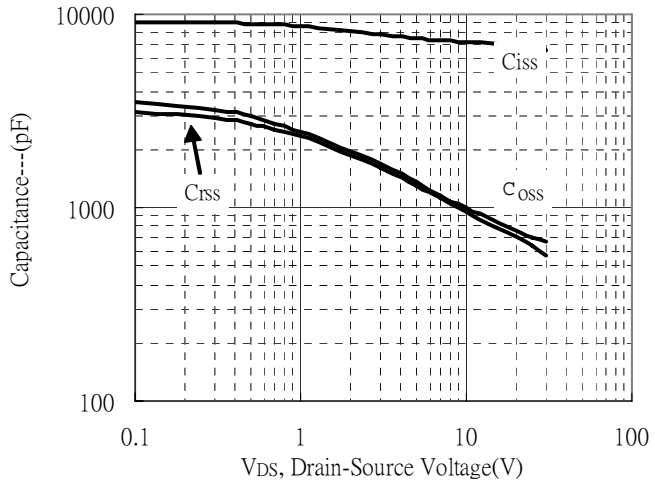


Drain-Source On-State Resistance vs Junction Tempearture

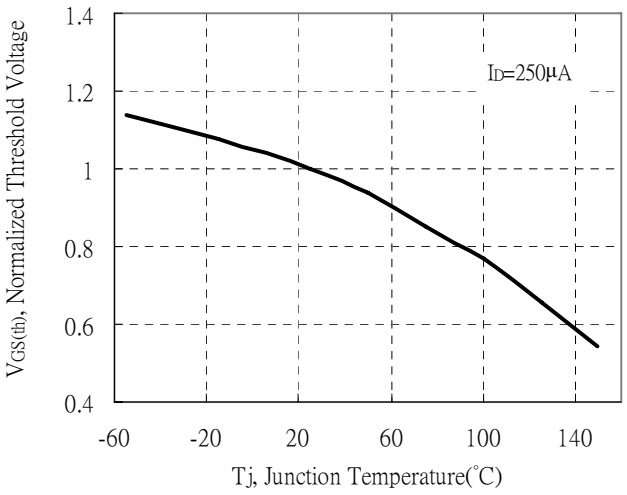


Typical Characteristics(Cont.)

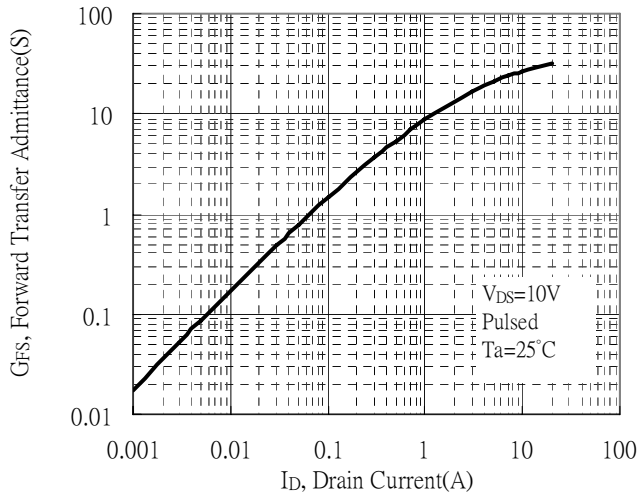
Capacitance vs Drain-to-Source Voltage



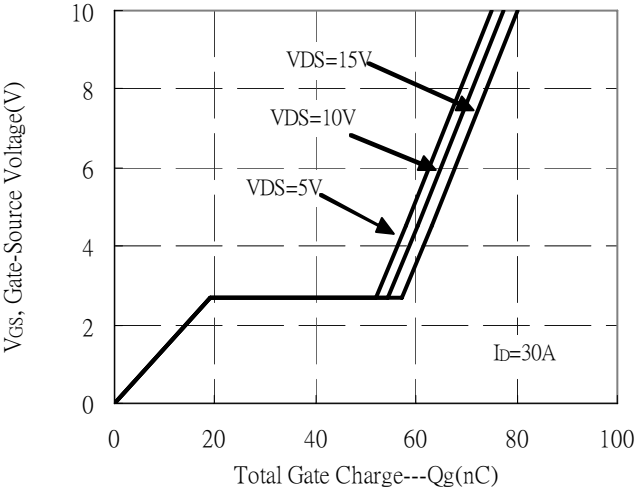
Threshold Voltage vs Junction Tempearture



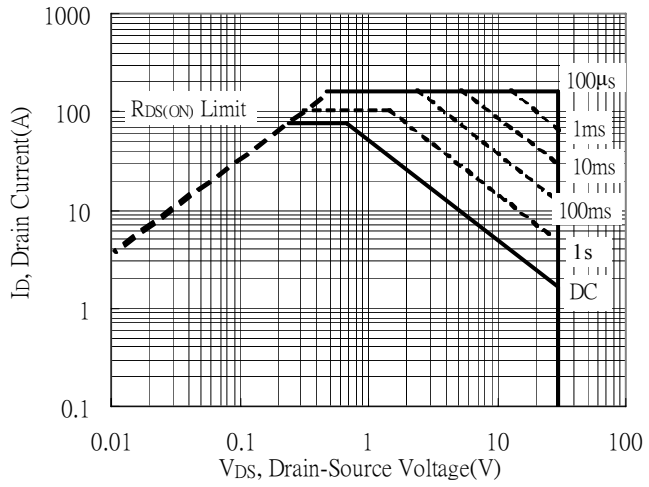
Forward Transfer Admittance vs Drain Current



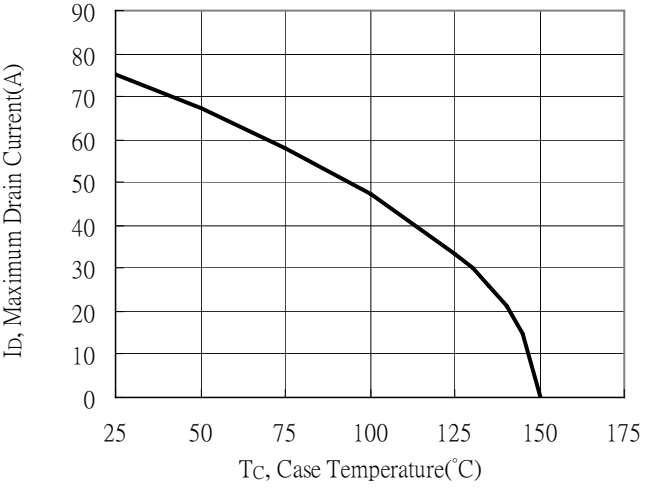
Gate Charge Characteristics



Maximum Safe Operating Area

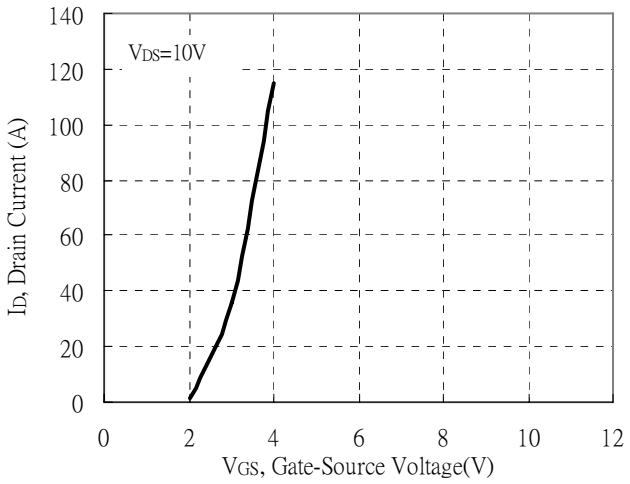


Maximum Drain Current vs Case Temperature

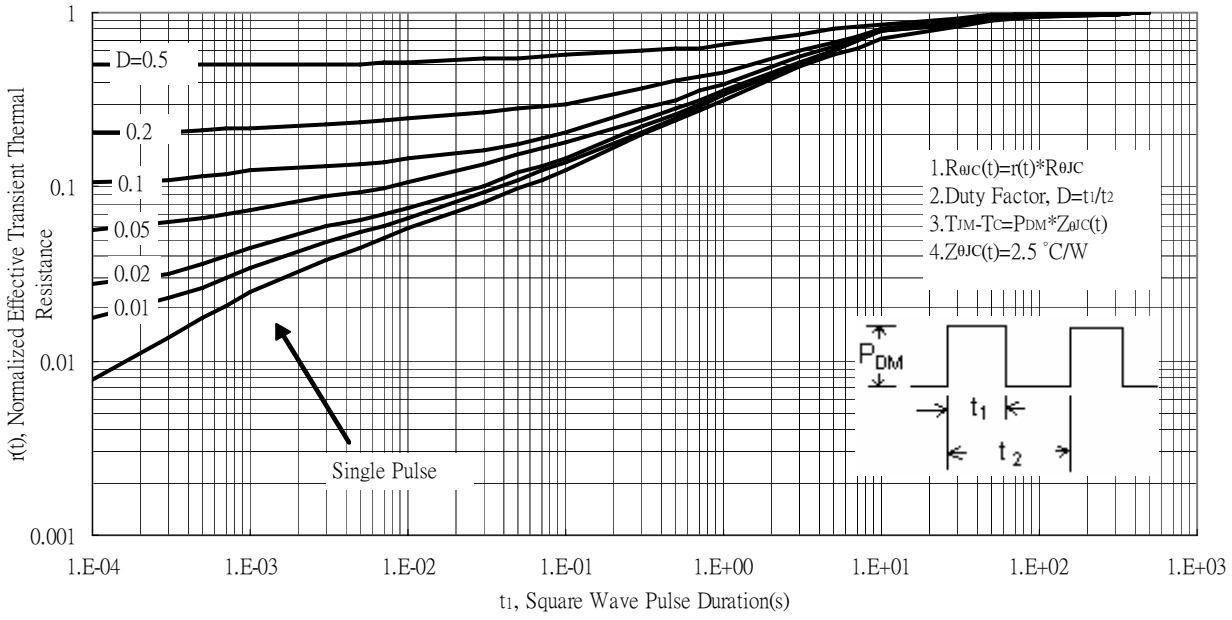


Typical Characteristics(Cont.)

Typical Transfer Characteristics



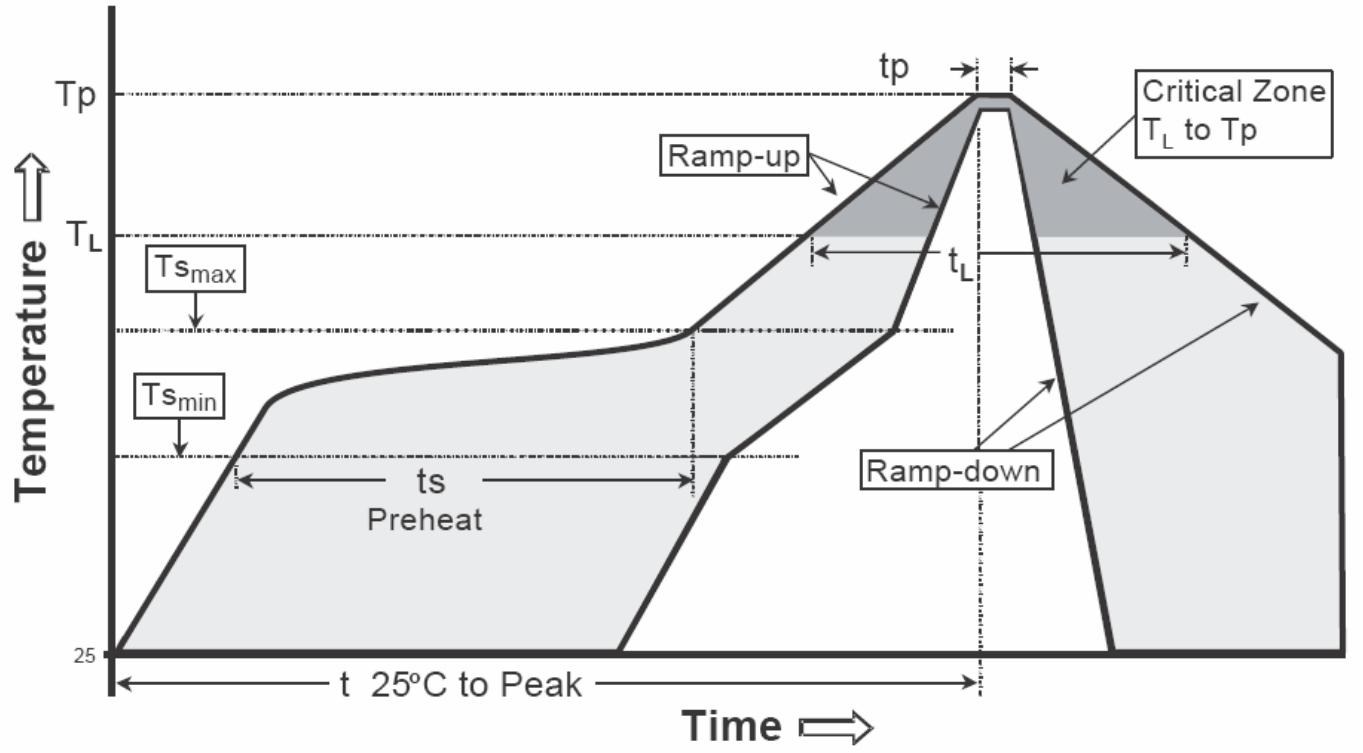
Transient Thermal Response Curves



Recommended wave soldering condition

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

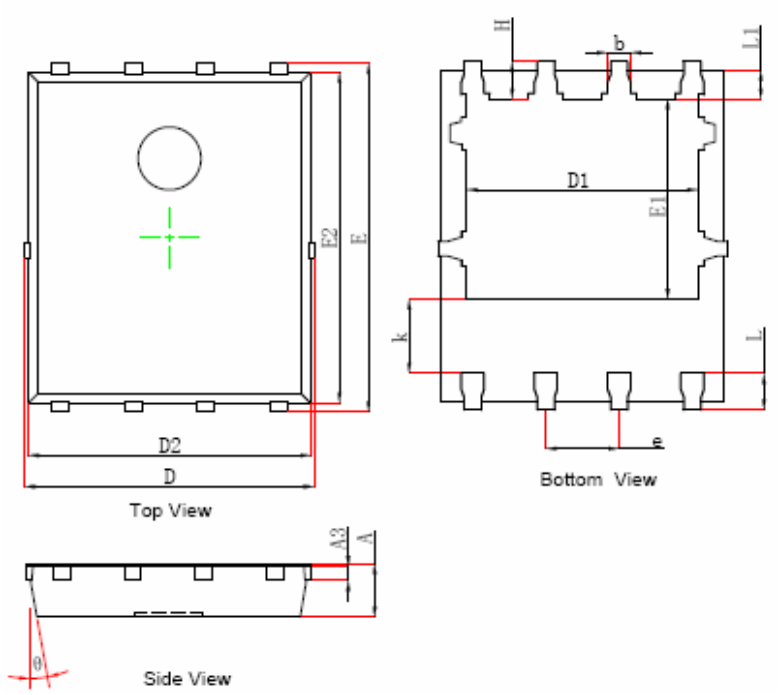
Recommended temperature profile for IR reflow

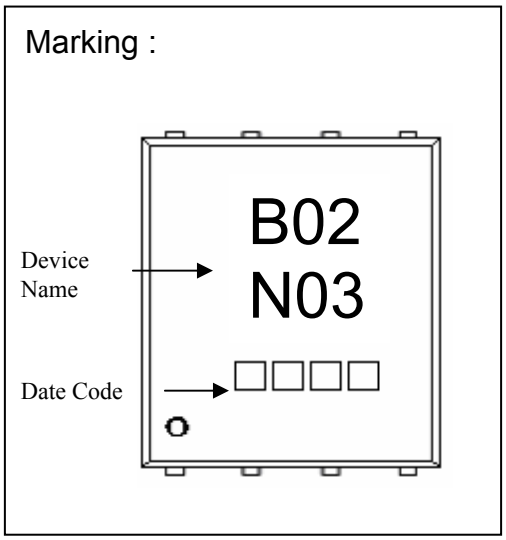


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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.

DFN5x6 Dimension (C Forming)





8-Lead DFN5x6 Plastic Package
CYS Package Code : H8

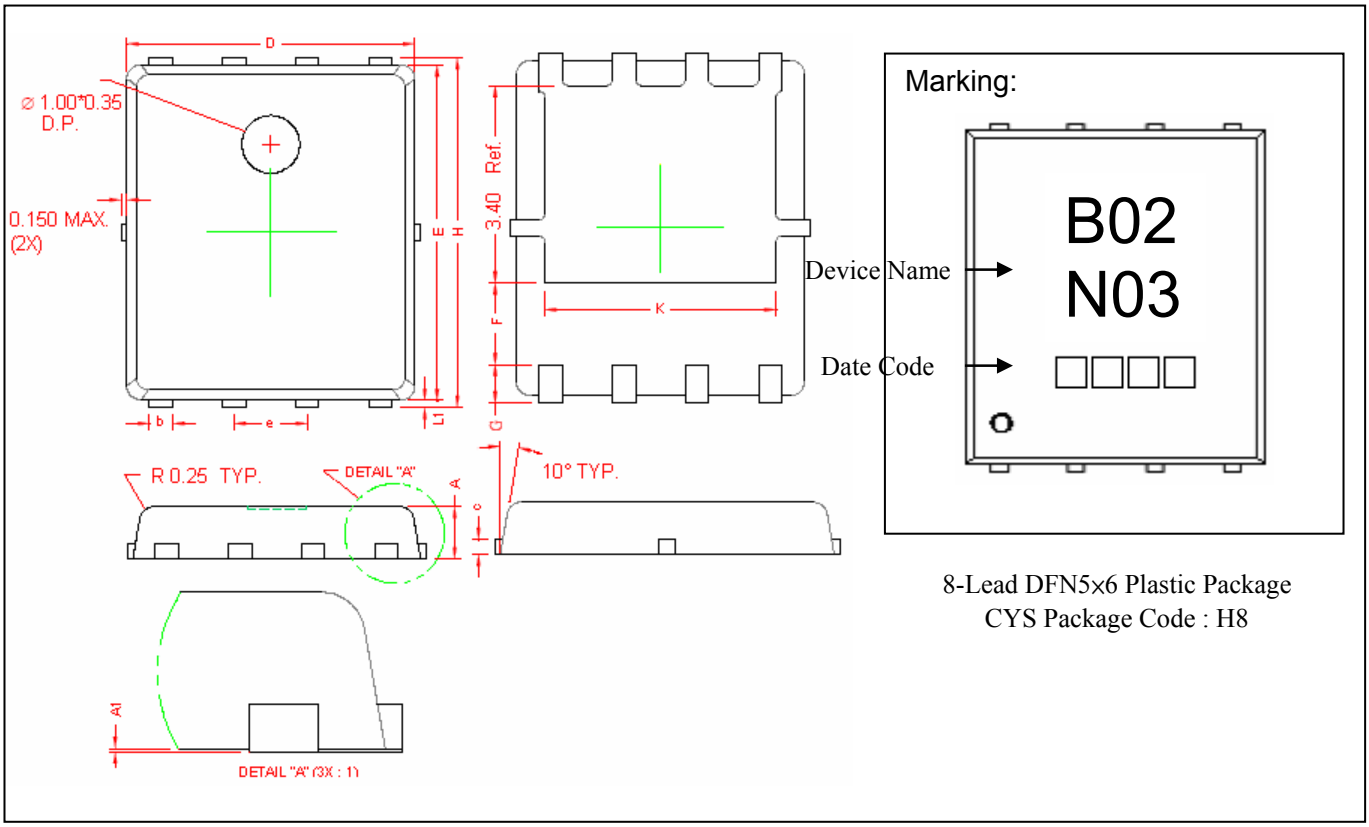
DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039	k	1.190	1.390	0.047	0.055
A3	0.254 REF		0.010 REF		b	0.350	0.450	0.014	0.018
D	4.944	5.096	0.195	0.201	e	1.270 TYP.		0.050 TYP.	
E	5.974	6.126	0.235	0.241	L	0.559	0.711	0.022	0.028
D1	3.910	4.110	0.154	0.162	L1	0.424	0.576	0.017	0.023
E1	3.375	3.575	0.133	0.141	H	0.574	0.726	0.023	0.029
D2	4.824	4.976	0.190	0.196	θ	10°	12°	10°	12°
E2	5.674	5.826	0.223	0.229					

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.

DFN5x6 Dimension (G Forming)



8-Lead DFN5x6 Plastic Package
CYS Package Code : H8

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.80	1.00	0.031	0.039	E	5.70	5.90	0.224	0.232
A1	0.00	0.05	0.000	0.002	e	1.27 BSC		0.050 BSC	
b	0.35	0.49	0.014	0.019	H	5.95	6.20	0.234	0.244
c	0.254 REF		0.010 REF		L1	0.10	0.18	0.004	0.007
D	4.90	5.10	0.193	0.201	G	0.60 REF		0.024 REF	
F	1.40 REF		0.055 REF		K	4.00 REF		0.157 REF	

Notes: 1.Controlling dimension: millimeters.
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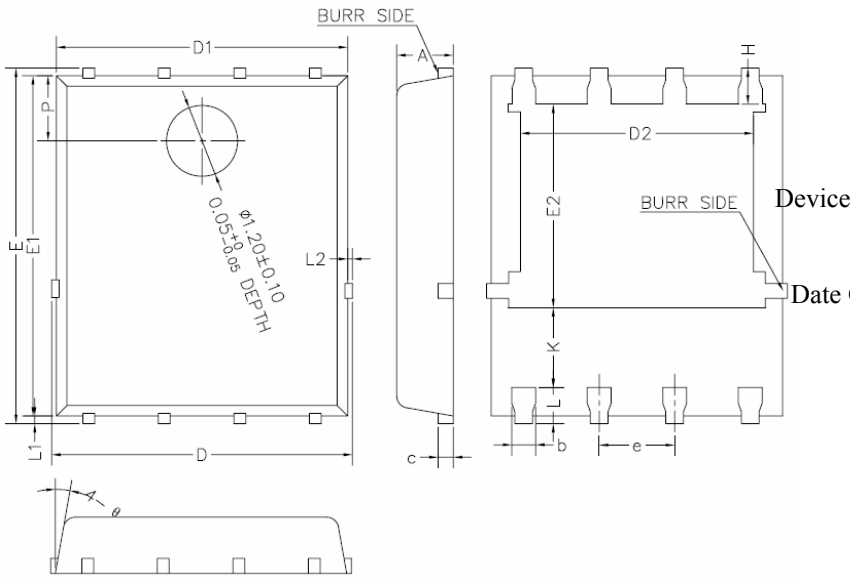
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

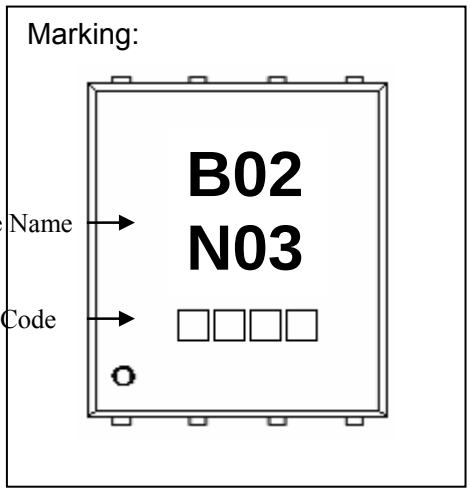
Material:

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.

DFN5x6 Dimension (N Forming)



Marking:



8-Lead DFN5x6 Plastic Package
CYS Package Code : H8

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.90	1.00	0.035	0.039	E2	3.18	3.54	0.125	0.139
b	0.35	0.45	0.014	0.018	H	0.51	0.71	0.020	0.028
c	0.21	0.34	0.008	0.013	K	1.10	-	0.043	-
D	-	5.10	-	0.201	L	0.51	0.71	0.020	0.028
D1	4.80	5.00	0.189	0.197	L1	0.06	0.20	0.002	0.008
D2	3.82	4.02	0.150	0.158	L2	-	0.10	-	0.004
e	1.17	1.37	0.046	0.054	p	1.00	1.20	0.039	0.047
E	5.90	6.10	0.232	0.240	θ	8°	12°	8°	12°
E1	5.70	5.80	0.224	0.228					

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.