

FMOSAB20N10-Q1

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FMOSAB20N10-Q1

20A 100V N-Channel Enhancement
Mode Power MOSFET

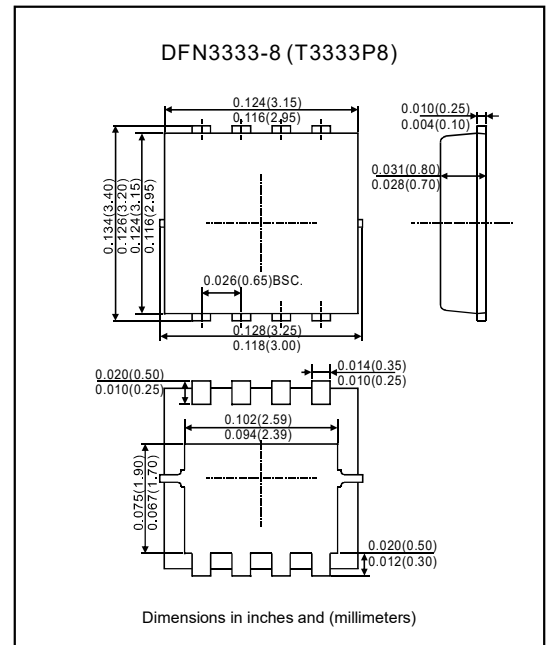
Features

- $V_{DS} = 100V$, $I_D = 20A$.
- $R_{DS(ON)} < 36m\Omega$, @ $V_{GS} = 10V$, $I_D = 10A$.
- $R_{DS(ON)} < 50m\Omega$, @ $V_{GS} = 4.5V$, $I_D = 6A$.
- Low on-resistance and low gate charge.
- 100% UIS and R_g tested.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex. FMOSAB20N10-Q1-H.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, DFN3333-8 (T3333P8).
- Mounting Position : Any.

Package outline

Maximum ratings (At $T_c = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Ratings	Units
Drain-Source voltage	V_{DS}	100	V
Gate-Source voltage	V_{GS}	± 20	V
Continuous drain current (Note1)	I_D	20	A
		12	
Pulsed drain current (Note2)	I_{DM}	79	A
Single pulsed avalanche current (Note3)	I_{AS}	17	A
Single pulsed avalanche energy (Note3)	E_{AS}	14	mJ
Power dissipation	P_D	26	W
		10.4	
Thermal resistance, Junction to ambient	$R_{\theta JA}$	80	$^\circ C/W$
Thermal resistance, Junction to case	$R_{\theta JC}$	5.8	$^\circ C/W$
Operating junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

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Electrical characteristics (At $T_J=25^{\circ}\text{C}$ unless otherwise noted)

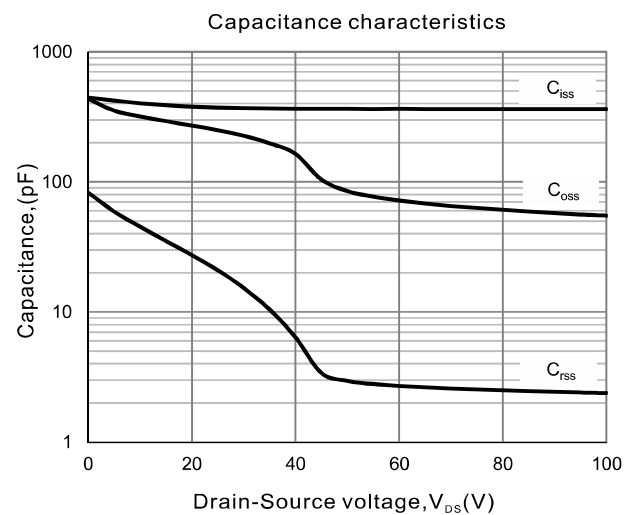
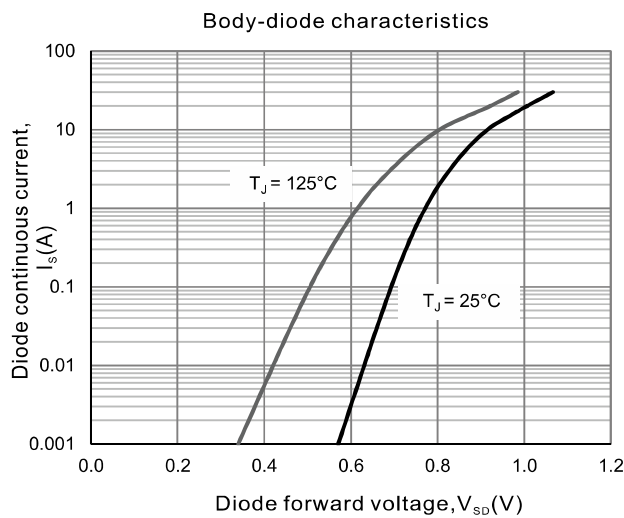
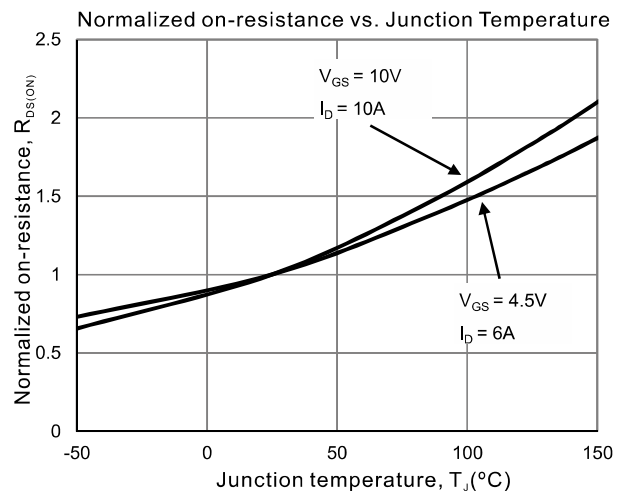
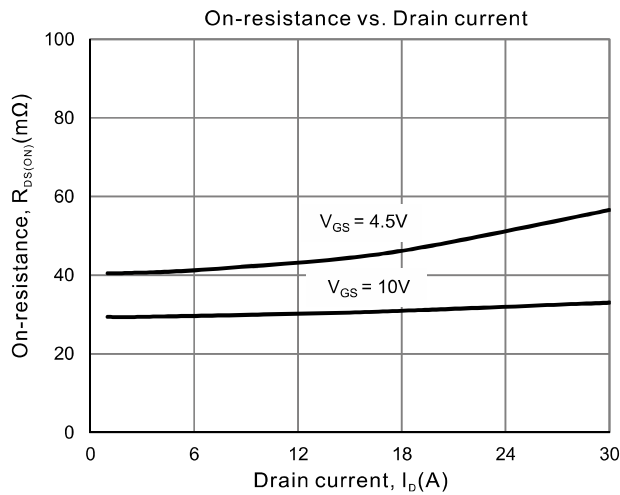
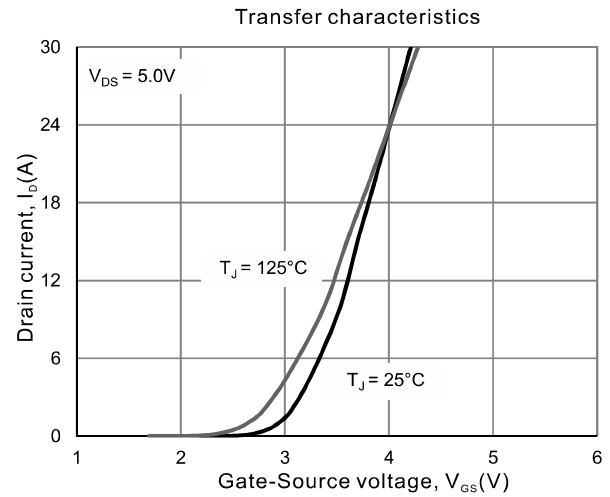
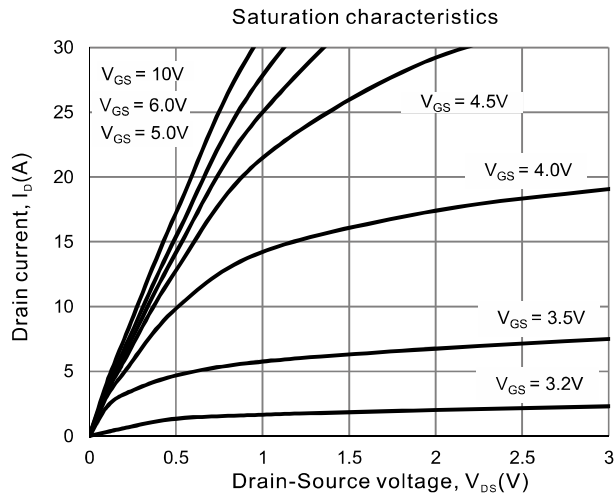
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-Source breakdown voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	100			V
Drain-Source leakage current	I _{DSS}	V _{DS} =80V, V _{GS} =0V			1.0	μA
		V _{DS} =80V, V _{GS} =0V, T _J =55°C			5.0	
Gate-Source leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
On characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.8	2.5	V
Static drain-source on-resistance	R _{DS(ON)}	V _{GS} =10V, I _D =10A		29	36	mΩ
		V _{GS} =4.5V, I _D =6A		39	50	
Forward transconductance	g _{FS}	V _{DS} =5V, I _D =10A		28		S
Dynamic characteristics (Note 5)						
Input capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V, f=1.0MHz		363		pF
Output capacitance	C _{oss}			85		
Reverse transfer capacitance	C _{rss}			3		
Gate resistance	R _g	V _{DS} =0V, V _{GS} =0V, f=1.0MHz		2.6		Ω
Switching characteristics (Note 5)						
Total gate charge	Q _g	V _{GS} =10V, V _{DS} =50V, I _D =10A		6.8		nC
		V _{GS} =4.5V, V _{DS} =50V, I _D =10A		3.7		
Gate-Source charge	Q _{gs}	V _{GS} =0 to 10V, V _{DS} =50V, I _D =10A		1		nC
Gate-Drain Charge	Q _{gd}			1.8		
Turn-on delay time	t _{d(on)}	V _{DS} =50V, V _{GS} =10V, R _L =2.5Ω, R _G =6Ω		4.9		ns
Turn-on rise time	t _r			16.6		
Turn-off delay time	t _{d(off)}			11.2		
Turn-off fall time	t _f			4.9		
Drain-Source diode characteristics and maximum ratings						
Maximum continuous Drain-Sorce forward current	I _s	T _C =25°C			26	A
Drain-Source diode forward voltage	V _{SD}	V _{GS} =0V, I _s =1A		0.7	1.0	V
Body diode reverse recovery time	t _{rr}	I _F =10A, dI _F /dt=100A/μs		33		ns
Body diode reverse recovery charge	Q _{rr}			45		nC

Notes :

1. Computed continuous current assumes the condition of $T_{J_{Max}}$ while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under $T_{J_{Max}} = 150^{\circ}\text{C}$
3. This single-pulse measurement was taken under the following condition [$L = 100\mu\text{H}$, $V_{GS} = 10\text{V}$, $V_{DS} = 50\text{V}$] while its value is limited by $T_{J_{Max}} = 150^{\circ}\text{C}$.
4. The power dissipation P_D is based on $T_{J_{Max}} = 150^{\circ}\text{C}$.
5. This value is guaranteed by design hence it is not included in the production test.

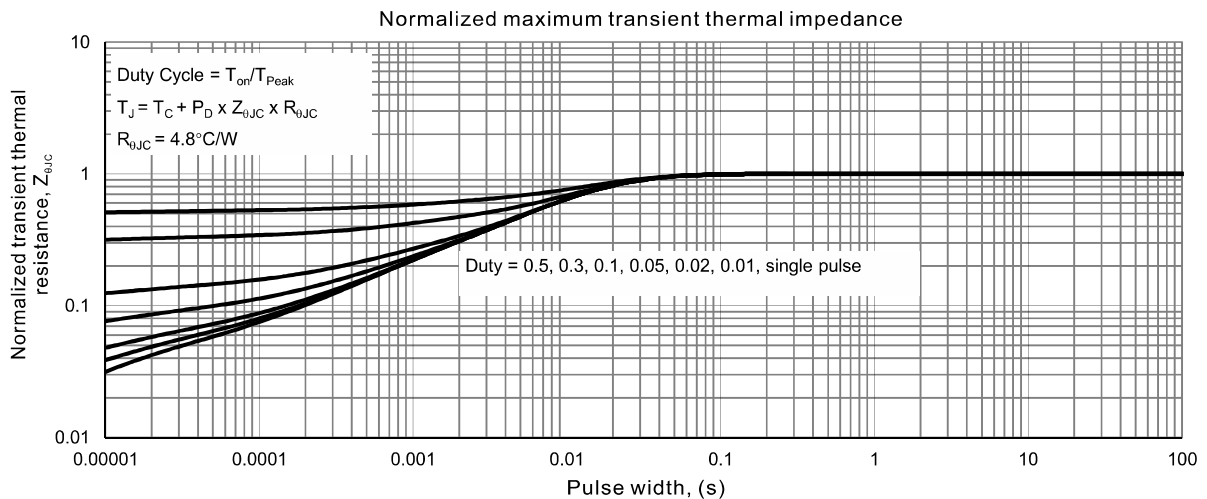
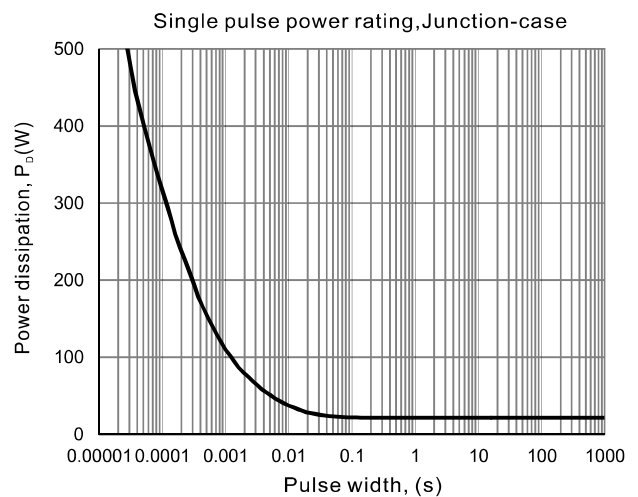
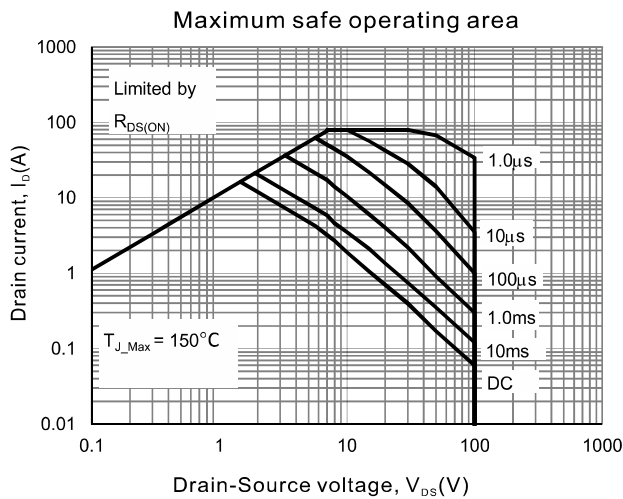
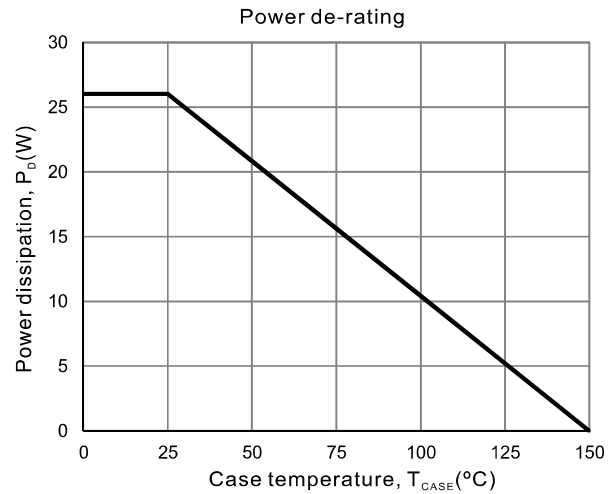
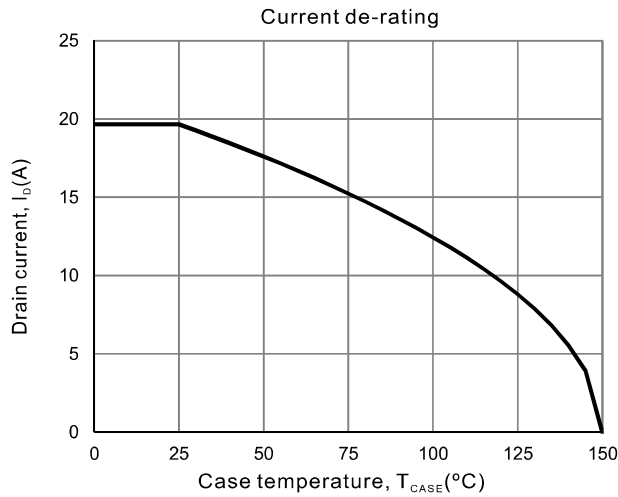
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Rating and characteristic curves



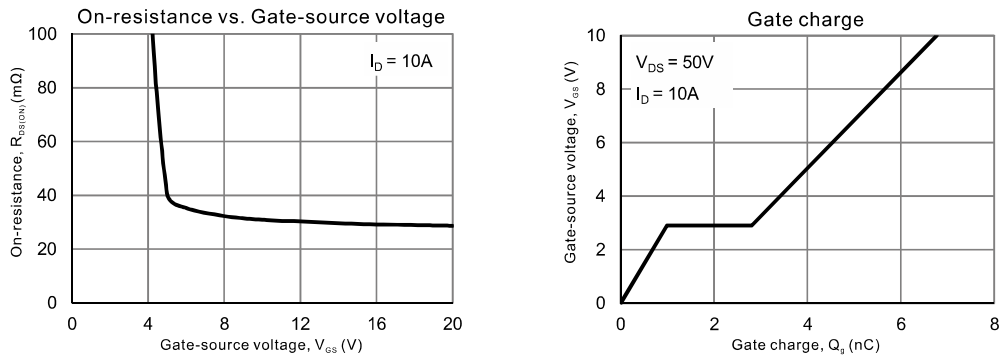
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Rating and characteristic curves



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Rating and characteristic curves



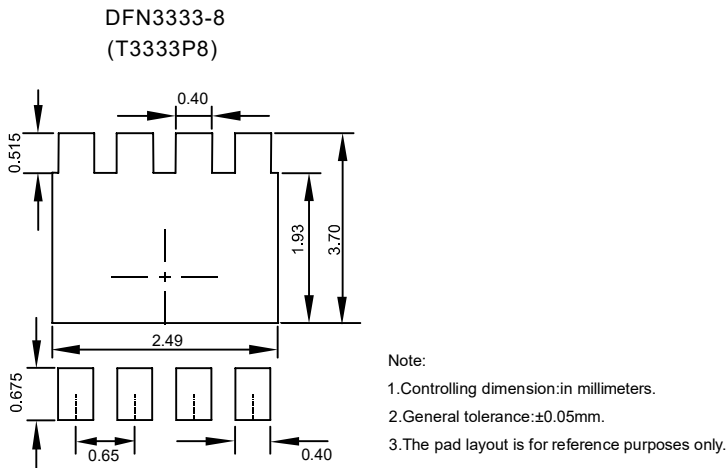
Pinning information

Pin	Simplified outline	Symbol
Pin 1, 2, 3 Source Pin 4 Gate Pin 5, 6, 7, 8 Drain		

Marking

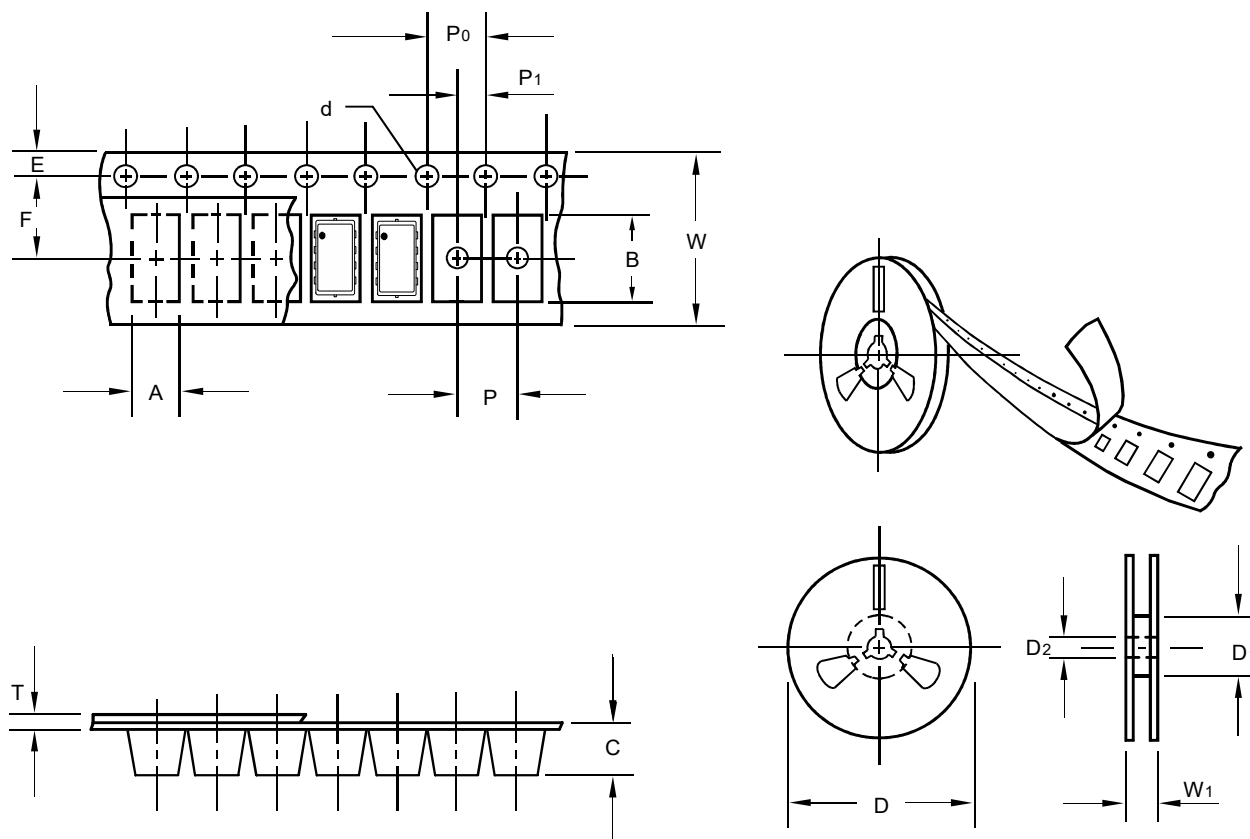
Type number	Marking code
FMOSAB20N10-Q1	SL1040AQ

Suggested solder pad layout



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Packing information



unit:mm

Item	Symbol	Tolerance	DFN3333-8 (T3333P8)
Carrier width	A	0.1	3.55
Carrier length	B	0.1	3.55
Carrier depth	C	0.1	1.10
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D ₁	min	100.00
7" Reel outside diameter	D	2.0	-
7" Reel inner diameter	D ₁	min	-
Feed hole diameter	D ₂	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	5.50
Punch hole pitch	P	0.1	8.00
Sprocket hole pitch	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	12.00
Reel width	W ₁	1.0	17.60

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

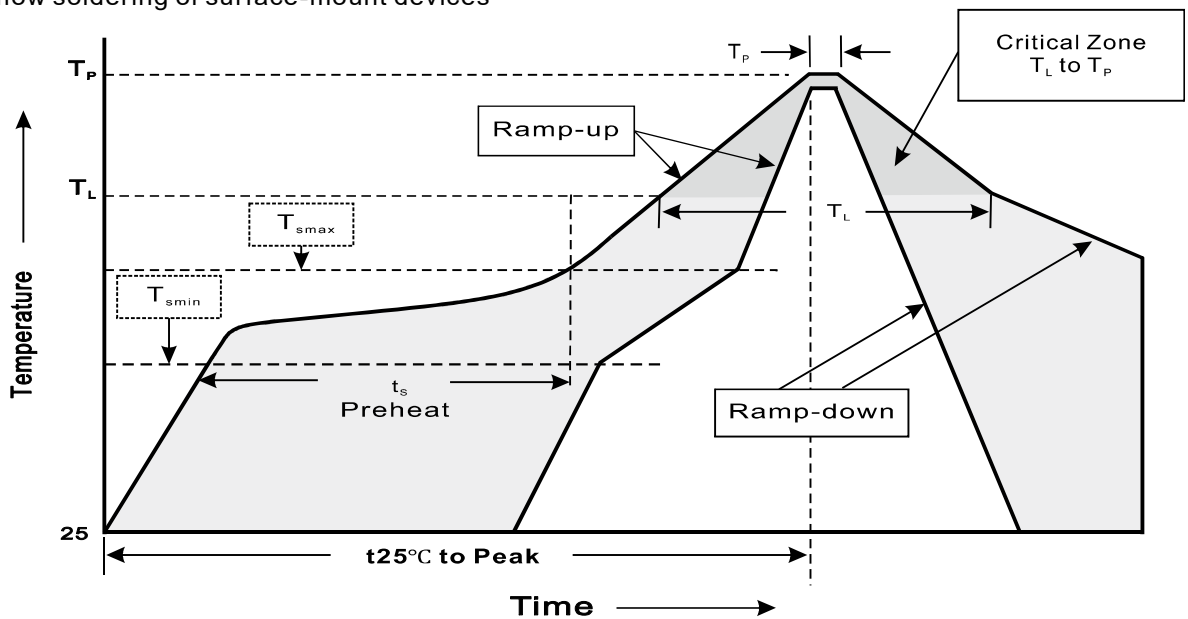
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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)
DFN3333-8 (T3333P8)	13"	5,000	8.0	10,000	355*335*38	330	350*330*360	80,000

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



- 3.Reflow soldering

Profile feature	Soldering Condition
Average ramp-up rate (T_L to T_p)	< 3°C/sec
Preheat -Temperature Min (T_{smin}) -Temperature Max (T_{smax}) -Time (min to max) (t_s)	150°C 200°C 60 ~ 120sec
T_{smax} to T_L -Ramp-up rate	< 3°C/sec
Time maintained above: -Temperature (T_L) -Time(T_L)	217°C 60 ~ 260 sec
Peak Temperature(T_p)	255°C -0/+5°C
Time within 5°C of actual peak Temperature(T_p)	10 ~ 30sec
Ramp-down rate	< 6°C/sec
Time 25°C to peak temperature	< 6 minutes