

Dual Asymmetric N-Channel Enhancement Mode MOSFET

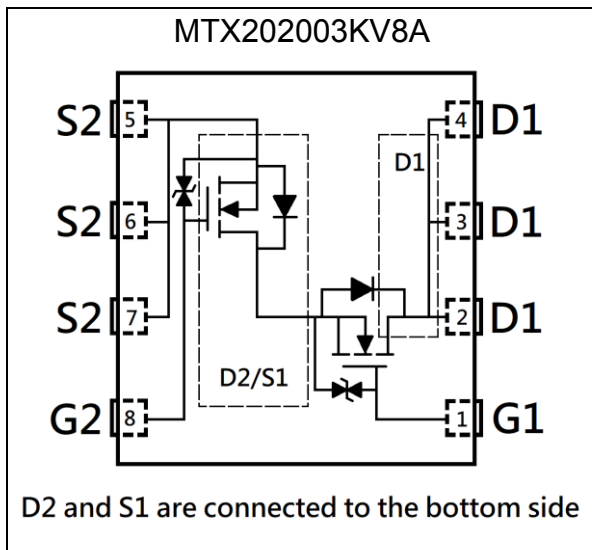
MTX202003KV8A

Features

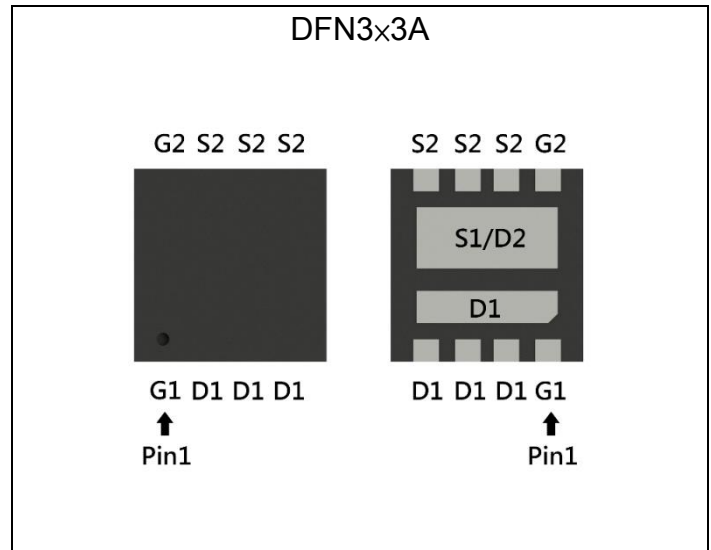
- Low Gate Charge
- Fast Switching Characteristic
- ESD protected gate

	Q1	Q2
BV_{DSS}	30V	30V
$I_D@V_{GS}=10V, T_C=25^\circ C$	18A	17.5A
$I_D@V_{GS}=10V, T_A=25^\circ C$	7.2A	7A
$R_{DS(ON) typ. @ V_{GS}=10V, I_D=6A}$	13mΩ	13mΩ
$R_{DS(ON) typ. @ V_{GS}=4.5V, I_D=4A}$	18mΩ	18mΩ

Equivalent Circuit

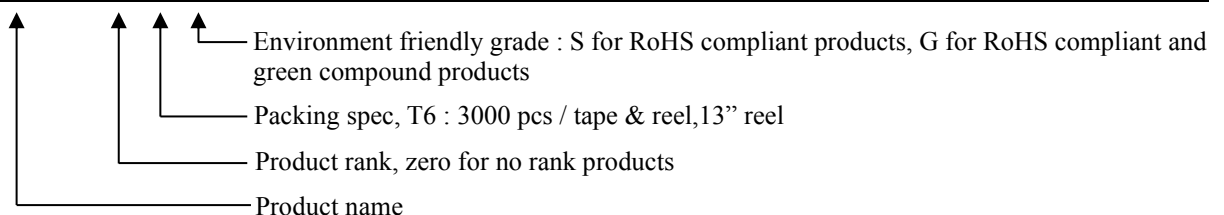


Outline



Ordering Information

Device	Package	Shipping
MTX202003KV8A-0-T6-G	DFN3x3A (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel





Absolute Maximum Ratings (TA=25°C)

Parameter	Symbol	Limits		Unit	
		Q1	Q2		
Drain-Source Voltage	V _{DS}	30	30	V	
Gate-Source Voltage	V _{GS}	±20	±20		
Continuous Drain Current @ V _{GS} =10V, T _C =25°C	*a	I _D	18	17.5	A
Continuous Drain Current @ V _{GS} =10V, T _C =100°C	*a		11.5	11	
Continuous Drain Current @ V _{GS} =10V, T _A =25°C	*b		7.2	7	
Continuous Drain Current @ V _{GS} =10V, T _A =70°C	*b		5.8	5.6	
Pulsed Drain Current	*c	I _{DM}	72	70	
Continuous Body Diode Forward Current @ T _C =25°C	*a	I _S	8	8	
Pulsed Body Diode Forward Current @ T _C =25°C	*a	I _{SM}	32	32	
Avalanche Current @ L=0.1mH		I _{AS}	10	10	
Avalanche Energy @ L=0.5mH		E _{AS}	6.3	6.3	mJ
Total Power Dissipation	T _C =25°C	P _D	10.4	9.6	W
	T _C =100°C		4.2	3.8	
	T _A =25°C		1.6	1.6	
	T _A =70°C		1	1	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55~+150		°C	

Thermal Data

Parameter	Symbol	Steady State		Unit
Thermal Resistance, Junction-to-case	R _{θJC}	12	13	°C/W
Thermal Resistance, Junction-to-ambient	*b R _{θJA}	76	80	

Note:

- *a. The power dissipation P_D is based on T_{J(MAX)}=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- *b. The value of R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The power dissipation P_D is based on R_{θJA} and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
- *c. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.



Q1/Q2 Electrical Characteristics (T_A=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	30	-	-	V	V _{GS} =0V, I _D =250μA
V _{GS(th)}	1	-	2.5		V _{DS} =V _{GS} , I _D =250μA
G _{FS}	-	3.6	-	S	V _{DS} =10V, I _D =1A
I _{GSS}	-	-	±10	μA	V _{GS} =±16V, V _{DS} =0V
I _{DSS}	-	-	1		V _{DS} =24V, V _{GS} =0V
R _{DS(ON)}	-	13	17	mΩ	V _{GS} =10V, I _D =6A
	-	18	25		V _{GS} =4.5V, I _D =4A
Dynamic					
C _{iss}	-	450	-	pF	V _{DS} =15V, V _{GS} =0V, f=1MHz
C _{oss}	-	80	-		
C _{rss}	-	60	-		
R _g	-	9	-	Ω	f=1MHz
Q _g *1, 2	-	5.4	-	nC	V _{DS} =15V, I _D =4A, V _{GS} =4.5V
Q _g *1, 2	-	11	-		V _{DS} =15V, I _D =4A, V _{GS} =10V
Q _{gs} *1, 2	-	1.5	-		
Q _{gd} *1, 2	-	2.5	-		
t _{d(ON)} *1, 2	-	6	-	ns	V _{DS} =15V, I _D =1A, V _{GS} =10V, R _{GS} =1Ω
t _r *1, 2	-	17	-		
t _{d(OFF)} *1, 2	-	32	-		
t _f *1, 2	-	11	-		
Source-Drain Diode					
V _{SD} *1	-	0.85	1.2	V	I _S =6A, V _{GS} =0V
t _{rr}	-	9	-	ns	I _F =2.3A, dI _F /dt=100A/μs
Q _{rr}	-	3.8	-	nC	

Note:

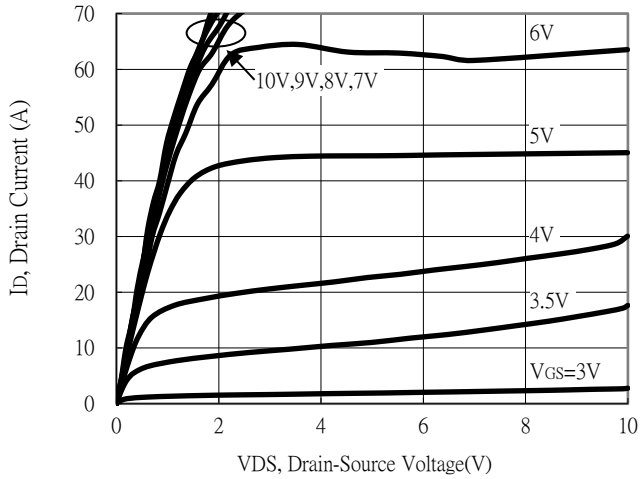
*1. Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

*2. Independent of operating temperature

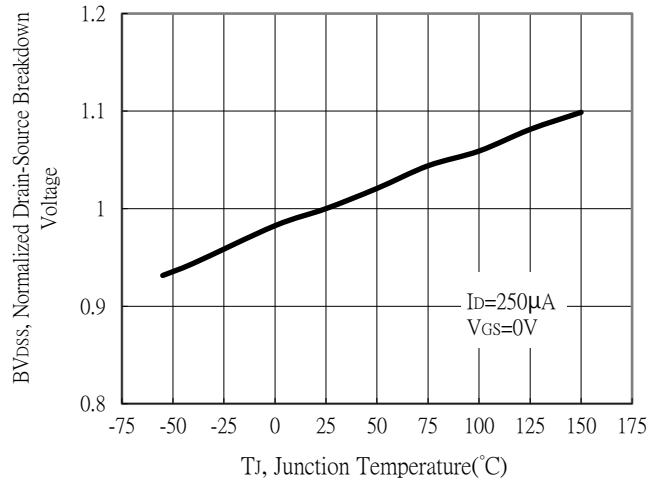


Typical Characteristics : Q1(N-channel)

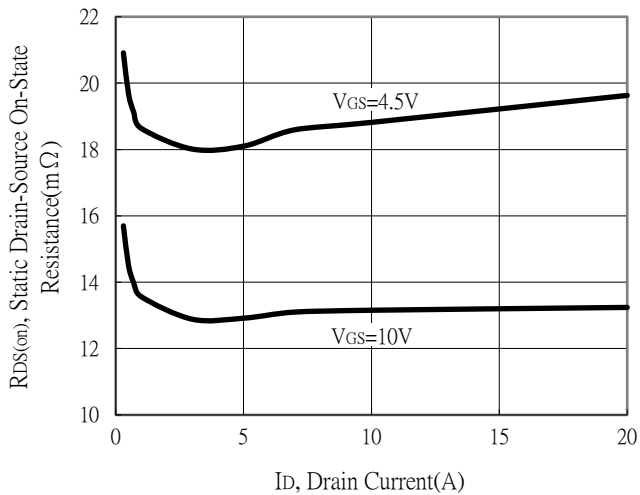
Typical Output Characteristics



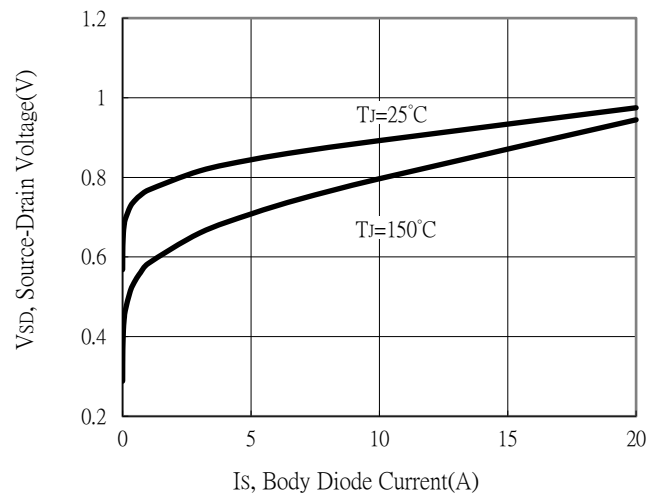
Breakdown Voltage vs Junction Temperature



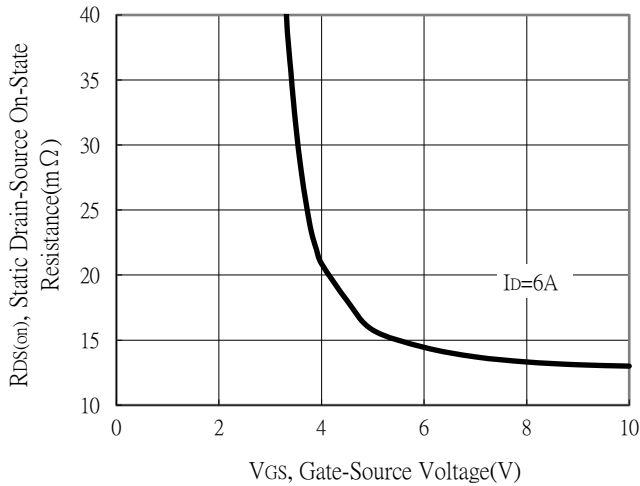
Static Drain-Source On-State resistance vs Drain Current



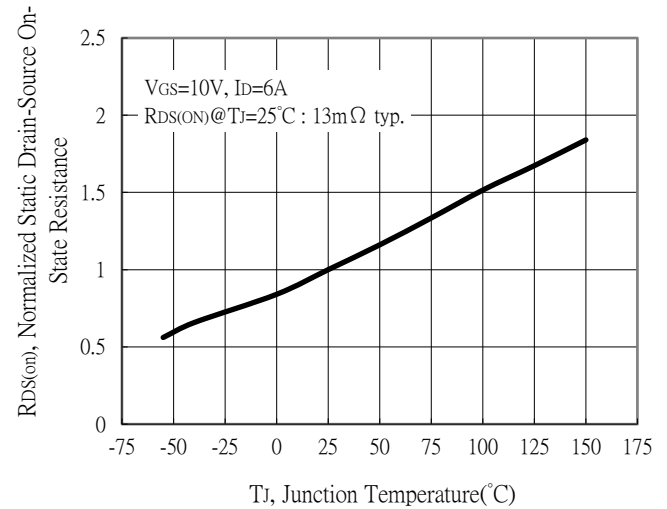
Body Diode Current vs Source-Drain Voltage



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

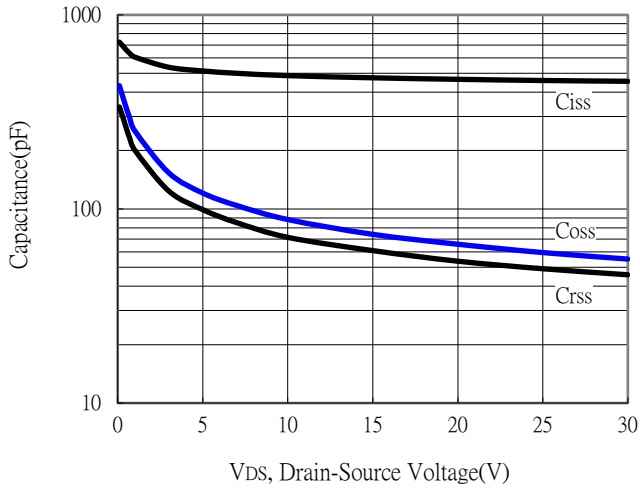


Drain-Source On-State Resistance vs Junction Temperature

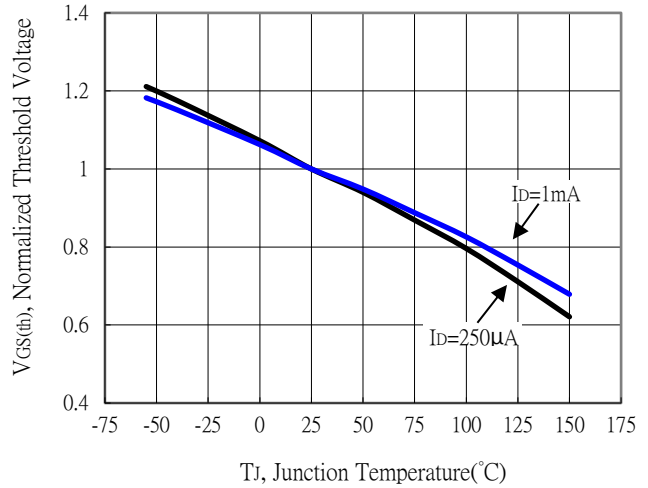


Typical Characteristics (Cont.) : Q1(N-channel)

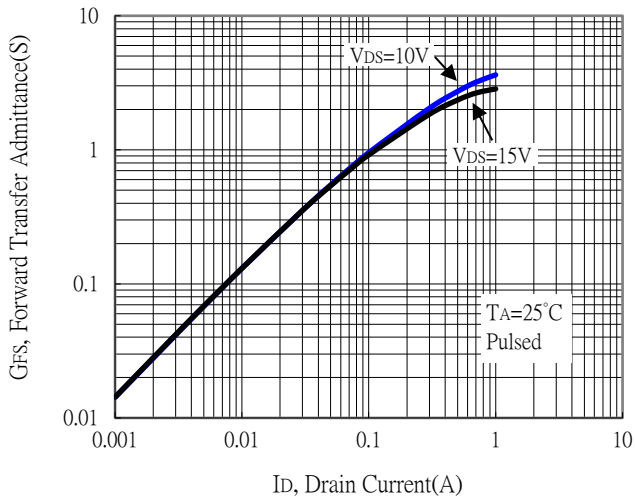
Capacitance vs Drain-to-Source Voltage



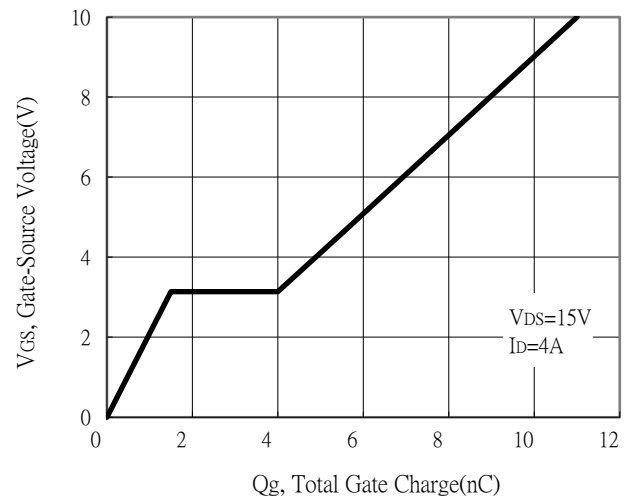
Threshold Voltage vs Junction Temperature



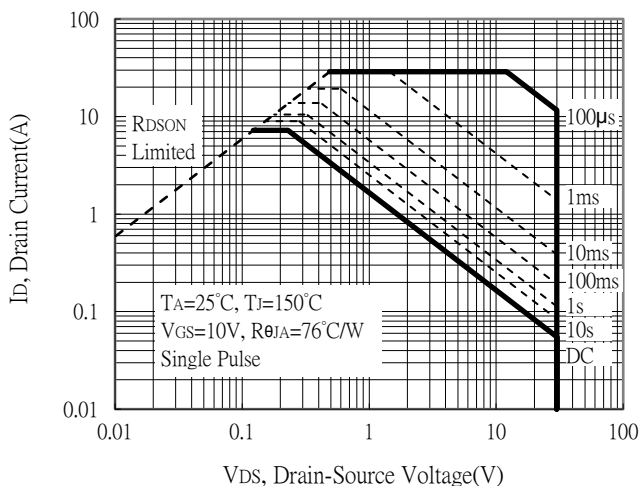
Forward Transfer Admittance vs Drain Current



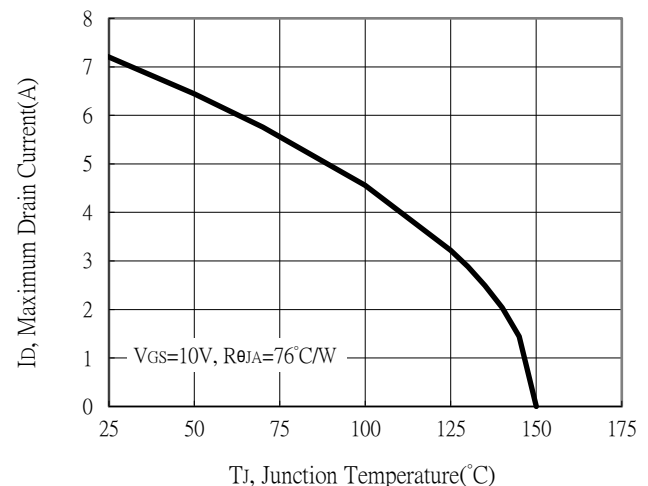
Gate Charge Characteristics



Maximum Safe Operating Area



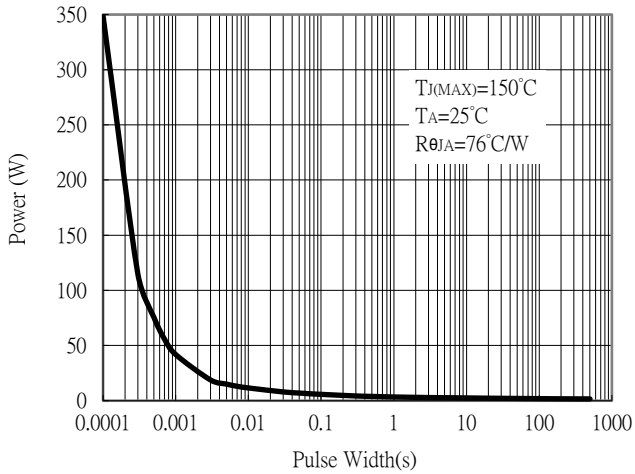
Maximum Drain Current vs Junction Temperature



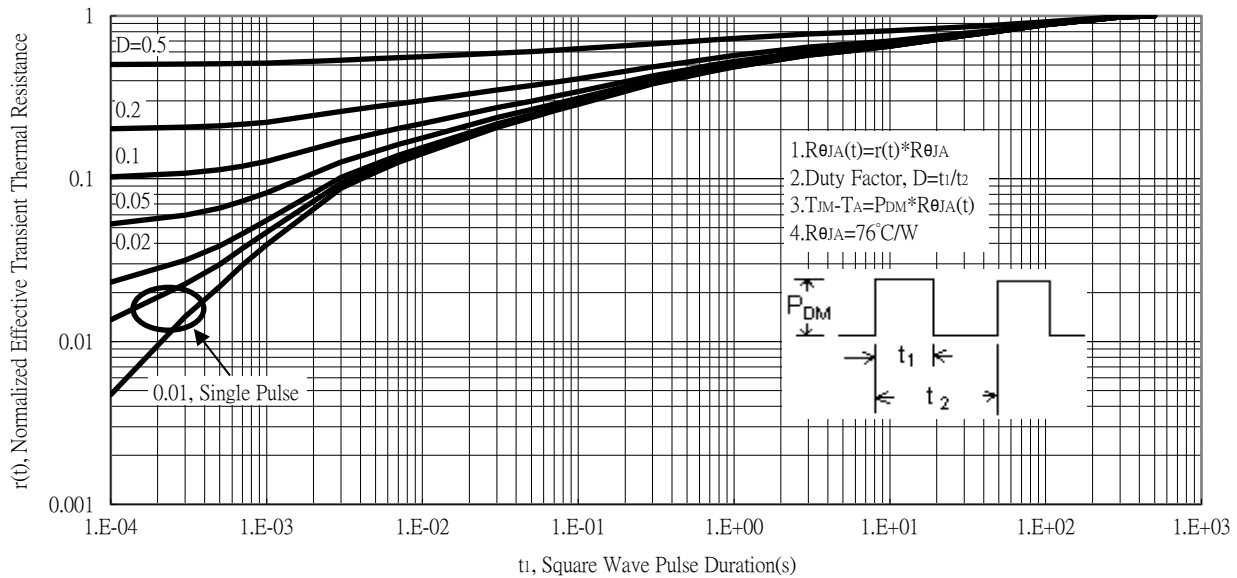


Typical Characteristics (Cont.) : Q1(N-channel)

Single Pulse Power Rating, Junction to Ambient



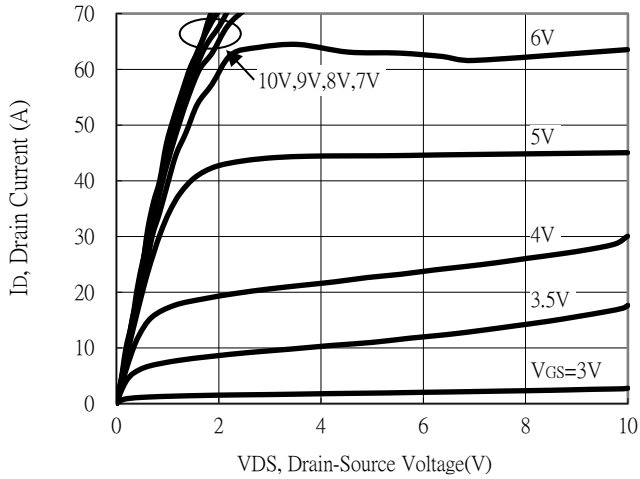
Transient Thermal Response Curves



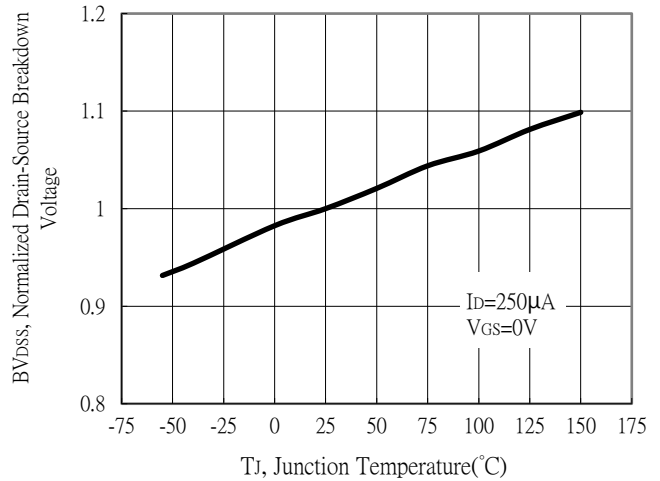


Typical Characteristics : Q2(N-channel)

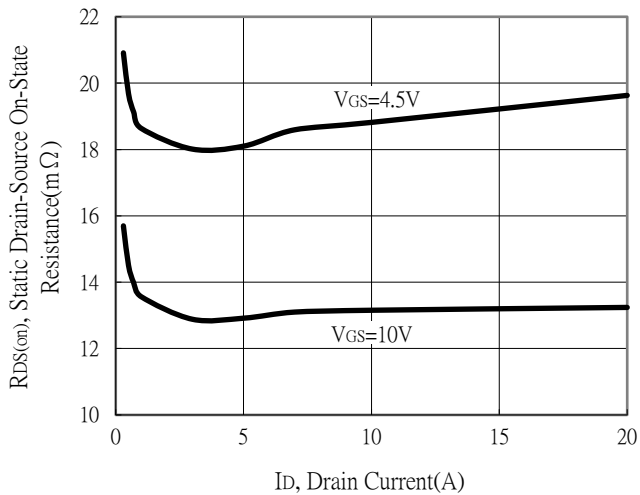
Typical Output Characteristics



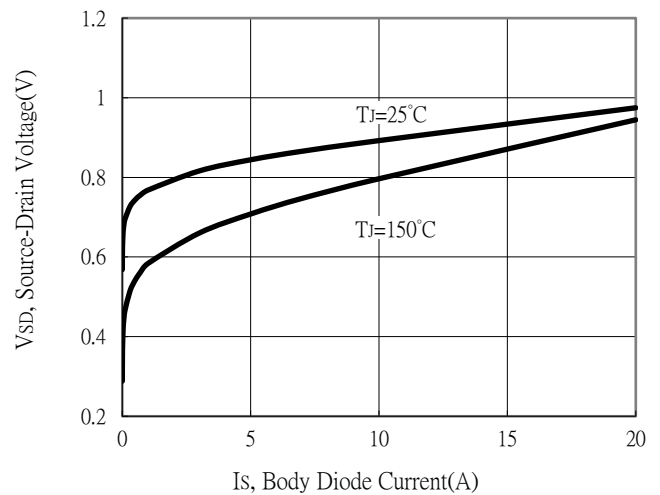
Breakdown Voltage vs Junction Temperature



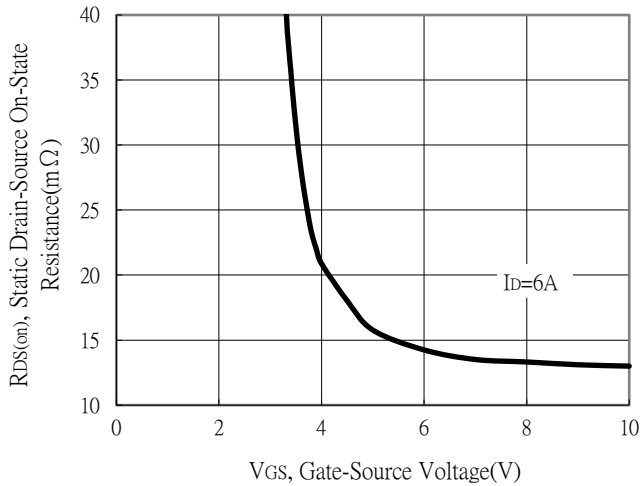
Static Drain-Source On-State resistance vs Drain Current



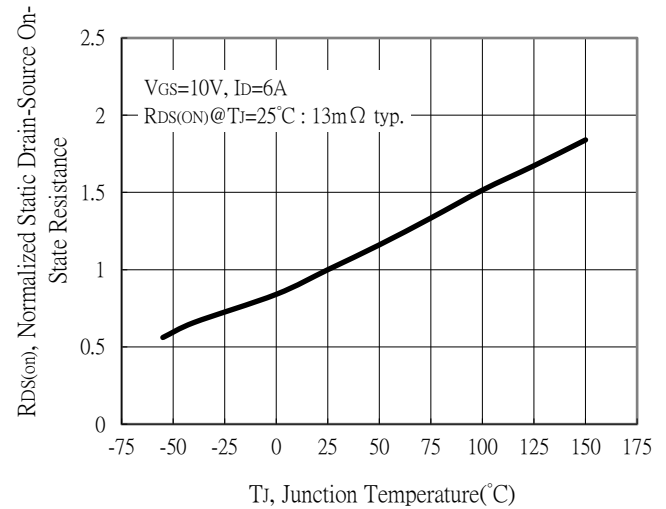
Body Diode Current vs Source-Drain Voltage



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

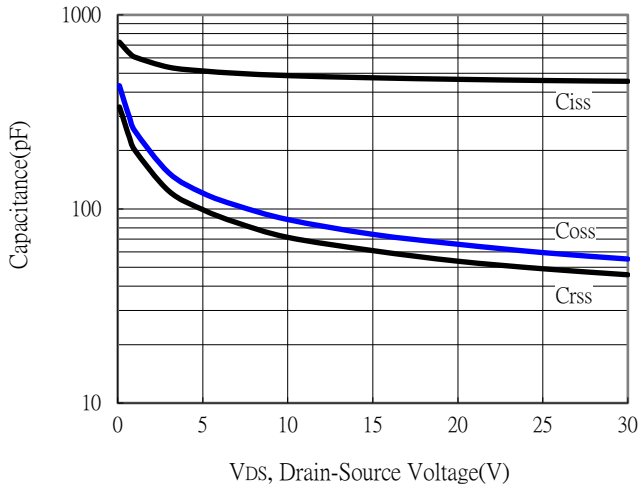


Drain-Source On-State Resistance vs Junction Temperature

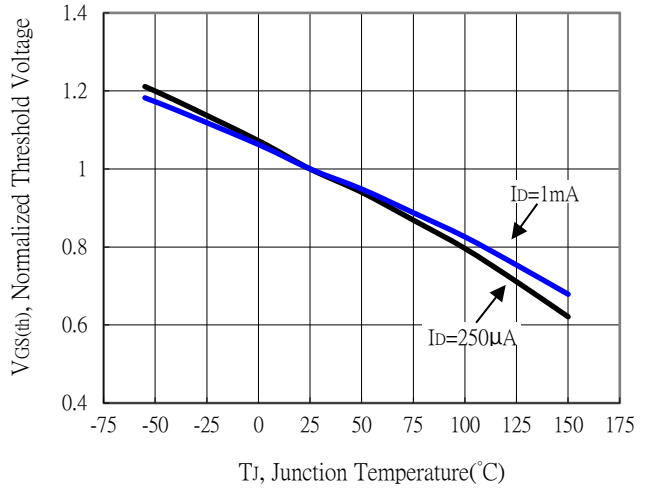


Typical Characteristics (Cont.) : Q2(N-channel)

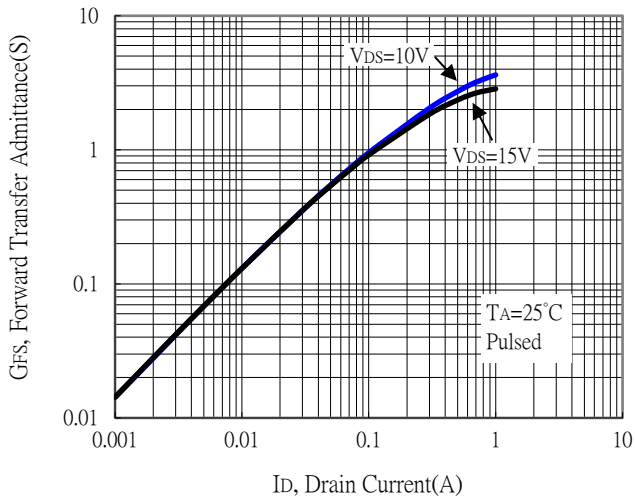
Capacitance vs Drain-to-Source Voltage



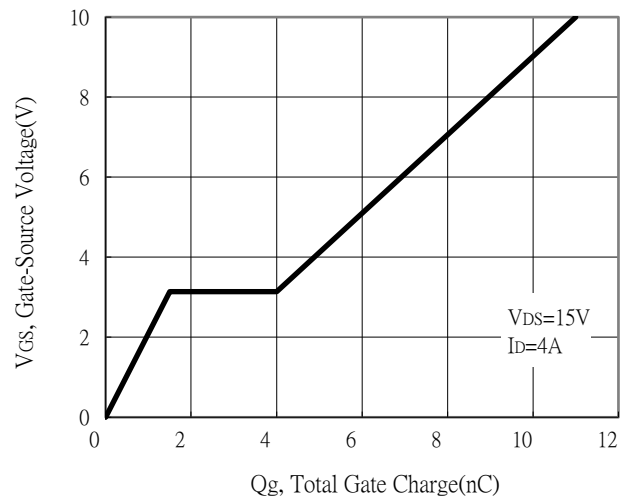
Threshold Voltage vs Junction Temperature



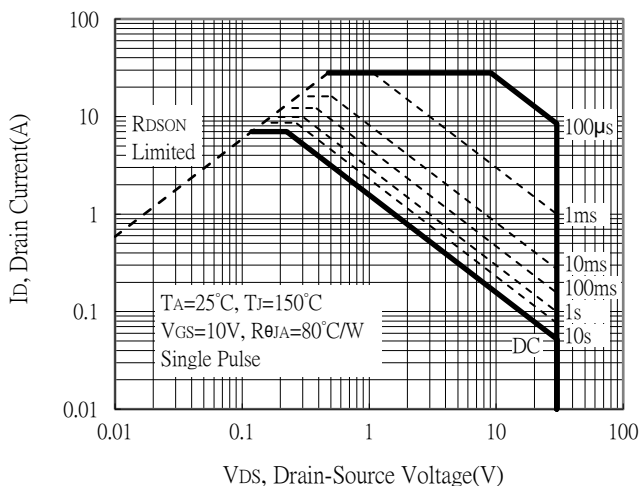
Forward Transfer Admittance vs Drain Current



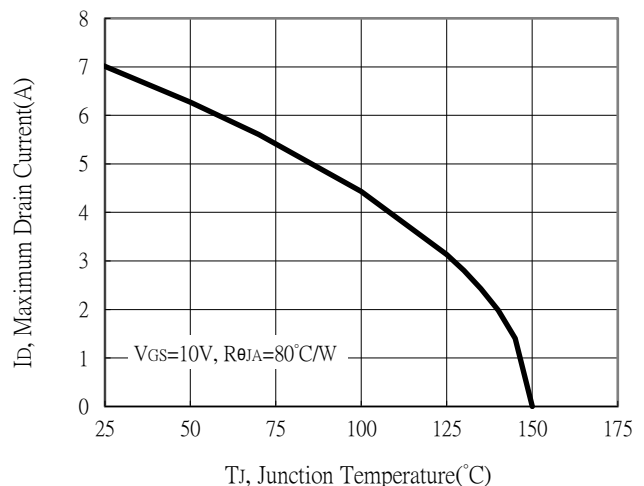
Gate Charge Characteristics



Maximum Safe Operating Area

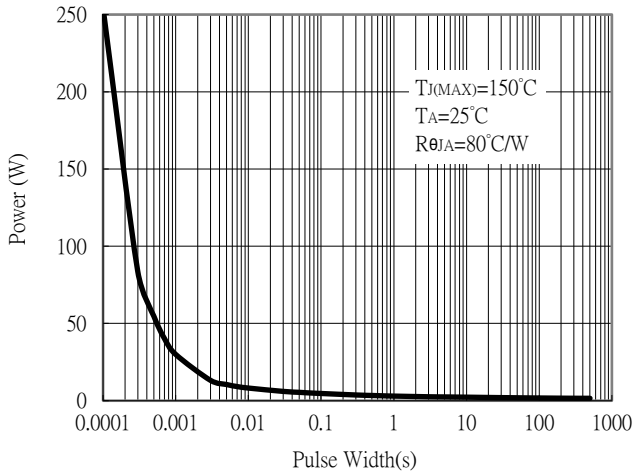


Maximum Drain Current vs Junction Temperature

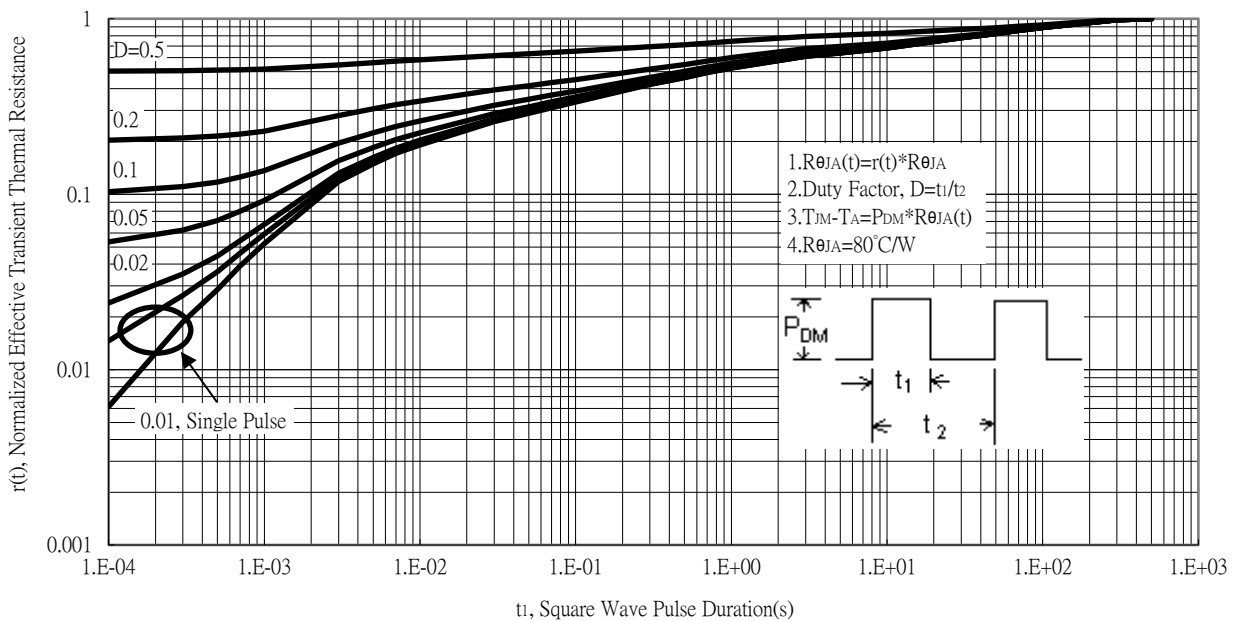


Typical Characteristics (Cont.) : Q2(N-channel)

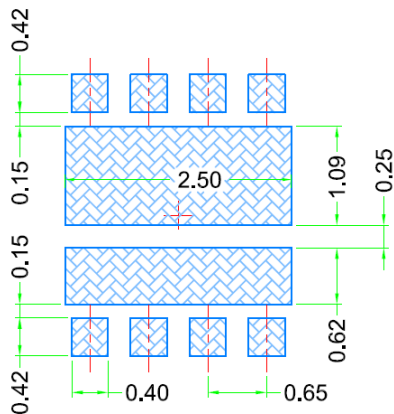
Single Pulse Power Rating, Junction to Ambient



Transient Thermal Response Curves

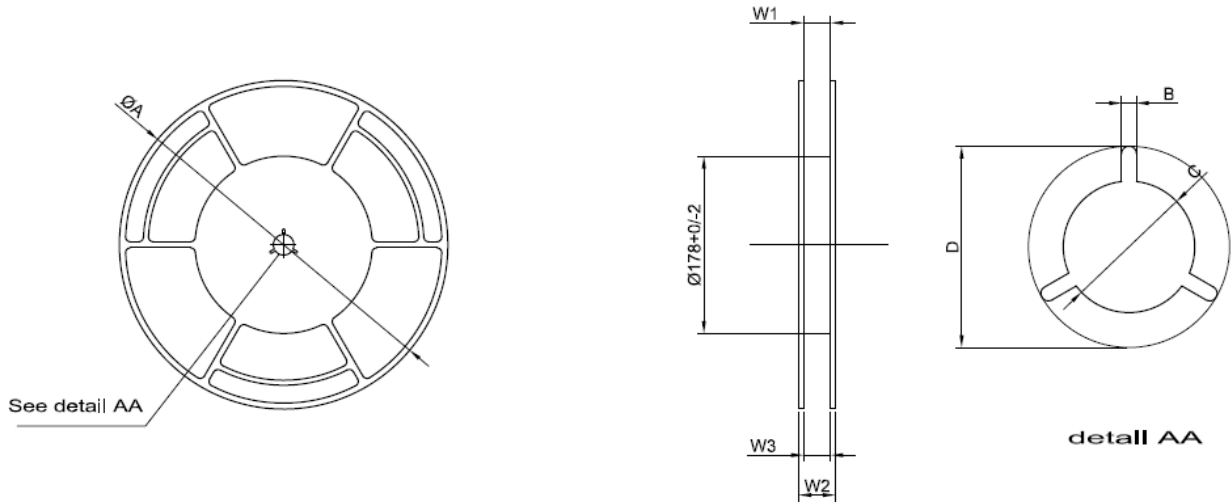


Recommended Soldering Footprint



Unit : mm

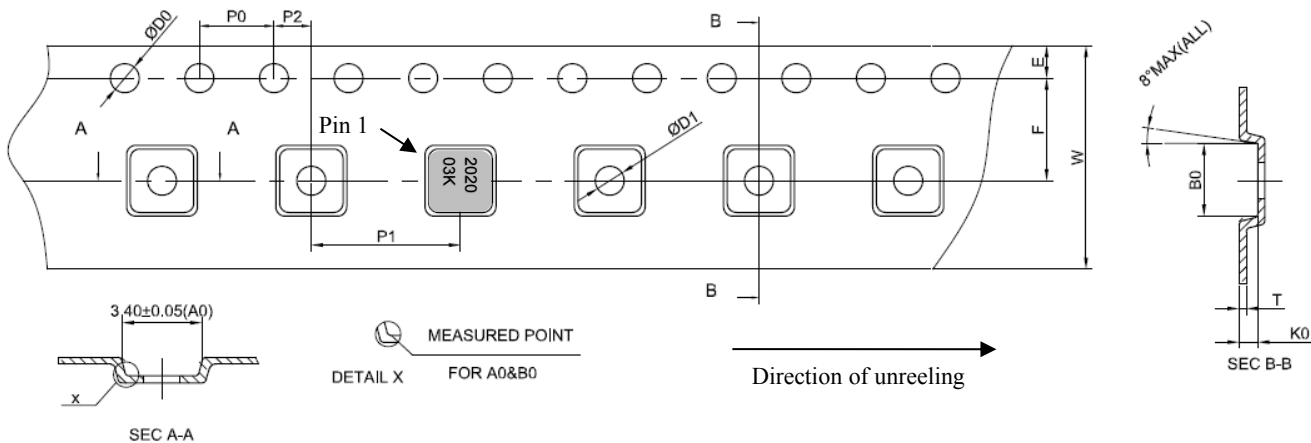
Reel Dimension



TAPE SIZE	A	B	C	D	W1	W2	W3
12mm	330±2.0	2.9±0.5	13.0+0.5/-0	23±1.0	12.4 +2/-0	18.4±0.5	12~15

Unit : mm

Carrier Tape Dimension



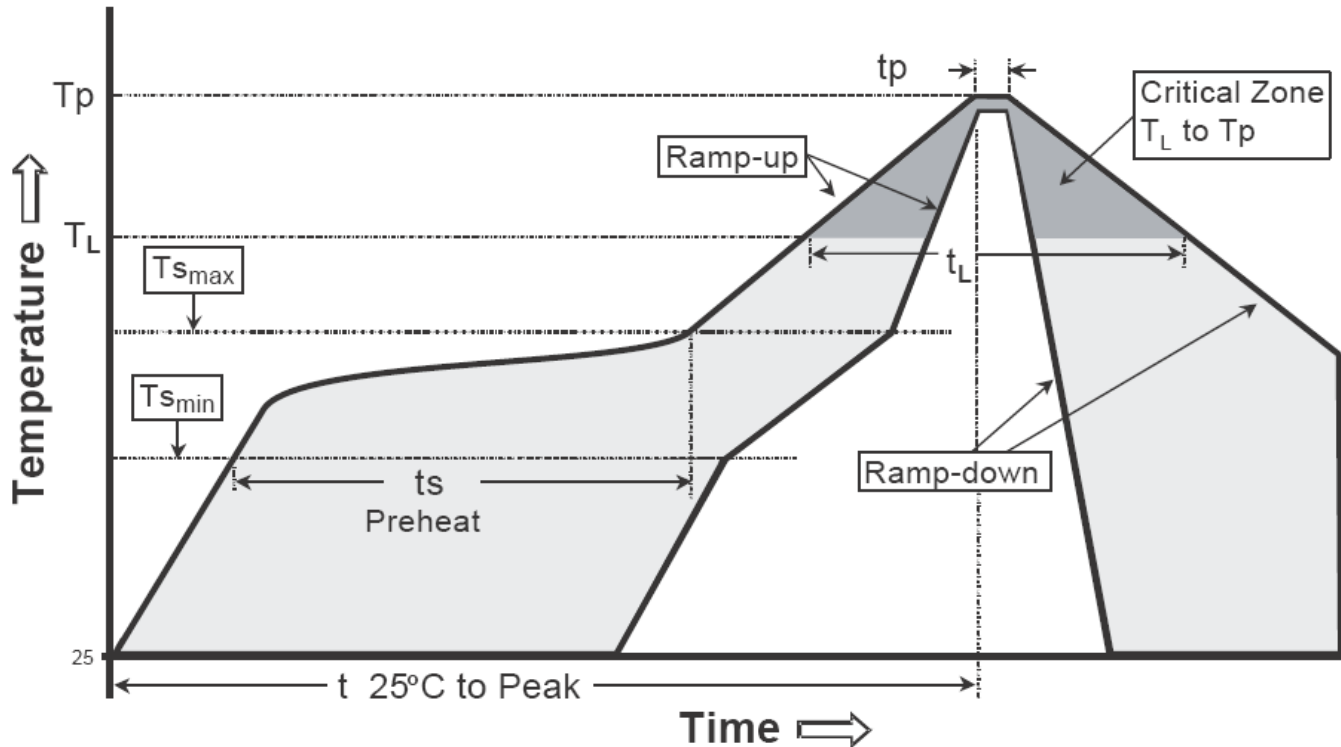
SYMBOL	A0	B0	K0	P0	P1	P2	T
SPEC	3.40±0.05	3.35±0.10	1.10±0.10	4.00±0.10	8.00±0.10	2.00±0.05	0.30±0.05
SYMBOL	E	F	ØD0	ØD1	W	10P0	
SPEC	1.75±0.10	5.50±0.05	1.50 ^{+0.10} _{-0.00}	1.50 ^{+0.10} _{-0.00}	12.00±0.30	40.00±0.20	

Unit : mm

Recommended wave soldering condition

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

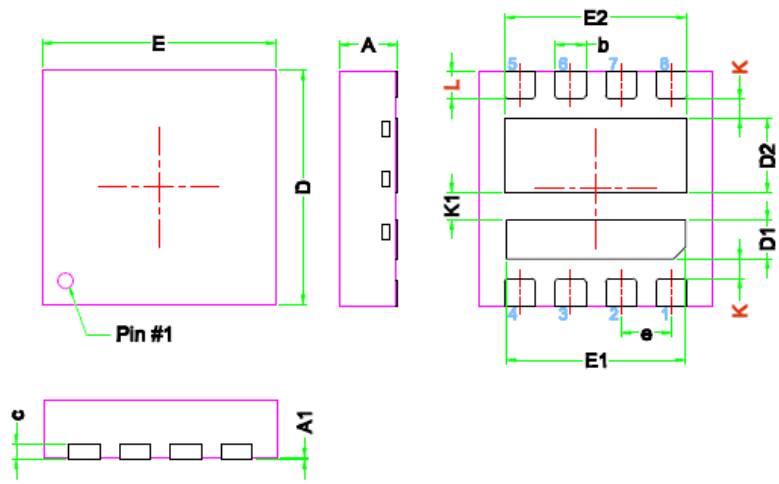
Recommended temperature profile for IR reflow



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)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(ts min to ts max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (Tl)	183°C	217°C
- Time (tl)	60-150 seconds	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.

DFN3x3A Dimension



Marking:

G2 S2 S2 S2

2020

03K

□□□□G

G1 D1 D1 D1

Device Name → 2020

Date Code → □□□□G ← Assembly site code

Note : 1.All dimensions are in mm.
 2.Dimensions are not inclusive burrs and mold flash.

8-Lead DFN3x3A Plastic Package
 CYStek Package Code: V8

Date Code(counting from left to right) :

1st code: year code, the last digit of Christian year

2nd code : month code, Jan→A, Feb→B, Mar→C, Apr→D, May→E, Jun→F, Jul→G, Aug→H, Sep→J, Oct→K, Nov→L, Dec→M

3rd and 4th codes : production serial number, 01~99

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.70	0.80	0.028	0.031	E	2.90	3.10	0.114	0.122
A1	0.00	0.05	0.000	0.002	E1	2.20	2.40	0.087	0.094
b	0.35	0.45	0.014	0.018	E2	2.20	2.45	0.087	0.096
c	0.20	REF	0.008	REF	e	0.55	0.75	0.022	0.030
D	2.90	3.10	0.114	0.122	K	0.15	0.35	0.006	0.014
D1	0.40	0.60	0.016	0.024	K1	0.25	0.45	0.010	0.018
D2	0.85	1.05	0.033	0.041	L	0.27	0.40	0.011	0.016

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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