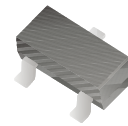


# CMSN1012H3-HF

N-Channel  
RoHS Device  
Halogen Free

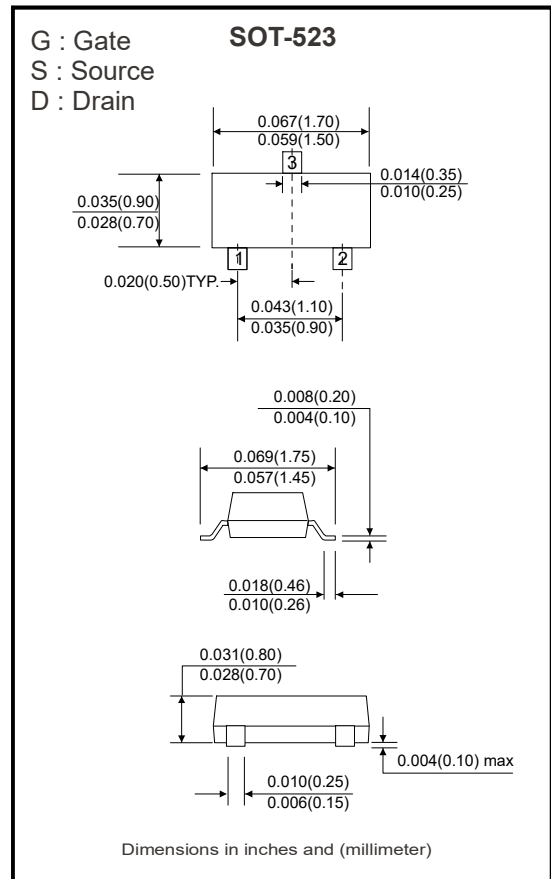
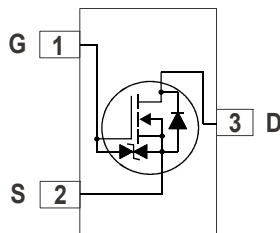


<b>BV<sub>DSS</sub></b>	<b>20V</b>
<b>I<sub>D</sub></b>	<b>560mA</b>
<b>R<sub>DS(on)</sub> @V<sub>GS</sub> =4.5V, I<sub>D</sub> =600mA</b>	<b>320mΩ (typ)</b>
<b>R<sub>DS(on)</sub> @V<sub>GS</sub> =2.5V, I<sub>D</sub> =400mA</b>	<b>510mΩ (typ)</b>
<b>R<sub>DS(on)</sub> @V<sub>GS</sub> =1.8V, I<sub>D</sub> =350mA</b>	<b>980mΩ (typ)</b>

## Features

- Simple drive requirement
- Small package outline
- Pb-free lead plating and halogen-free package

## Circuit Diagram



## Maximum Rating (at Ta=25°C unless otherwise noted)

Parameter	Symbol	Limits	Unit	
Drain-Source Voltage	V <sub>DS</sub>	20	V	
Gate-Source Voltage	V <sub>GS</sub>	±8		
Continuous Drain Current @ T <sub>A</sub> =25 °C, V <sub>GS</sub> =4.5V(Note 3)	I <sub>D</sub>	560	mA	
Continuous Drain Current @ T <sub>A</sub> =85 °C, V <sub>GS</sub> =4.5V(Note 3)		400		
Pulsed Drain Current(Notes 1, 2)	I <sub>DM</sub>	2.5	A	
Maximum Power Dissipation (Note 3)	P <sub>D</sub>	T <sub>A</sub> =25 °C	150	mW
		T <sub>A</sub> =85 °C	80	
ESD susceptibility		2000 (Note 4)	V	
Operating Junction and Storage Temperature	T <sub>j</sub> , T <sub>stg</sub>	-55~+150	°C	

- Note : 1. Pulse width limited by maximum junction temperature.  
 2. Pulse width ≤ 300μs, duty cycle ≤ 2%.  
 3. Surface mounted on FR-4 board.  
 3. Human body model, 1.5kΩ in series with 100pF

## Electrical Characteristics (at T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	20	-	-	V	V <sub>GS</sub> = 0, I <sub>D</sub> = 250μA
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	-	0.02	-	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
V <sub>GS(th)</sub>	0.5	0.92	1.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
I <sub>GSS</sub>	-	-	±10	μA	V <sub>GS</sub> = ± 8V, V <sub>DS</sub> = 0
I <sub>DSS</sub>	-	-	1		V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0
	-	-	10	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0 (T <sub>J</sub> = 70°C)	
*R <sub>DS(ON)</sub>	-	320	450	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 600mA
	-	510	700		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 500mA
	-	980	1200		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 350mA
*G <sub>FS</sub>	-	1	-	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 400mA
<b>Dynamic</b>					
C <sub>iss</sub>	-	60	-	pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0, f = 1MHz
C <sub>oss</sub>	-	14	-		
C <sub>rss</sub>	-	9	-		
t <sub>d(ON)</sub>	-	5	-	ns	V <sub>DS</sub> = 10V, I <sub>D</sub> = 200mA, V <sub>GS</sub> = 4.5V R <sub>G</sub> = 10Ω
t <sub>r</sub>	-	5	-		
t <sub>d(OFF)</sub>	-	24	-		
t <sub>f</sub>	-	18	-		
Q <sub>g</sub>	-	0.76	-	nC	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250mA, V <sub>GS</sub> = 4.5V
Q <sub>gs</sub>	-	0.074	-		
Q <sub>gd</sub>	-	0.27	-		
<b>Source-Drain Diode</b>					
*V <sub>SD</sub>	-	0.8	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 150mA

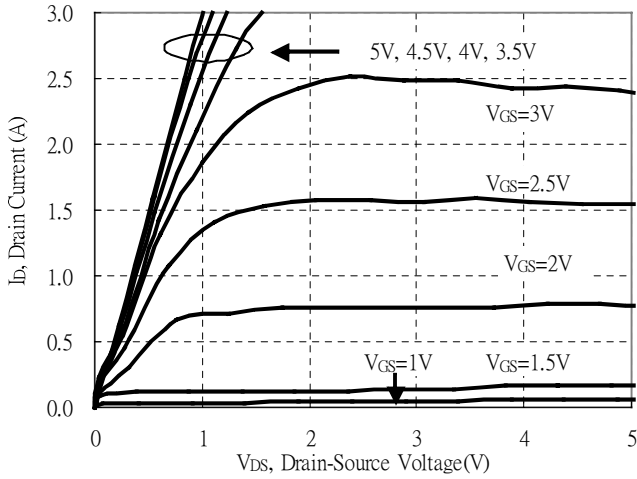
\*Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

## Thermal Performance

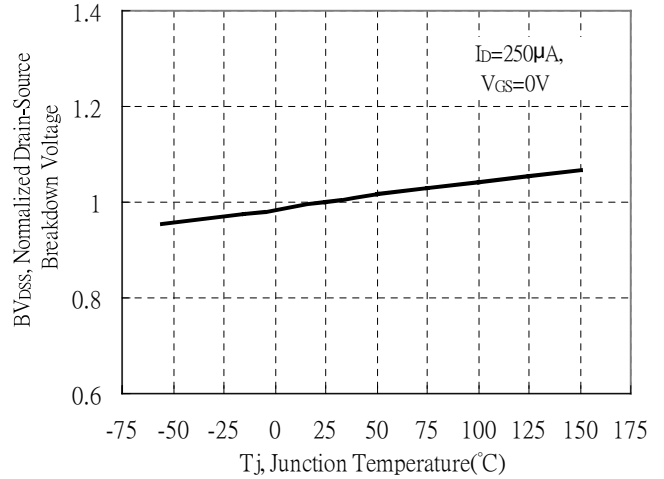
Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient(PCB mounted)	R <sub>th,ja</sub>	833	°C/W

Typical Characteristics

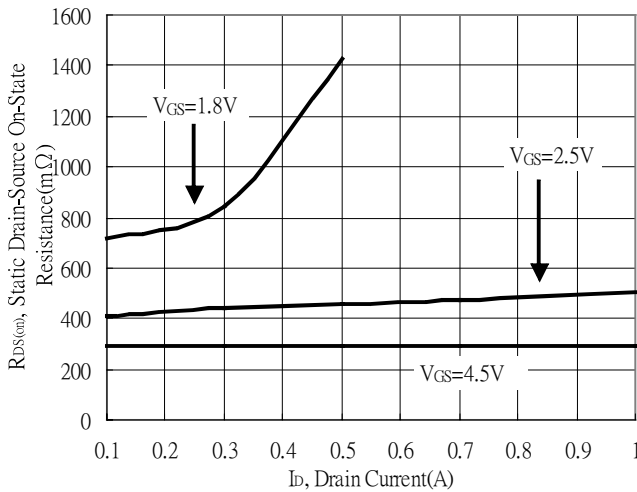
Typical Output Characteristics



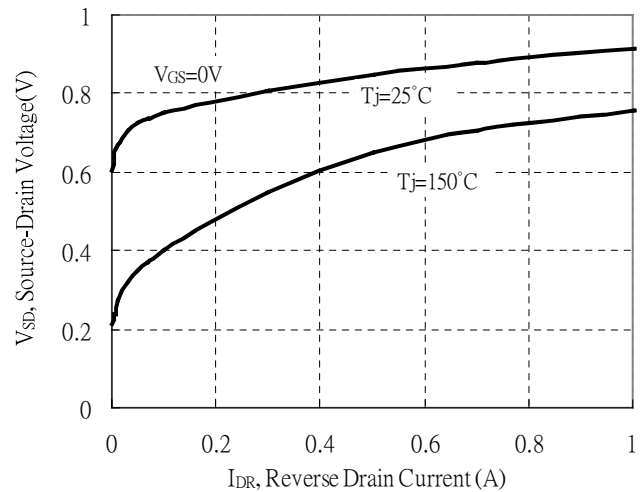
Brekdown Voltage vs Ambient Temperature



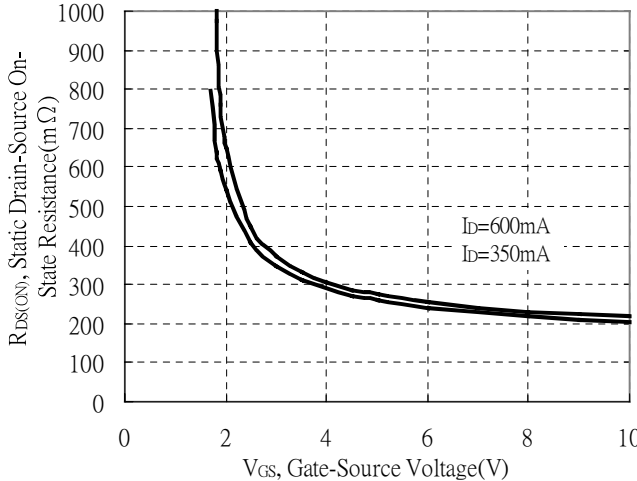
Static Drain-Source On-State resistance vs Drain Current



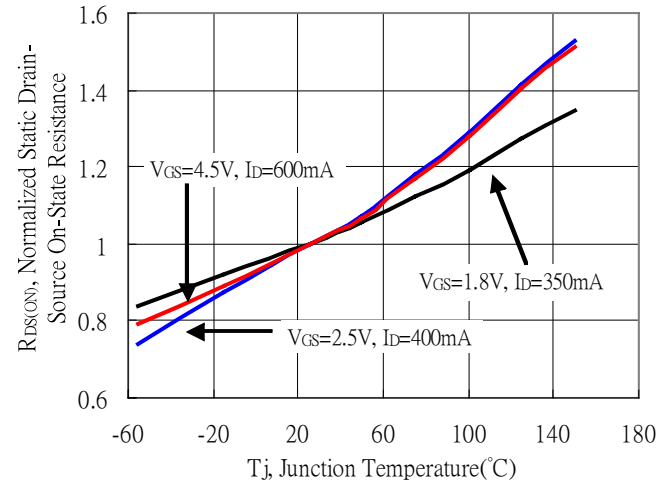
Reverse Drain Current vs Source-Drain Voltage



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



Drain-Source On-State Resistance vs Junction Temperature

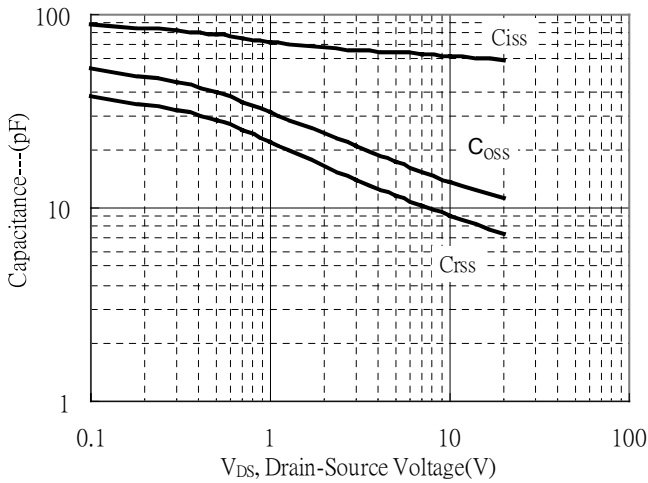


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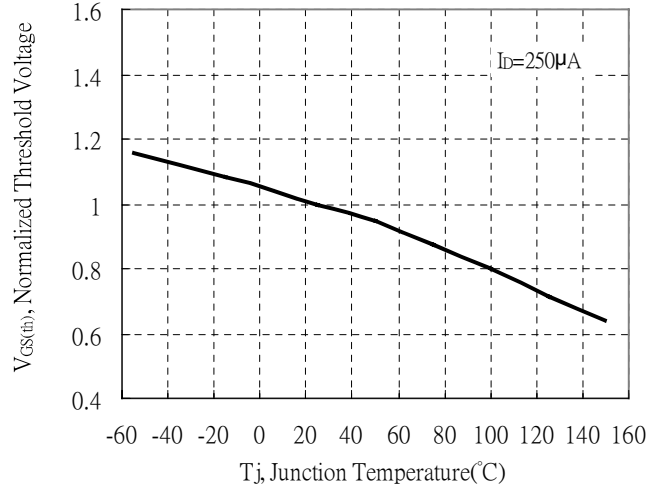
REV:A

Typical Characteristics(Cont.)

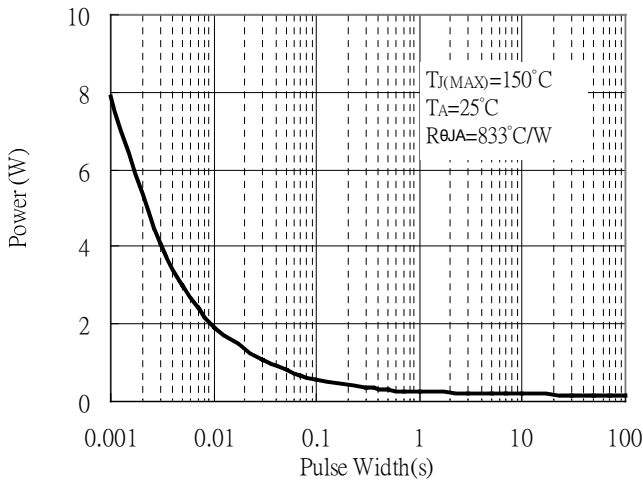
Capacitance vs Drain-to-Source Voltage



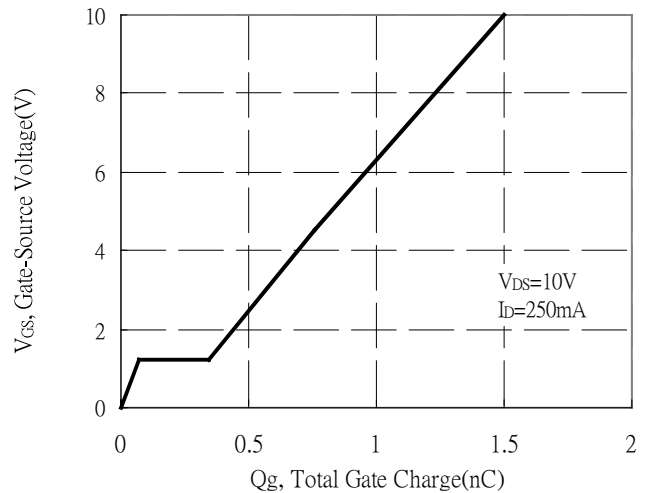
Threshold Voltage vs Junction Temperature



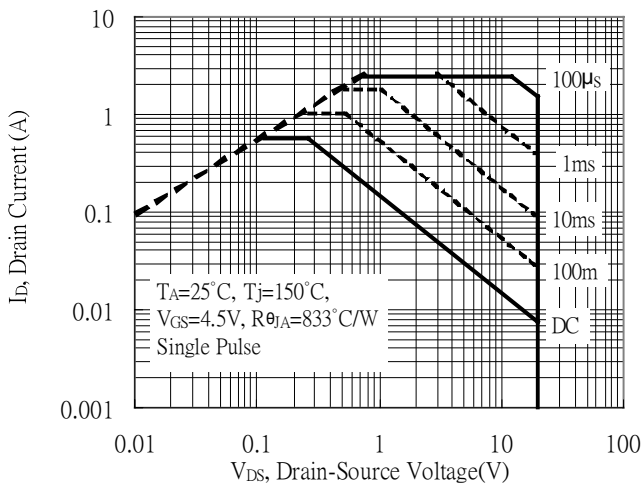
Single Pulse Power Rating, Junction to Ambient  
(Note on page 2)



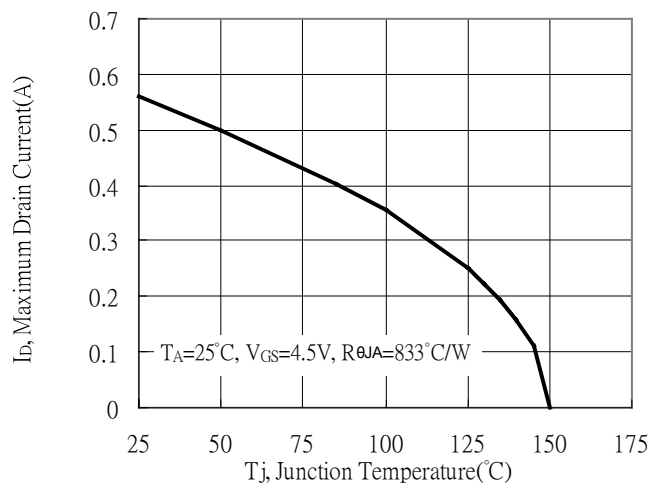
Gate Charge Characteristics



Maximum Safe Operating Area



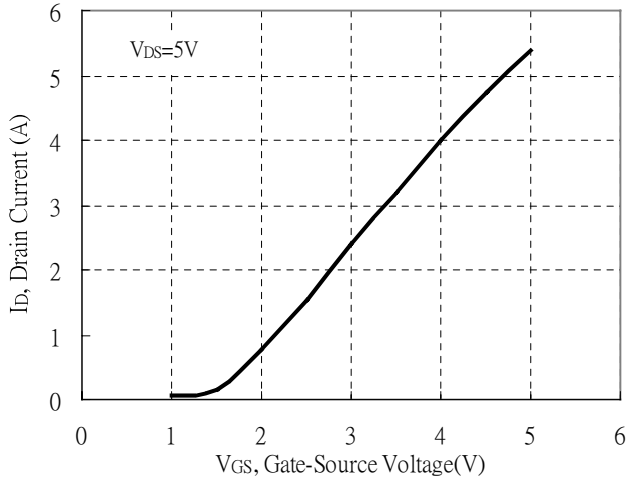
Maximum Drain Current vs Junction Temperature



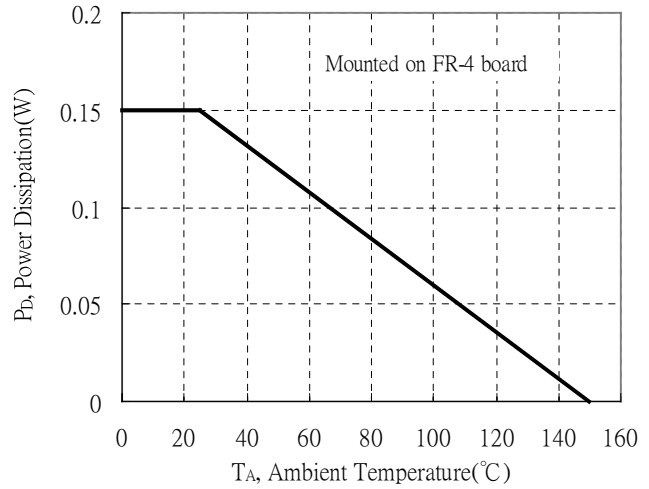
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## Typical Characteristics(Cont.)

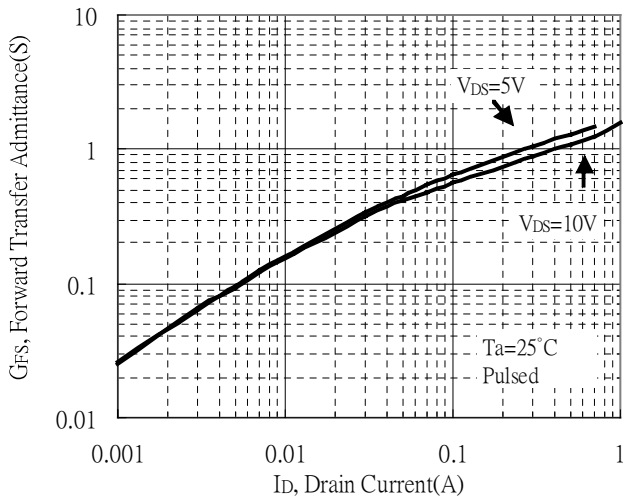
Typical Transfer Characteristics



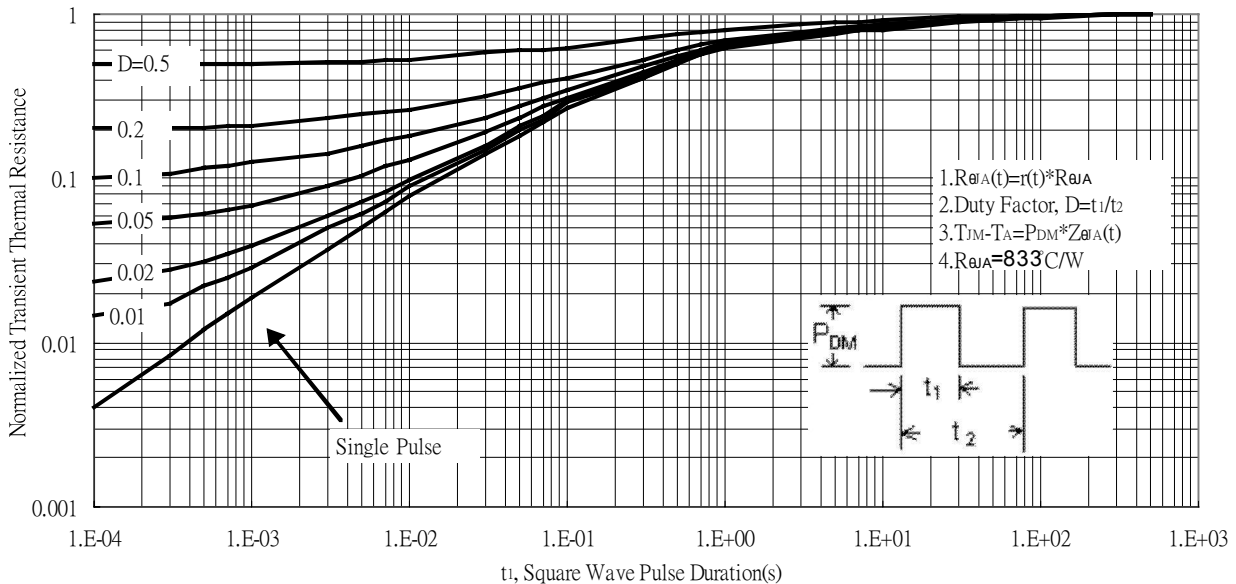
Power Derating Curve



Forward Transfer Admittance vs Drain Current

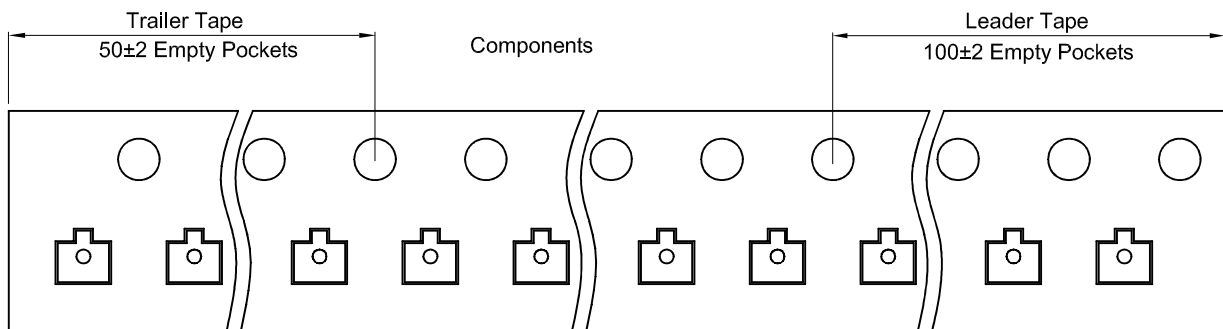
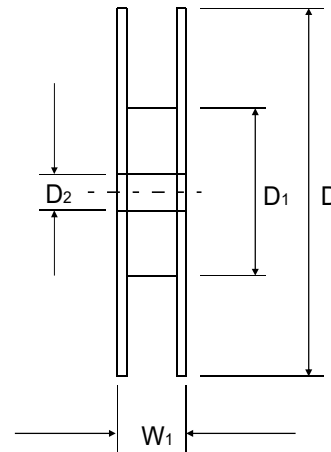
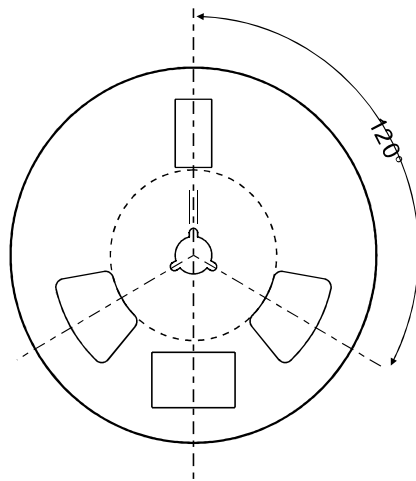
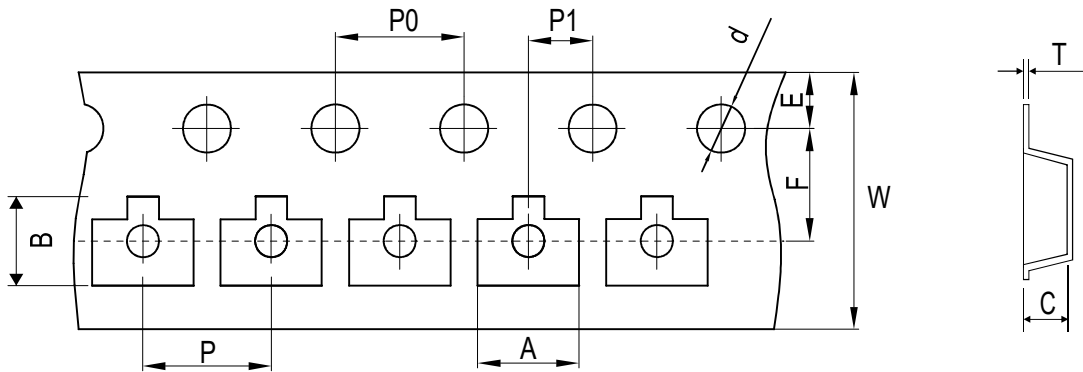


Transient Thermal Response Curves



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**Reel Taping Specification**



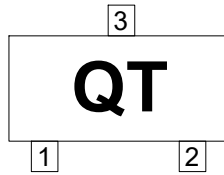
SOT-523	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	1.85 ± 0.05	1.85 ± 0.05	0.875 ± 0.05	1.50 ± 0.10	178 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.073 ± 0.002	0.073 ± 0.002	0.034 ± 0.002	0.059 ± 0.004	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

SOT-523	SYMBOL	E	F	P	P0	P1	W	W1
	(mm)	1.75 ± 0.10	3.50 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	8.00 + 0.30 / - 0.10	12.30 ± 1.00
	(inch)	0.069 ± 0.004	0.138 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.315 + 0.012 / - 0.004	0.484 ± 0.039

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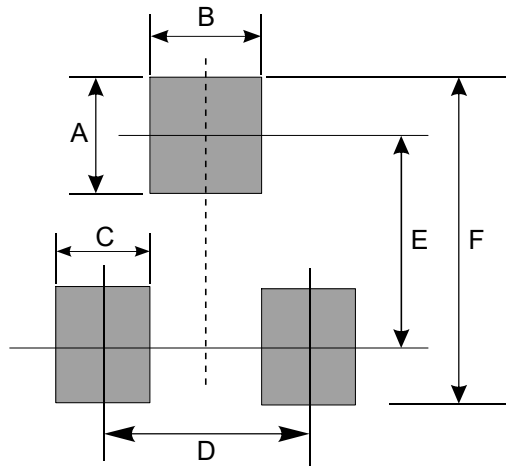
## Marking Code

Part Number	Marking Code
CMSN1012H3-HF	QT



## Suggested PAD Layout

SIZE	SOT-523	
	(mm)	(inch)
A	0.60	0.024
B	0.50	0.020
C	0.40	0.016
D	1.00	0.039
E	1.24	0.049
F	1.84	0.072



## Standard Packaging

Case Type	REEL PACK	
	REEL ( pcs )	Reel Size (inch)
SOT-523	3,000	7

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