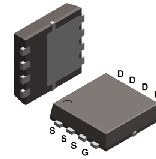


CMS52N04V8-HF

N-Channel
RoHS Device
Halogen Free

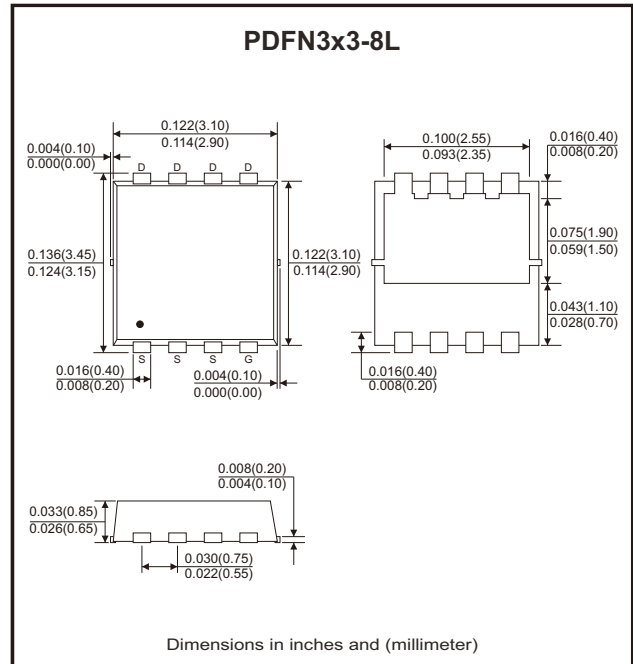


Features

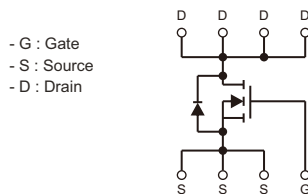
- Low thermal resistance.
- Advanced high cell density trench technology.

Mechanical data

- Case: PDFN3x3-8L, molded plastic.
- Molding compound: UL flammability classification rating 94V-0.
- Terminals: Matte tin plated leads, solderability per MIL-STD-202, method 208.



Circuit Diagram



Maximum Ratings (at T_C=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-source voltage	V _{DSS}	40	V
Gate-source voltage	V _{GSS}	±20	V
Continuous drain current (V _{GS} =10V, T _C =25°C) (Note 1)	I _D	52	A
Continuous drain current (V _{GS} =10V, T _C =100°C) (Note 1)	I _D	33	
Pulsed drain current (V _{GS} =10V, T _C =25°C) (Note 1,2,3)	I _{DM}	144	A
Single pulse avalanche energy (V _{DD} = 40V, L = 1mH)	E _{AS}	91	mJ
Power dissipation (T _C =25°C)	P _D	20.8	W
Thermal resistance junction to case (Note 1)	R _{θJC}	6	°C/W
Thermal resistance junction to air (Note 1)	R _{θJA}	62.5	°C/W
Operating junction temperature range	T _J	-55 to +150	°C
Storage temperature range	T _{STG}	-55 to +150	°C

Electrical Characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 32V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
On Characteristics						
Static drain-source on-resistance (Note 2)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 15A$			4.6	m Ω
	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 10A$			7	m Ω
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1		2	V
Dynamic Characteristics (Note 4)						
Input capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 20V, f = 1MHz$		916		pF
Output capacitance	C_{oss}			348		
Reverse transfer capacitance	C_{rss}			48		
Switching Characteristics (Note 4)						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 20V, V_{GS} = 10V$ $R_G = 3.9\Omega, R_L = 1.33\Omega, I_D = 15A$		5.7		ns
Turn-on rise time	t_r			24		
Turn-off delay time	$t_{d(off)}$			24		
Turn-off fall time	t_f			18		
Total gate charge	Q_g	$V_{DD} = 20V, V_{GS} = 10V, I_D = 15A$		21		nC
Gate to source charge	Q_{gs}			3.7		
Gate to drain (miller) charge	Q_{gd}			4.7		
Source-Drain Diode Characteristics						
Diode forward voltage (Note 2)	V_{SD}	$I_{SD} = 15A, V_{GS} = 0V$			1.3	V
Drain continuous forward current	I_S	$T_C = 25^\circ\text{C}$			52	A
Reverse recovery time	t_{rr}	$I_{SD} = 15A, di/dt = 100A/\mu s$		22		ns
Reverse recovery charge	Q_{rr}				7.2	

- Notes: 1. Surface mounted on 1 in² pad area, $t \leq 10$ sec.
 2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 3. Limited by bonding wire.
 4. Guaranteed by design, not subject to production testing.

Rating and Characteristic Curves (CMS52N04V8-HF)

Fig.1 - Typical Output Characteristics

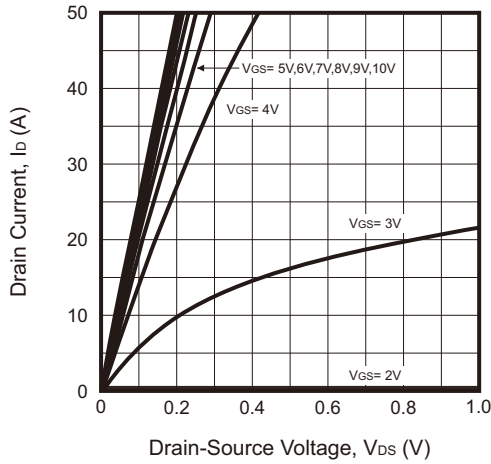


Fig.2 - On-Resistance vs. Drain Current and Gate Voltage

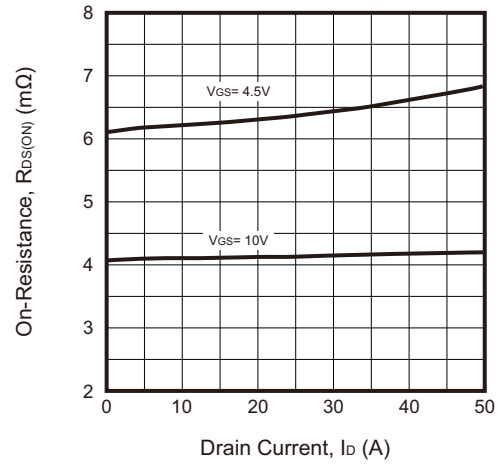


Fig.3 - On-Resistance vs. Gate-Source Voltage

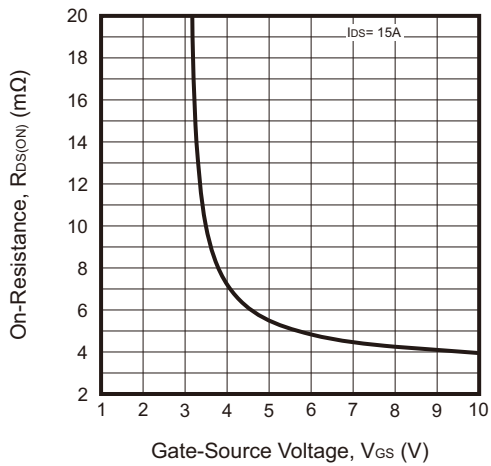


Fig.4 - Body-Diode Characteristics

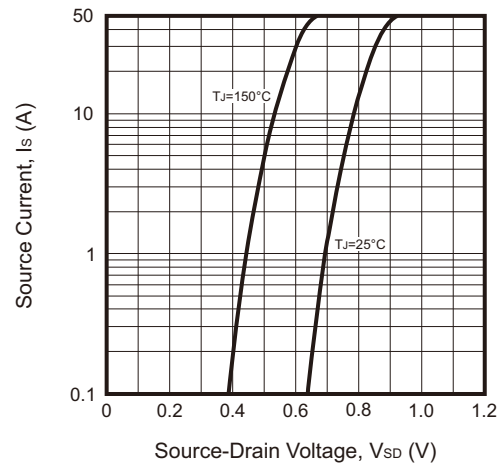


Fig.5 - On-Resistance vs. Junction Temperature

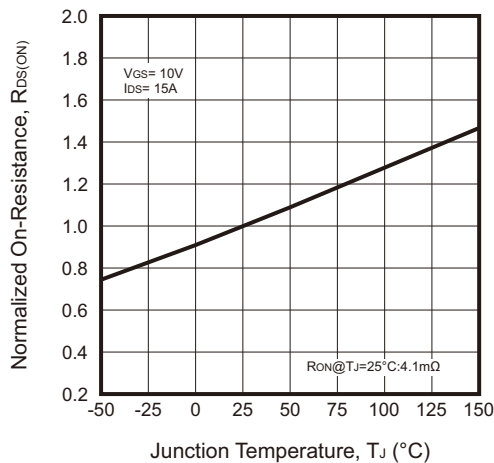
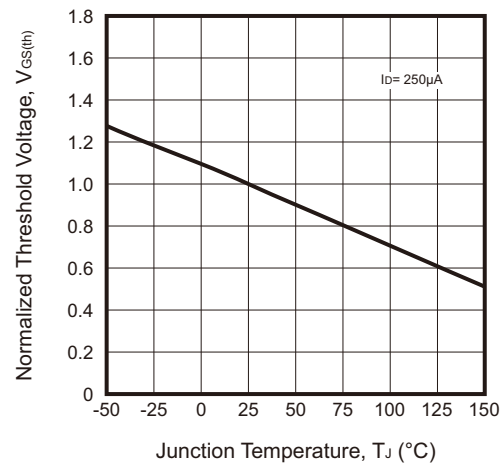


Fig.6 - $V_{GS(th)}$ vs. Junction Temperature



Rating and Characteristic Curves (CMS52N04V8-HF)

Fig.7 - Capacitance Characteristics

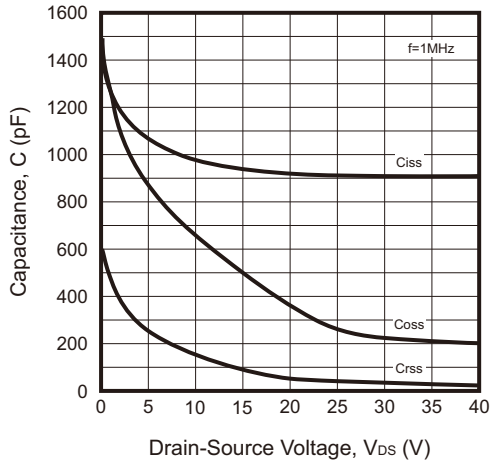


Fig.8 - Maximum Safe Operating Area

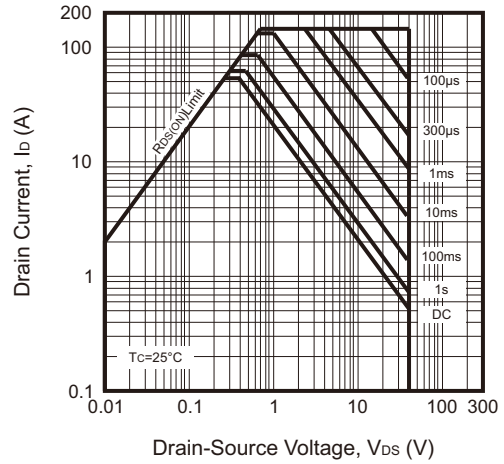


Fig.9 - Current Capability

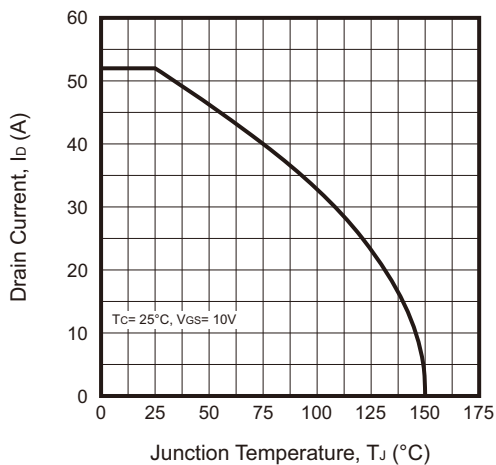


Fig.10 - Power Capability

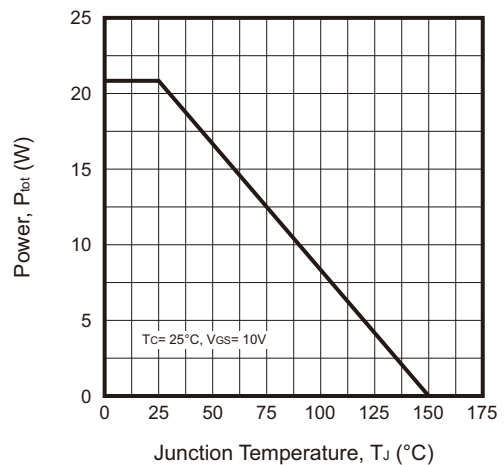
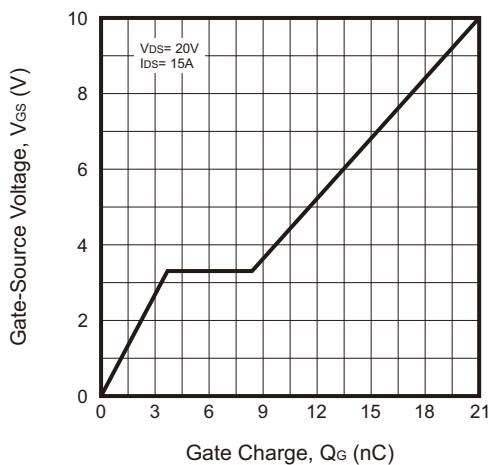
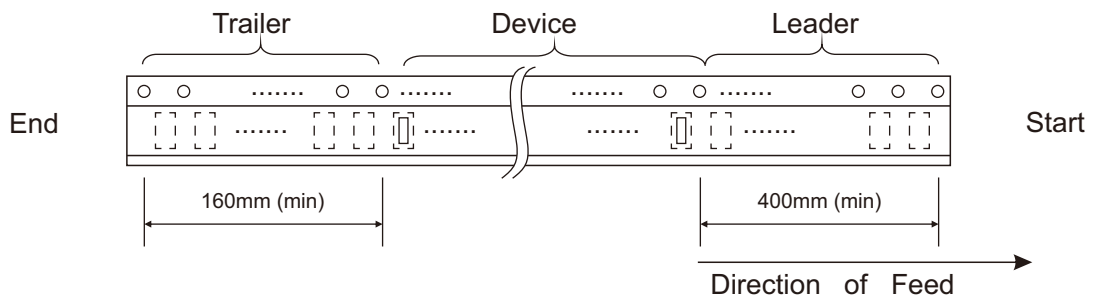
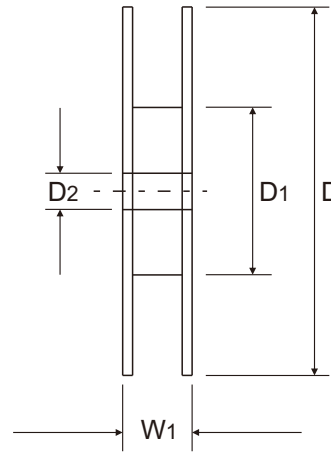
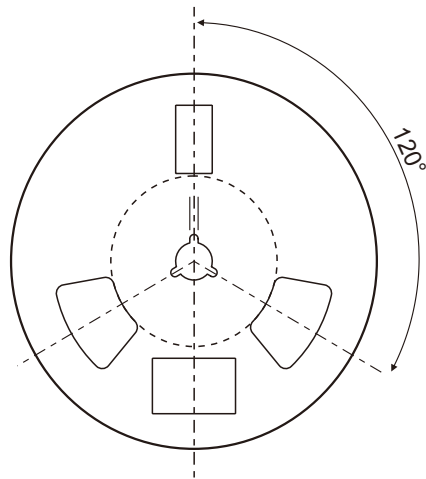
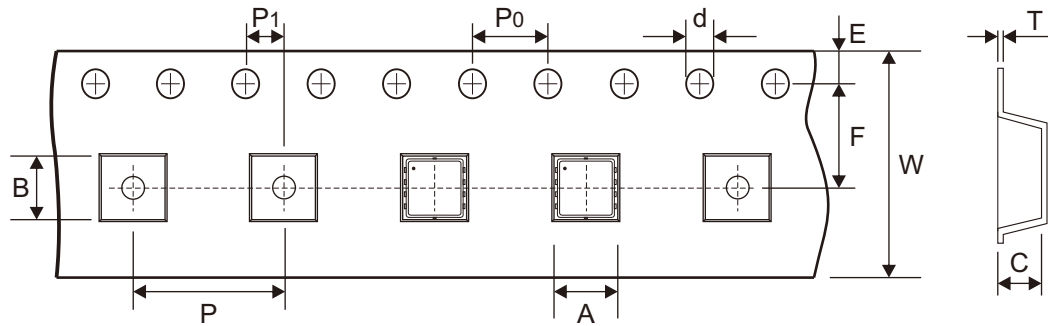


Fig.11 - Gate-Charge Characteristics



Reel Taping Specification

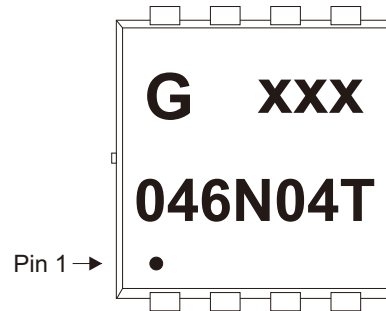


PDFN3x3-8L	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	3.60 ± 0.10	3.60 ± 0.10	1.20 ± 0.10	1.50 + 0.10 - 0.00	330 ± 1.00	100 ± 1.00	13.00 ± 0.20
	(inch)	0.142 ± 0.004	0.142 ± 0.004	0.047 ± 0.004	0.059 + 0.004 - 0.000	12.992 ± 0.039	3.937 ± 0.039	0.512 ± 0.008

PDFN3x3-8L	SYMBOL	E	F	P	P0	P1	T	W	W1
	(mm)	1.75 ± 0.10	5.50 ± 0.05	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.25 ± 0.02	12.00 + 0.30 - 0.10	17.80 ± 0.30
	(inch)	0.069 ± 0.004	0.217 ± 0.002	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.010 ± 0.001	0.472 + 0.012 - 0.004	0.701 ± 0.012

Marking Code

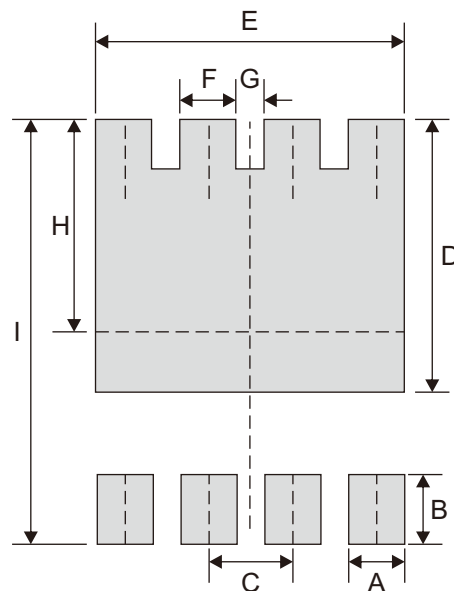
Part Number	Marking Code
CMS52N04V8-HF	046N04T



XXX = Control code

Suggested P.C.B. PAD Layout

SIZE	PDFN3x3-8L	
	(mm)	(inch)
A	0.42	0.017
B	0.70	0.028
C	0.65	0.026
D	2.25	0.089
E	2.37	0.093
F	0.42	0.017
G	0.23	0.009
H	1.85	0.073
I	3.70	0.146



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
PDFN3x3-8L	5,000	13