CMSH9930Q8-HF

2N- and 2P-Channel
RoHS Device
Halogen Free

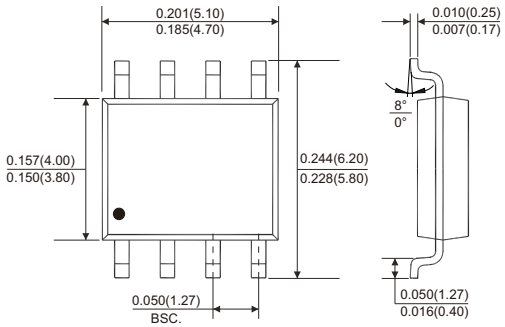
Features

- Simple drive requirement.
- Low on-resistance.
- Fast switching speed.

Mechanical data

- Case: SOP-8, molded plastic.
- Mounting position: Any.

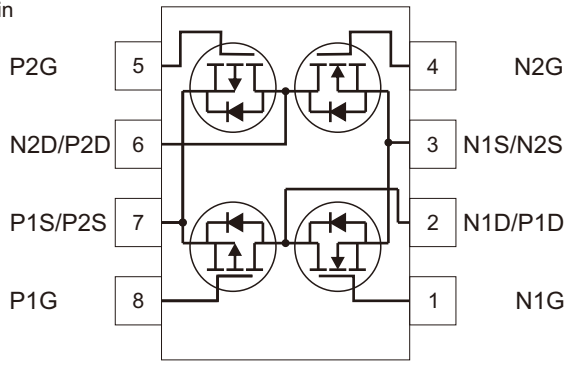
SOP-8



Dimensions in inches and (millimeter)

Circuit Diagram

G:Gate
S:Source
D:Drain



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

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-source breakdown voltage		BV_{DSS}	30	-30	V
Gate-source voltage		V_{GS}	±20	±20	V
Continuous drain current (Note 2)	T_A = 25°C, V_{GS} = 10V (-10V)	I_D	6	-4.4	A
	T_A = 70°C, V_{GS} = 10V (-10V)		4.8	-3.5	
Pulsed drain current (Note 1)		I_{DM}	24	-20	A
Power dissipation	T_A = 25°C	P_D	1.38		W
	T_A = 70°C		0.88		
Max. thermal resistance, junction to case		$R_{\theta JC}$	36		°C/W
Max. thermal resistance, junction to ambient (Note 2)		$R_{\theta JA}$	90		°C/W
Operating junction and storage temperature range		T_J, T_{STG}	-55 to +150		°C

Notes: 1. Pulse width limited by maximum junction temperature.
2. Surface mounted on 1in² copper pad of FR-4 board, pulse width ≤ 10s.

N-Channel Electrical Characteristics (at T_C=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	30			V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0		2.5	V
Gate-source leakage	I_{GSS}	V_{GS} = ±20, V_{DS} = 0V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V			1	μA
		V_{DS} = 24V, V_{GS} = 0V, T_J = 70°C			25	
Static Drain-source on-state resistance (Note 1)	$R_{DS(ON)}$	I_D = 5A, V_{GS} = 10V		17	24	mΩ
		I_D = 3A, V_{GS} = 4.5V		21	30	
Forward transconductance (Note 1)	G_{FS}	V_{DS} = 5V, I_D = 5A		6.7		S
Dynamic						
Input capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz		496	750	pF
Output capacitance	C_{oss}			61		
Reverse transfer capacitance	C_{rss}			47		
Turn-on delay time (Note 1)	$t_{d(ON)}$	V_{DS} = 15V, I_D = 1A, V_{GS} = 10V, R_G = 6Ω		6.2		ns
Rise time (Note 1)	t_r			17.2		
Turn-off delay time (Note 1)	$t_{d(OFF)}$			30.2		
Fall time (Note 1)	t_f			7.6		
Total gate charge (Note 1)	Q_g	V_{DS} = 15V, I_D = 6A, V_{GS} = 4.5V		5.6	9	nC
Gate-source charge (Note 1)	Q_{gs}			1.9		
Gate-drain charge (Note 1)	Q_{gd}			2.1		
Body Diode						
Diode forward voltage (Note 1)	V_{SD}	V_{GS} = 0V, I_S = 1.2A		0.78	1.2	V
Reverse recovery time (Note 1)	t_{rr}	I_F = 5A, dI_F/dt = 100A/μs		7.7		ns
Recovered charge (Note 1)	Q_{rr}			3.3		nC

Notes: 1. Pulse width ≤ 300μs, duty cycle ≤ 2%.

P-Channel Electrical Characteristics (at T_C=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D = -250μA	-30			V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.0		-2.5	V
Gate-source leakage	I_{GSS}	V_{GS} = ±20, V_{DS} = 0V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = -30V, V_{GS} = 0V			-1	μA
		V_{DS} = -24V, V_{GS} = 0V, T_J = 70°C			-25	
Static Drain-source on-state resistance (Note 1)	$R_{DS(ON)}$	I_D = -4A, V_{GS} = -10V		35	48	mΩ
		I_D = -2A, V_{GS} = -4.5V		46	70	
Forward transconductance (Note 1)	G_{FS}	V_{DS} = -10V, I_D = -5A		7.8		S
Dynamic						
Input capacitance	C_{iss}	V_{DS} = -25V, V_{GS} = 0V, f = 1MHz		597	900	pF
Output capacitance	C_{oss}			63		
Reverse transfer capacitance	C_{rss}			51		
Turn-on delay time (Note 1)	$t_{d(ON)}$	V_{DS} = -15V, I_D = -1A, V_{GS} = -10V, R_G = 6Ω		5.6		ns
Rise time (Note 1)	t_r			17.6		
Turn-off delay time (Note 1)	$t_{d(OFF)}$			64.4		
Fall time (Note 1)	t_f			33.8		
Total gate charge (Note 1)	Q_g	V_{DS} = -15V, I_D = -4.4A, V_{GS} = -4.5V		6.7	11	nC
Gate-source charge (Note 1)	Q_{gs}			2.2		
Gate-drain charge (Note 1)	Q_{gd}			2.5		
Body Diode						
Diode forward voltage (Note 1)	V_{SD}	V_{GS} = 0V, I_S = -1.2A		-0.78	-1.2	V
Reverse recovery time (Note 1)	t_{rr}	I_F = -4.5A, dI_F/dt = 100A/μs		7.7		ns
Recovered charge (Note 1)	Q_{rr}			3.0		nC

Notes: 1. Pulse width ≤ 300μs, duty cycle ≤ 2%.

N-Channel Typical Rating and Characteristic Curves (CMSH9930Q8-HF)

Fig.1 - Typical Output Characteristics

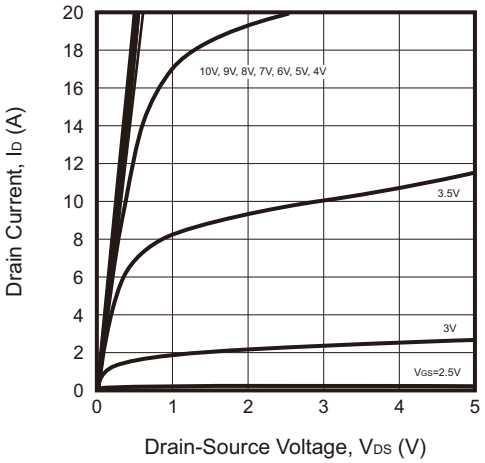


Fig.2 - Breakdown Voltage vs Ambient Temperature

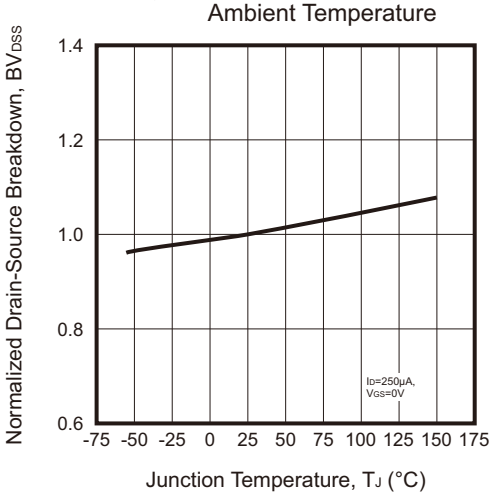


Fig.3 - Static Drain-Source On-State Resistance vs Drain Current

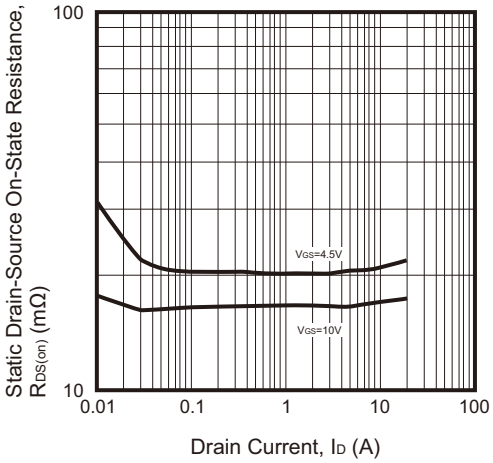


Fig.4 - Reverse Drain Current vs Source-Drain Voltage

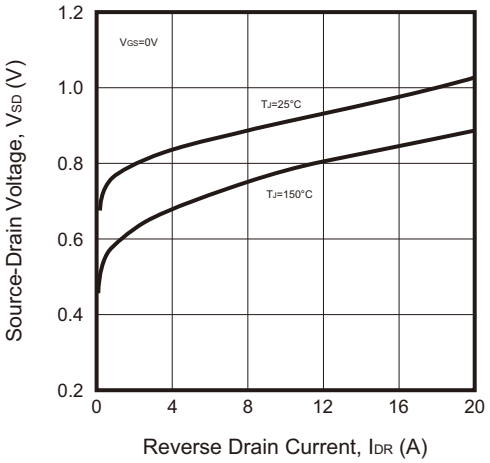


Fig.5 - Static Drain-Source On-State Resistance vs Gate-Source Voltage

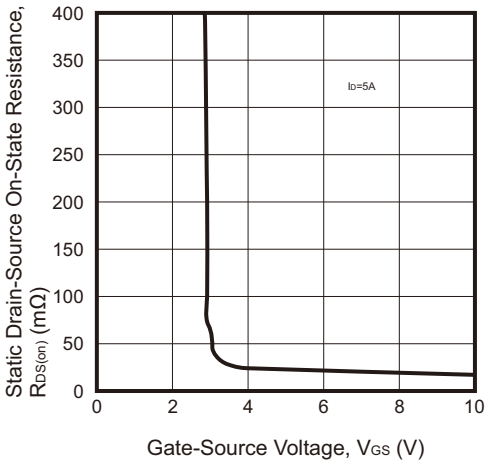
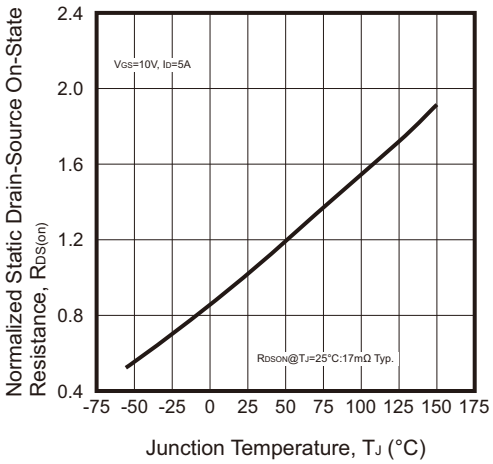


Fig.6 - Drain-Source On-State Resistance vs Junction Temperature



N-Channel Typical Rating and Characteristic Curves (CMSH9930Q8-HF)

Fig.7 - Capacitance vs Drain-to-Source Voltage

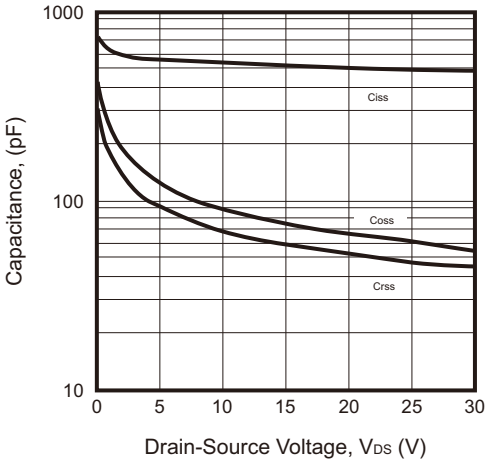


Fig.8 - Threshold Voltage vs Junction Temperature

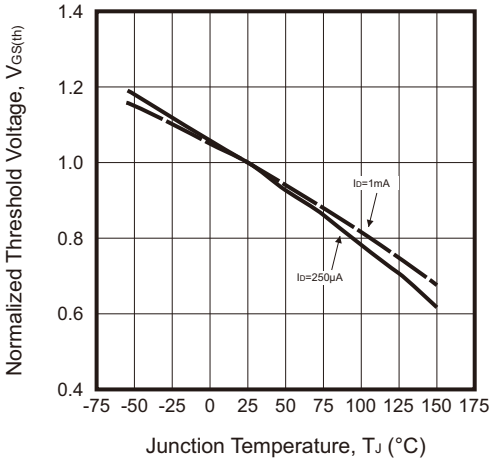


Fig.9 - Forward Transfer Admittance vs Drain Current

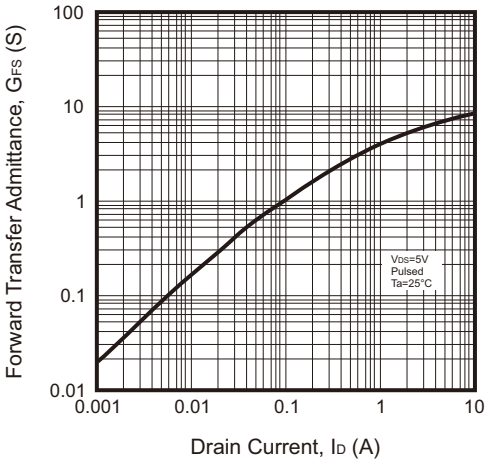


Fig.10 - Gate Charge Characteristics

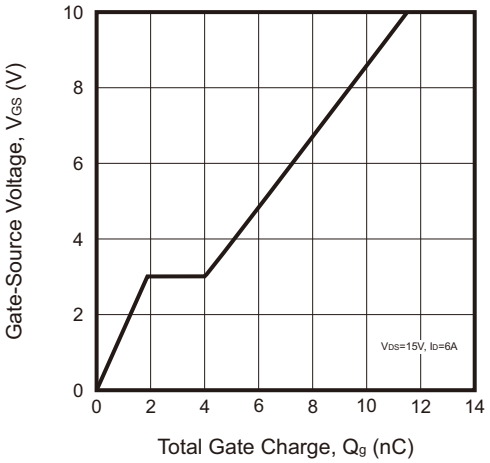


Fig.11 - Maximum Safe Operating Area

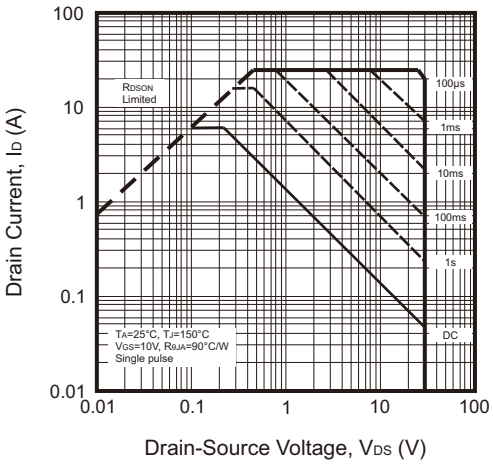
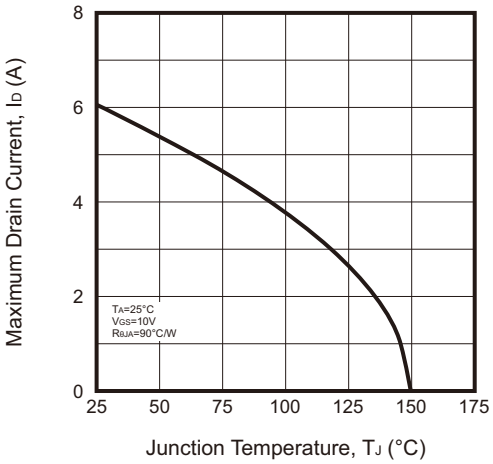


Fig.12 - Maximum Drain Current vs Junction Temperature



N-Channel Typical Rating and Characteristic Curves (CMSH9930Q8-HF)

Fig.13 - Single Pulse Power Rating, Junction to Ambient (Note on Page 1)

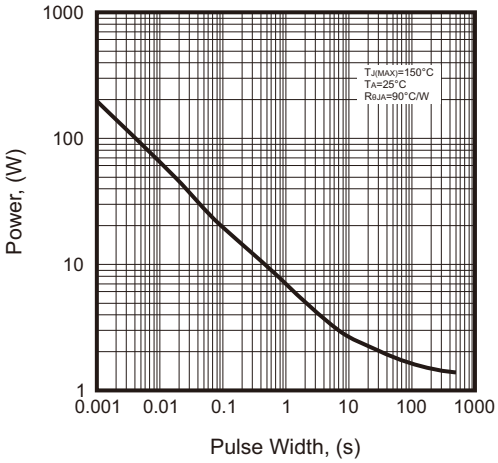
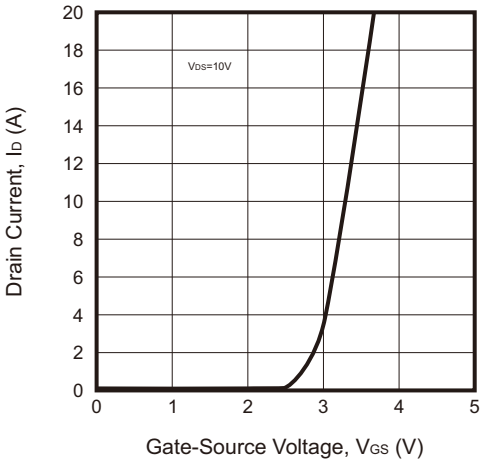


Fig.14 - Typical Transfer Characteristics



P-Channel Typical Rating and Characteristic Curves (CMSH9930Q8-HF)

Fig.15 - Typical Output Characteristics

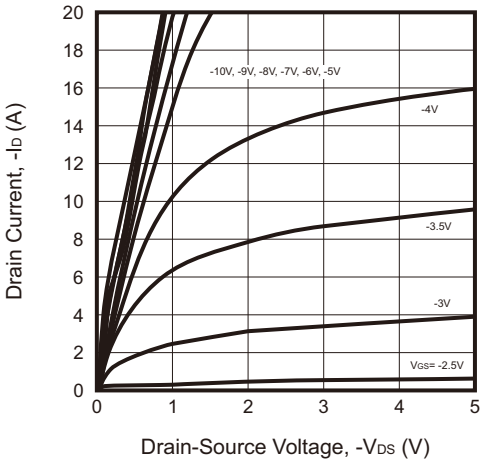


Fig.16 - Breakdown Voltage vs Ambient Temperature

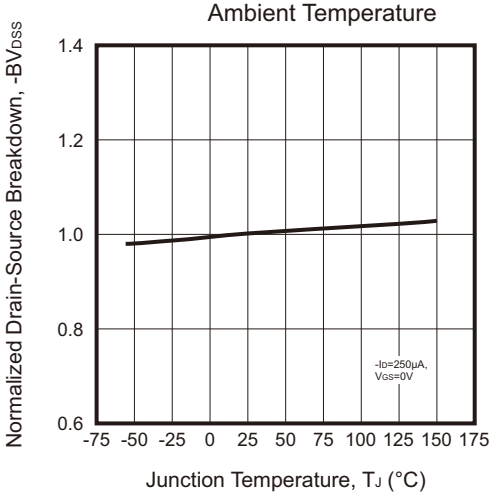


Fig.17 - Static Drain-Source On-State Resistance vs Drain Current

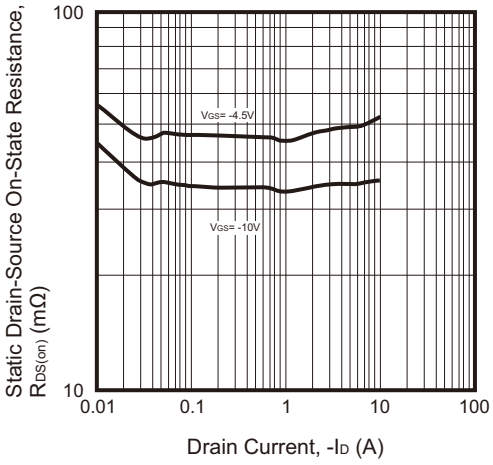


Fig.18 - Reverse Drain Current vs Source-Drain Voltage

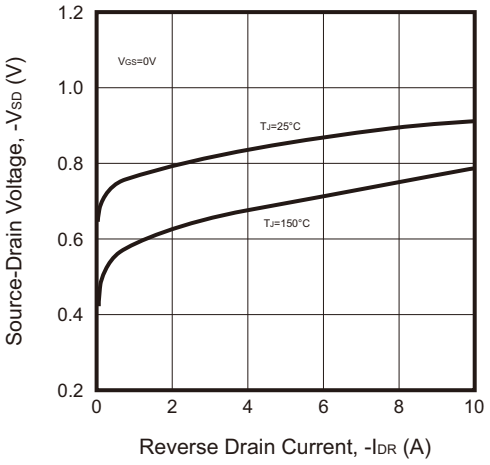


Fig.19 - Static Drain-Source On-State Resistance vs Gate-Source Voltage

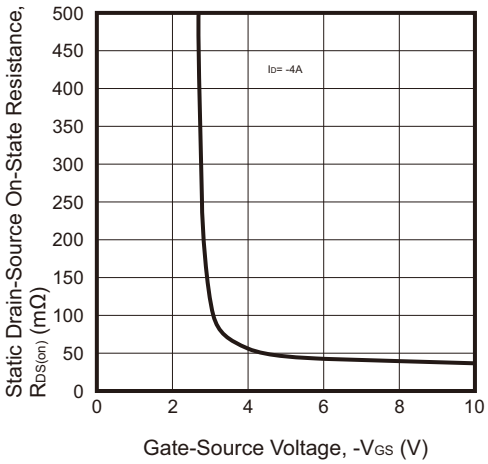
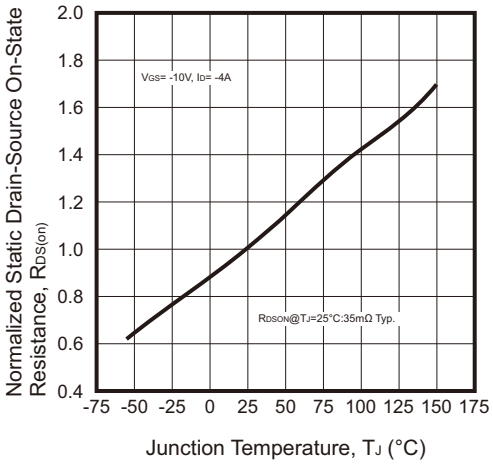


Fig.20 - Drain-Source On-State Resistance vs Junction Temperature



P-Channel Typical Rating and Characteristic Curves (CMSH9930Q8-HF)

Fig.21 - Capacitance vs Drain-to-Source Voltage

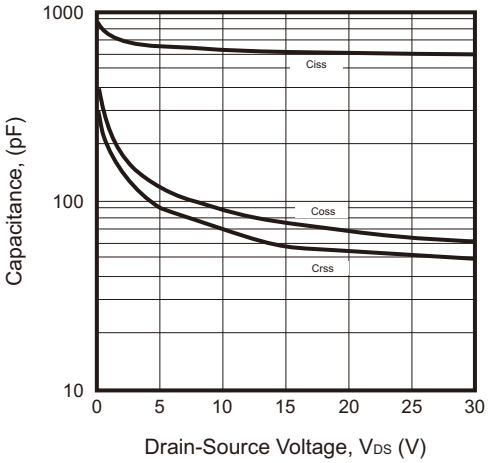


Fig.22 - Threshold Voltage vs Junction Temperature

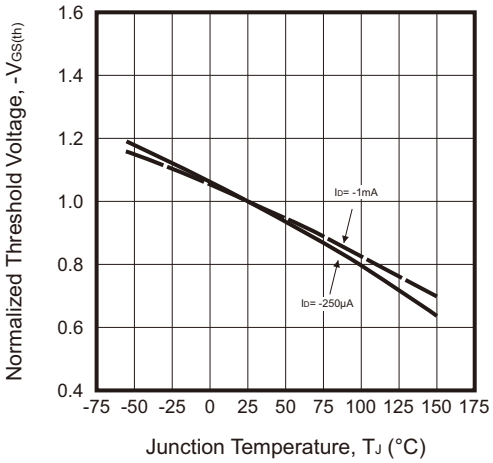


Fig.23 - Forward Transfer Admittance vs Drain Current

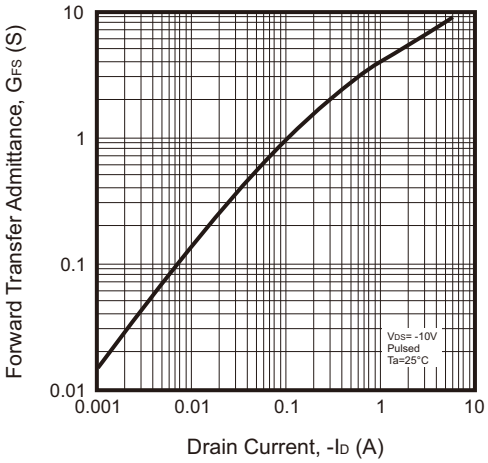


Fig.24 - Gate Charge Characteristics

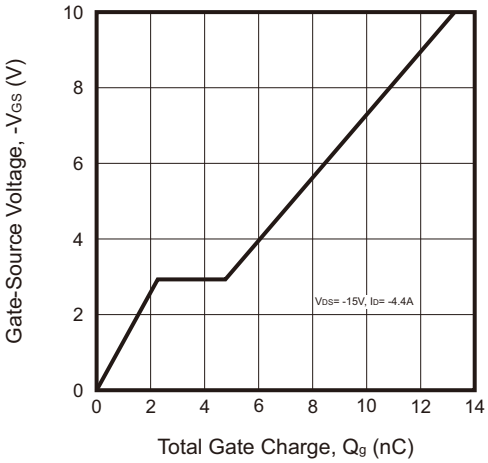


Fig.25 - Maximum Safe Operating Area

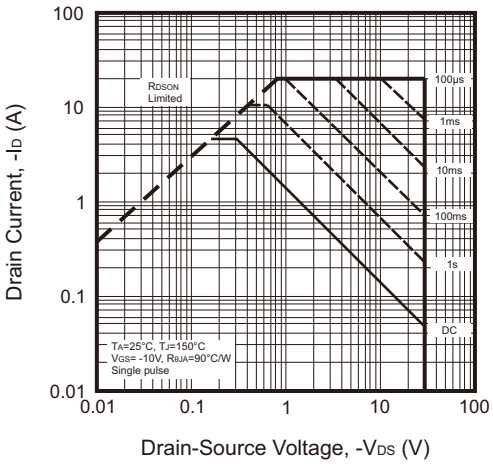
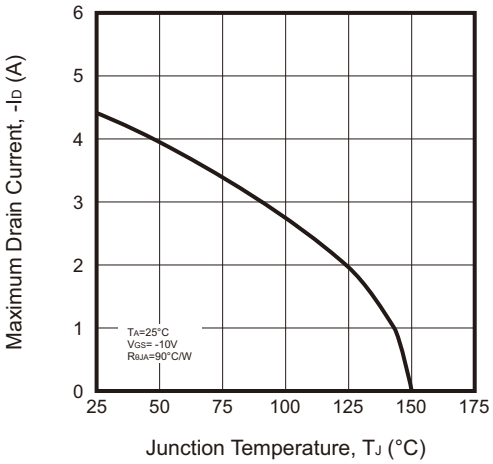


Fig.26 - Maximum Drain Current vs Junction Temperature



P-Channel Typical Rating and Characteristic Curves (CMSH9930Q8-HF)

Fig.27 - Single Pulse Power Rating, Junction to Ambient (Note on Page 1)

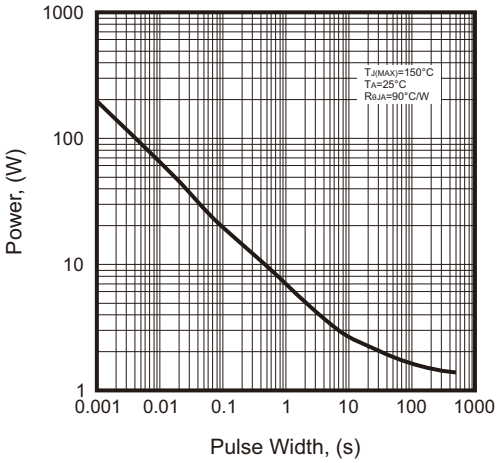
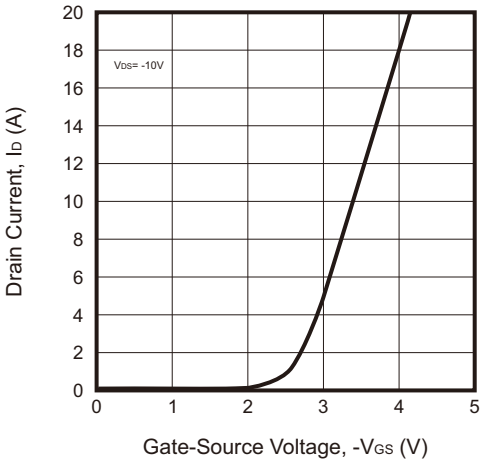
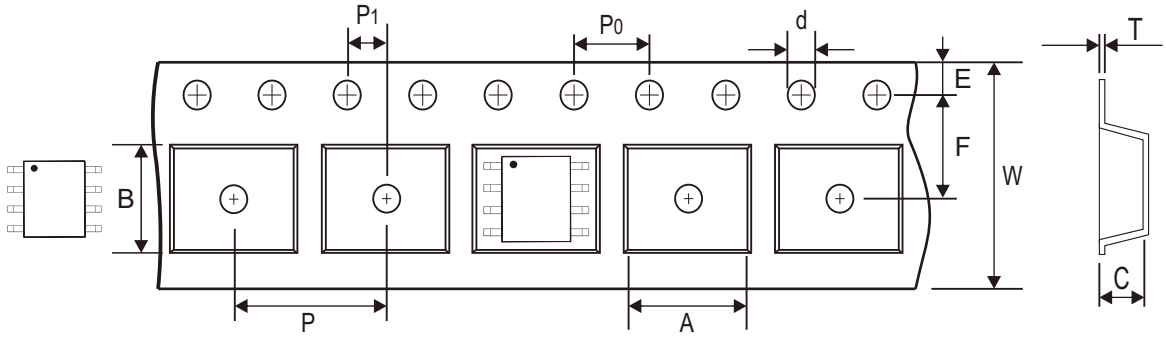
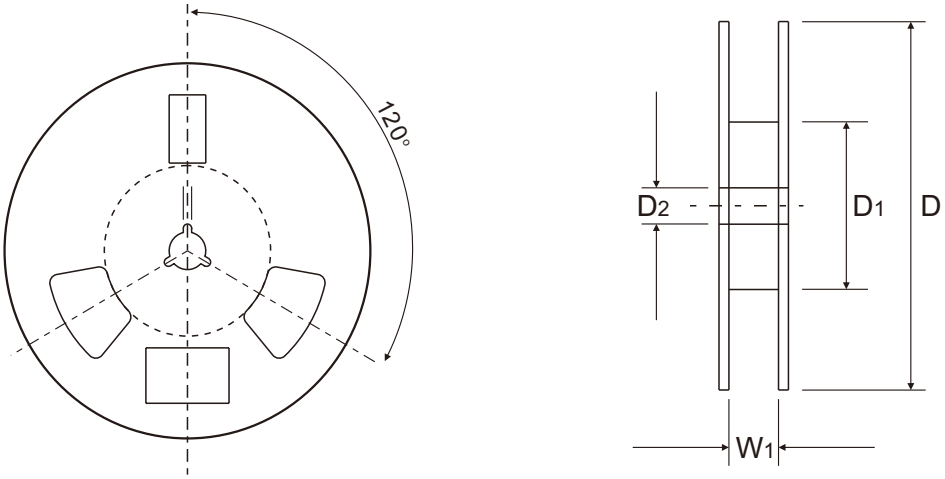


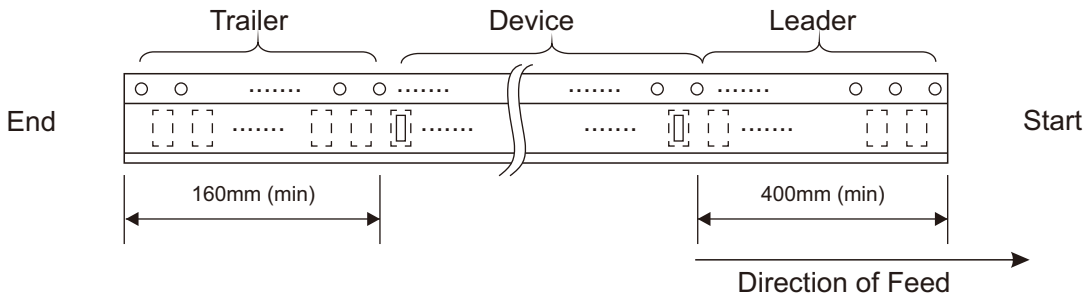
Fig.28 - Typical Transfer Characteristics



Reel Taping Specification





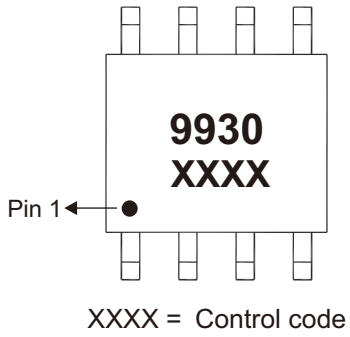


	SYMBOL	A	B	C	d	D	D_1	D_2
SOP-8	(mm)	6.40 ± 0.10	5.20 ± 0.10	2.10 ± 0.10	1.55 ± 0.05	330.00 ± 2.00	100.00 ± 1.50	13.50 ± 0.10
	(inch)	0.252 ± 0.004	0.205 ± 0.004	0.083 ± 0.004	0.061 ± 0.002	12.992 ± 0.079	3.937 ± 0.059	0.531 ± 0.004

	SYMBOL	E	F	P	P_0	P_1	T	W	W_1
SOP-8	(mm)	1.75 ± 0.10	5.50 ± 0.05	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.292 ± 0.013	12.00 + 0.30 − 0.10	13.40 ± 0.10
	(inch)	0.069 ± 0.004	0.217 ± 0.002	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.011 ± 0.001	0.472 + 0.012 − 0.004	0.528 ± 0.004

Marking Code

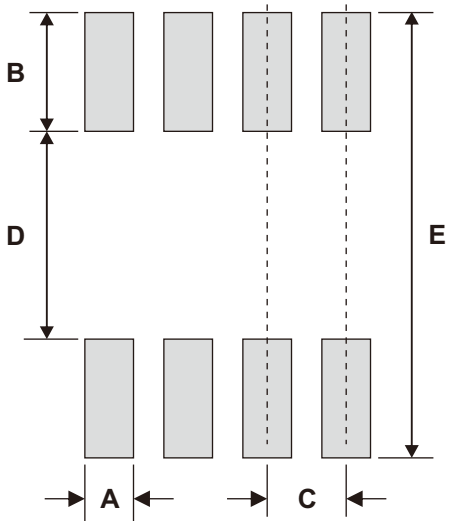
Part Number	Marking Code
CMSH9930Q8-HF	9930



XXXX = Control code

Suggested P.C.B. PAD Layout

SIZE	SOP-8	
	(mm)	(inch)
A	0.60	0.024
B	1.52	0.060
C	1.27	0.050
D	4.00	0.157
E	7.00	0.276



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOP-8	4,000	13