

CMSP3139KH3A-HF

P-Channel
RoHS Device
Halogen Free



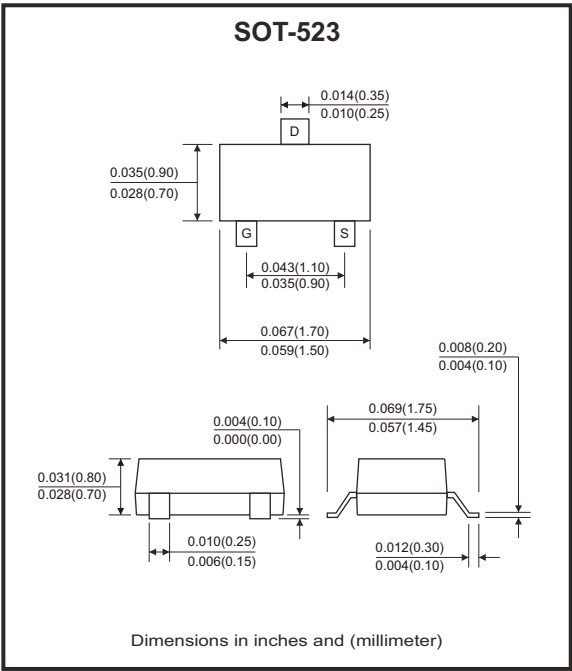
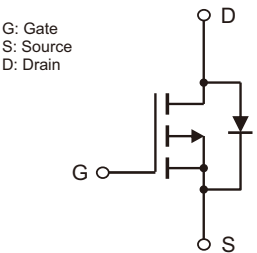
Features

- Excellent $R_{DS(on)}$ and low gate charge.
- Load switch.

Mechanical data

- Case: SOT-523, molded plastic.
- Terminals: Solderable per MIL-STD-750, method 2026.
- Mounting position: Any.

Circuit Diagram



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

Parameter		Symbol	Value	Unit
Drain-source voltage		V_{DS}	-20	V
Gate-source voltage		V_{GS}	± 10	V
Continuous drain current	$T_A = 25^{\circ}\text{C}$	I_D	-0.7	A
	$T_A = 100^{\circ}\text{C}$	I_D	-0.4	
Pulsed drain current (Note 1)		I_{DM}	Refer to Fig.3	A
Power dissipation	$T_A = 25^{\circ}\text{C}$	P_D	0.5	W
	$T_A = 100^{\circ}\text{C}$	P_D	0.1	
Operating junction and storage temperature range		T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Thermal resistance junction to ambient (Note 2)	$R_{\theta JA}$			412	$^{\circ}\text{C/W}$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	BV _{DSS}	I _D = -250μA, V _{GS} = 0V	-20			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -20V, V _{GS} = 0V			-1	μA
Gate-body leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} = ±10V			±10	μA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.5	-0.7	-0.9	V
Drain-source on-resistance (Note 3)	R _{DS(on)}	V _{GS} = -4.5V, I _D = -0.5A		307	399	mΩ
	R _{DS(on)}	V _{GS} = -2.5V, I _D = -0.4A		394	600	mΩ
Dynamic Characteristics						
Gate resistance	R _g	f = 1MHz		174		Ω
Input capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = -10V, f = 1MHz		70		pF
Output capacitance	C _{oss}			18		
Reverse transfer capacitance	C _{rss}			10		
Total gate charge	Q _g	V _{GS} = 0 to -4.5V, V _{DS} = -10V I _D = -1A		1		nC
Gate to source charge	Q _{gs}			0.3		
Gate to drain ("miller") charge	Q _{gd}			0.1		
Switching Characteristics						
Turn-on delay time	t _{d(on)}	V _{GS} = -4.5V, V _{DD} = -10V, I _D = -0.5A R _{GEN} = 3Ω		6.2		ns
Turn-on rise time	t _r			7.3		
Turn-off delay time	t _{d(off)}			40		
Turn-off fall time	t _f			22		
Body-Diode Characteristics						
Max. continuous body diode forward current	I _S				-0.7	A
Max. pulsed body diode forward current	I _{SM}				-2.8	A
Diode forward voltage	V _{SD}	V _{GS} = 0V, I _S = -0.5A			-1.2	V
Reverse recovery time	t _{rr}	I _F = -2A, dI/dt = 100A/μs		10		ns
Reverse recovery charge	Q _{rr}			0.6		nC

Notes: 1. Pulse width limited by maximum junction temperatures.

2. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB.

3. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 0.5\%$.

Typical Rating and Characteristic Curves (CMSP3139KH3A-HF)

Fig.1 - Power Derating

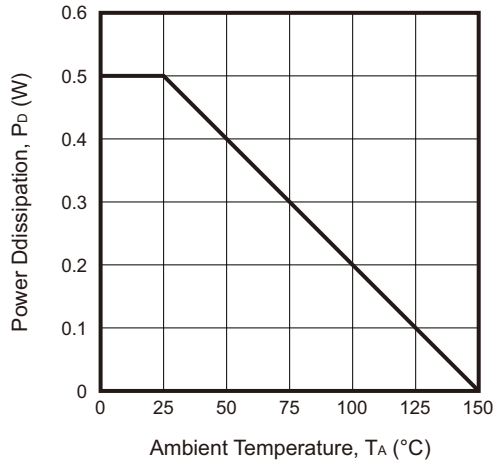


Fig.2 - Current Derating

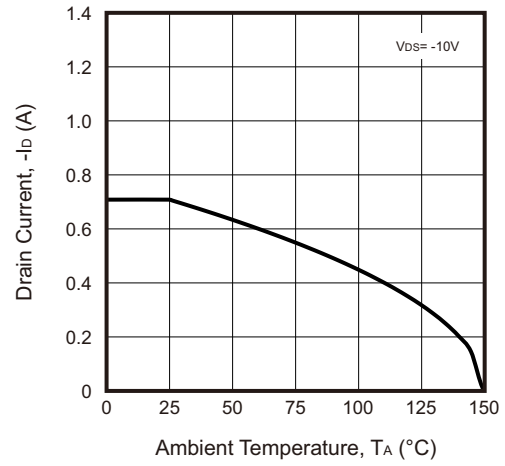


Fig.3 - Peak Current Capacity

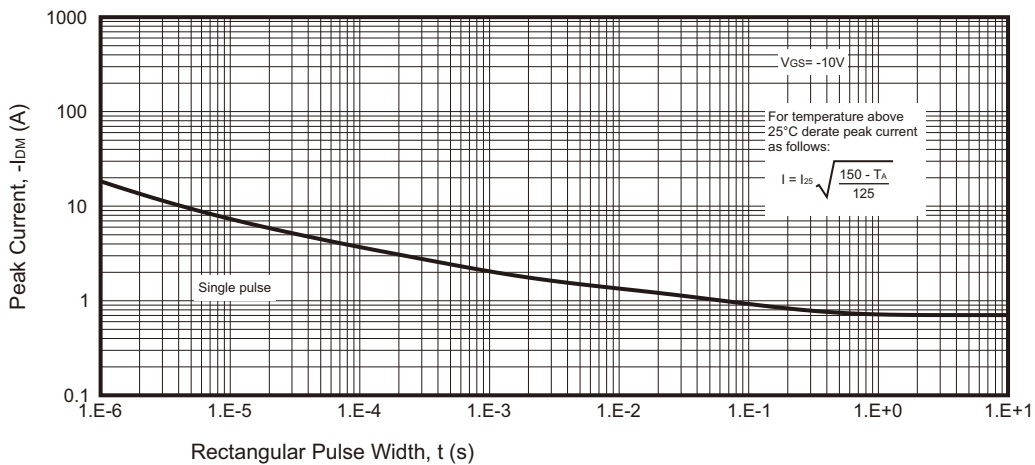


Fig.4 - Output Characteristics

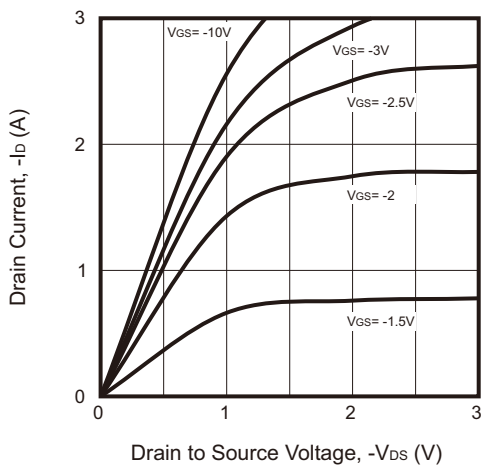
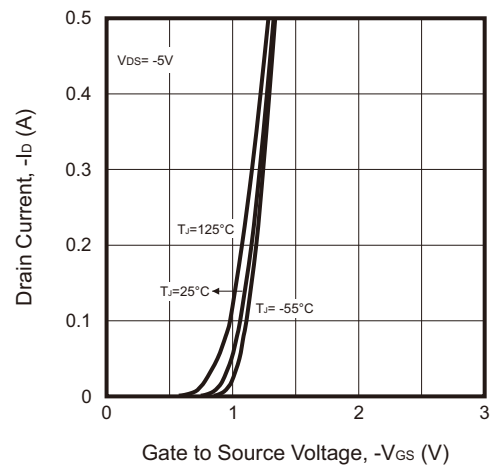


Fig.5 - Typical Transfer Characteristics



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Fig.6 - On-Resistance vs. Drain Current

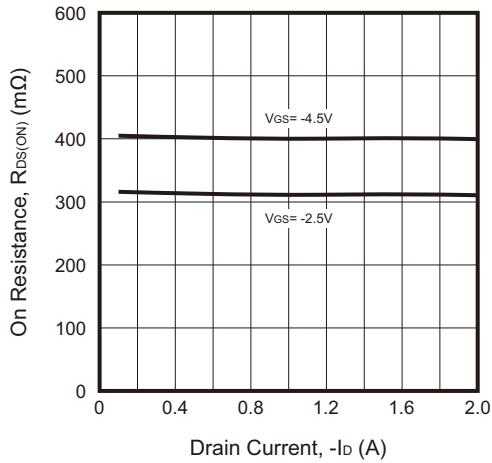


Fig.7 - Body Diode Characteristics

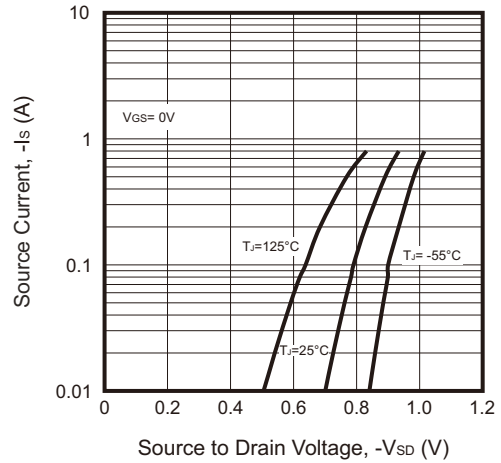


Fig.8 - Gate Charge Characteristics

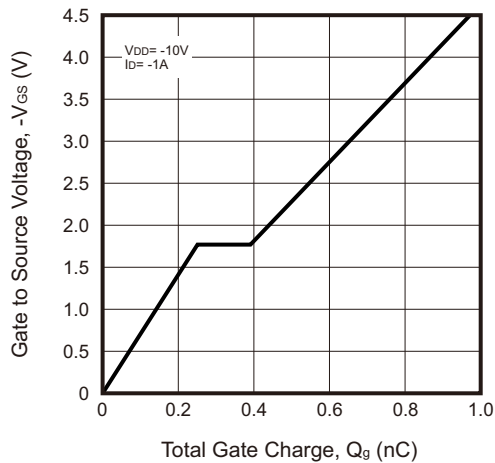


Fig.9 - Capacitance Characteristics

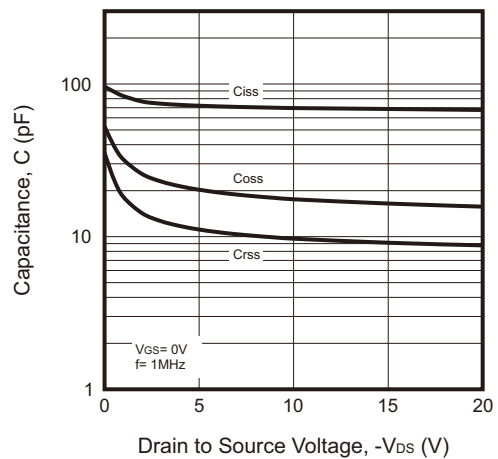


Fig.10 - Normalized Breakdown Voltage vs. Junction Temperature

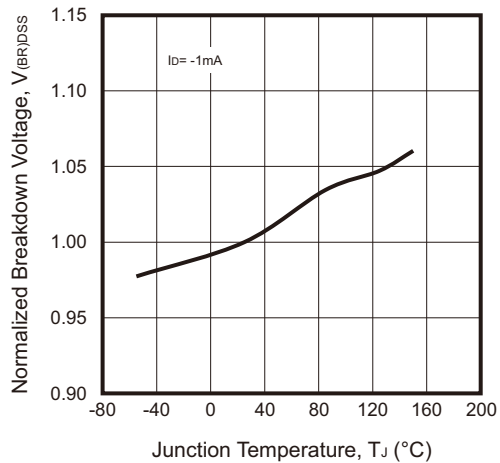
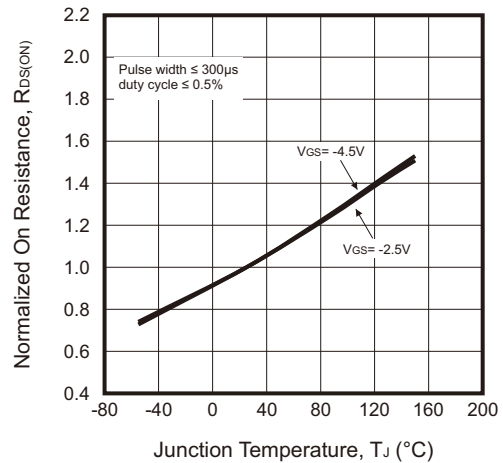


Fig.11 - Normalized On Resistance vs. Junction Temperature



Typical Rating and Characteristic Curves (CMSP3139KH3A-HF)

Fig.12 - Normalized Threshold Voltage vs. Junction Temperature

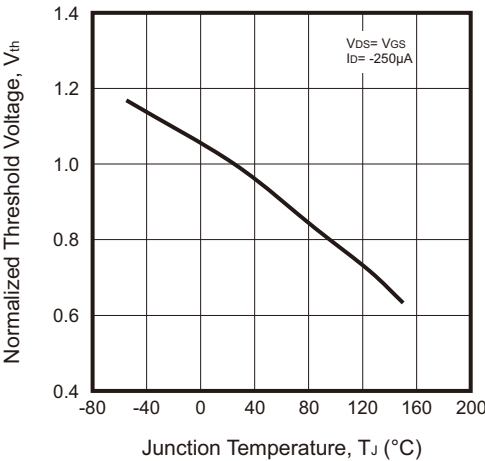


Fig.13 - $R_{DS(ON)}$ vs. V_{GS}

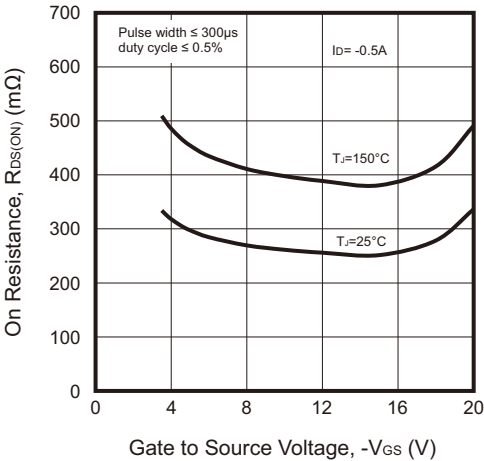
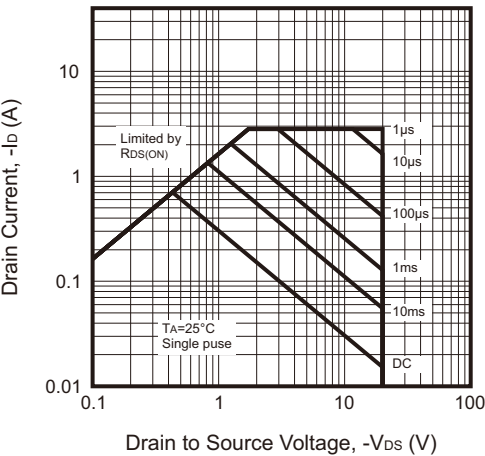
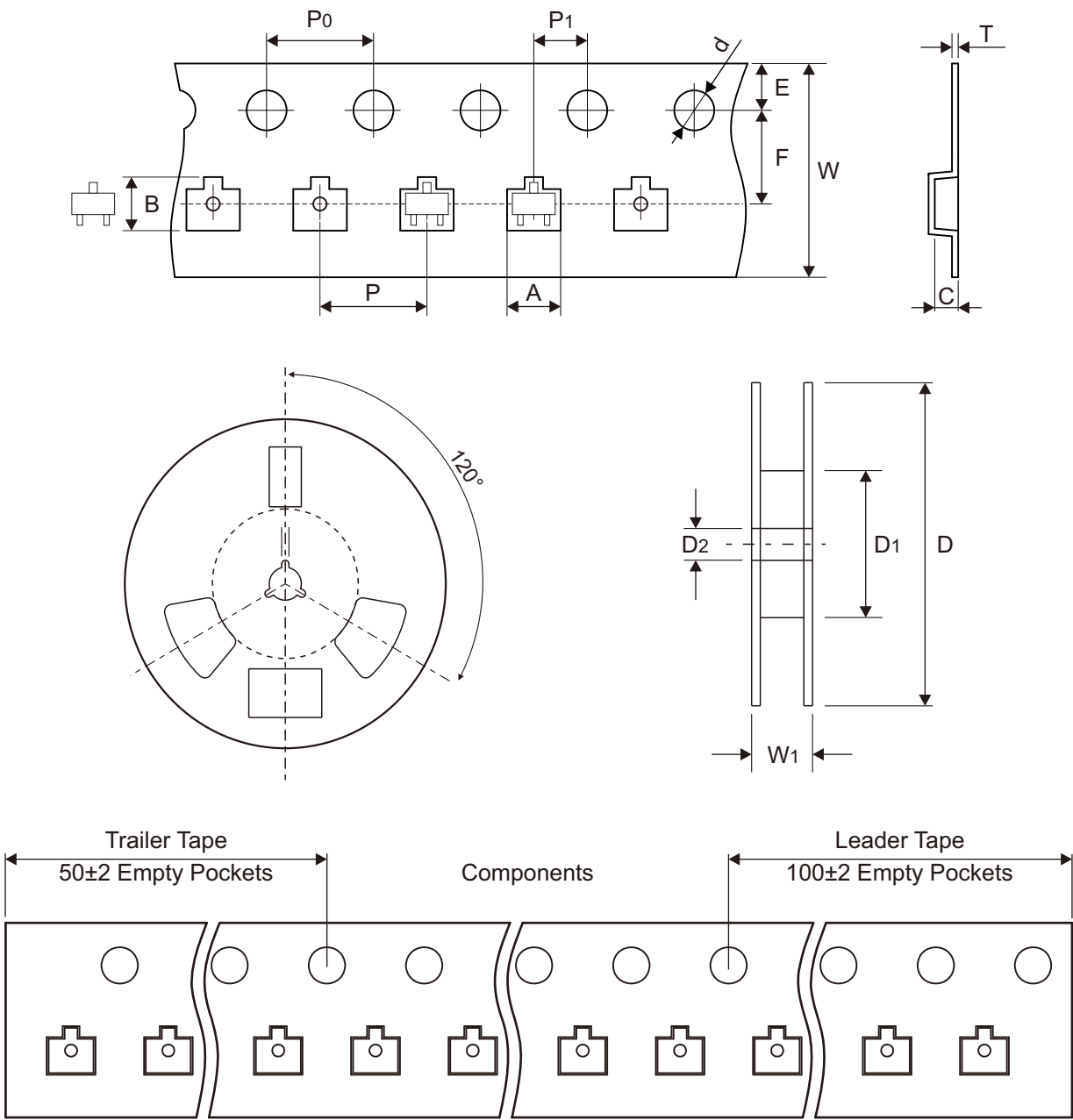


Fig.14 - Maximum Safe Operating Area



Reel Taping Specification

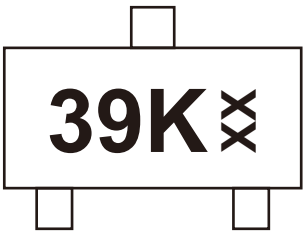


	SYMBOL	A	B	C	d	D	D1	D2
SOT-523	(mm)	1.73 ± 0.10	1.92 ± 0.10	1.00 ± 0.10	1.50 ± 0.05	178.50 ± 0.50	51.50 ± 0.50	13.45 ± 0.25
	(inch)	0.068 ± 0.004	0.076 ± 0.004	0.039 ± 0.004	0.059 ± 0.002	7.028 ± 0.020	2.028 ± 0.020	0.530 ± 0.010

	SYMBOL	E	F	P	P0	P1	T	W	W1
SOT-523	(mm)	1.75 ± 0.10	3.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.20 ± 0.05	8.00 ± 0.15	11.00 ± 1.00
	(inch)	0.069 ± 0.004	0.138 ± 0.002	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.008 ± 0.002	0.315 ± 0.006	0.433 ± 0.039

Marking Code

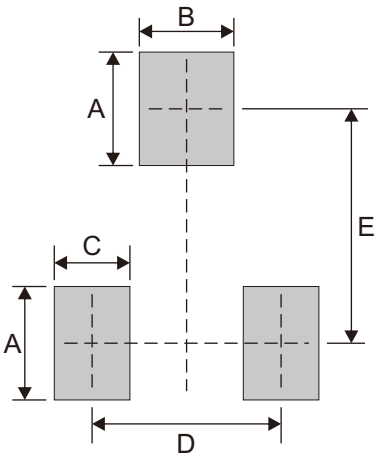
Part Number	Marking Code
CMSP3139KH3A-HF	39K



XX = Control code

Suggested P.C.B. 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



Standard Packaging

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