UNIKC Semiconductor

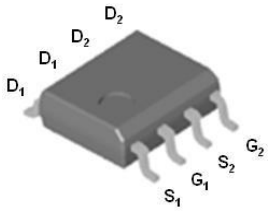
RoHS Compliant

P5003QVG

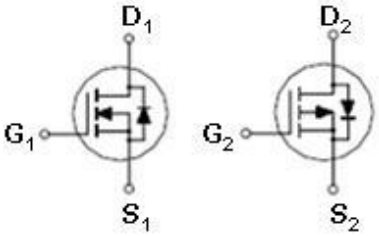
N&P-Channel Enhancement Mode MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D	Channel
30V	27.5mΩ @V_{GS} = 10V	10A	N
-30V	45mΩ @V_{GS} = -10V	-7A	P



SOP-8



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	CH.	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	N	30	V
			P	-30	
Gate-Source Voltage		V_{GS}	N	±20	
			P	±20	
Continuous Drain Current	T_A = 25 °C	I_D	N	10	A
			P	-7	
	T_A = 70 °C		N	7	
			P	-5	
Pulsed Drain Current[1]		I_{DM}	N	20	
			P	-20	
Power Dissipation	T_A = 25 °C	P_D	N	2.5	W
			P	2.5	
	T_A = 70 °C		N	1.6	
			P	1.6	
Junction & Storage Temperature Range		T_J, T_{STG}		-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient	$R_{\theta JA}$		50	°C / W
Junction-to-Case	$R_{\theta JC}$		30	°C / W

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle≤1%.

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ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS		LIMITS MIN	LIMITS TYP	LIMITS MAX	UNITS
STATIC							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	N	30			V
		V_{GS} = 0V, I_D = -250μA	P	-30			
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	N	1	1.5	2.5	
		V_{DS} = V_{GS}, I_D = -250μA	P	-1	-1.5	-2.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	N			±100	nA
		V_{DS} = 0V, V_{GS} = ±20V	P			±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V	N			1	μA
		V_{DS} = -24V, V_{GS} = 0V	P			-1	
		V_{DS} = 20V, V_{GS} = 0V, T_J = 55 °C	N			10	
		V_{DS} = -20V, V_{GS} = 0V, T_J = 55 °C	P			-10	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 5V, V_{GS} = 10V	N	20			A
		V_{DS} = -5V, V_{GS} = -10V	P	-20			
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 6A	N		30	40	mΩ
		V_{GS} = -4.5V, I_D = -4A	P		62	80	
		V_{GS} = 10V, I_D = 7A	N		20.5	27.5	
		V_{GS} = -10V, I_D = -5A	P		37.5	45	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 7A	N		16		S
		V_{DS} = -5V, I_D = -5A	P		13		
DYNAMIC							
Input Capacitance	C_{iss}	N-Channel V_{GS} = 0V, V_{DS} = 15V, f = 1MHz P-Channel V_{GS} = 0V, V_{DS} = -15V, f = 1MHz	N		680		pF
			P		780		
Output Capacitance	C_{oss}		N		105		
			P		145		
Reverse Transfer Capacitance	C_{rss}		N		75		
			P		79		
Total Gate Charge[2]	Q_g	N-Channel V_{DS} = 0.5*$V_{(BR)DSS}$, V_{GS} = 10V, I_D = 7A P-Channel V_{DS} = 0.5*$V_{(BR)DSS}$, V_{GS} = -10V, I_D = -5A	N		14		nC
			P		15.1		
Gate-Source Charge[2]	Q_{gs}		N		1.9		
			P		2.1		
Gate-Drain Charge[2]	Q_{gd}		N		3.3		
			P		4.0		
Gate Resistance	R_g	V_{GS}=15mV,V_{DS}=0V,f=1MHz	N		1.7	2.5	Ω
			P		3.5	6	

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DYNAMIC							
Turn-On Delay Time[2]	$t_{d(on)}$	N-Channel V_{DD}= 10V $I_D \cong$ 1A, V_{GS} = 10V, R_{GEN} =3Ω	N		4.6	7	nS
			P		7.7	11.5	
Rise Time[2]	t_r		N		4	6	
			P		5.7	8.5	
Turn-Off Delay Time[2]	$t_{d(off)}$	P-Channel V_{DD} = -10V $I_D \cong$ -1A, V_{GS} = -10V, R_{GEN} = 3Ω	N		20	30	
			P		20	30	
Fall Time[2]	t_f		N		5	8	
			P		9.5	14	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)							
Continuous Current	I_S		N			1.3	A
			P			-1.3	
Forward Voltage[1]	V_{SD}	I_F = 1A, V_{GS} = 0V	N			1	V
		I_F = -1A, V_{GS} = 0V	P			-1	

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

[3]Pulse width limited by maximum junction temperature.

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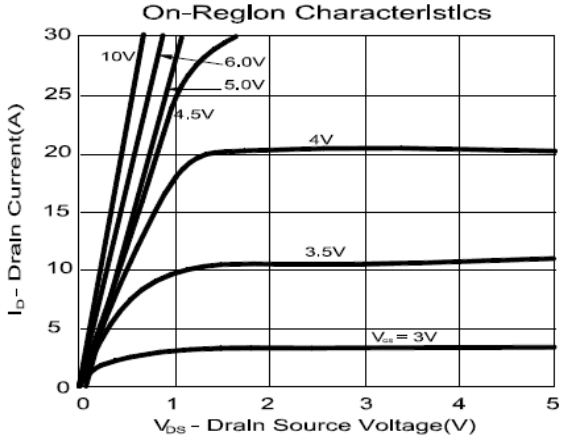
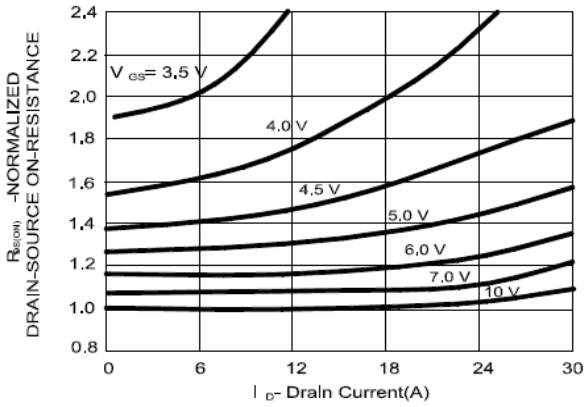
N-CHANNEL

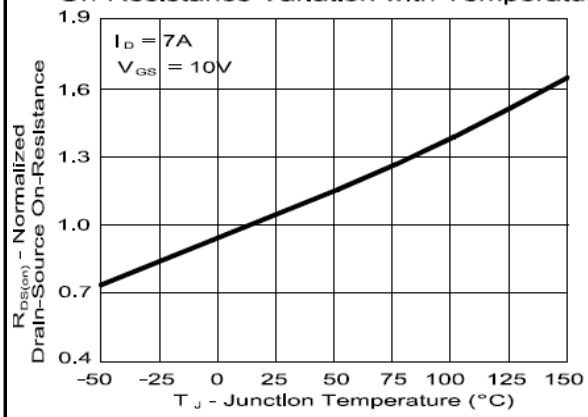
On-Region Characteristics



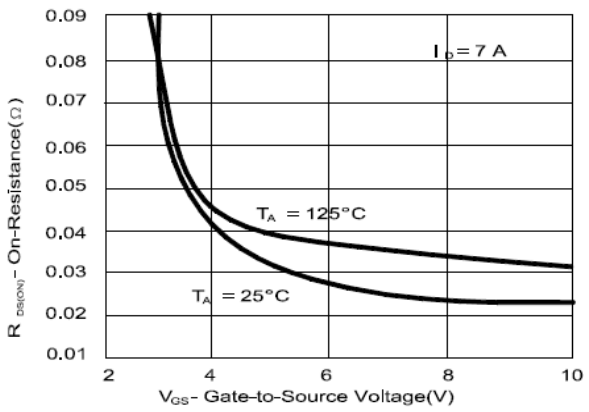
On-Resistance Variation with Drain Current and Gate Voltage



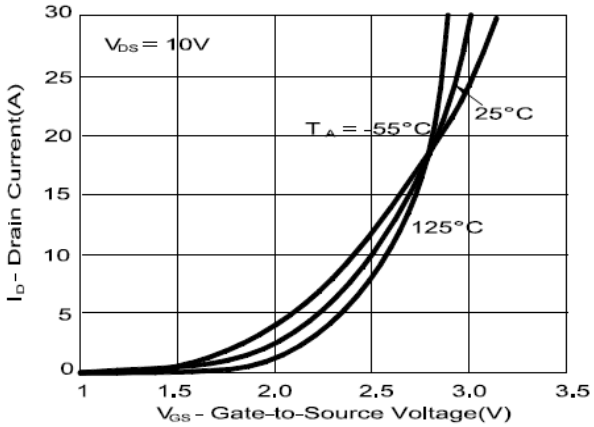
On-Resistance Variation with Temperature



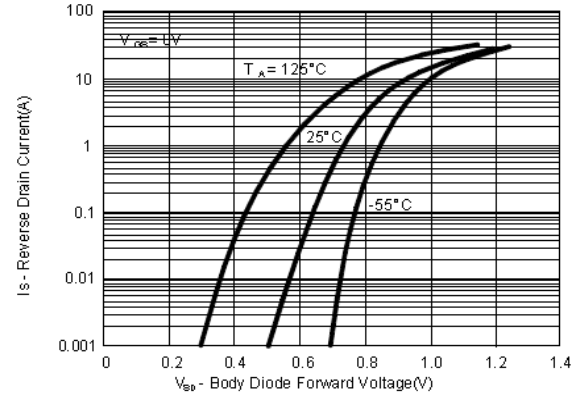
On-Resistance Variation with Gate-to-Source Voltage



Transfer Characteristics



Body Diode Forward Voltage Variation with Source Current and Temperature



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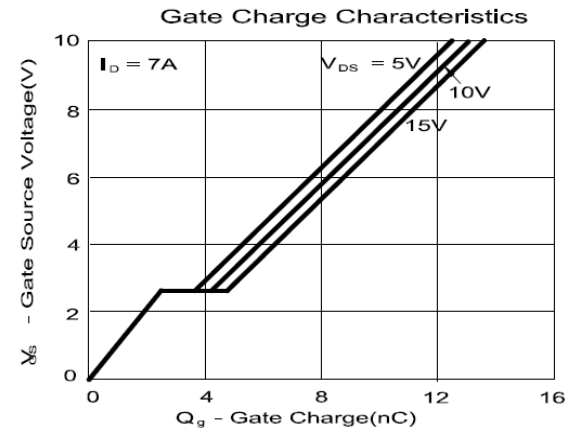

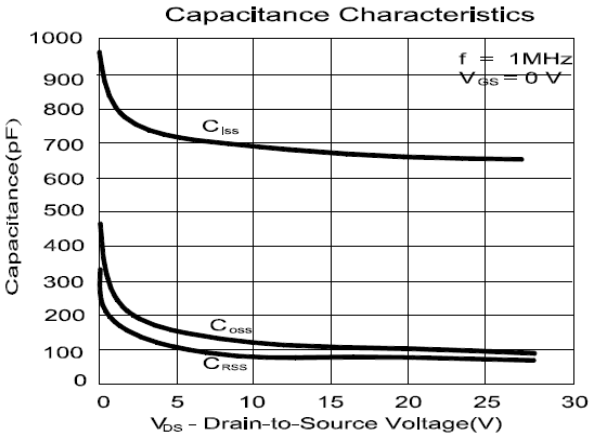

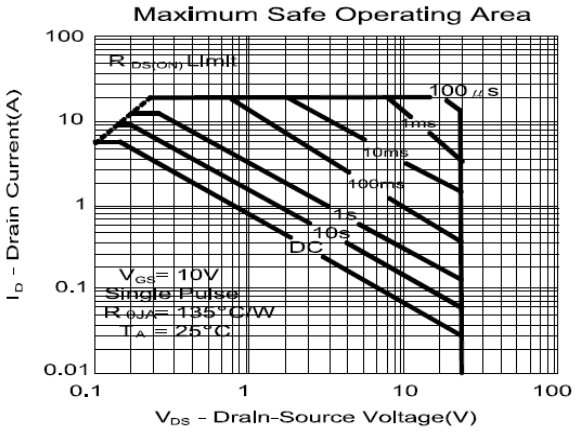

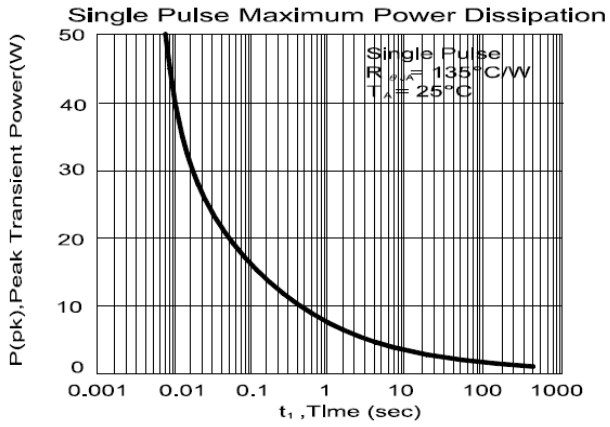

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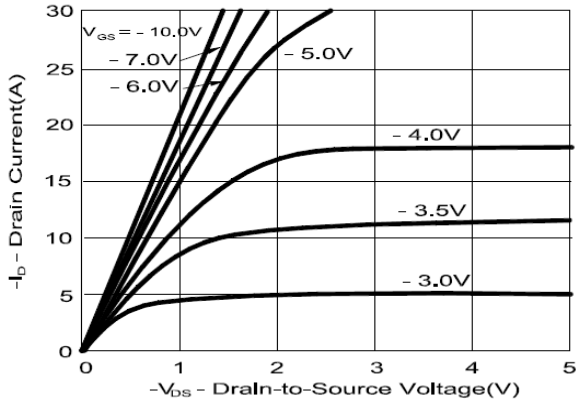
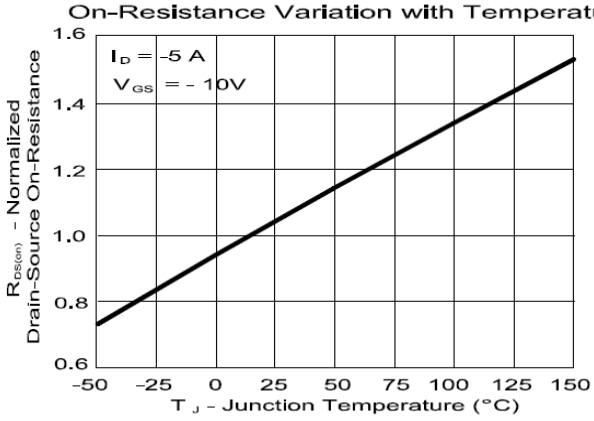
P-CHANNEL

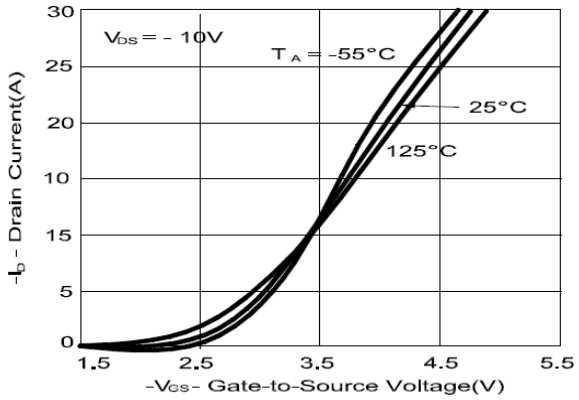
On-Region Characteristics



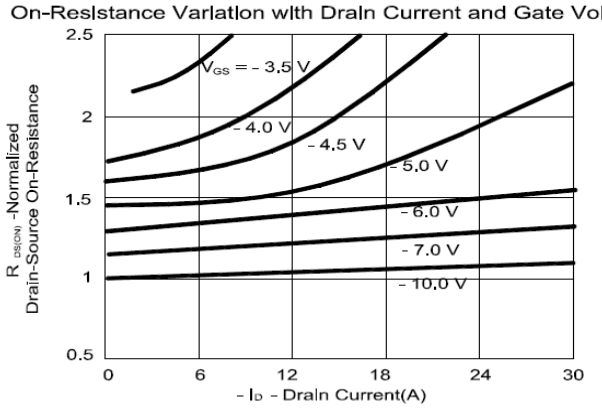
On-Resistance Variation with Temperature



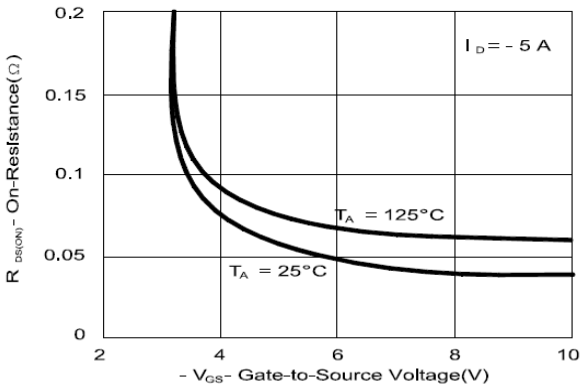
Transfer Characteristics



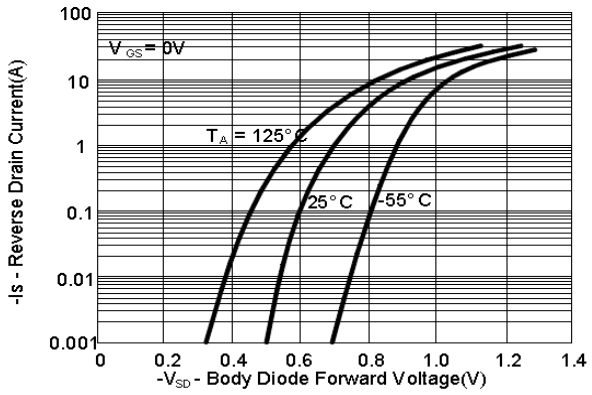
On-Resistance Variation with Drain Current and Gate Voltage



On-Resistance Variation with Gate-to-Source Voltage



Body Diode Forward Voltage Variation with Source Current and Temperature



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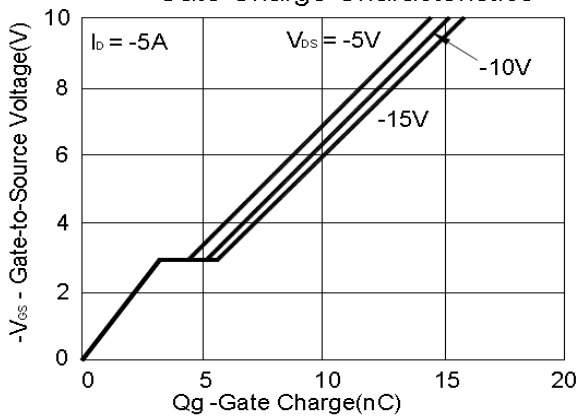
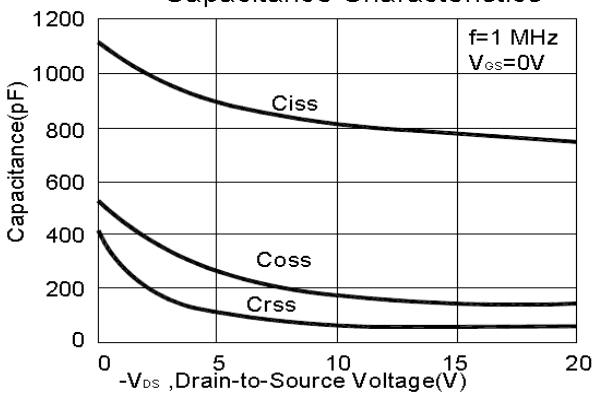
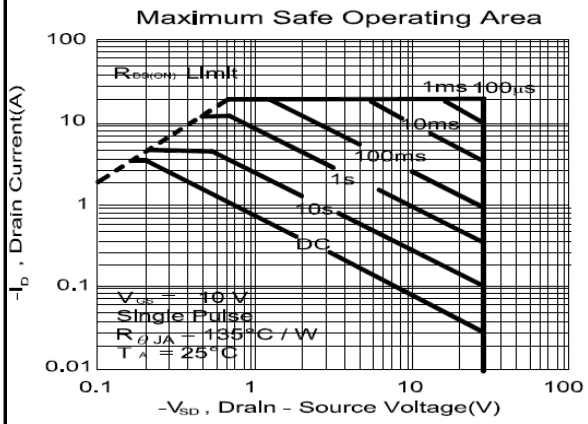
Gate Charge Characteristics



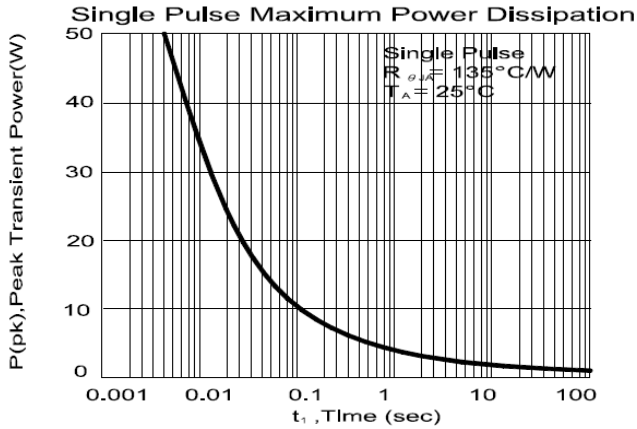
Capacitance Characteristics



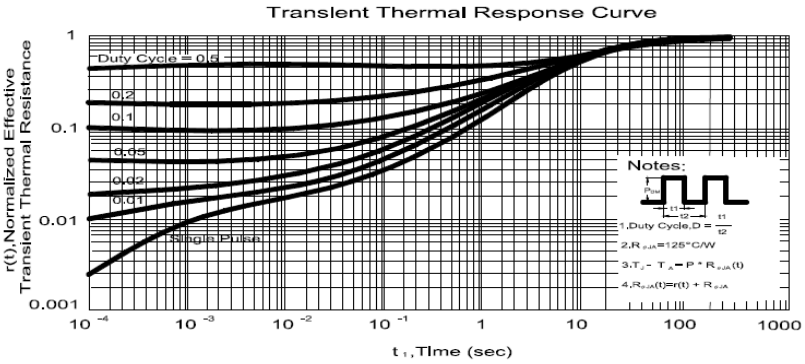
Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



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Package Dimension

SOP-8 MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	4.8	4.9	5.0	H	0.4	0.6	0.93
B	3.8	3.9	4.0	I	0.19	0.21	0.25
C	5.79	6.0	6.2	J	0.25	0.375	0.5
D	0.33	0.4	0.51	K	0°	3°	18°
E	1.25	1.27	1.29				
F	1.1	1.3	1.65				
G	0.05	0.15	0.25				

