N and P Channel Enhancement Mode Power MOSFET

Description

The G070C03D52 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

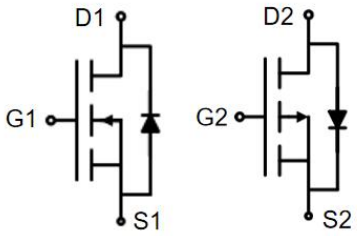
General Features

- NMOS
- V_{DS} 30V
- I_D (at V_{GS} = 10V) 65A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 8.5mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5V) < 12mΩ
- 100% Avalanche Tested
- RoHS Compliant

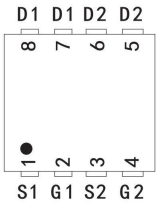
- PMOS
- V_{DS} -30V
- I_D (at V_{GS} = -10V) -19A
- $R_{DS(ON)}$ (at V_{GS} = -10V) < 22mΩ
- $R_{DS(ON)}$ (at V_{GS} = -4.5V) < 32mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

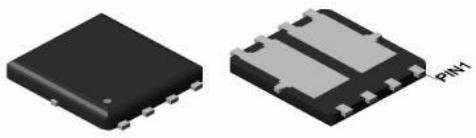
- Power switch
- DC/DC converters



Schematic diagram



pin assignment



DFN5X6 Dual

Ordering Information

Device	Package	Marking	Packaging
G070C03D52	DFN5X6 Dual	G070C03D	5000pcs/Reel

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	NMOS	PMOS	Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Continuous Drain Current	T_C = 25ºC	I_D	65	-19	A
	T_C = 100ºC		41	-12	
Pulsed Drain Current	(note1)	I_{DM}	260	-76	A
Gate-Source Voltage		V_{GS}	±20	±20	V
Power Dissipation		P_D	48	40	W
Single pulse avalanche energy	（note2）	E_{AS}	42	42	mJ
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To 150	-55 To 150	ºC

Thermal Resistance

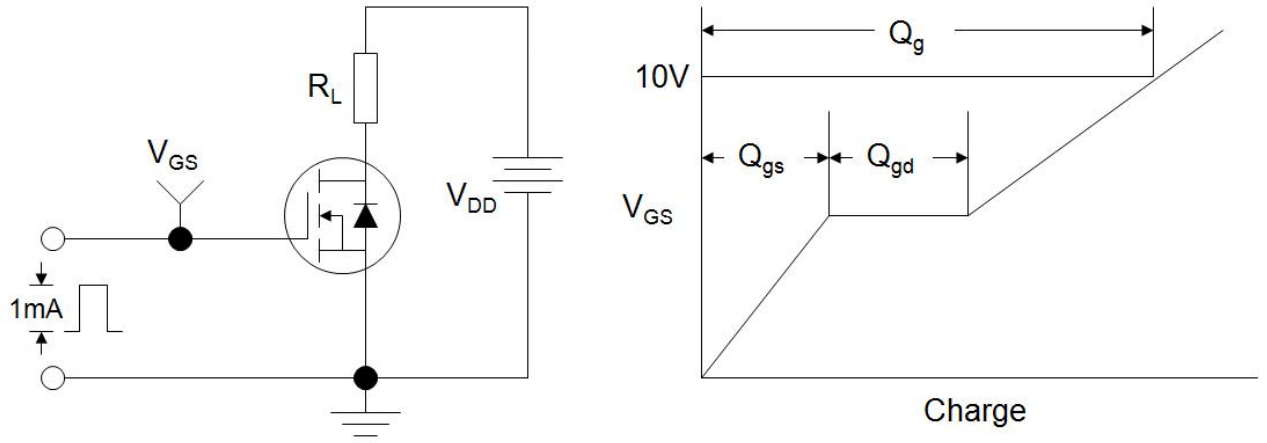
Parameter	Symbol	NMOS	PMOS	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	50	ºC/W
Maximum Junction-to-Case	R_{thJC}	2.6	3.1	ºC/W

NMOS Specifications T_J = 25ºC, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	30	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.6	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	--	7	8.5	mΩ
		V_{GS} = 4.5V, I_D = 20A	--	10	12	
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 20A	--	39	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1.0MHz	--	1390	--	pF
Output Capacitance	C_{oss}		--	230	--	
Reverse Transfer Capacitance	C_{rss}		--	188	--	
Total Gate Charge	Q_g	V_{DD} = 15V, I_D = 20A, V_{GS} = 10V	--	27	--	nC
Gate-Source Charge	Q_{gs}		--	4	--	
Gate-Drain Charge	Q_{gd}		--	6	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 15V, I_D = 20A, R_G = 1.8Ω	--	10	--	ns
Turn-on Rise Time	t_r		--	8	--	
Turn-off Delay Time	$t_{d(off)}$		--	30	--	
Turn-off Fall Time	t_f		--	5	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	65	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} =20A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 20A, V_{GS} = 0V di/dt=500A/us	--	24	--	nC
Reverse Recovery Time	Trr		--	14.7	--	ns

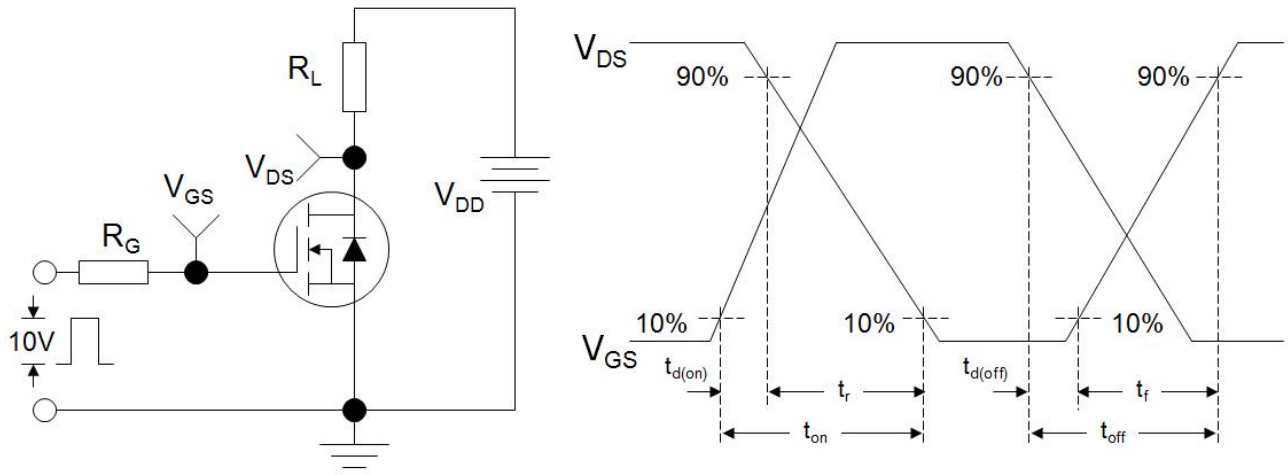
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=30V,VGS=10V,L=0.5mH,Rg=25Ω
   The table shows the minimum avalanche energy, which is 110mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

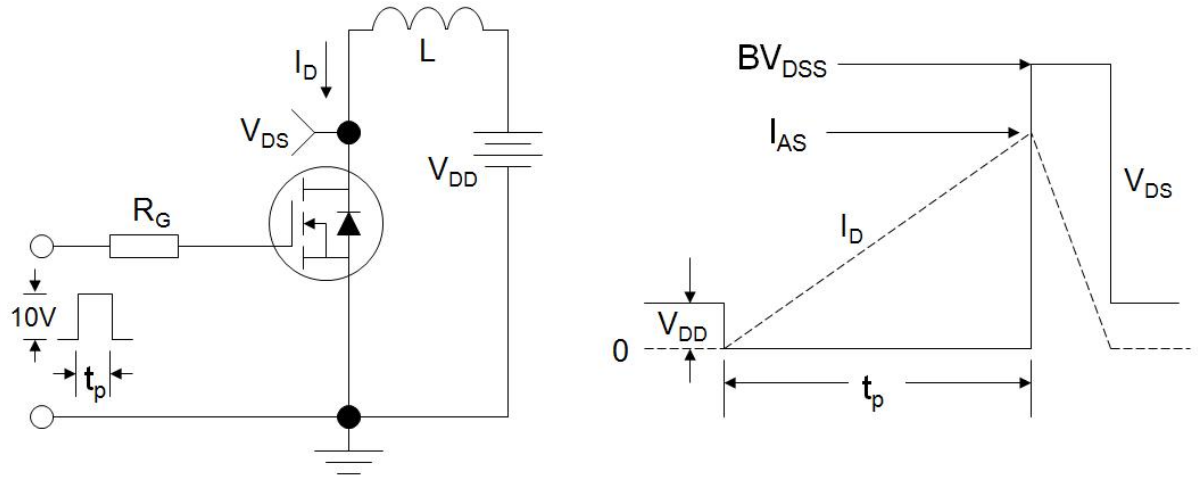
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



NMOS Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

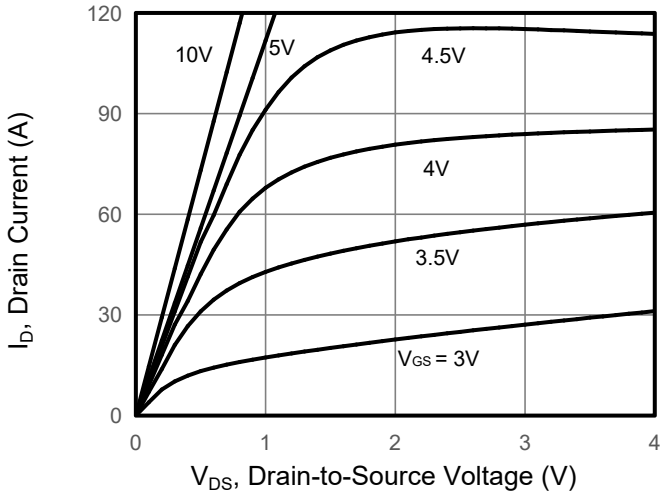


Figure 2. Transfer Characteristics

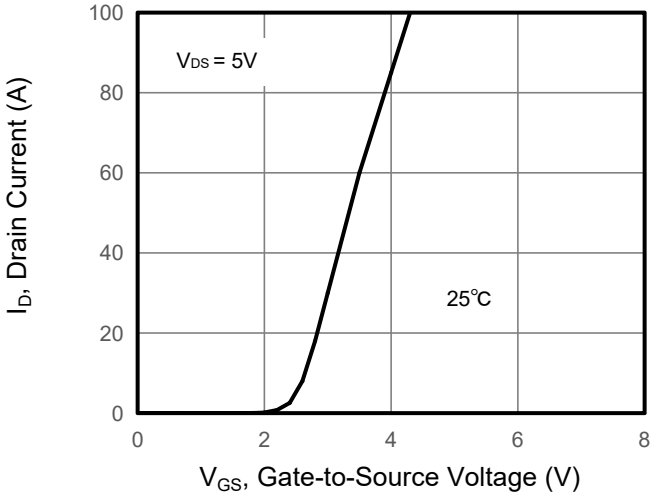


Figure 3. Drain Source On Resistance

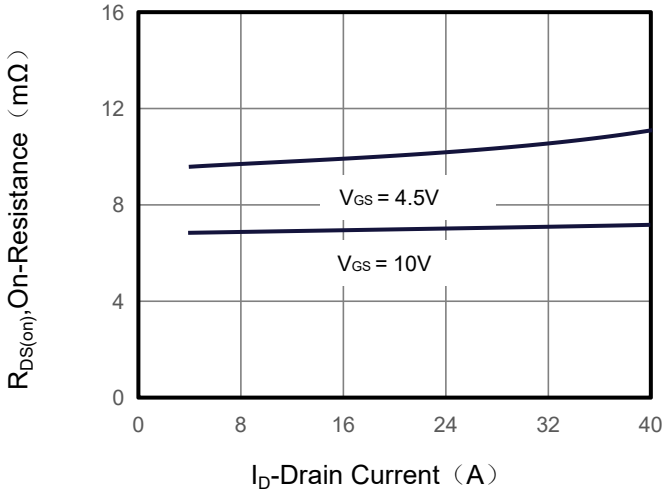


Figure 4. Gate Charge

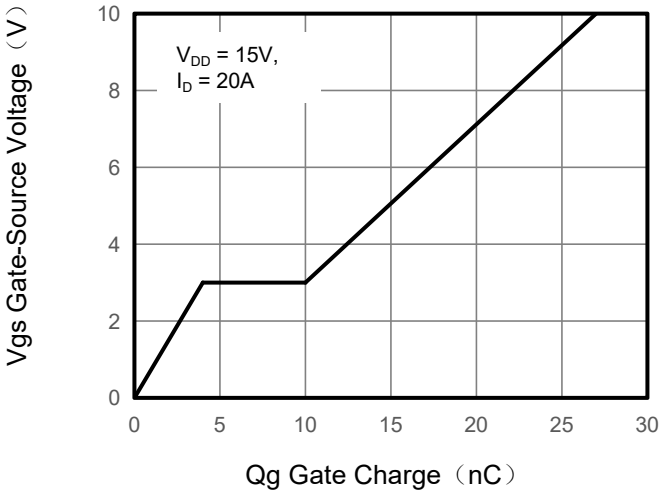


Figure 5. Capacitance

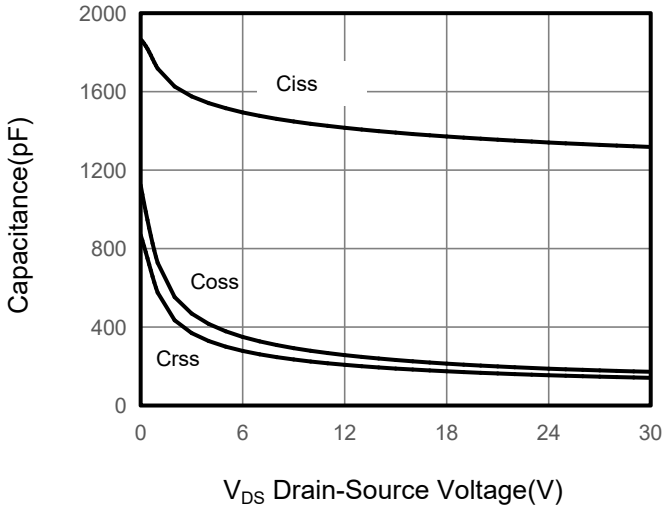
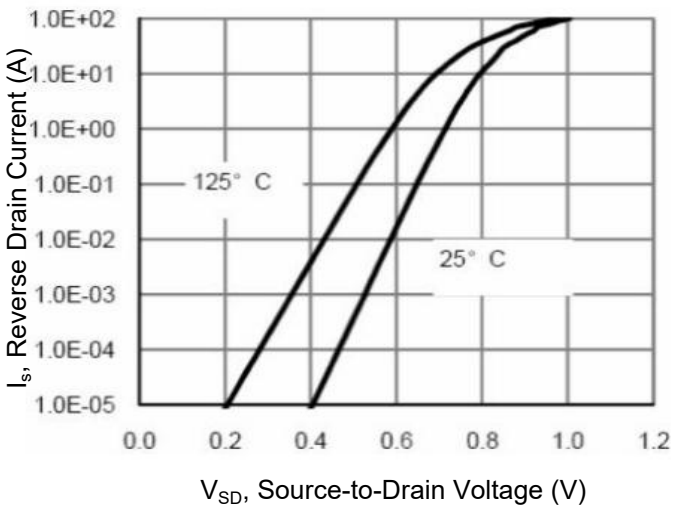


Figure 6. Source-Drain Diode Forward



NMOS Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

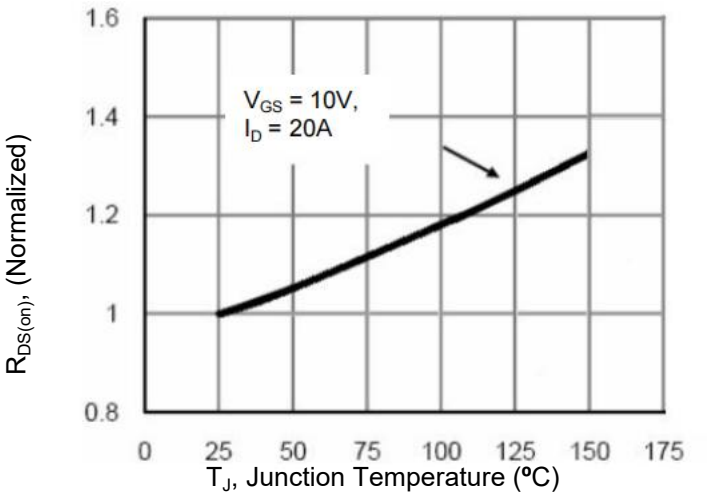


Figure 8. Safe Operation Area

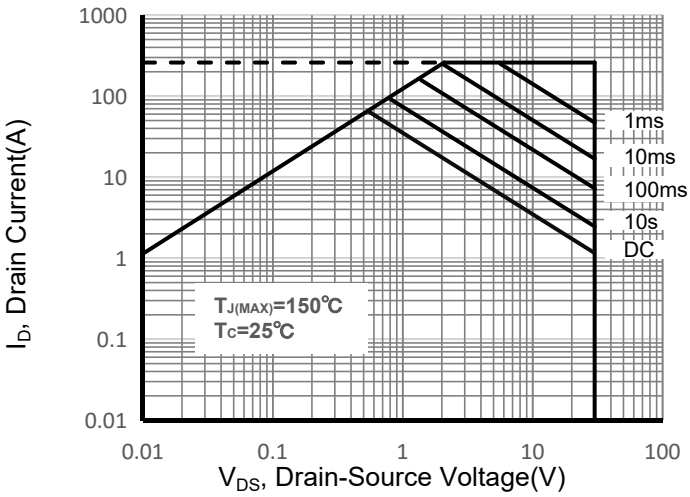


Figure 9. Maximum Continuous Drain Current vs Case Temperature

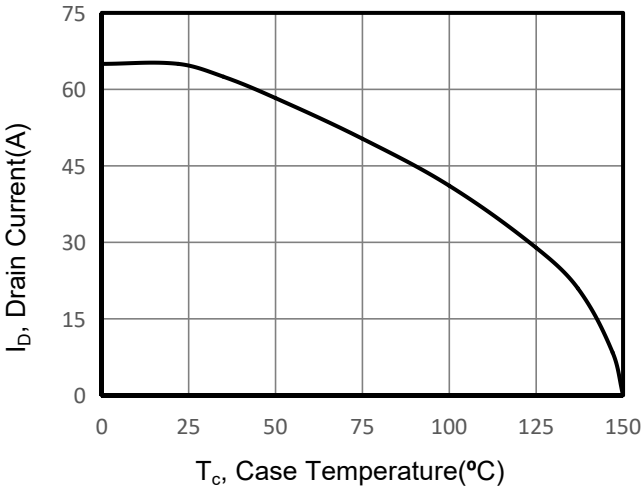
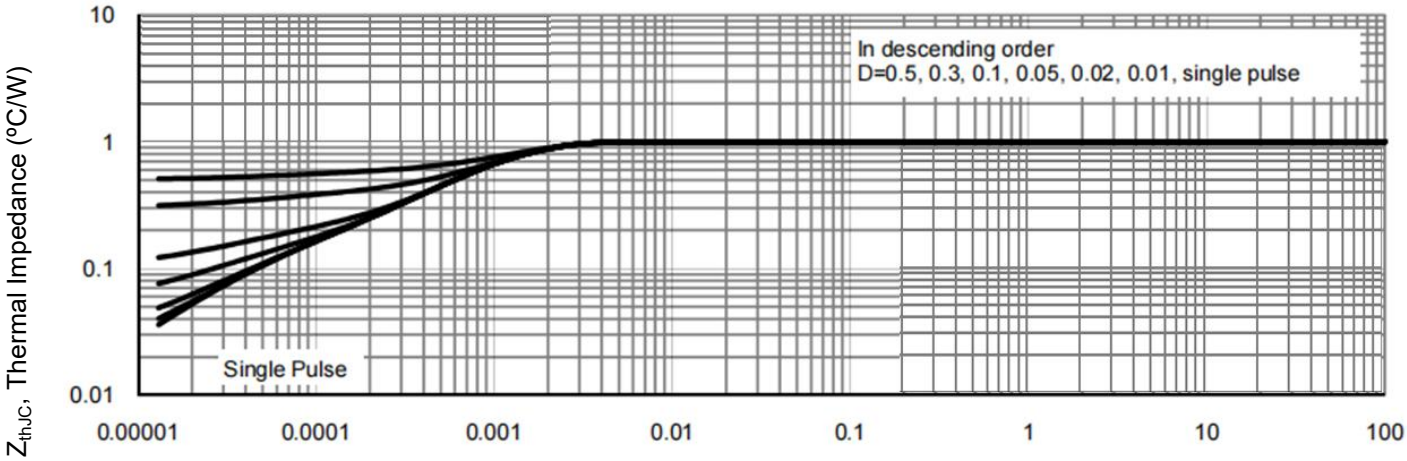


Figure 10. Normalized Maximum Transient Thermal Impedance

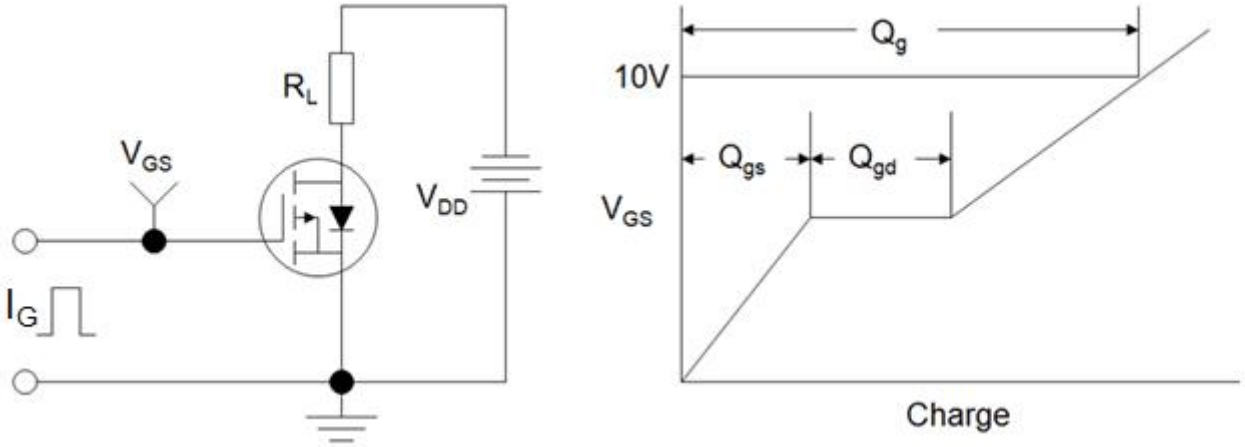


PMOS Specifications T_J = 25ºC, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-30	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -30V, V_{GS} = 0V	--	--	-1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.0	-1.5	-2.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -6A	--	18	22	mΩ
		V_{GS} = -4.5V, I_D = -6A	--	25	32	
Forward Transconductance	g_{FS}	V_{DS} = -5V,I_D = -6A	--	37	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -15V, f = 1.0MHz	--	1300	--	pF
Output Capacitance	C_{oss}		--	165	--	
Reverse Transfer Capacitance	C_{rss}		--	157	--	
Total Gate Charge	Q_g	V_{DD} = -15V, I_D = -6A, V_{GS} = -10V	--	23	--	nC
Gate-Source Charge	Q_{gs}		--	3	--	
Gate-Drain Charge	Q_{gd}		--	5	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = -15V, I_D = -6A, R_G = 3Ω	--	12.5	--	ns
Turn-on Rise Time	t_r		--	18	--	
Turn-off Delay Time	$t_{d(off)}$		--	125	--	
Turn-off Fall Time	t_f		--	66	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	-19	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = -6A, V_{GS} = 0V	--	--	-1.2	V
Reverse Recovery Charge	Q_{rr}	I_F = -6A, V_{GS} = 0V di/dt=-500A/us	--	62	--	nC
Reverse Recovery Time	T_{rr}		--	32	--	ns

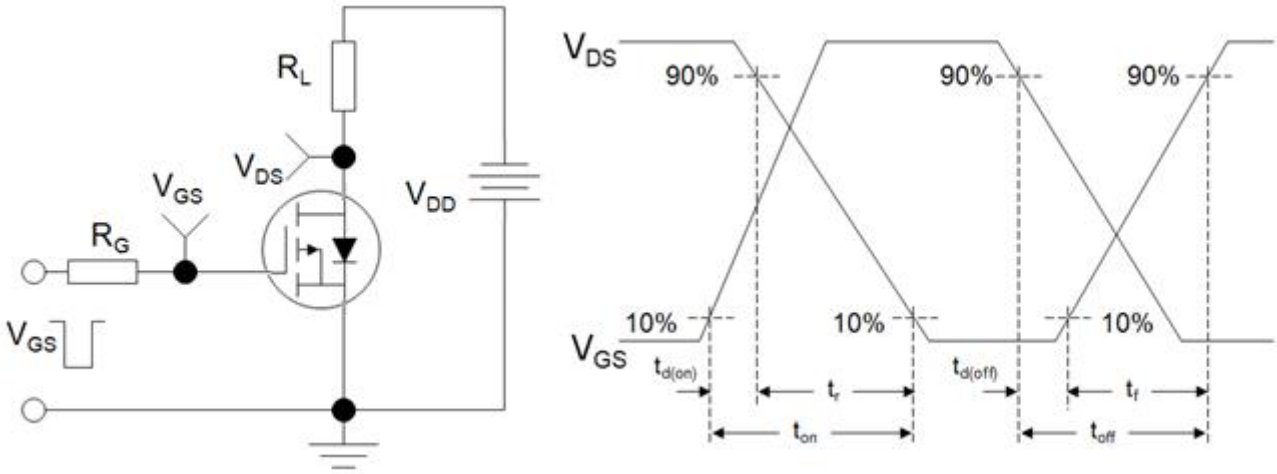
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=-30V,VGS=-10V,L=0.5mH,Rg=25Ω
   The table shows the minimum avalanche energy, which is 110mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

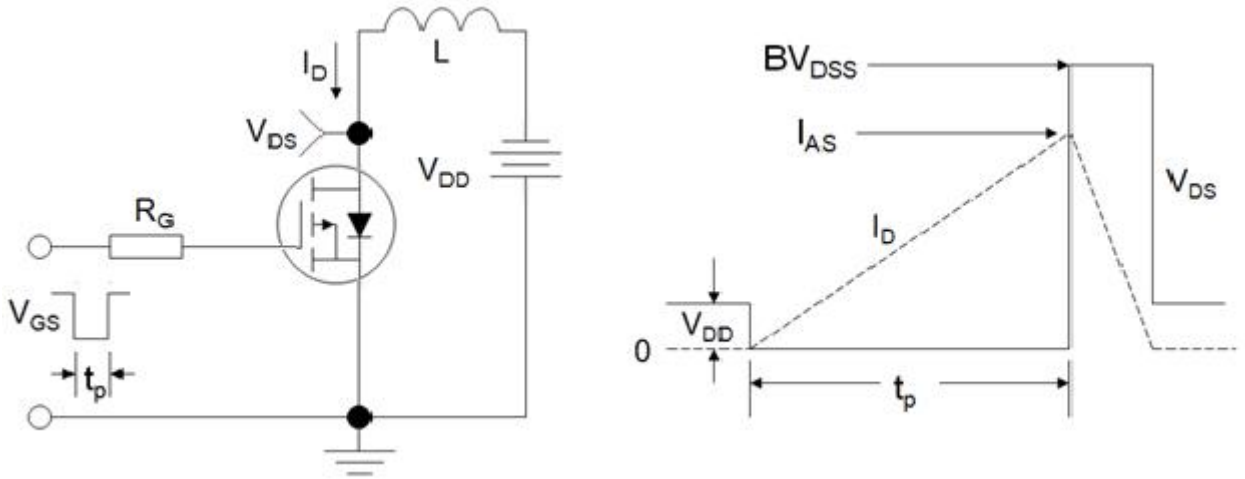
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



PMOS Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

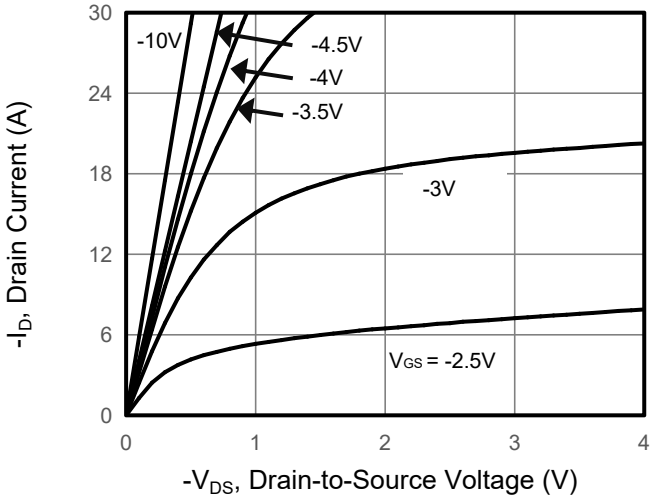


Figure 2. Transfer Characteristics

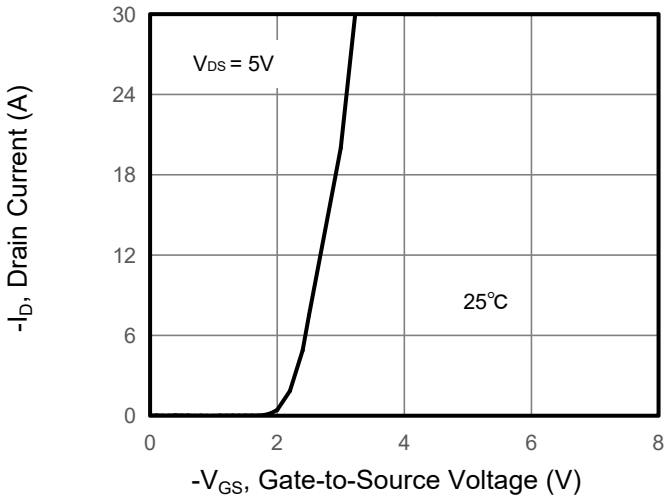


Figure 3.Drain Source On Resistance

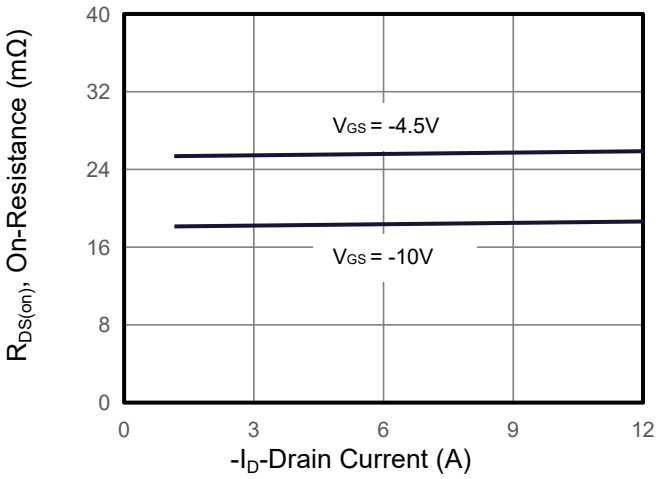


Figure 4. Gate Charge

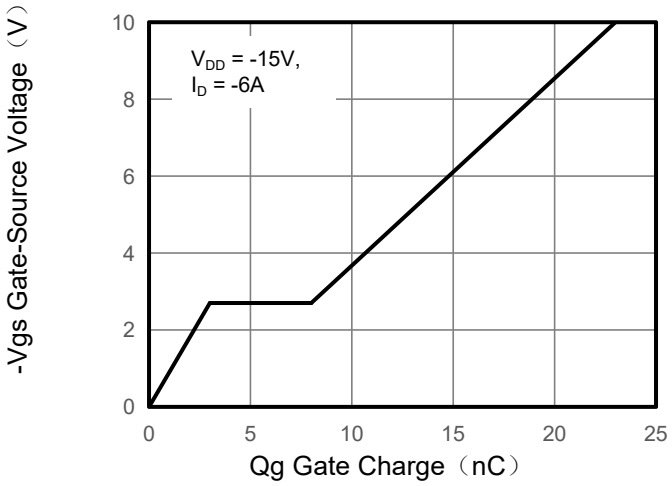


Figure 5. Capacitance

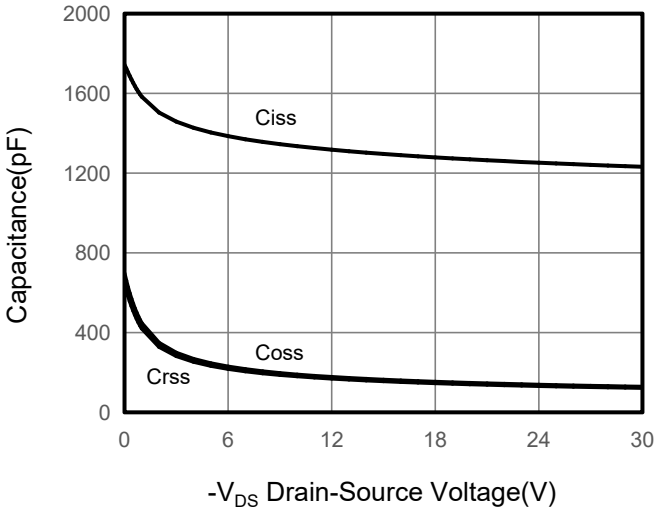
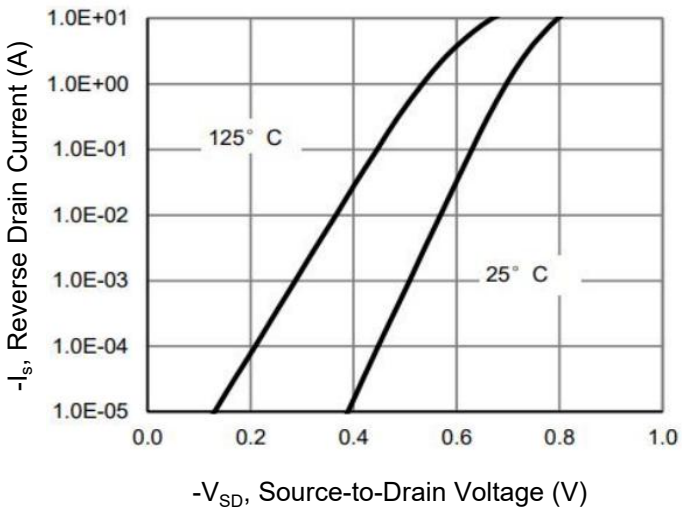


Figure 6. Source-Drain Diode Forward



PMOS Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

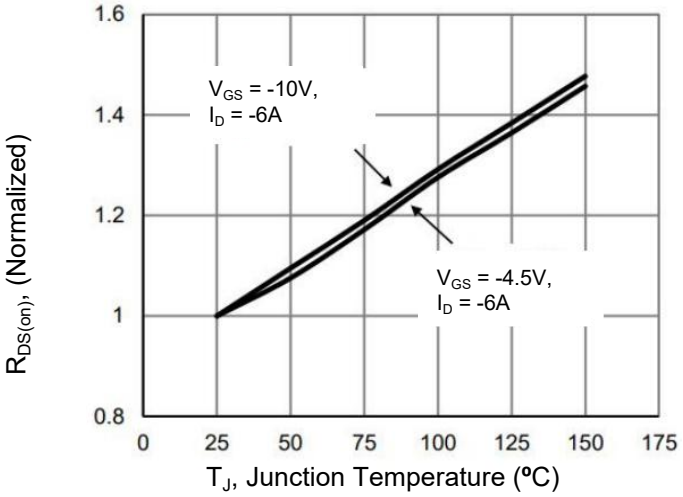


Figure 8. Safe Operation Area

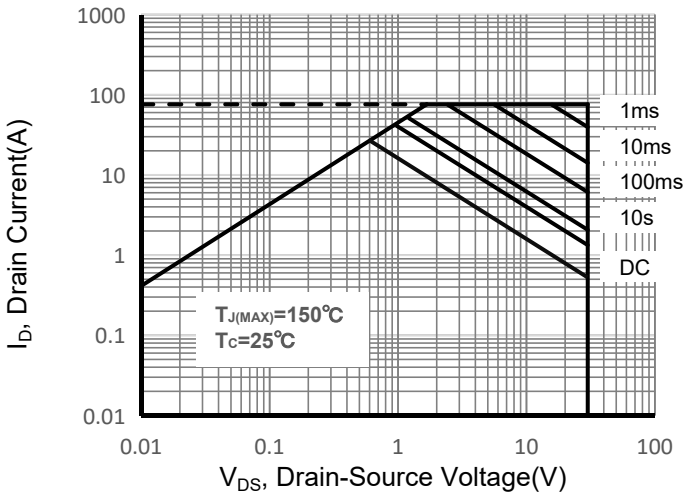


Figure 9. Maximum Continuous Drain Current vs Case Temperature

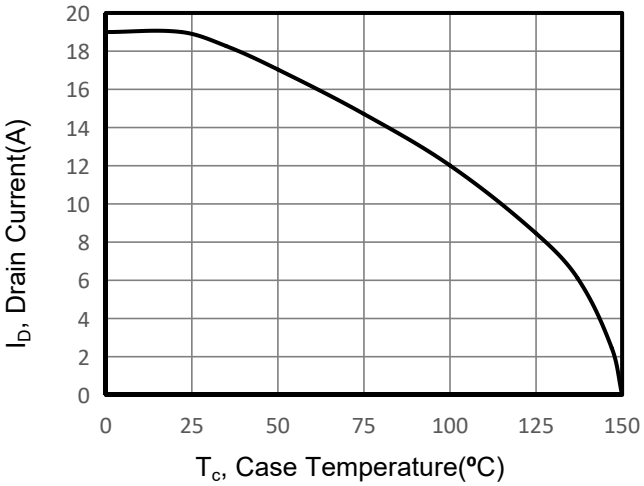
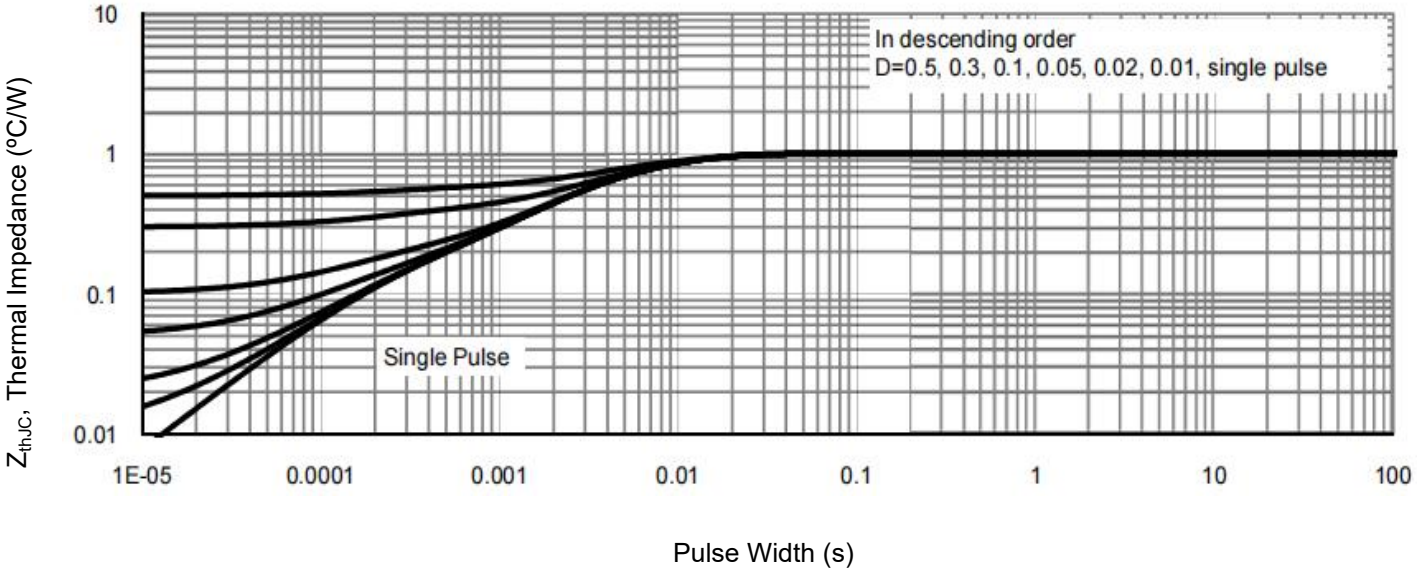
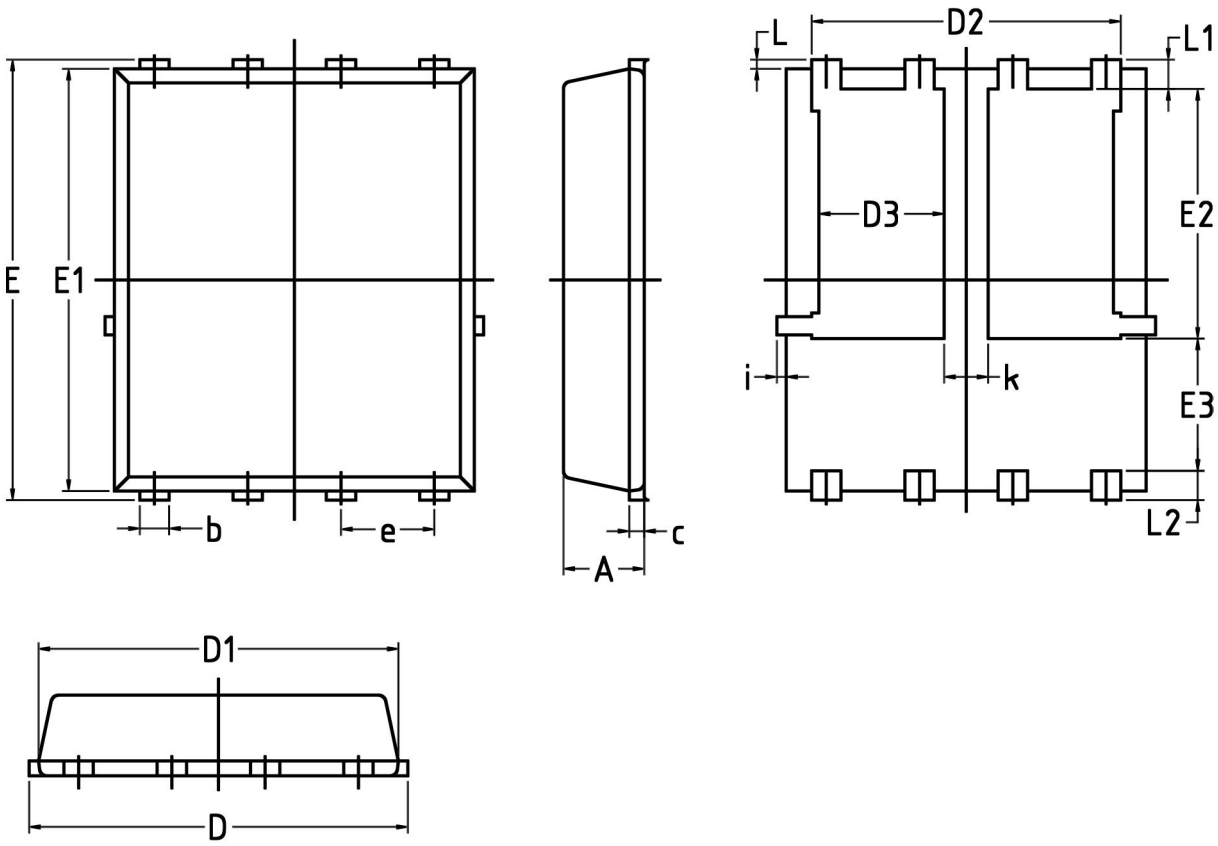


Figure 10. Normalized Maximum Transient Thermal Impedance



DFN5X6-8L DUAL Package information



SYMBOL	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.203 BSC		0.0080 BSC	
D	4.80	5.40	0.1890	0.2126
D1	4.80	5.00	0.1890	0.1969
D2	4.11	4.31	0.1620	0.1700
D3	1.60	1.80	0.0629	0.0708
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	3.30	3.50	0.1300	0.1378
E3	1.70	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0019	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
i	/	0.18	/	0.0070
k	0.5	0.7	0.0197	0.0276