

Complementary MOSFET

2NP12

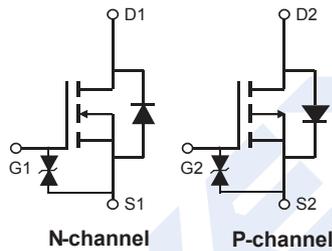
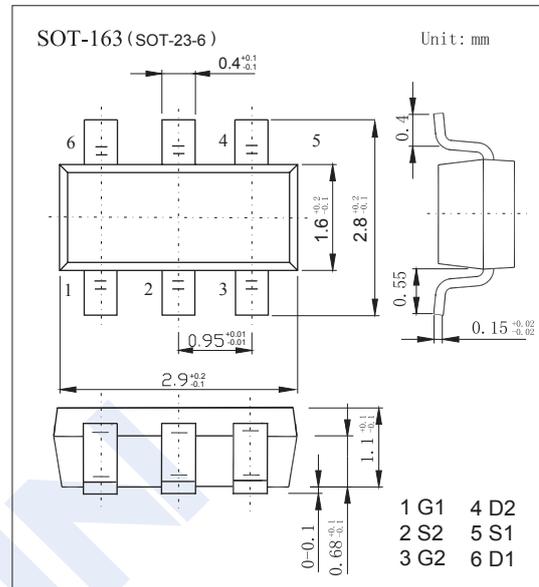
■ Features

N-Channel :

- $V_{DS} (V) = 60V$
- $I_D = 300m A (V_{GS} = 10V)$
- $R_{DS(ON)} < 3 \Omega (V_{GS} = 10V)$
- ESD Protected 2KV HBM

P-Channel :

- $V_{DS} (V) = -60V$
- $I_D = -180m A (V_{GS} = 10V)$
- $R_{DS(ON)} < 5 \Omega (V_{GS} = -10V)$
- ESD Protected 2KV HBM



■ Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter	Symbol	N-Channel	P-Channel	Unit	
Drain-Source Voltage	V_{DS}	60	-60	V	
Gate-Source Voltage	V_{GS}	± 20			
Continuous Drain Current	I_D	$T_A=25^\circ C$	300	-180	mA
		$T_A=70^\circ C$	210	-100	
Pulsed Drain Current	I_{DM}	800	-580		
Power Dissipation	P_D	$T_A=25^\circ C$	1.15		W
		$T_A=70^\circ C$	0.73		
Thermal Resistance.Junction- to-Ambient	R_{thJA}	$t \leq 10s$	110		$^\circ C/W$
		Steady-State	150		
Thermal Resistance.Junction- to-Lead	R_{thJL}	80			
Junction Temperature	T_J	150		$^\circ C$	
Storage Temperature Range	T_{stg}	-55 to 150			

Complementary MOSFET

2NP12

■ N-Channel Mosfet Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage (Note.1)	V _{DSS}	I _D =100 μ A, V _{GS} =0V	60			V
Zero Gate Voltage Drain Current (Note.1)	I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	μ A
Gate-Body Leakage Current (Note.1)	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±10	uA
Gate Threshold Voltage (Note.1)	V _{GS(th)}	V _{DS} = 10V, I _D = 1mA	1	1.6	2.5	V
Static Drain-Source On-Resistance (Note.1)	R _{DS(on)}	V _{GS} =10V, I _D =500mA			2	Ω
		V _{GS} =10V, I _D =50mA			3	
Forward Transfer Admittance (Note.1)	Y _{fs}	V _{GS} =10V, I _D =200mA	80			ms
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1MHz			50	pF
Output Capacitance	C _{oss}				25	
Reverse Transfer Capacitance	C _{rss}				5	
Total Gate Charge	Q _g	V _{GS} =4.5V, V _{DS} =15V, I _D =200mA			0.8	nC
Turn-On DelayTime	t _{d(on)}	I _D =200mA, V _{DS} =30V, R _G =10Ω, V _{GEN} =10V, R _L =150Ω			20	ns
Turn-Off DelayTime	t _{d(off)}				40	

Note: 1. Short duration test pulse used to minimize self-heating effect.

Complementary MOSFET

2NP12

■ P-Channel Mosfet Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{DSS}	I _D =-250μA, V _{GS} =0V	-50			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-50V, V _{GS} =0V			-0.1	μA
		V _{DS} =-50V, V _{GS} =0V, T _J =55°C			-15	
Gate-Body Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±10	μA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-1.0mA	-0.8		-2	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-5V, I _D =-100mA			5	Ω
Forward Transconductance	g _{FS}	V _{DS} =-25V, I _D =-100mA, f=1.0KHz	50			mS
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-5V, f=1MHz		30		pF
Output Capacitance	C _{oss}			10		
Reverse Transfer Capacitance	C _{rss}			5		
Turn-On DelayTime	t _{d(on)}		V _{DD} =-15V, I _D =-0.25A, R _L =50Ω (Note 2)		2.5	
Turn-On Rise Time	t _r			1		
Turn-Off DelayTime	t _{d(off)}			16		
Turn-Off Fall Time	t _f			8		
Gate Charge	Q _T				6000	
Maximum Body-Diode Continuous Current	I _S				-0.13	A
Maximum Body-Diode Pulsed Current	I _{SM}				-0.52	
Diode Forward Voltage	V _{SD}	I _{SD} =-130mA, V _{GS} =0V		-2.5		V

Note2 . Switching Time is Essentially Independent of Operating Temperature.

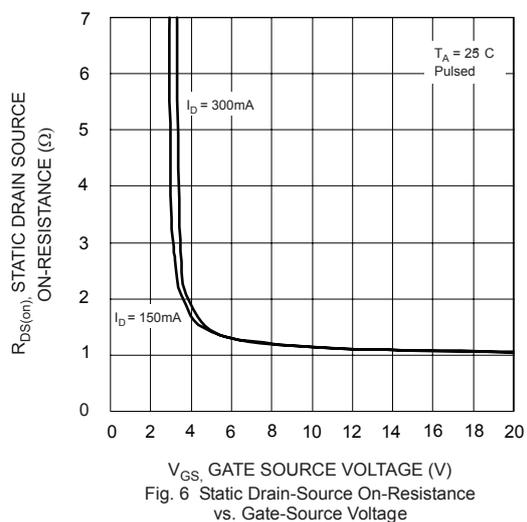
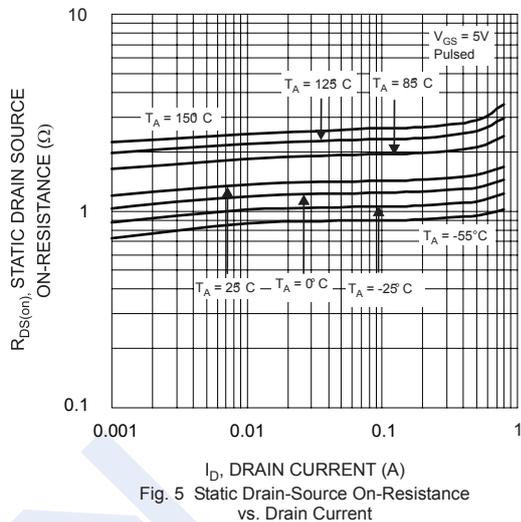
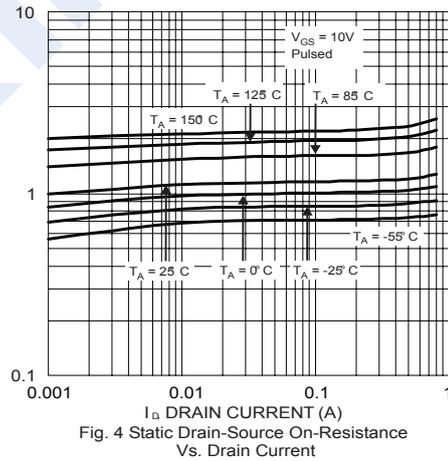
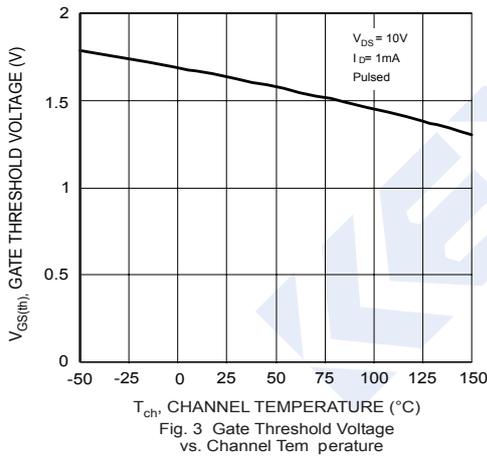
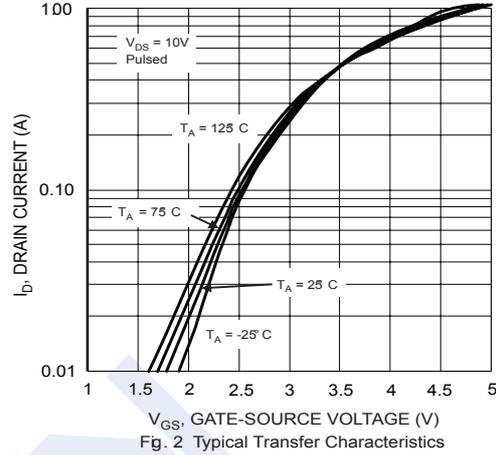
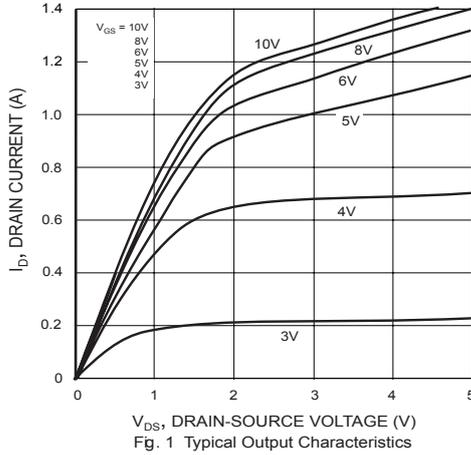
■ Marking

Marking	NP12 :
---------	--------

Complementary MOSFET

2NP12

■ N-Channel Mosfet Typical Characteristics



Complementary MOSFET

2NP12

■ N-Channel Mosfet Typical Characteristics

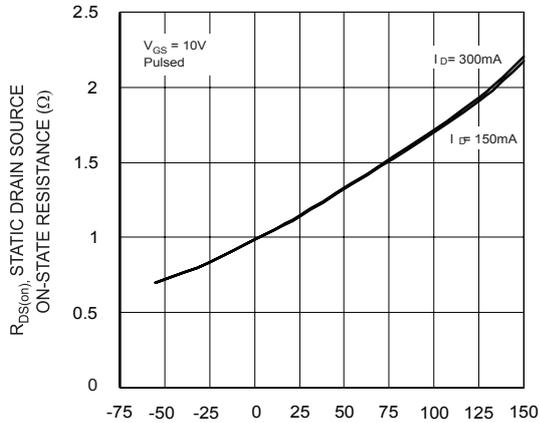


Fig. 7 Static Drain-Source On-State Resistance vs. Channel Temperature

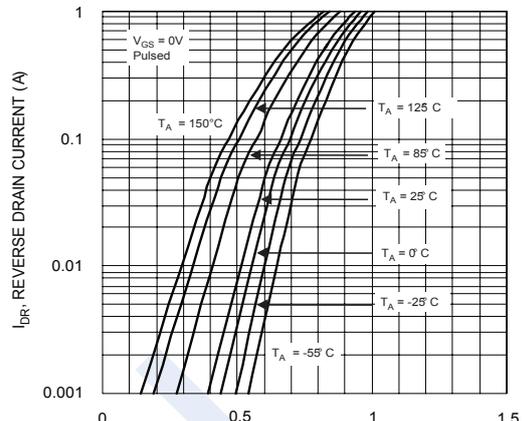


Fig. 8 Reverse Drain Current vs. Source-Drain Voltage

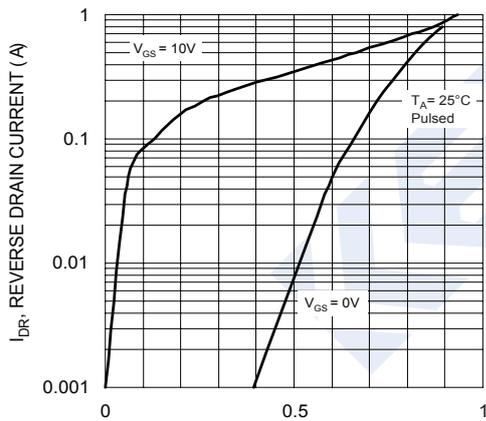


Fig. 9 Reverse Drain Current vs. Source-Drain Voltage

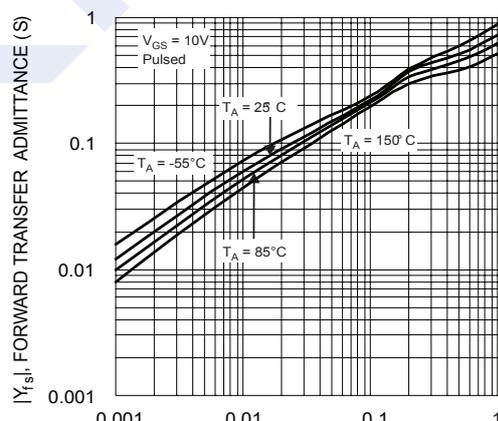


Fig. 10 Forward Transfer Admittance vs. Drain Current

Complementary MOSFET 2NP12

■ P-Channel Mosfet Typical Characteristics

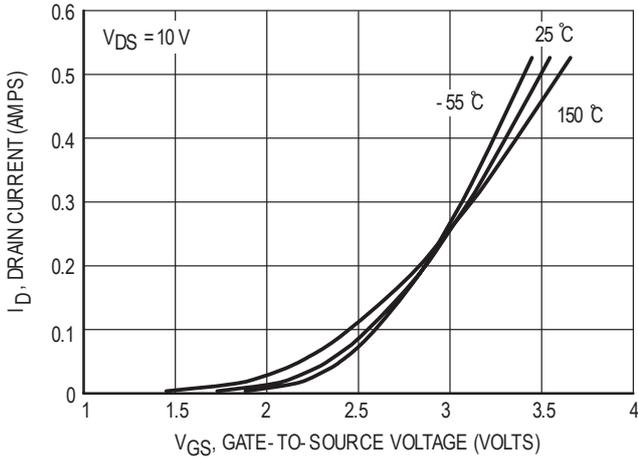


FIG1. Transfer Characteristics

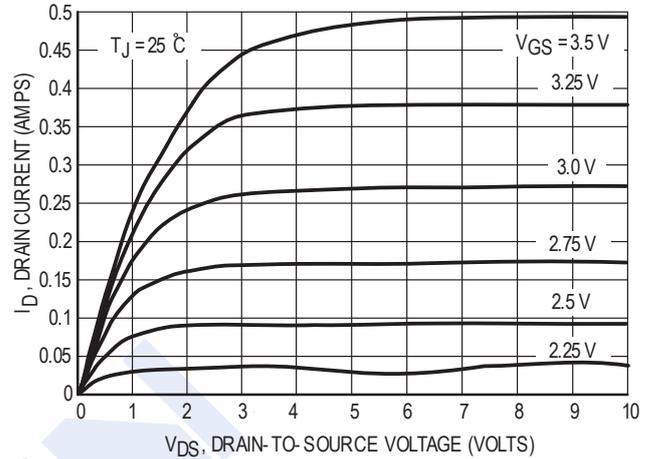


FIG2. On-Region Characteristics

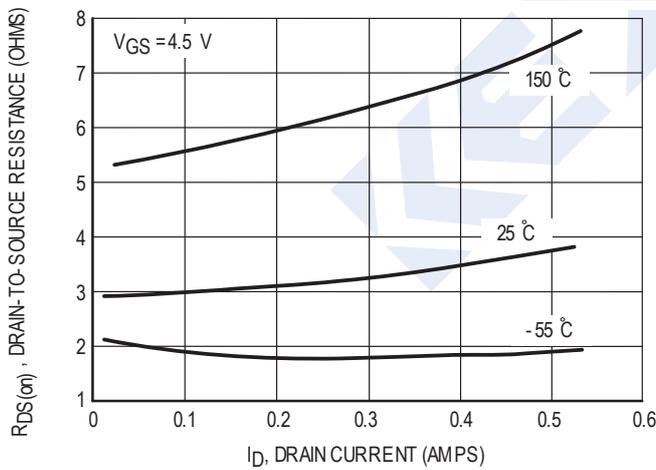


FIG3. On-Resistance versus Drain Current

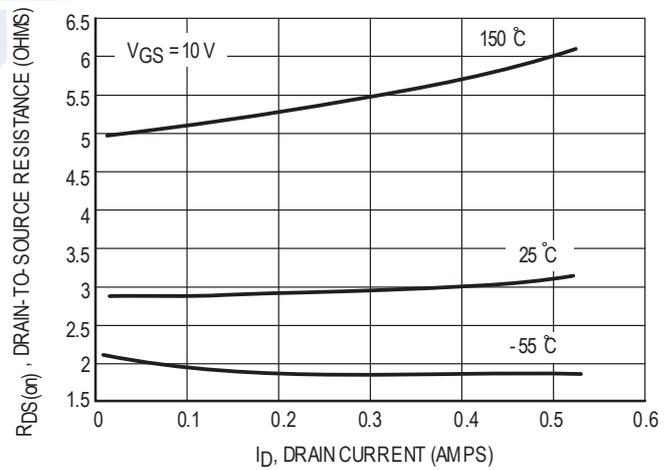


FIG4. On-Resistance versus Drain Current

Complementary MOSFET 2NP12

■ P-Channel Mosfet Typical Characteristics

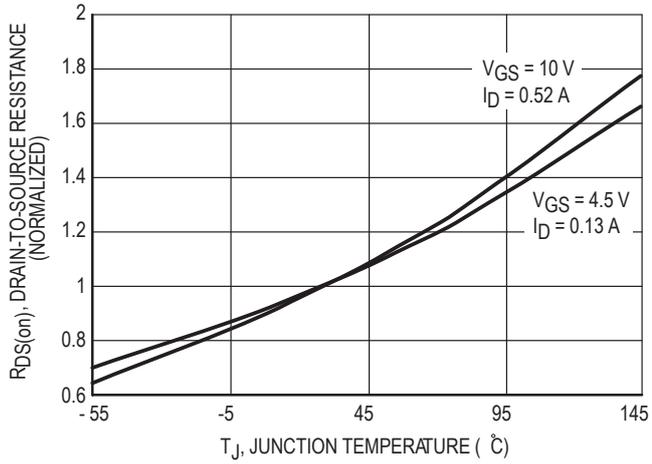


FIG5. On-Resistance Variation with Temperature

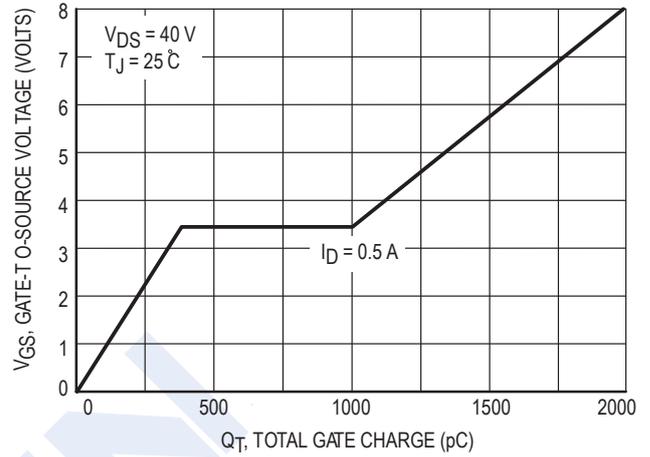


FIG6. Gate Charge

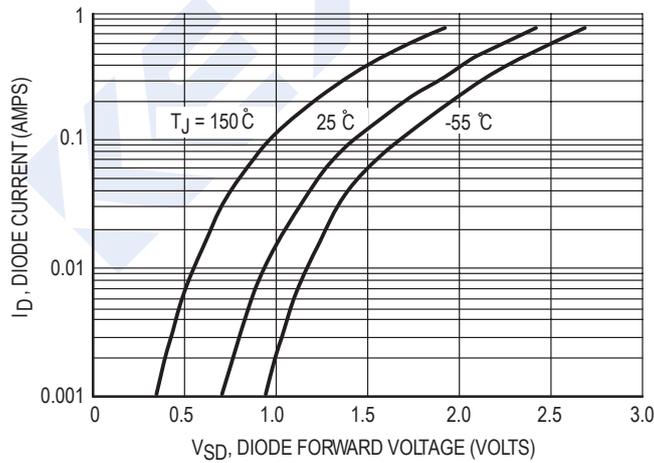


FIG7. Body Diode Forward Voltage