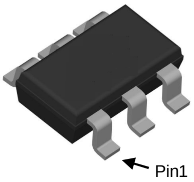
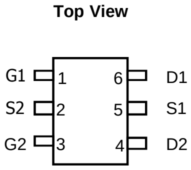
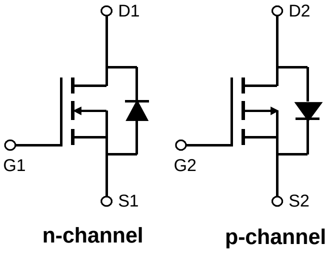
N And P-Channel Enhancement Mode Power MOSSFET





Features

- Advanced trench process technology
- High Density Cell Design For Ultra Low On-Resistance



Order Information

Product	Package	Marking	Packing	Min Unit Quantity
MNP5030DV	SOT-23-6	04C03	3000PCS/Reel	3000PCS

Absolute Maximum Ratings

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Symbol	Parameter		Rating		Unit
			NMOS	PMOS	
Common Ratings (TC=25°C Unless Otherwise Noted)					
V_{GS}	Gate-Source Voltage		±12	±12	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		30	-30	V
T_J	Maximum Junction Temperature		150		°C
T_{STG}	Storage Temperature Range		-50 to 150		°C
I_S	Diode Continuous Forward Current	T_C =25°C	1.6	-2.2	A
Mounted on Large Heat Sink					
I_{DM}	Pulse Drain Current Tested	T_C =25°C	30	-30	A
I_D	Continuous Drain Current(V_{GS}=10V)	T_C =25°C	5.8	-4.2	A
P_D	Maximum Power Dissipation	T_C =25°C	1.4		W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient		89.29		°C/W

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N-Channel

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current (Tc=25℃)	V_{DS}=30V,V_{GS}=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±12V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	0.6	--	1.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=5A	--	--	35	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=4A	--	--	36	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=2.5V, I_D=3A	--	--	52	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=10V,V_{GS}=0V, f=1MHz	--	340	--	pF
C_{oss}	Output Capacitance		--	115	--	pF
C_{rss}	Reverse Transfer Capacitance		--	33	--	pF
Q_g	Total Gate Charge	V_{DS}=15V,I_D=5.8A, V_{GS}=4.5V	--	11	--	nC
Q_{gs}	GateSource Charge		--	1.6	--	nC
Q_{gd}	GateDrain Charge		--	2.8	--	nC
Switching Characteristics						
$t_{d(on)}$	Turnon Delay Time	V_{DD}=15V, I_D=1A, R_L=2.7Ω, R_G=3Ω, V_{GEN}=10V	--	7	--	ns
t_r	Turnon Rise Time		--	15	--	ns
$t_{d(off)}$	TurnOff Delay Time		-	38	--	ns
t_f	TurnOff Fall Time		--	3	--	ns
Source Drain Diode Characteristics						
I_S	Max. Diode Forward Current		--	--	1.6	A
V_{SD}	Forward on voltage	I_S=1.6 A, V_{GS}=0V	--	--	1.2	V

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

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P-Channel

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=-250μA	-30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current (Tc=25℃)	V_{DS}=-30V,V_{GS}=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±12V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250μA	-0.5	--	-1.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-4A	--	--	65	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-4.5V, I_D=-3A	--	--	75	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-4.5V, I_D=-1A	--	--	100	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=-15V,V_{GS}=0V, f=1MHz	--	954	--	pF
C_{oss}	Output Capacitance		--	115	--	pF
C_{rss}	Reverse Transfer Capacitance		--	77	--	pF
Q_g	Total Gate Charge	V_{DS}=-15V,I_D=-4A, V_{GS}=-10 V	--	9.4	--	nC
Q_{gs}	Gate-Source Charge		--	2	--	nC
Q_{gd}	Gate-Drain Charge		--	3	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-15V, R_L=3.7Ω, R_{GEN}=3.3Ω, V_{GS}=-10V	--	6.3	--	nS
t_r	Turn-on Rise Time		--	3.2	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	38.2	--	nS
t_f	Turn-Off Fall Time		--	12	--	nS
Source- Drain Diode Characteristics						
I_S	Max. Diode Forward Current		--	--	-2.2	A
V_{SD}	Forward on voltage	I_S=1.8 A, V_{GS}=0V	--	--	1	V

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

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N-Channel Typical Characteristics

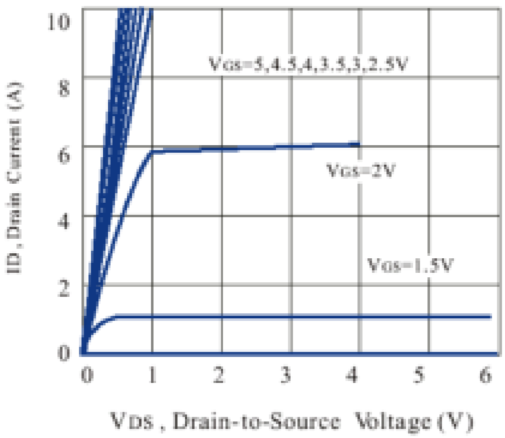


Figure 1. Output Characteristics

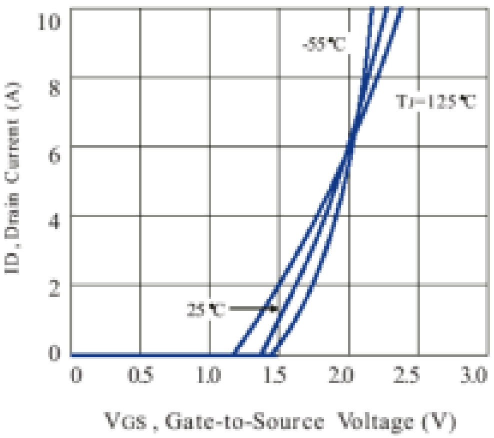


Figure 2. Transfer Characteristics

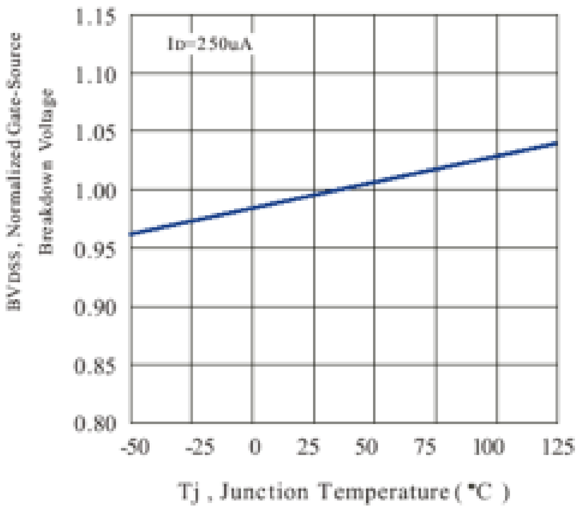


Figure 3. Breakdown Voltage Variation with Temperature

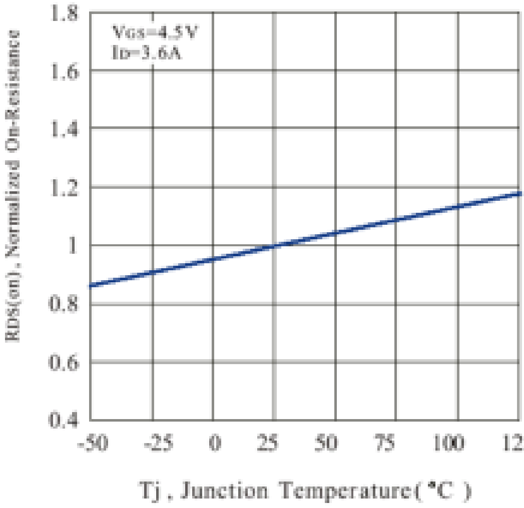


Figure 4. On-Resistance Variation with Tempera

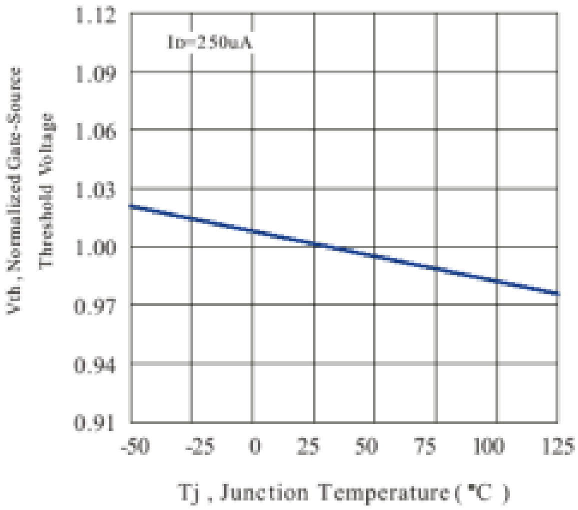


Figure 5. Gate Threshold Variation with Temperature

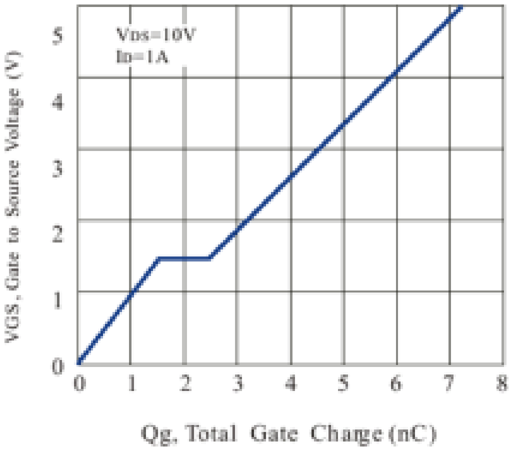
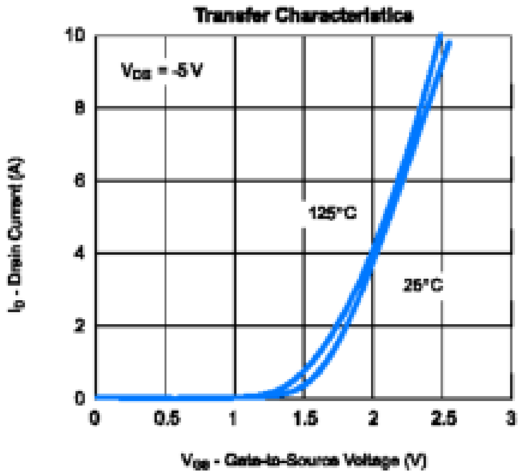
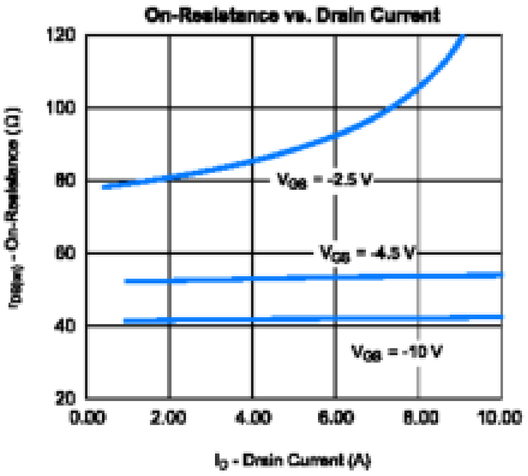
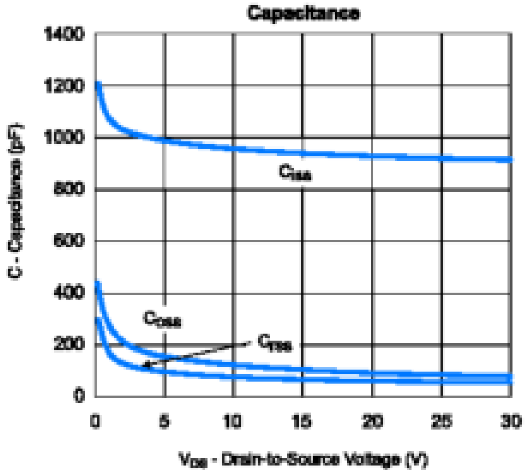


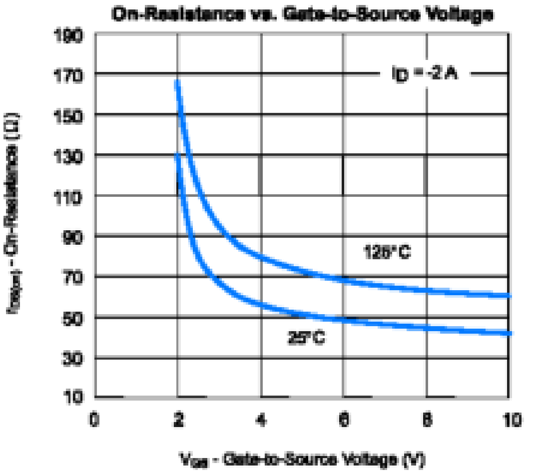
Figure 6. Gate Charge

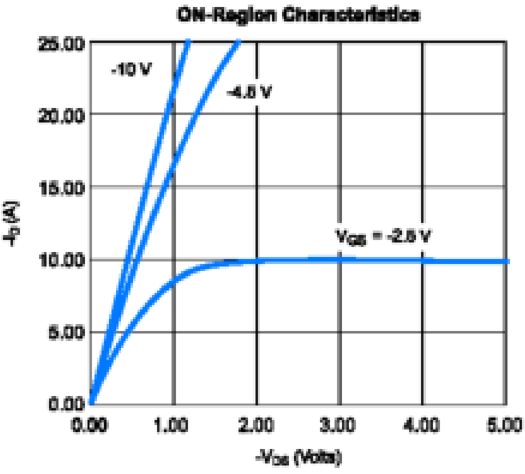
P-Channel Typical **Characteristics**


Transfer Characteristics

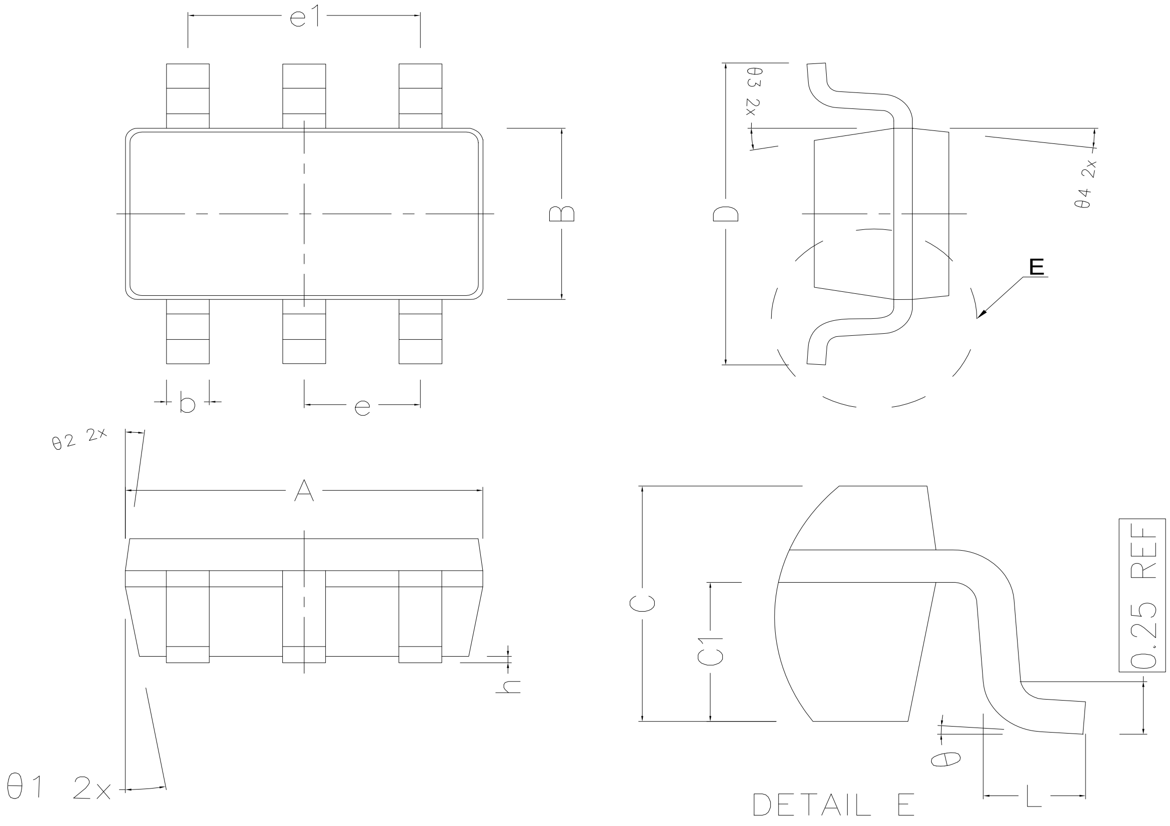

On-Resistance vs. Drain Current


Capacitance


On-Resistance vs. Gate-to-Source Voltage


ON-Region Characteristics

SOT-23-6L **Package Outline Dimensions (Units: mm)**



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	2.820	2.920	3.020
B	1.500	1.600	1.700
C	1.050	1.100	1.150
C1	0.600	0.650	0.700
D	2.650	2.800	2.950
L	0.300	0.450	0.600
b	0.280	0.350	0.420
h	0.020	0.050	0.100
K	0.120	–	0.230
e	0.950TYPE		
e1	1.900TYPE		
θ_1	10° TYPE		
θ_2	7° TYPE		
θ_3	10° TYPE		
θ_4	7° TYPE		
θ	0° ~ 8°		