



MCMNP517

Features

- Halogen free available upon request by adding suffix "-HF"
- Super High Density Cell Design for Extremely Low $R_{DS(ON)}$
- Lead Free Finish/Rohs Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Marking:517

N and P-Channel Enhancement Mode Field Effect Transistor

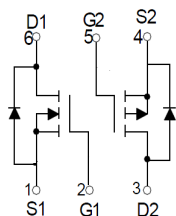
Maximum ratings ($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	12	-12	V
Gate-Source Voltage	V_{GS}	± 12	± 12	V
Continuous Drain Current (NOTE1)	I_D	6.0	-4.1	A
Pulsed Drain Current	I_{DM}	24	-16.4	A
Continuous Source-Drain Diode Current	I_S	6	-4.1	A
Thermal Resistance from Junction to Ambient (NOTE1)	$R_{\theta JA}$	167		$^\circ\text{C/W}$
Operating Junction Temperature	T_J	150		$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150		$^\circ\text{C}$

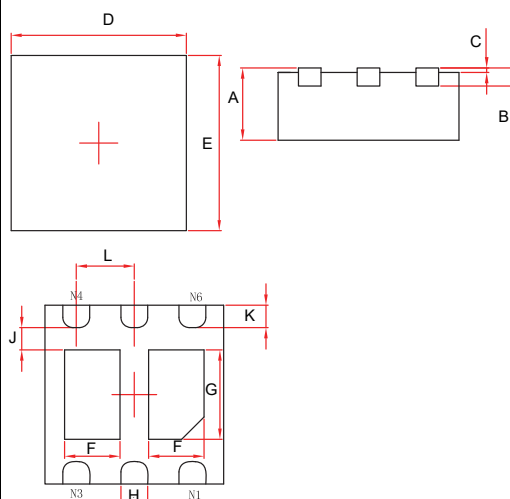
Notes :

1. Surface mounted on FR4 board using the minimum recommended pad size.

Equivalent Circuit



DFN2020-6U



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.028	.035	0.700	0.900	
B	0.008REF.		0.203REF.		
C	0.000	0.002	0.000	0.050	
D	0.076	0.082	1.924	2.076	
E	0.076	0.082	1.924	2.076	
F	0.020	0.028	0.520	0.720	
G	0.035	0.043	0.900	1.100	
H	0.010	0.014	0.250	0.350	
J	0.008	---	0.200	---	
K	0.007	0.013	0.174	0.326	
L	0.026TYP.		0.650TYP.		

MOSFET ELECTRICAL CHARACTERISTICS

N-ch MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	12			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 16V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 12V, V_{DS} = 0V$			± 100	nA
Gate threshold voltage (note 2)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.5		1	V
Drain-source on-resistance(note 2)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 6A$			24	m Ω
		$V_{GS} = 4.5V, I_D = 5A$			27	m Ω
		$V_{GS} = 2.5V, I_D = 4A$			42	m Ω
		$V_{GS} = 1.8V, I_D = 2A$			74	m Ω
Forward tranconductance(note 2)	g_{FS}	$V_{DS} = 5V, I_D = 3.8A$	4			S
Diode forward voltage	V_{SD}	$I_S = 1A, V_{GS} = 0V$			1	V
DYNAMIC CHARACTERISTICS (note 4)						
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$		630		pF
Output Capacitance	C_{oss}			164		pF
Reverse Transfer Capacitance	C_{rss}			137		pF
SWITCHING CHARACTERISTICS (note 3,4)						
Turn-on delay time	$t_{d(on)}$	$V_{GS} = 5V, V_{DS} = 10V,$ $R_{GEN} = 6\Omega, R_L = 1.7\Omega$		5.5		ns
Turn-on rise time	t_r			14		ns
Turn-off delay time	$t_{d(off)}$			29		ns
Turn-off fall time	t_f			10.2		ns
Total Gate Charge	Q_g	$V_{DS} = 10V, I_D = 6A,$ $V_{GS} = 10V$		12		nC
Gate-Source Charge	Q_{gs}			1		nC
Gate-Drain Charge	Q_{gd}			2		nC

P-ch MOSFET ELECTRICAL CHARACTERISTICS(T_a=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-12			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -8V, V _{GS} = 0V			-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±8V, V _{DS} = 0V			±100	nA
Gate threshold voltage (note 2)	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.5		-0.9	V
Drain-source on-resistance(note 2)	R _{DS(on)}	V _{GS} = -4.5V, I _D = -3.5A			45	mΩ
		V _{GS} = -2.5V, I _D = -3A			60	mΩ
		V _{GS} = -1.8V, I _D = -2A			90	mΩ
Forward tranconductance(note 2)	g _{FS}	V _{DS} = -5V, I _D = -4.1A	6			S
Diode forward voltage	V _{SD}	I _S = -3.3A, V _{GS} = 0V			-1.2	V
DYNAMIC CHARACTERISTICS (note 4)						
Input Capacitance	C _{iss}	V _{DS} = -4V, V _{GS} = 0V, f = 1MHz		740		pF
Output Capacitance	C _{oss}			290		pF
Reverse Transfer Capacitance	C _{rss}			190		pF
SWITCHING CHARACTERISTICS (note 3,4)						
Turn-on delay time	t _{d(on)}	V _{GEN} = -4.5V, V _{DD} = -4V, I _D = -3.3A, R _G = 1Ω , R _L = 1.2 Ω			20	ns
Turn-on rise time	t _r				53	ns
Turn-off delay time	t _{d(off)}				48	ns
Turn-off fall time	t _f				20	ns
Total Gate Charge	Q _g	V _{DS} = -4V, I _D = -4.1A, V _{GS} = -2.5V			9	nC
Gate-Source Charge	Q _{gs}			1.2		nC
Gate-Drain Charge	Q _{gd}			1.6		nC

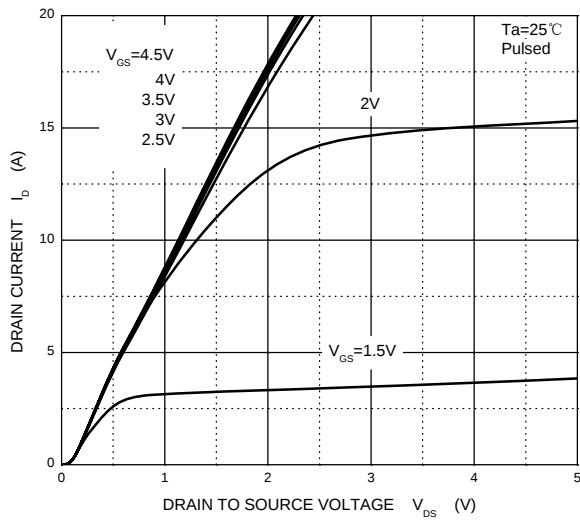
Notes :

2. Pulse Test: Pulse width = 300μs, duty cycle ≤ 2%.
3. Switching characteristics are independent of operating junction temperature.
4. Guaranteed by design, not subject to production.

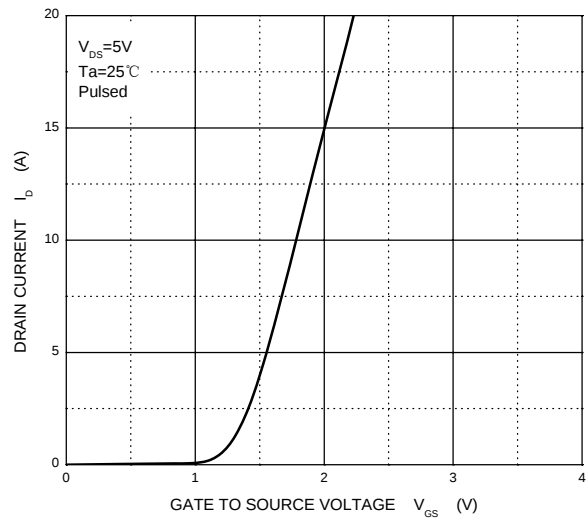
Typical Characteristics

N-Channel MOS

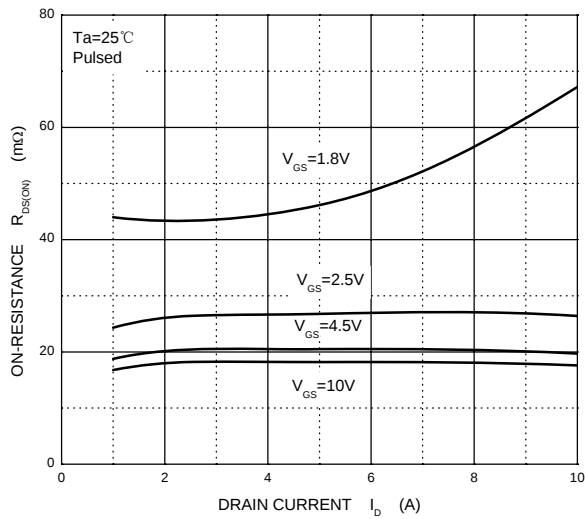
Output Characteristics



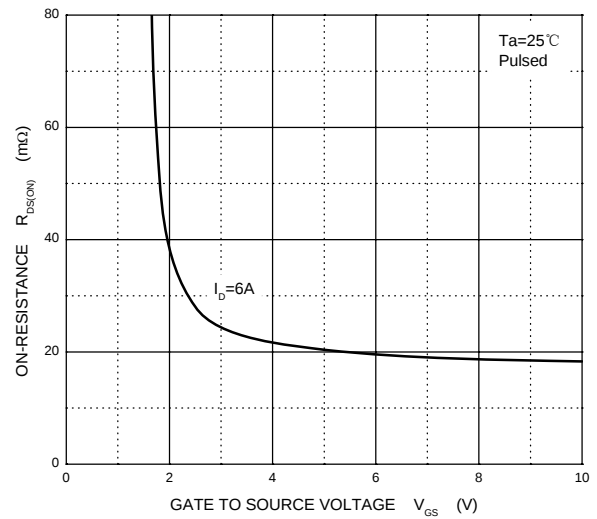
Transfer Characteristics



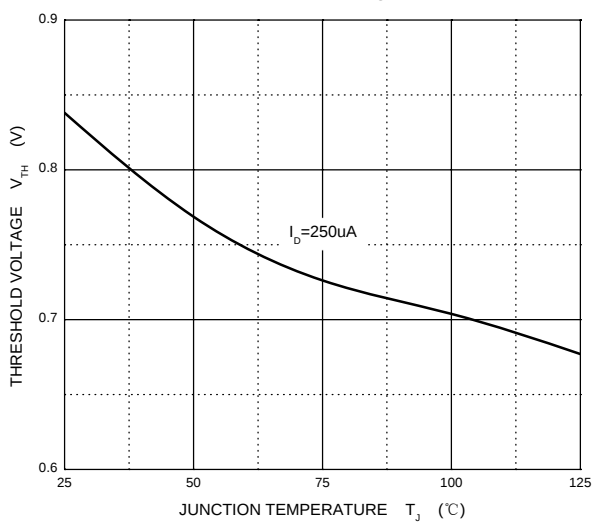
$R_{DS(ON)}$ — I_D



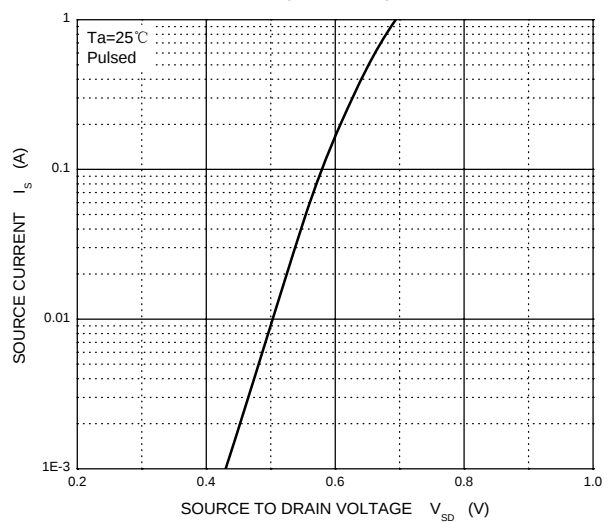
$R_{DS(ON)}$ — V_{GS}



Threshold Voltage



I_S — V_{SD}

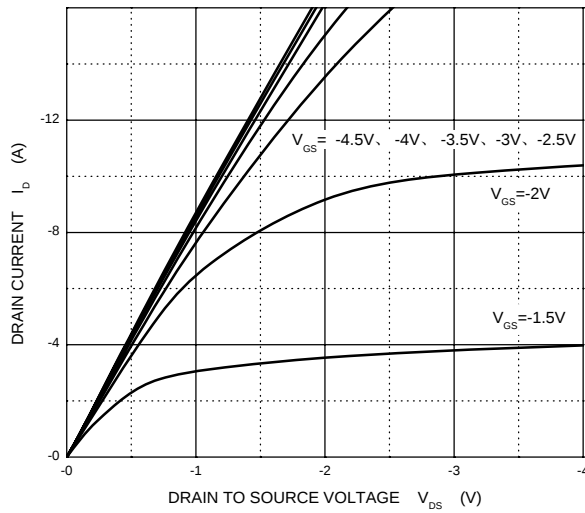


Typical Characteristics

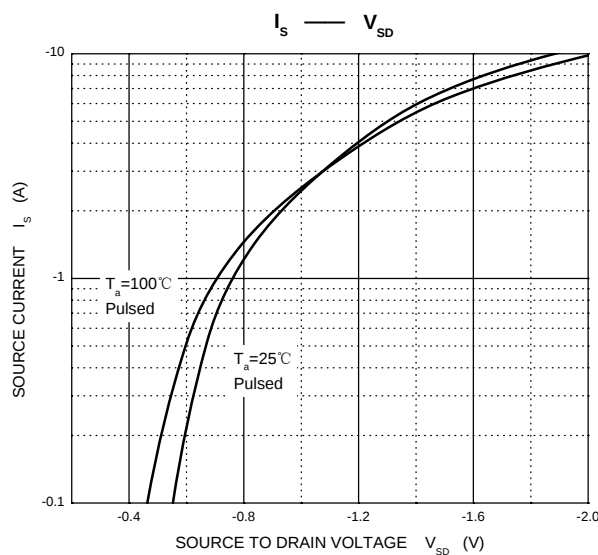
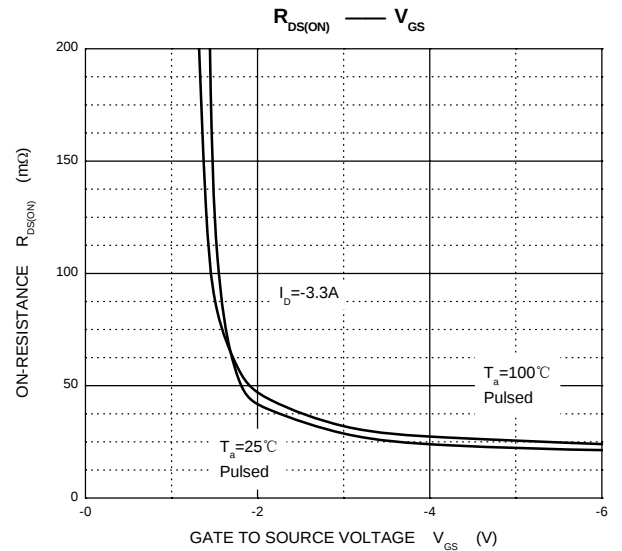
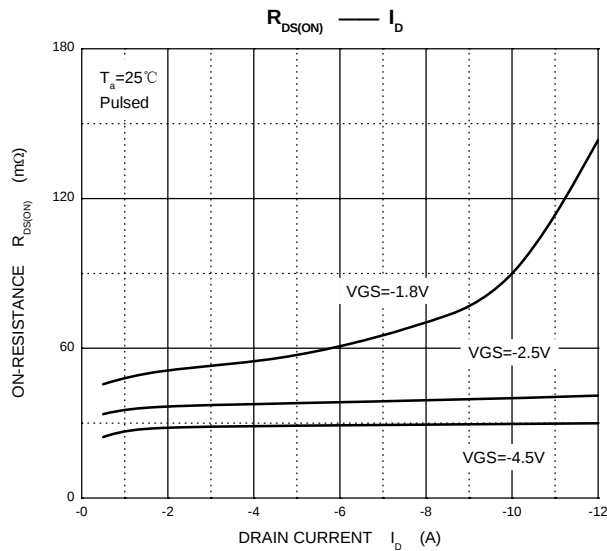
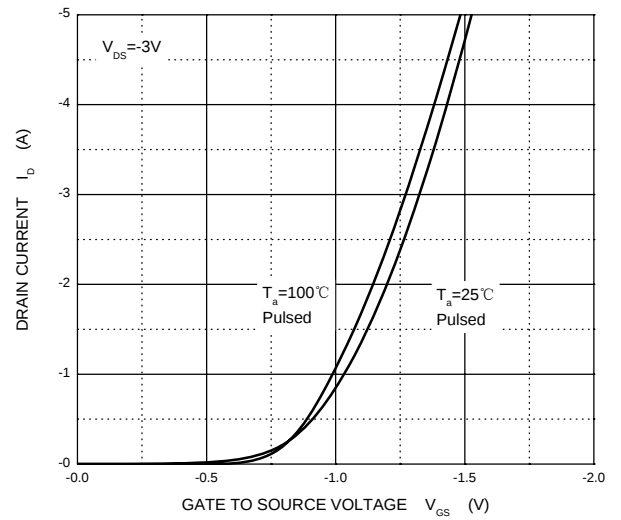
P-Channel MOS

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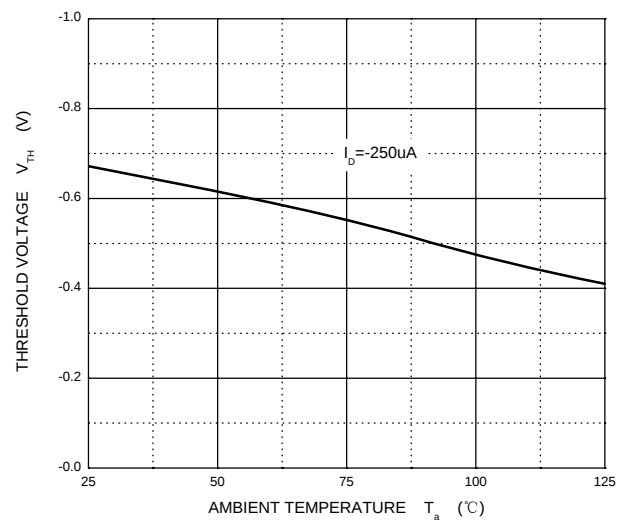
Output Characteristics



Transfer Characteristics



Threshold Voltage





Ordering Information :

Device	Packing
Part Number-TP	Tape&Reel:3.0Kpcs/Reel

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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