Micro Commercial Components

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MCP140N10Y

N-Channel Enhancement Mode Field Effect Transistor

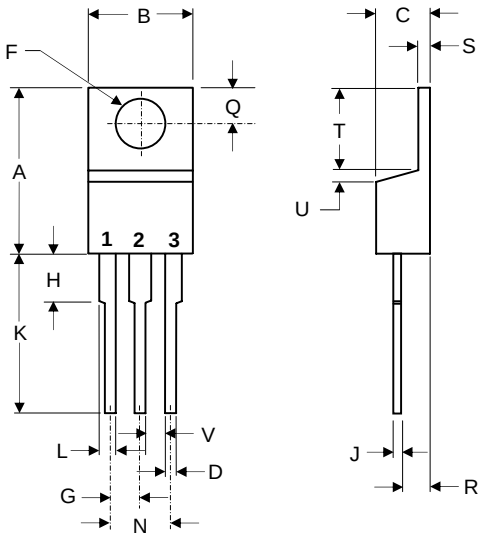
Features

- Trench Power MV MOSFET technology
- Low $R_{DS(ON)}$
- Halogen free available upon request by adding suffix "-HF"
- Low Gate Charge
- Optimized for fast-switching applications
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1

Maximum Ratings @ 25ºC Unless Otherwise Specified

Symbol	Parameter		Rating	Unit
V_{DS}	Drain-source Voltage		100	V
I_{DM}	Pulsed Drain Current (Note 3)		500	A
I_D	Continuous Drain Current (Note 7)	T_C = 25°C	140	A
		T_C = 100°C	115	
V_{GS}	Gate-source Voltage		±20	V
P_{DSM}	Power Dissipation (Note 1)	T_C = 25°C	220	W
		T_C = 100°C	110	
E_{AS}	Single pulse avalanche energy (Note 3)		800	mj
T_J	Operating Junction Temperature		-55 to +175	℃
T_{STG}	Storage Temperature		-55 to +175	℃

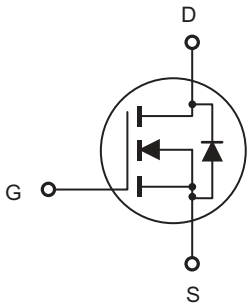
TO-220



1.GATE
2.DRAIN
3.SOURCE

DIM	INCHES MIN	INCHES MAX	MM MIN	MM MAX	NOTE
A	.560	.625	14.22	15.88	
B	.380	.420	9.65	10.67	
C	.140	.190	3.56	4.82	
D	.020	.045	0.51	1.14	
F	.134	.161	3.40	4.09	∅
G	.190	.110	2.29	2.79	
H	---	.250	---	6.35	
J	.012	.025	0.30	0.64	
K	.500	.580	12.70	14.73	
L	.045	.060	1.14	1.52	
N	.190	.210	4.83	5.33	
Q	.100	.135	2.54	3.43	
R	.080	.115	2.04	2.92	
S	.045	.055	1.14	1.39	
T	.230	.270	5.84	6.86	
U	-----	.050	-----	1.27	
V	.045	-----	1.15	-----	

Internal Block Diagram



Electrical characteristics (T_a=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	100			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V, V_{GS}=0V			1	μA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±20V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	2	3	4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=50A		3.3	3.9	mΩ
		T_J=125°C		5.3	6.2	
g_{FS}	Diode Forward Voltage	V_{DS}=5V, I_D=50A	80			S
V_{SD}	Diode Forward Voltage	I_S=50A,V_{GS}=0V		0.85	0.99	V
I_S	Maximum Body-Diode Continuous Current (Note 7)				140	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=50V, f=1MHz		6920		pF
C_{oss}	Output Capacitance			1026		pF
C_{rss}	Reverse Transfer Capacitance			34		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		2.6		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=50V, I_D=50A		117		nC
Q_{gs}	Gate Source Charge			40		nC
Q_{gd}	Gate Drain Charge			37		nC
$t_{D(on)}$	Turn-on Delay Time	V_{GS}=10V, V_{DS}=50V, R_L=2.5Ω, R_{GEN}=3Ω		48		ns
t_r	Turn-on Rise Time			56		ns
$t_{D(off)}$	Turn-off Delay Time			75		ns
t_f	Turn-off Fall Time			33		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A,di/dt=500A/μs		60		ns
Q_{rr}	Body Diode Reverse Recovery charge	I_F=20A,di/dt=500A/μs		560		nC

1. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ t≤ 10s and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.
2. The power dissipation P_D is based on $T_{J(MAX)}$=175° C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
3. Single pulse width limited by junction temperature $T_{J(MAX)}$=175° C.
4. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
5. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
6. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=175° C. The SOA curve provides a single pulse rating.
7. The maximum current rating is package limited.

Fig 1: Output Characteristics

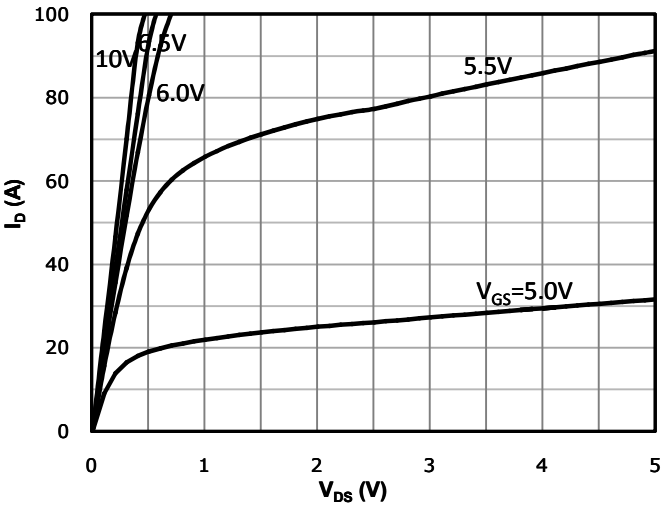


Fig 2: Transfer Characteristics

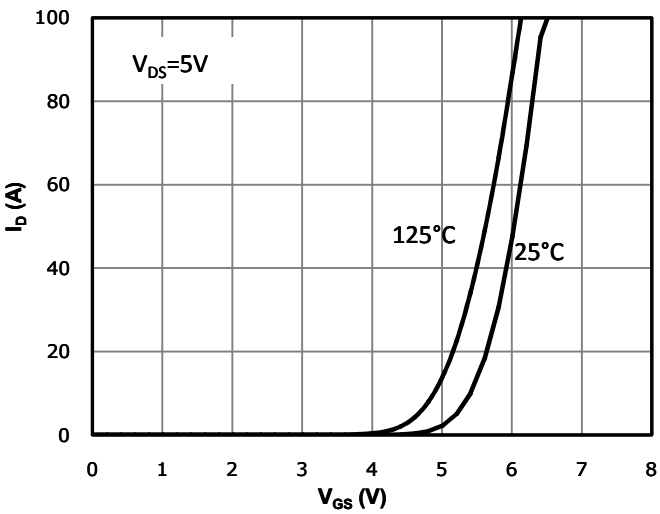


Fig 3: Rds(on) vs Drain Current and Gate Voltage

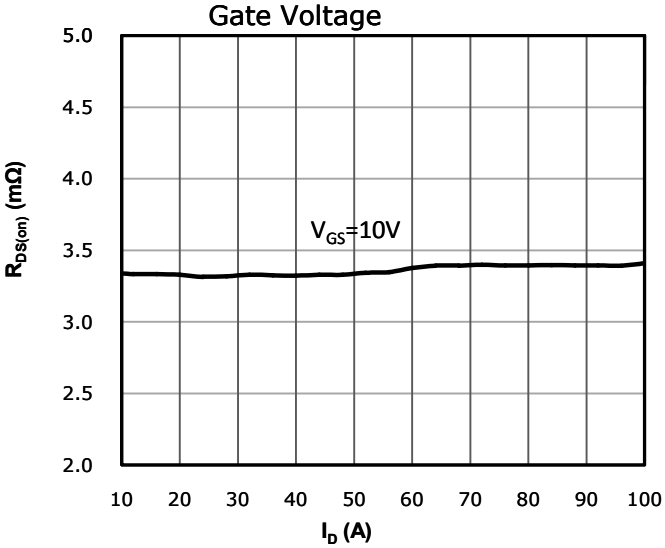


Fig 4: Rds(on) vs Gate Voltage

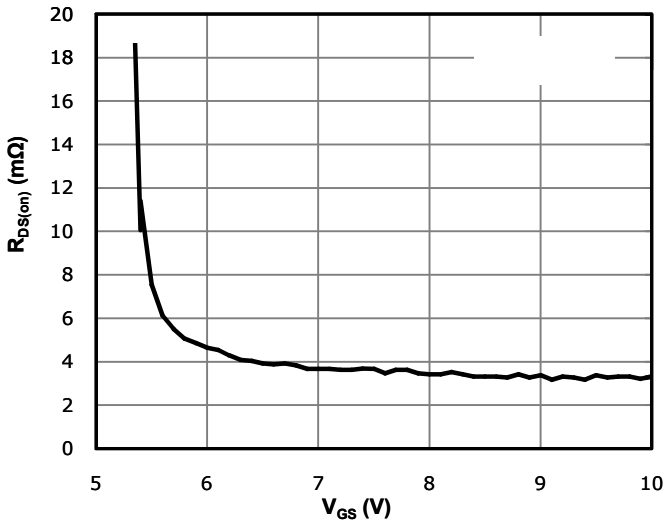


Fig 5: Rds(on) vs. Temperature

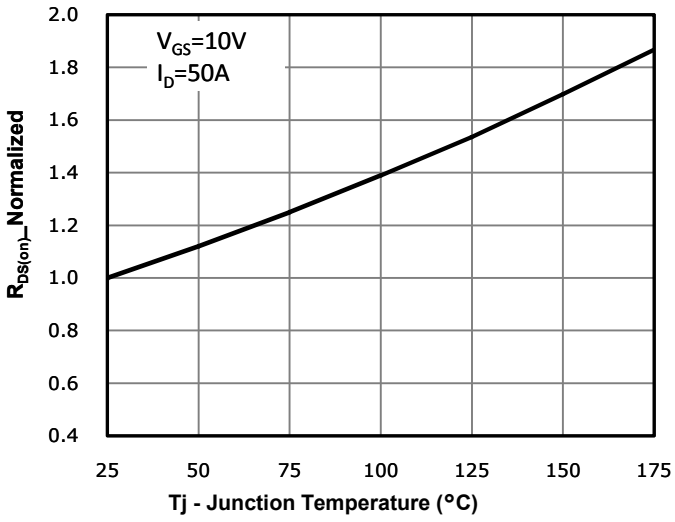


Fig 6: Capacitance Characteristics

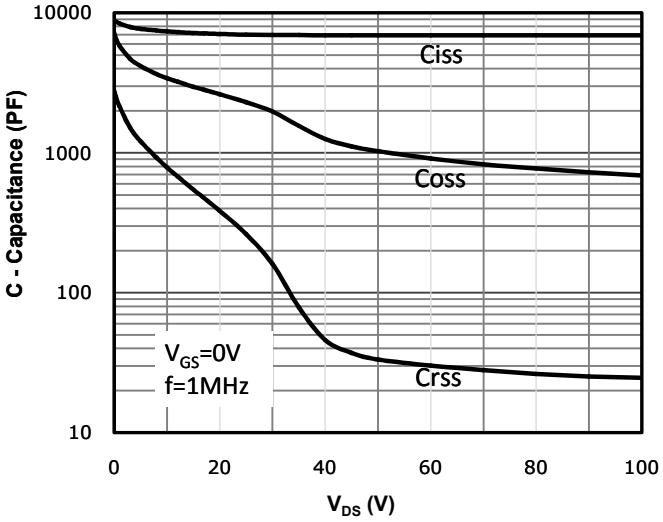


Fig 7: Gate Charge Characteristics

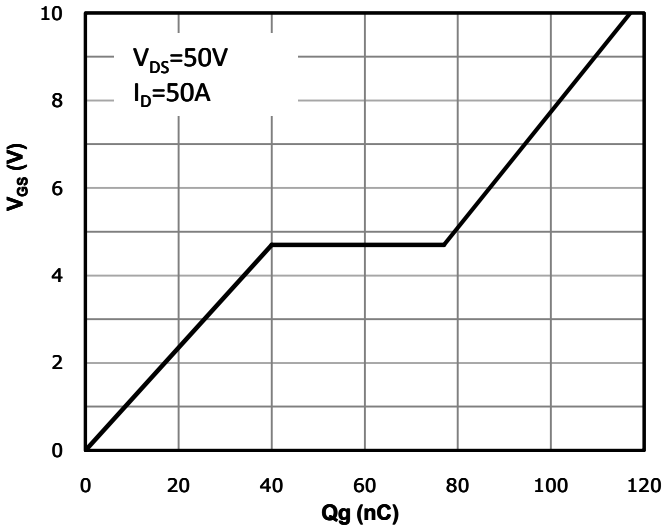


Fig 8: Body-diode Forward Characteristics

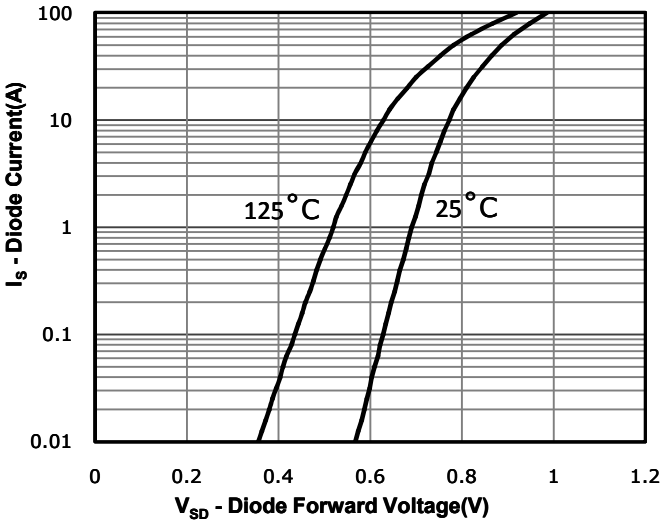


Fig 9: Power Dissipation

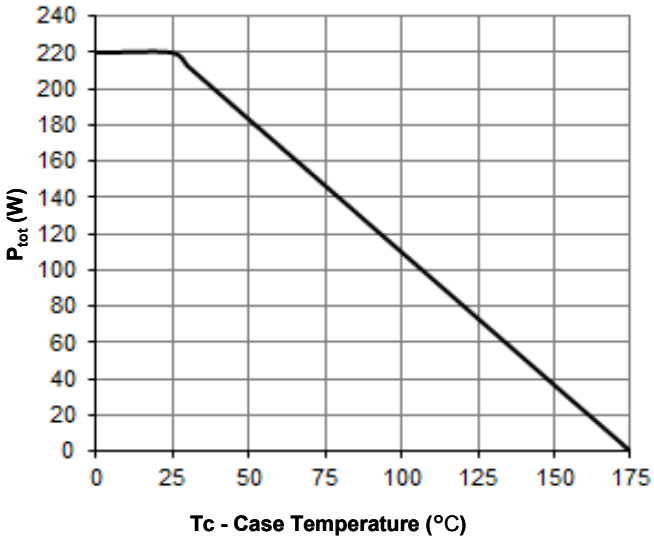


Fig 10: Drain Current Derating

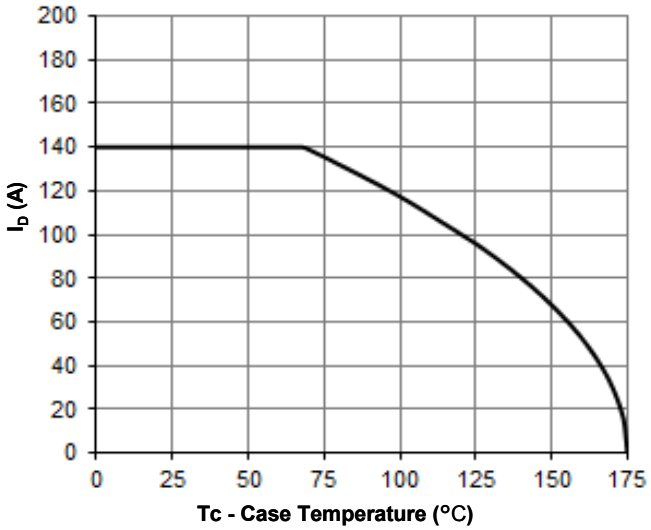
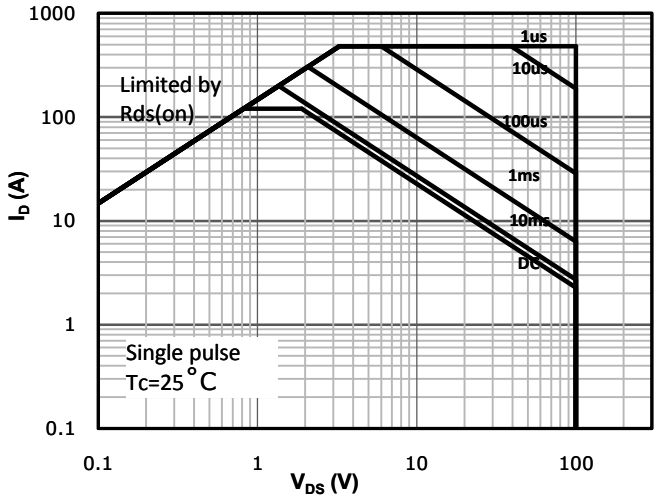


Fig 11: Safe Operating Area



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Ordering Information :

Device	Packing
Part Number-BP	Bulk;1Kpcs/Box

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

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