



Micro Commercial Components



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MCAC50N03Y

N-Channel Power MOSFET

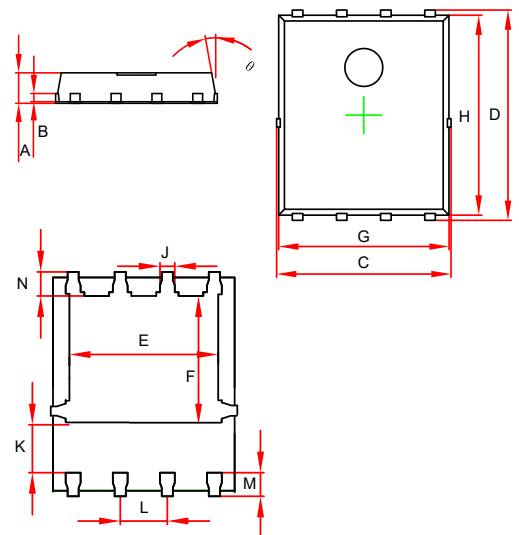
Features

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

Maximum Ratings @ 25°C Unless Otherwise Specified

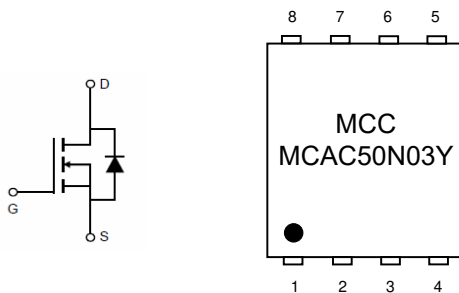
Symbol	Parameter	Rating	Unit
V_{DS}	Drain-source Voltage	30	V
I_D	Drain Current-Continuous (Note 7)	$T_C = 25^\circ\text{C}$	50
		$T_C = 100^\circ\text{C}$	35
I_{DM}	Pulsed Drain Current (Note 3)	200	A
V_{GS}	Gate-source Voltage	± 20	V
P_{DSM}	Maximum Power Dissipation (Note 1)	$T_C = 25^\circ\text{C}$	38
		$T_C = 100^\circ\text{C}$	19
E_{AS}	Single pulse avalanche energy (Note 3)	300	mj
T_J	Operating Junction Temperature	-55 to +175	$^\circ\text{C}$
T_{STG}	Storage Temperature	-55 to +175	$^\circ\text{C}$

DFN5060



DIM	DIMENSIONS				NOTE
	INCHES		MM		
A	0.035	.039	0.900	1.000	
B	0.010REF.		0.254REF.		
C	0.193	0.200	4.900	5.100	
D	0.232	0.240	5.900	6.100	
E	0.148	0.163	3.750	4.150	
F	0.130	0.142	3.300	3.600	
G	0.189	0.197	4.800	5.000	
H	0.222	0.230	5.650	5.850	
K	0.047	0.059	1.200	1.500	
J	0.014	0.018	0.350	0.450	
L	0.048	0.052	1.220	1.320	
M	0.020	0.028	0.510	0.710	
N	0.020	0.028	0.510	0.710	

Internal Structure and Marking Code



ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$ $T_J=55^{\circ}\text{C}$			1	μA
					5	
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1	1.3	2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=25\text{A}$		4.3	5.6	m Ω
		$V_{GS}=4.5\text{V}, I_D=25\text{A}$		5.4	7.0	
V_{FS}	Diode Forward Voltage	$V_{DS}=5\text{V}, I_D=25\text{A}$	20			S
V_{SD}	Diode Forward Voltage	$I_S=50\text{A}, V_{GS}=0\text{V}$		0.85	0.99	V
I_S	Maximum Body-Diode Continuous Current (note 7)				50	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance			2989		pF
C_{oss}	Output Capacitance	$V_{GS}=0\text{V}, V_{DS}=15\text{V}, f=1\text{MHz}$		335		pF
C_{riss}	Reverse Transfer Capacitance			290		pF
R_g	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$		1.9		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=4.5\text{V}, V_{DS}=25\text{V}, I_D=14\text{A}$		26		nC
Q_{gs}	Gate Source Charge			3.5		nC
Q_{gd}	Gate Drain Charge			14		nC
$t_{D(on)}$	Turn-on Delay Time	$V_{GS}=4.5\text{V}, V_{DS}=15\text{V}, R_L=2.5\Omega,$ $R_{GEN}=3\Omega$		21		ns
t_r	Turn-on Rise Time			32		ns
$t_{D(off)}$	Turn-off Delay Time			59		ns
t_f	Turn-off Fall Time			34		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20\text{A}, di/dt=100\text{A}/\mu\text{s}$		14		ns
Q_{rr}	Body Diode Reverse Recovery charge	$I_F=20\text{A}, di/dt=100\text{A}/\mu\text{s}$		2.8		nC

Note:

- 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 $T_A=25^{\circ}\text{C}$. The Power dissipation PDSM is based on $R_{\theta JA} t \leq 10\text{s}$ and the maximum allowed junction temperature of 150°C . The value in any given application depends on the user's specific board design.
- The power dissipation PD is based on $T_J(\text{MAX})=175^{\circ}\text{C}$, using junction - to - case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- Single pulse width limited by junction temperature $T_J(\text{MAX})=175^{\circ}\text{C}$.
- The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
- The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ pulses, duty cycle 0.5% max.
- 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 $T_J(\text{MAX})=175^{\circ}\text{C}$. The SOA curve provides a single pulse rating.
- The maximum current rating is package limited.

Typical Electrical and Thermal Characteristics

Figure 1. Typ. Output Characteristics

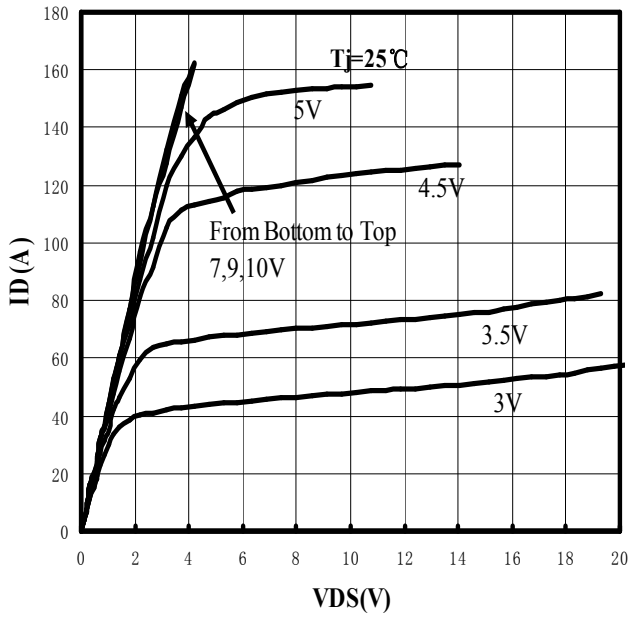


Figure 2. Typ. Output Characteristics

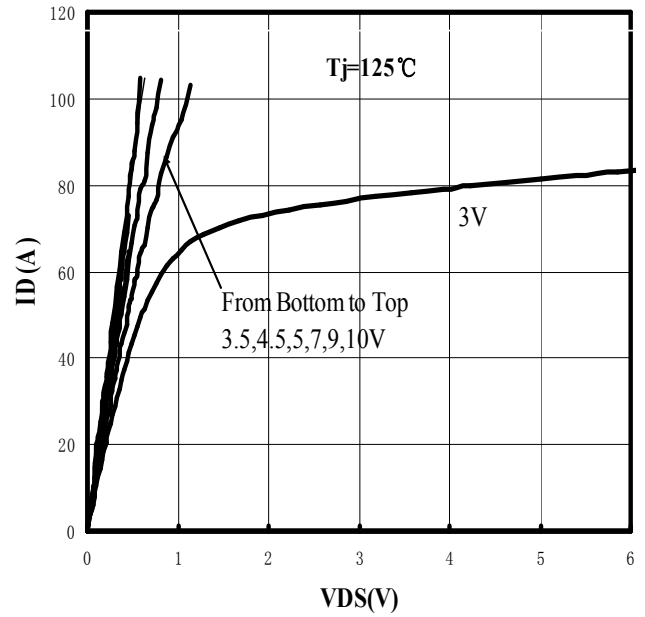


Figure 3. Transfer Characteristics

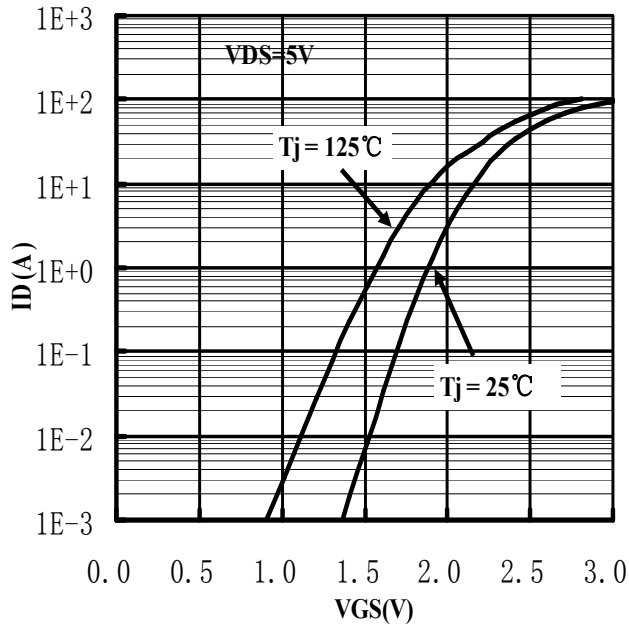
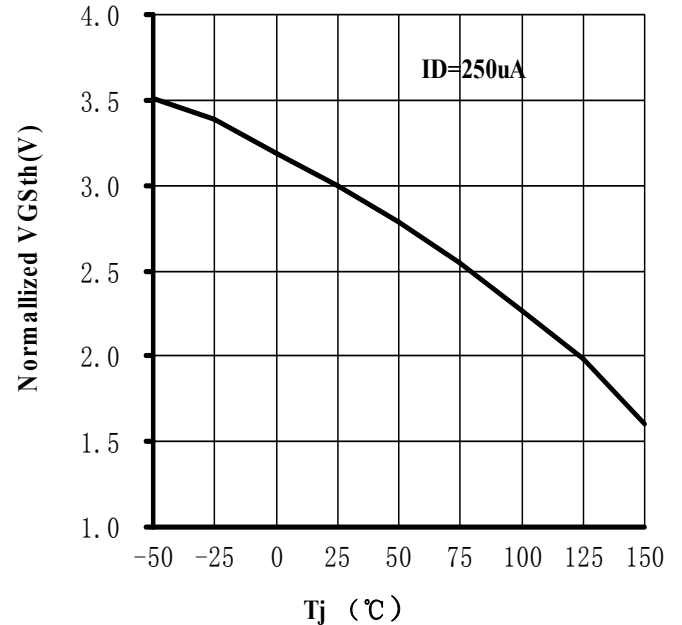


Figure 4. Gate Threshold Voltage Characteristics



Typical Electrical and Thermal Characteristics

Figure 5. R_{DS(on)} vs. Drain Current Characteristics

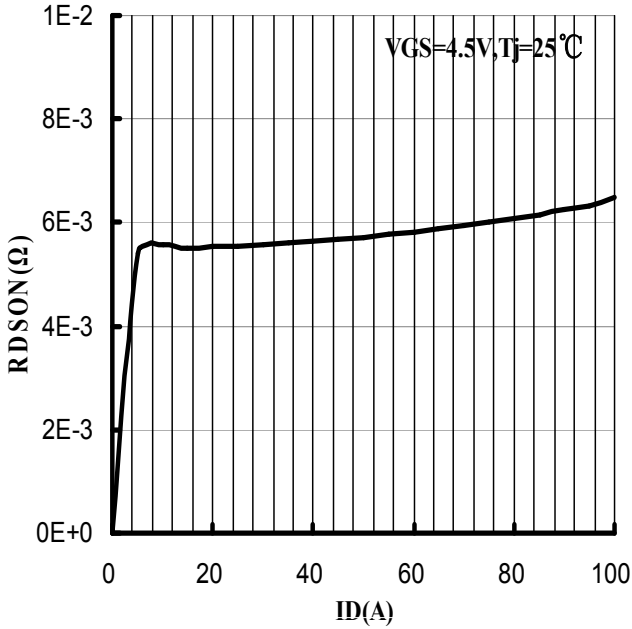


Figure 6. R_{DS(on)} vs. Junction Tem Characteristics

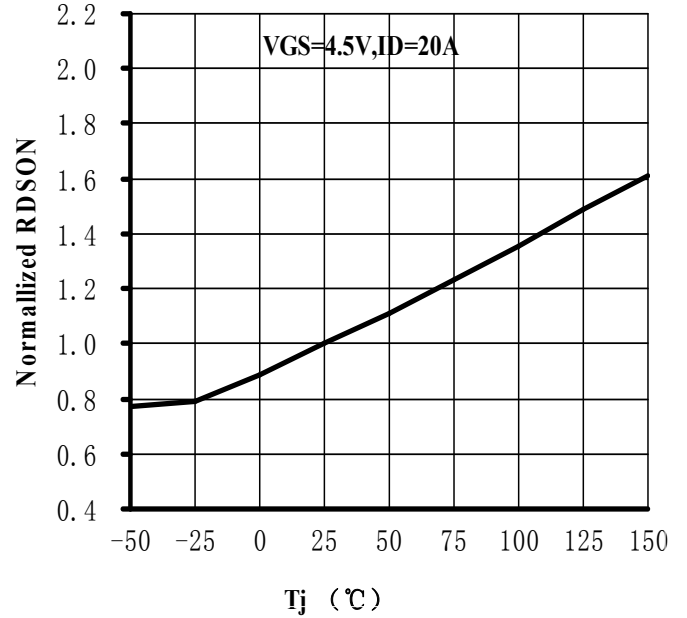


Figure 7. R_{DS(on)} vs. VGS Characteristics

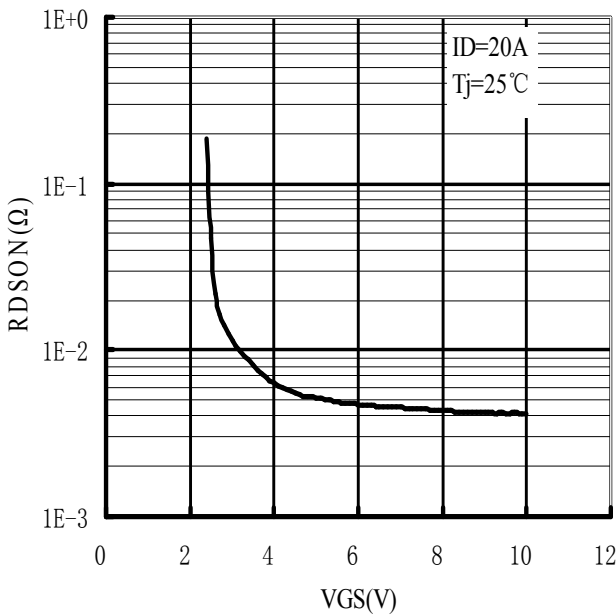
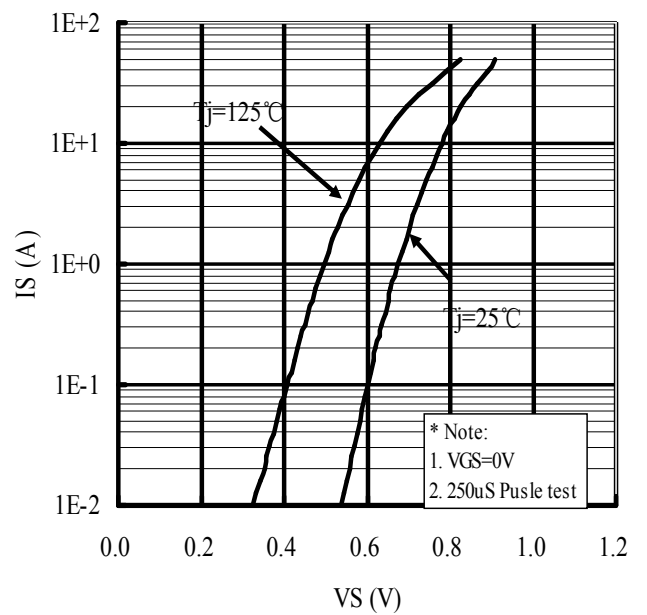


Figure 8. I_S vs. VSD Characteristics



Typical Electrical and Thermal Characteristics

Figure 9. Gate Charge Characteristics

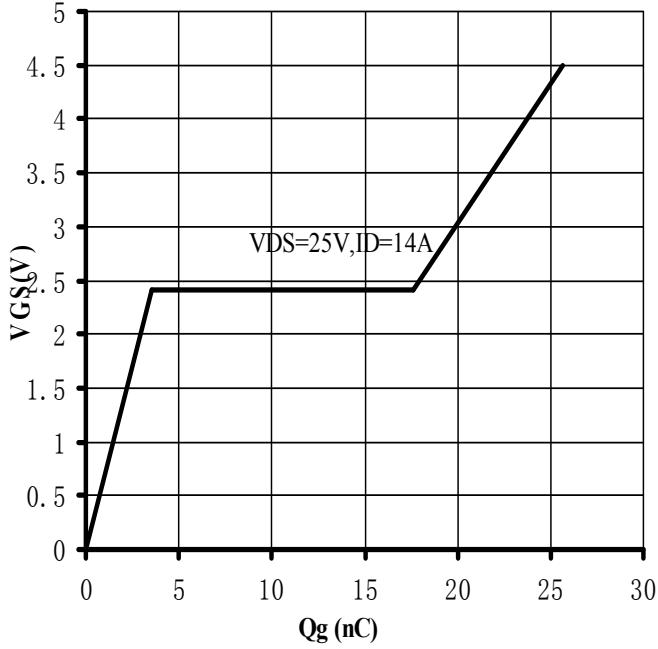


Figure 10. Capacitance Characteristics

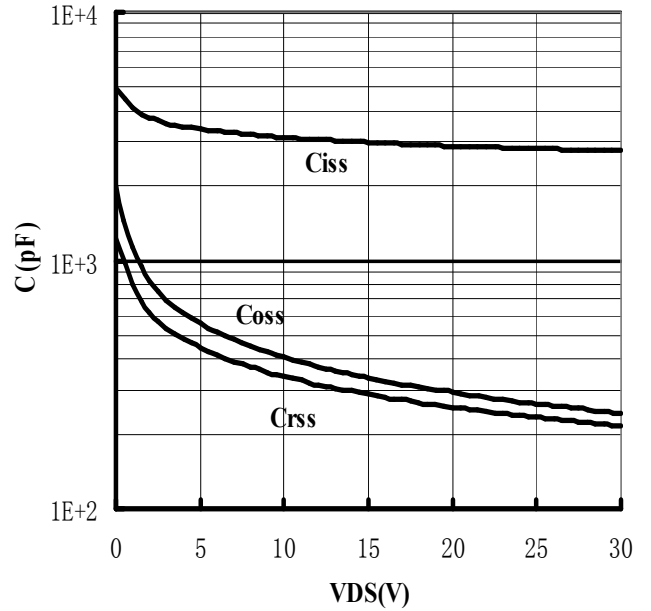
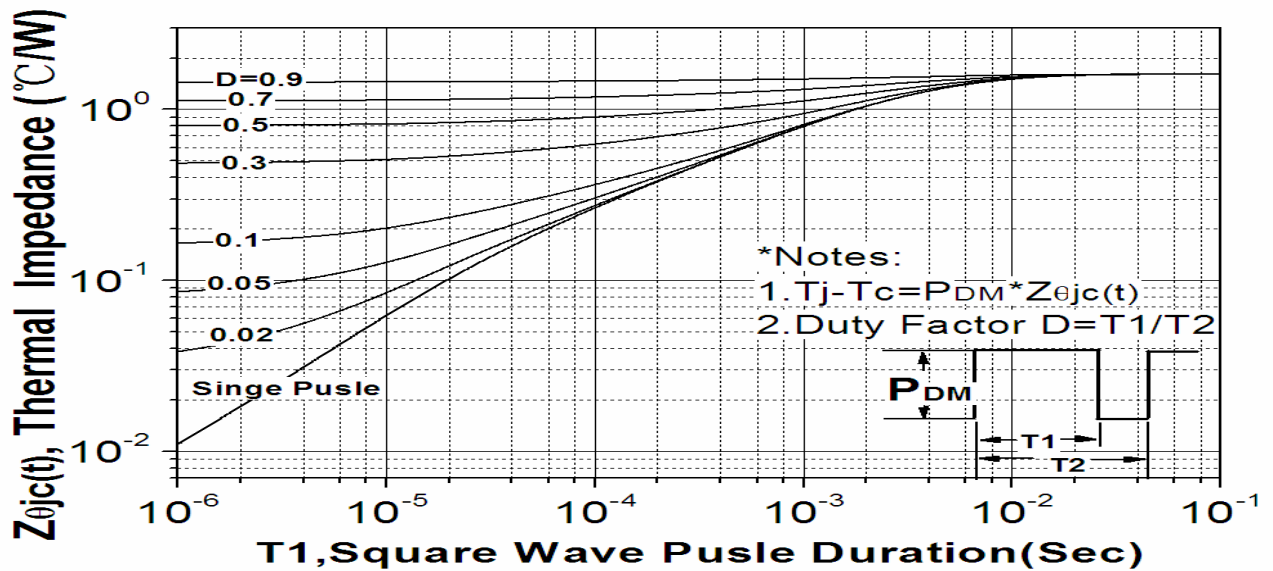


Figure 11. Thermal Resistance Characteristics





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Ordering Information :

Device	Packing
Part Number-TP	Tape&Reel:5Kpcs/ Reel

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

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