



**THE DATASHEET OF  
MCAC53N06Y-TP**



## Features

- Split Gate Trench MOSFET Technology
- Low Gate Charge
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

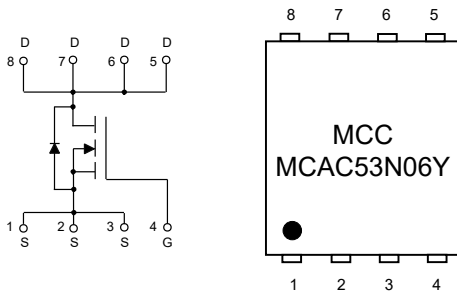
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 55°C/W Junction to Ambient<sup>(Note2)</sup>
- Thermal Resistance: 1.8°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	53
		$T_C=100^\circ\text{C}$	34
Pulsed Drain Current <sup>(Note 3)</sup>	$I_{DM}$	212	A
Total Power Dissipation <sup>(Note 4)</sup>	$P_D$	69	W
Single Pulse Avalanche Energy <sup>(Note 5)</sup>	$E_{AS}$	100	mJ

Note:

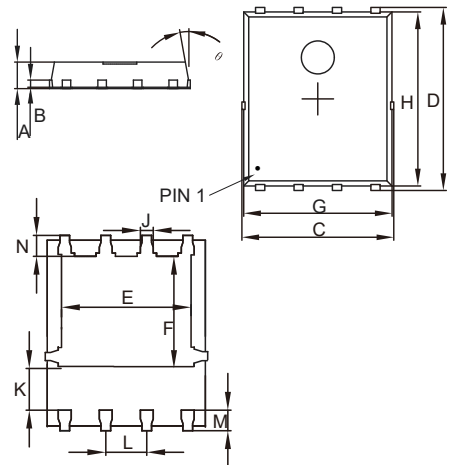
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ .
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.
5.  $T_J=25^\circ\text{C}$ ,  $V_{DD}=40\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $L=0.5\text{mH}$ .

## Internal Structure and Marking Code



# N-CHANNEL MOSFET

## DFN5060



### DIMENSIONS

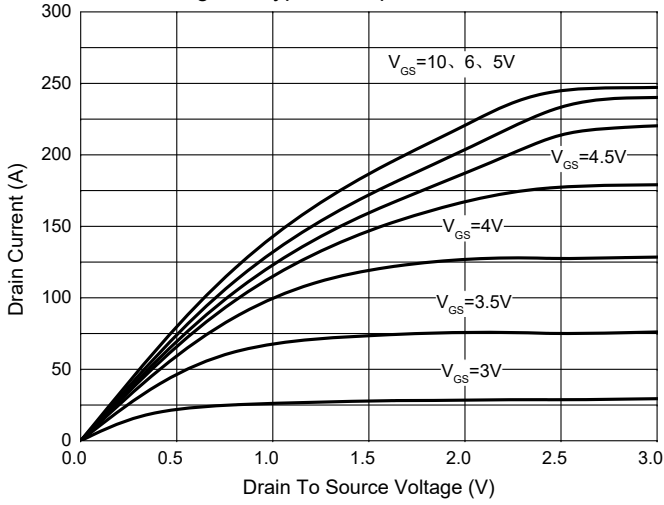
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.031	0.047	0.80	1.20	
B	0.010		0.254		TYP.
C	0.193	0.222	4.90	5.64	
D	0.232	0.250	5.90	6.35	
E	0.148	0.167	3.75	4.25	
F	0.126	0.154	3.20	3.92	
G	0.189	0.213	4.80	5.40	
H	0.222	0.239	5.65	6.06	
K	0.045	0.059	1.15	1.50	
J	0.012	0.020	0.30	0.50	
L	0.046	0.054	1.17	1.37	
M	0.012	0.028	0.30	0.71	
N	0.016	0.028	0.40	0.71	

**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

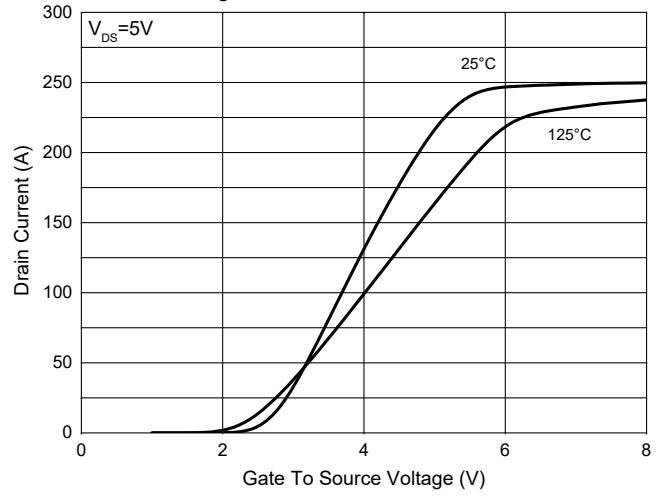
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.1	1.7	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		5.3	7.5	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$		6.9	9.5	
Gate Resistance	$R_g$	f=1 MHz, Open drain		1.6		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				53	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=20A$			0.99	V
Reverse Recovery Time	$t_{rr}$	$I_F=20A, di_F/dt=500A/\mu s$		30		ns
Reverse Recovery Charge	$Q_{rr}$			18		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz$		2062		pF
Output Capacitance	$C_{oss}$			410		
Reverse Transfer Capacitance	$C_{rss}$			18		
Total Gate Charge	$Q_g$	$V_{DS}=30V, V_{GS}=10V, I_D=20A$		31		nC
Gate-Source Charge	$Q_{gs}$			6		
Gate-Drain Charge	$Q_{gd}$			5		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, V_{GS}=10V,$ $I_{DS}=20A, R_{GEN}=3\Omega$		10		ns
Turn-On Rise Time	$t_r$			34		
Turn-Off Delay Time	$t_{d(off)}$			26.2		
Turn-Off Fall Time	$t_f$			45		

**Curve Characteristics**

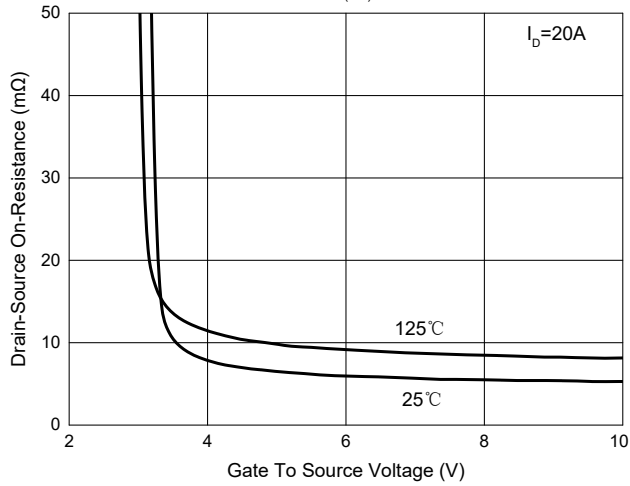
**Fig. 1 - Typical Output Characteristics**



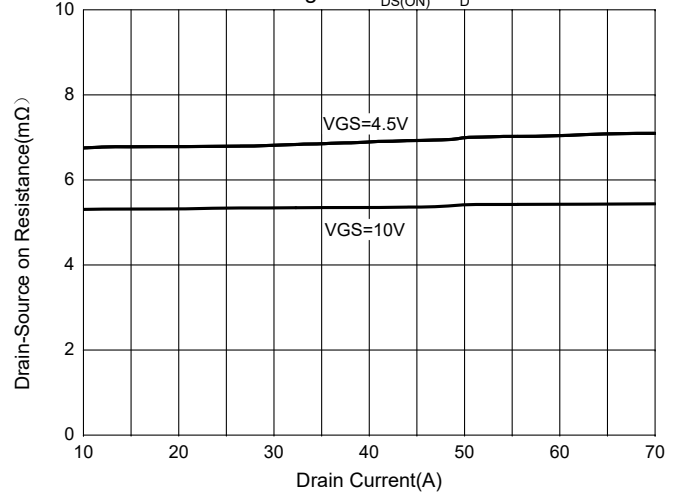
**Fig. 2 - Transfer Characteristics**



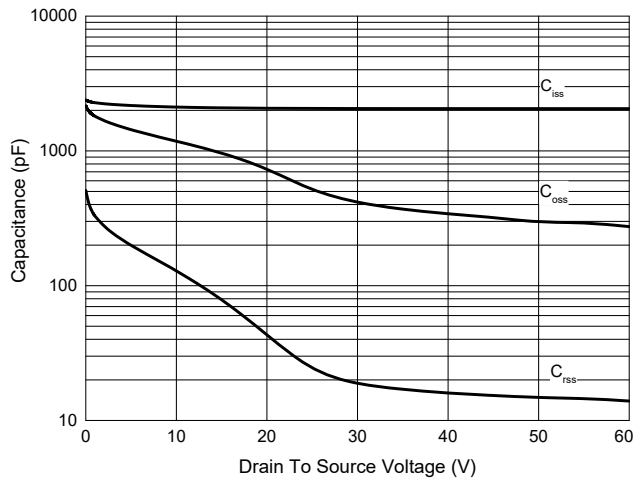
**Fig. 3 -  $R_{DS(ON)} - V_{GS}$**



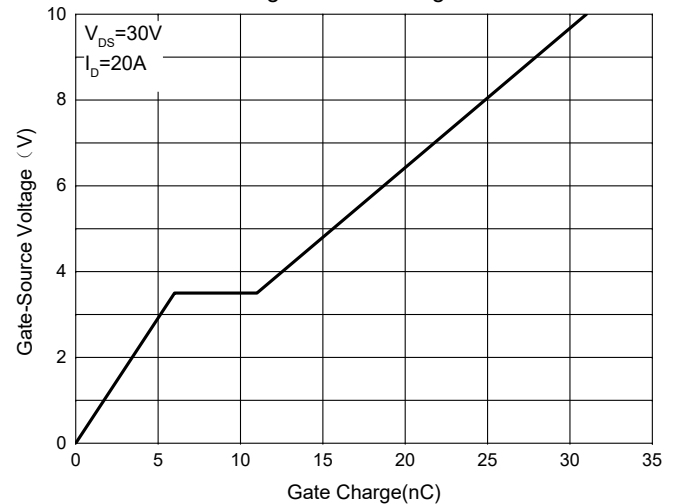
**Fig. 4 -  $R_{DS(ON)} - I_D$**



**Fig. 5 - Capacitance Characteristics**



**Fig. 6 - Gate Charge**



Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

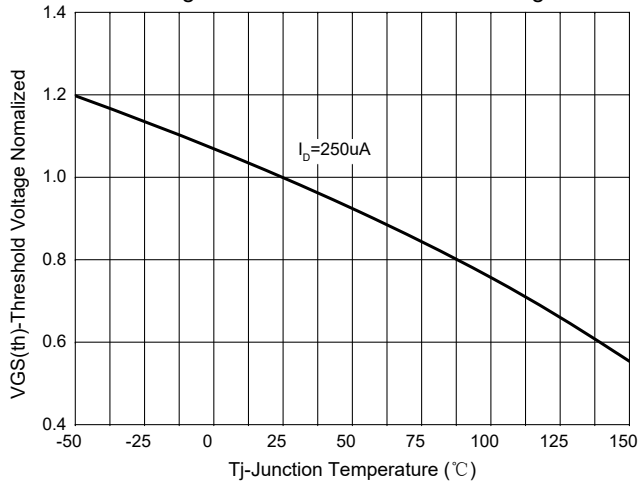


Fig.8-Normalized On Resistance Characteristics

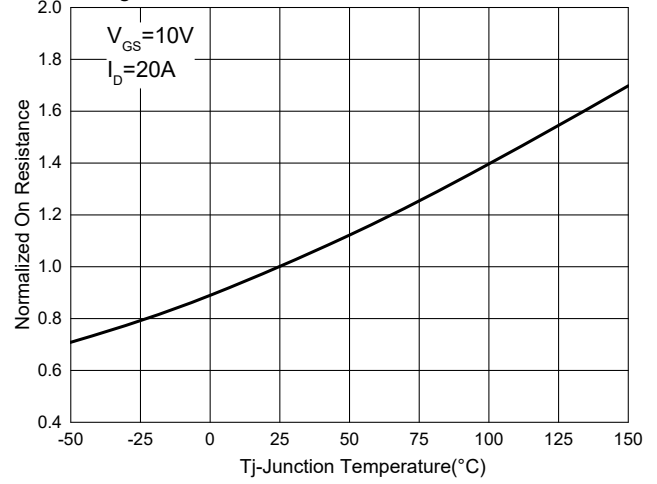


Fig. 9 -  $I_S - V_{SD}$

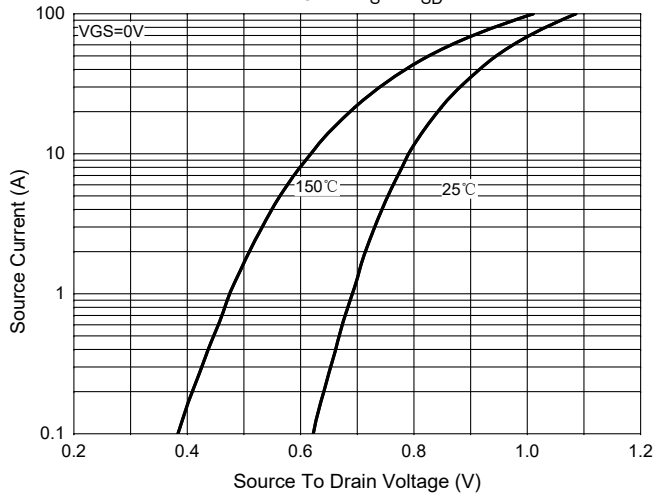


Fig. 10 - Current dissipation

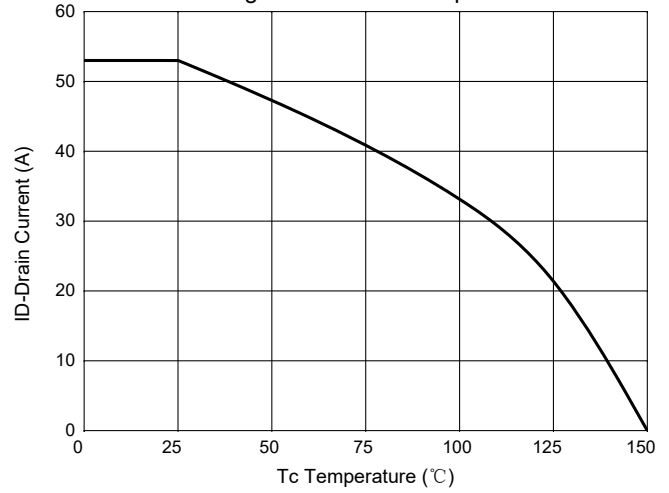
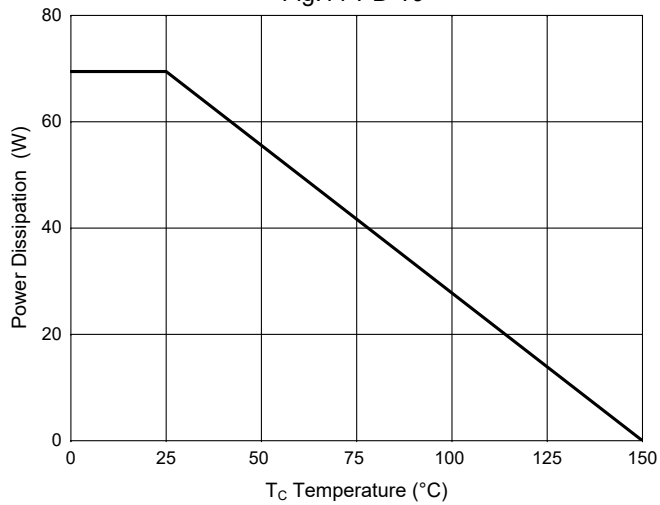


Fig.11-PD-TJ



## Curve Characteristics

Fig. 12 - Safe Operation Area

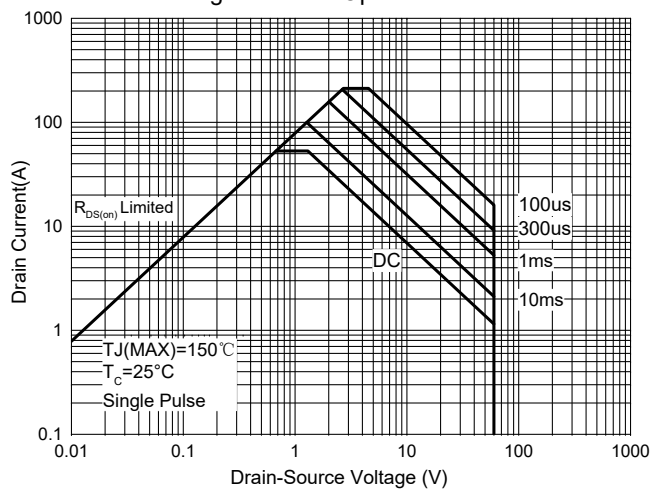
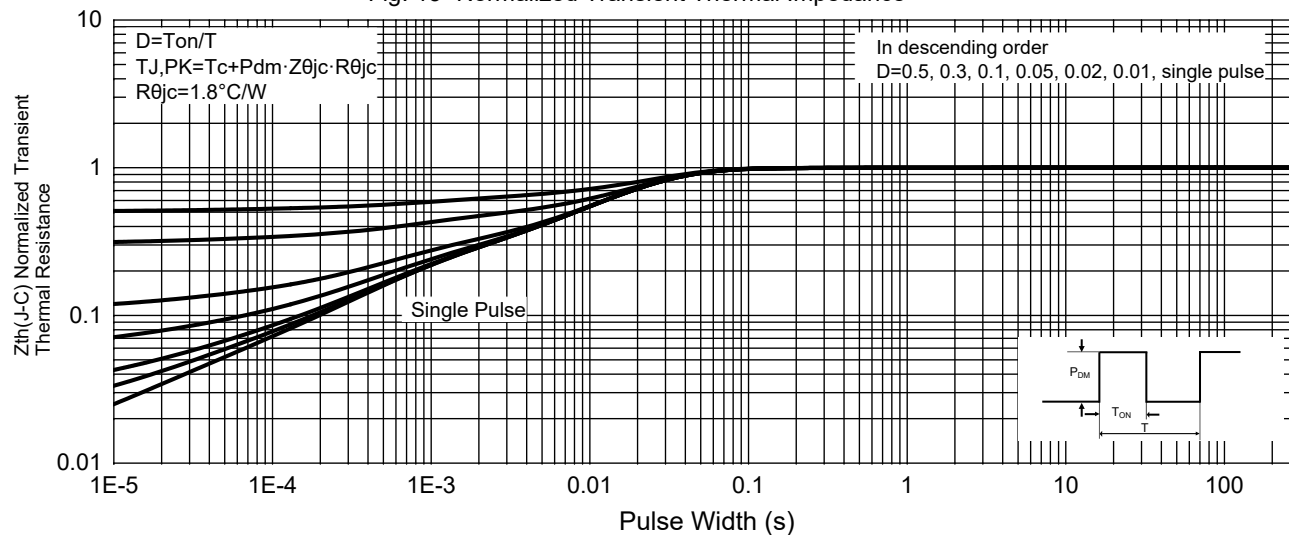


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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