

**Features**

- Excellent Package for Heat Dissipation
- High Density Cell Design for Low  $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

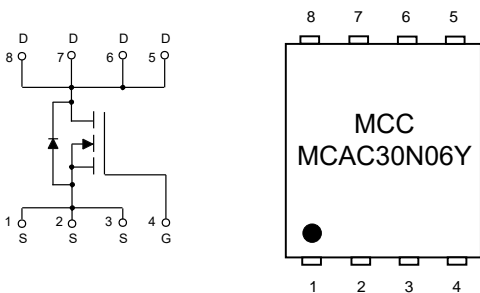
**Maximum Ratings**

- Operating Junction Temperature Range :  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Storage Temperature Range:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Thermal Resistance:  $5^{\circ}\text{C/W}$  Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_C=25^{\circ}\text{C}$	30
		$T_C=100^{\circ}\text{C}$	19
Pulsed Drain Current	$I_{DM}$	130	A
Avalanche Energy, Single Pulse <sup>(Note 2)</sup>	$E_{AS}$	100	mJ
Total Power Dissipation	$P_D$	30	W

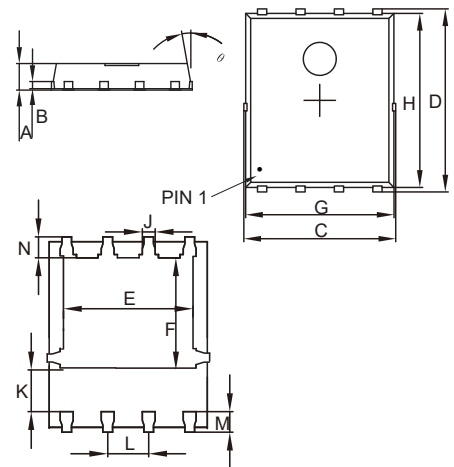
Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.  
2.  $T_j=25^{\circ}\text{C}$ ,  $V_{DD}=40\text{V}$ ,  $V_G=10\text{V}$ ,  $L=0.5\text{mH}$ ,  $R_G=25\Omega$

**Internal Structure and Marking Code**



**N-CHANNEL MOSFET**

**DFN5060**



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	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 Parameter</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Gate-Threshold Voltage <sup>(Note 3)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			1	$\mu A$
Drain-Source On-Resistance <sup>(Note 3)</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$		16	20	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$		17.5	22	
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=10A$		0.85	1.2	V
<b>Dynamic Parameters<sup>(Note 4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz$		1552		pF
Output Capacitance	$C_{oss}$			192		
Reverse Transfer Capacitance	$C_{rss}$			133		
<b>Switching Parameters<sup>(Note 4)</sup></b>						
Total Gate Charge	$Q_g$	$V_{GS}=10V, V_{DS}=30V, I_D=15A$		48		nC
Gate-Source Charge	$Q_{gs}$			7		
Gate-Drain Charge	$Q_{gd}$			10		
Reverse Recovery Charge	$Q_{rr}$	$I_F=10A, di/dt=500A/us$		47		ns
Reverse Recovery Time	$t_{rr}$			39		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, R_L=1\Omega, I_D=2A, R_{GEN}=3\Omega$		11		ns
Turn-On Rise Time	$t_r$			6		
Turn-Off Delay Time	$t_{d(off)}$			30		
Turn-Off Fall Time	$t_f$			9		

Note: 3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

4. These Parameters Have No Way to Verify.

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

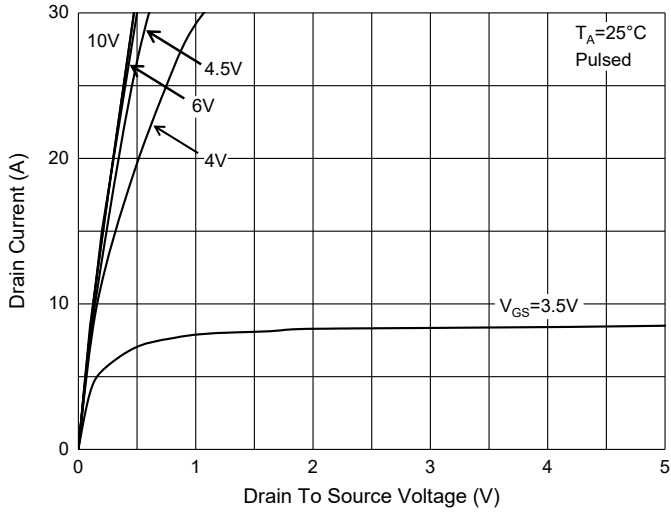


Fig. 2 - Transfer Characteristics

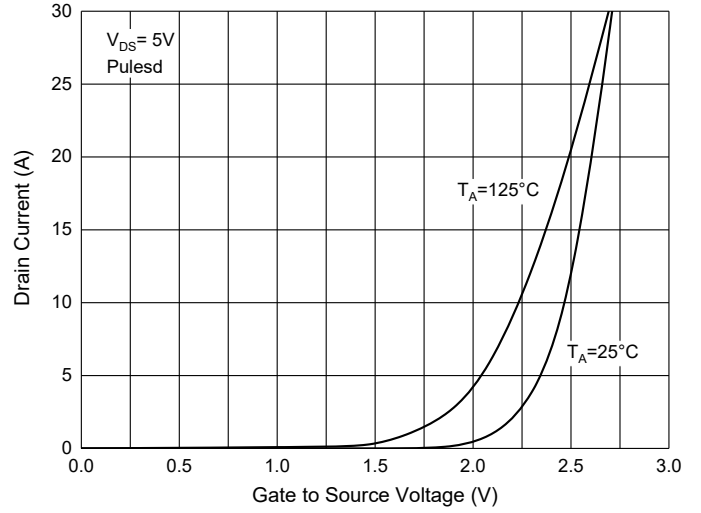


Fig. 3 - Capacitance Characteristics

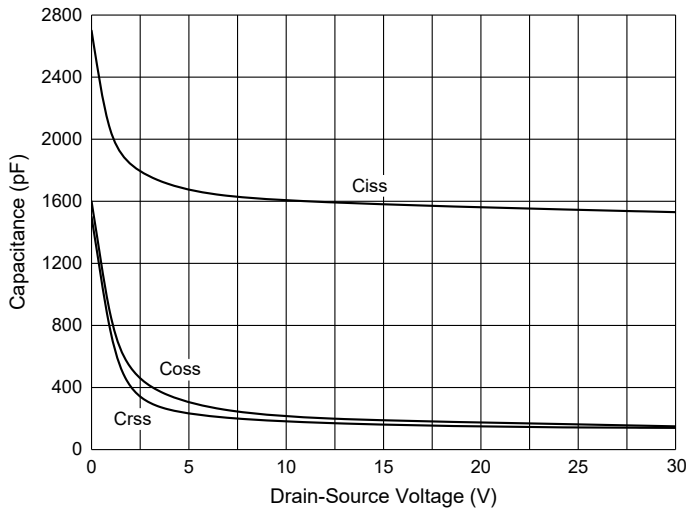


Fig. 4 - Gate Charge

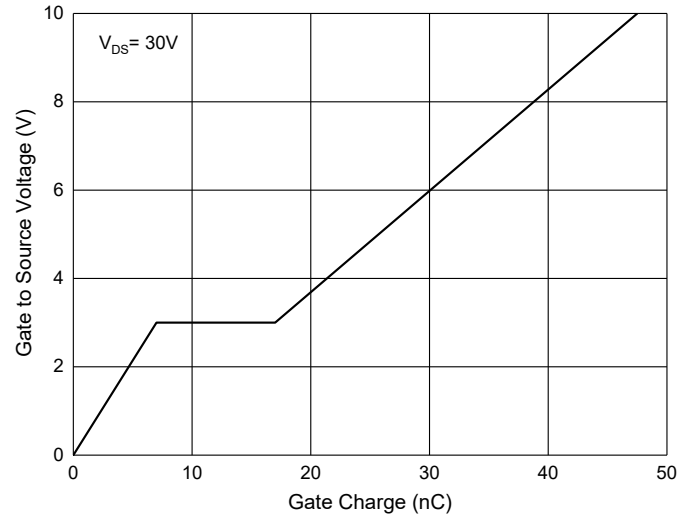


Fig. 5 -  $R_{DS(ON)} - I_D$

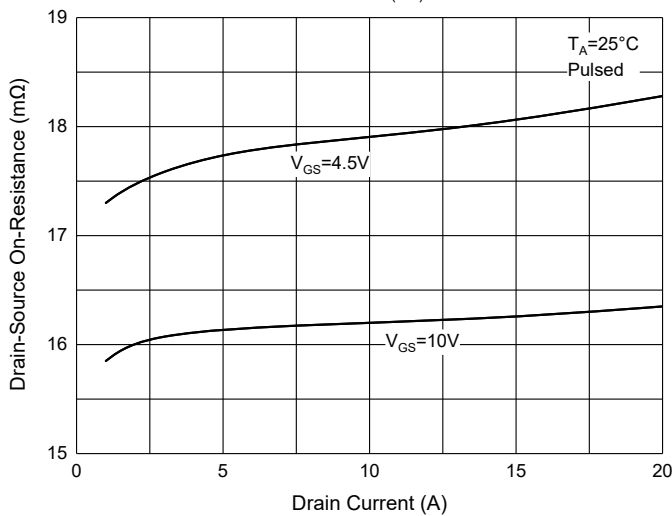
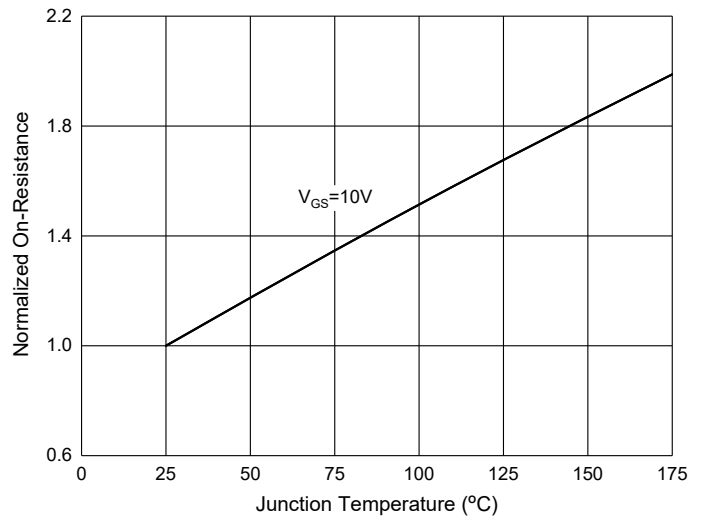
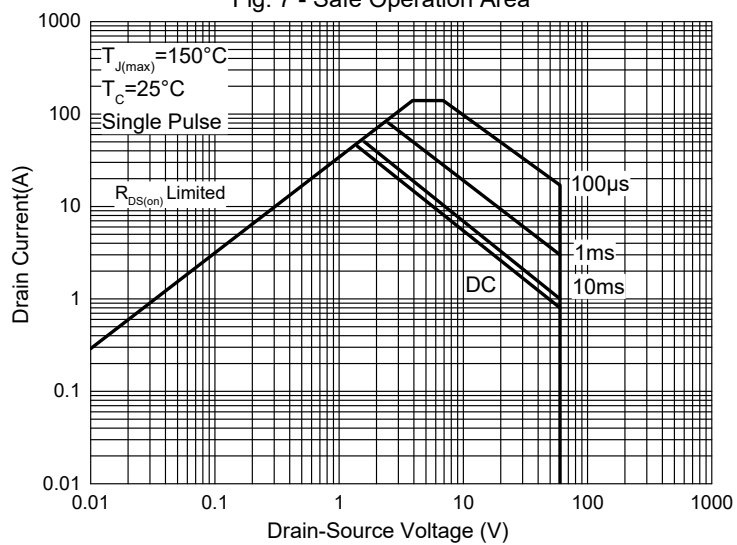


Fig. 6 - Drain-Source on Resistance



## Curve Characteristics

Fig. 7 - Safe Operation Area



## Ordering Information

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

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