



**THE DATASHEET OF  
MCG30N03A-TP**



### Features

- Trench Power LV MOSFET Technology
- Excellent Package For Heat Dissipation
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

### Maximum Ratings

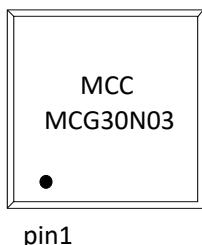
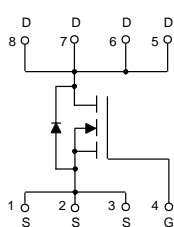
- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance: 60°C/W Junction to Ambient (Note2)
- Thermal Resistance: 5.5°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	30
		$T_C=100^\circ\text{C}$	21
Pulsed Drain Current (Note3)	$I_{DM}$	120	A
Total Power Dissipation (Note4)	$P_D$	27	W
Single Pulse Avalanche Energy (Note5)	$E_{AS}$	60	mJ

Note:

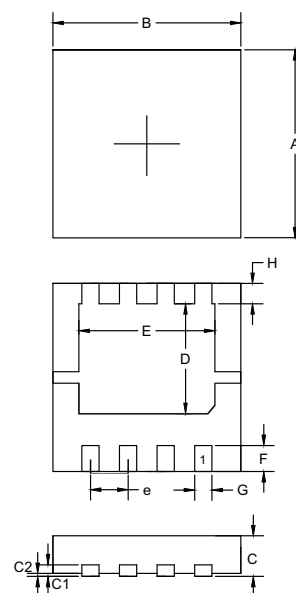
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment 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.  $T_J=25^\circ\text{C}$ ,  $V_{DD}=25\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $R_G=25\Omega$ ,  $L=1\text{mH}$ .

### Internal Structure and Marking Code



## N-CHANNEL MOSFET

### DFN3333



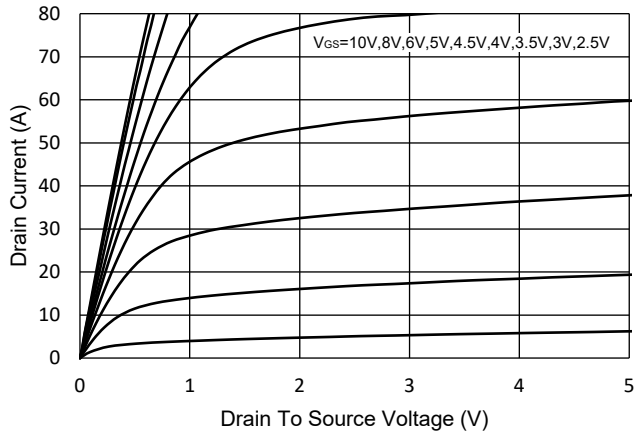
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.70	0.75	17.8	19.0	
B	0.70	0.75	17.8	19.0	
C	0.08	0.09	2.0	2.3	
ØF	0.00	0.009	0.0	0.23	
ØG	0.00	0.009	0.0	0.23	
Ø	0.00	0.009	0.0	0.23	
Ø	0.00	0.009	0.0	0.23	
Ø	0.00	0.009	0.0	0.23	
Ø	0.00	0.009	0.0	0.23	
P	0.01G	0.016	0.25	0.41	
^	0.024	0.028	0.61	0.71	

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

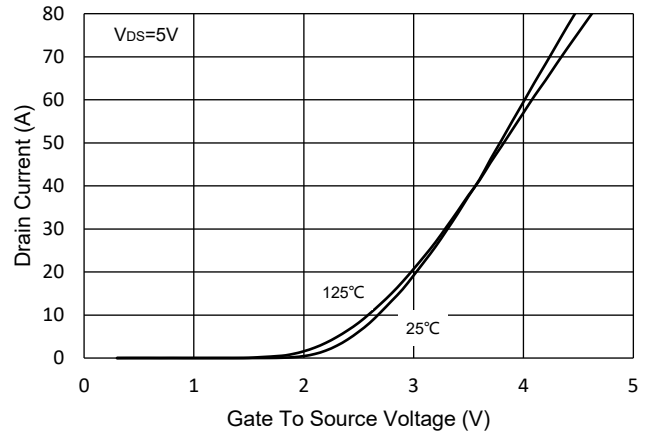
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.5	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$		7.6	10	m $\Omega$
		$V_{GS}=4.5V, I_D=15A$		10	13	
Gate Resistance	$R_g$	f=1 MHz, Open drain		2.0		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				30	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=15A$			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=15A, dI_F/dt=100A/\mu s$		22		ns
Reverse Recovery Charge	$Q_{rr}$			10		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, f=1MHz$		1052		pF
Output Capacitance	$C_{oss}$			180		
Reverse Transfer Capacitance	$C_{rss}$			155		
Total Gate Charge	$Q_g$	$V_{DS}=15V, V_{GS}=10V, I_D=30A$		22.6		nC
Gate-Source Charge	$Q_{gs}$			3.1		
Gate-Drain Charge	$Q_{gd}$			6.2		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=10V, I_{DS}=2A, R_{GEN}=3\Omega$		6		ns
Turn-On Rise Time	$t_r$			5		
Turn-Off Delay Time	$t_{d(off)}$			24		
Turn-Off Fall Time	$t_f$			8		

**Curve Characteristics**

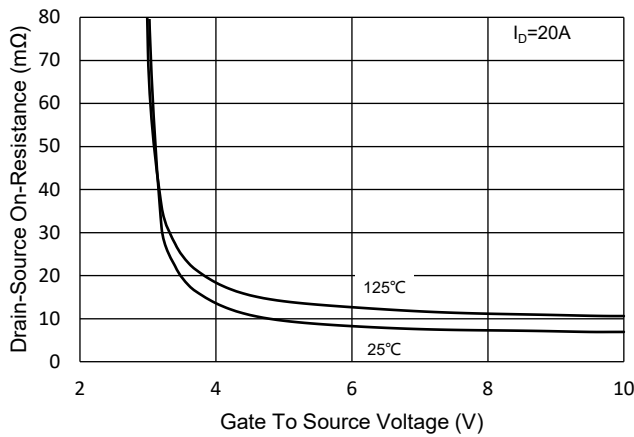
**Fig.1 - Typical Output Characteristics**



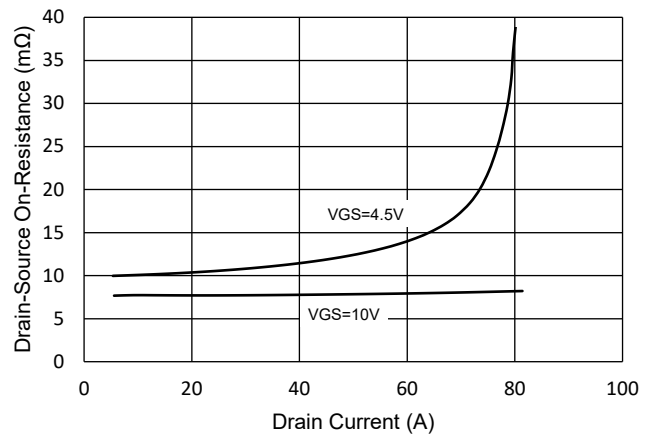
**Fig.2 - Transfer Characteristic**



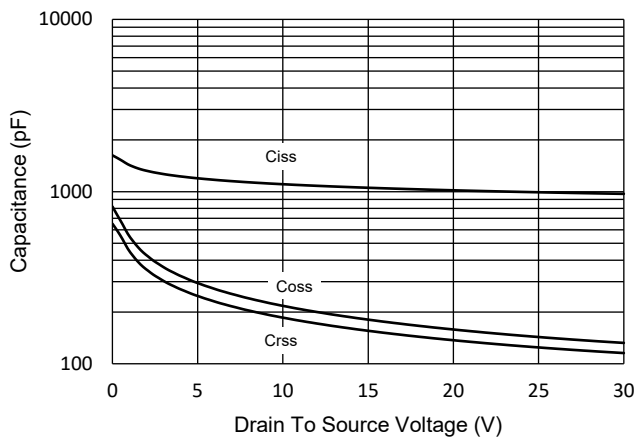
**Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$**



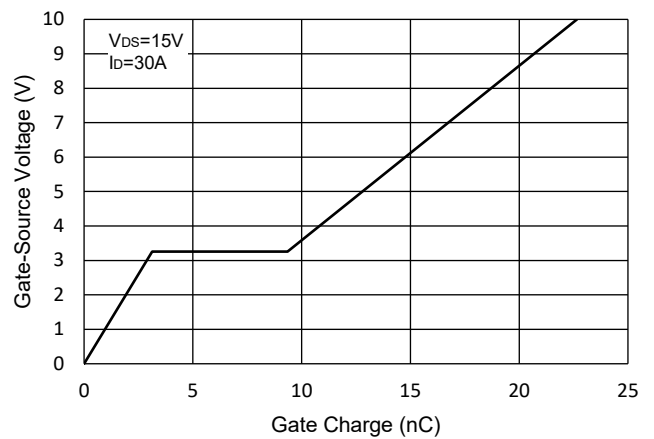
**Fig.4 -  $R_{DS(ON)}$  -  $I_D$**



**Fig.5 - Capacitance Characteristics**

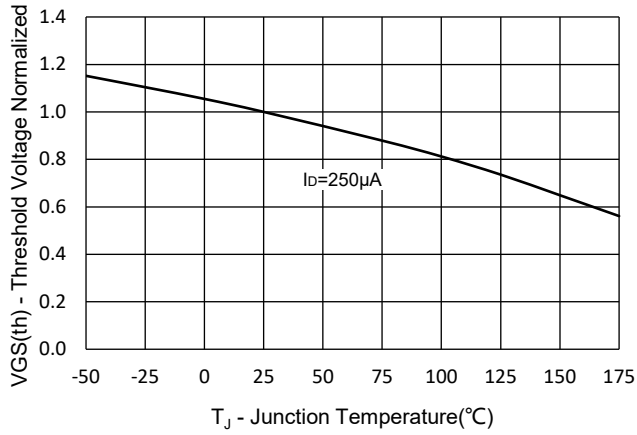


**Fig.6 - Gate Charge**

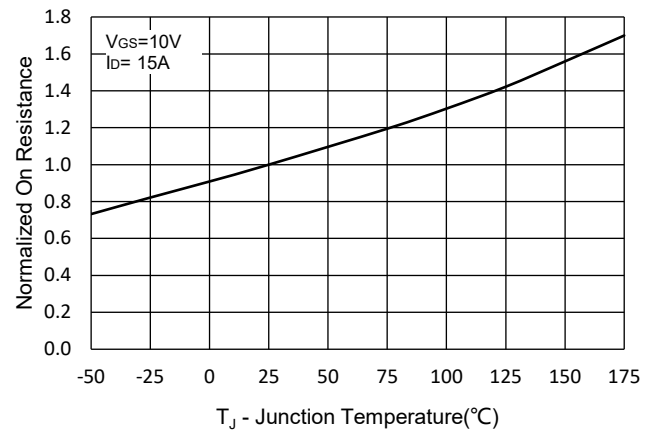


**Curve Characteristics**

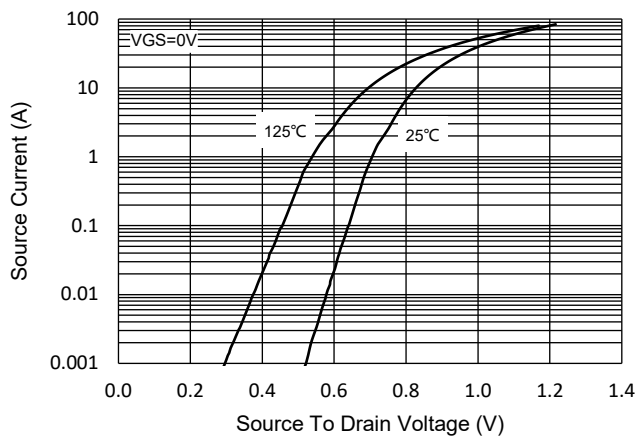
**Fig.7 - Normalized Threshold Voltage**



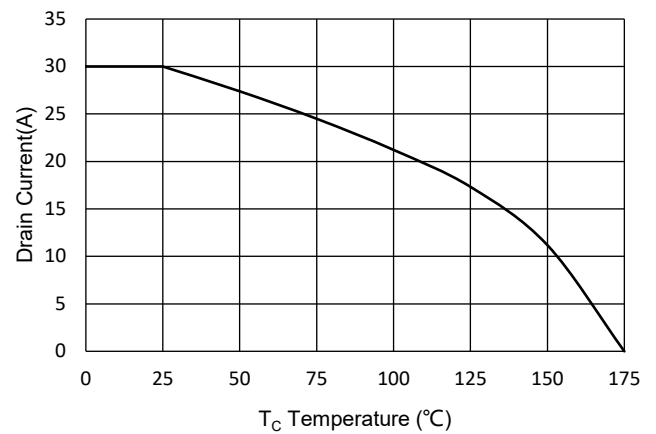
**Fig.8 - Normalized On Resistance Characteristics**



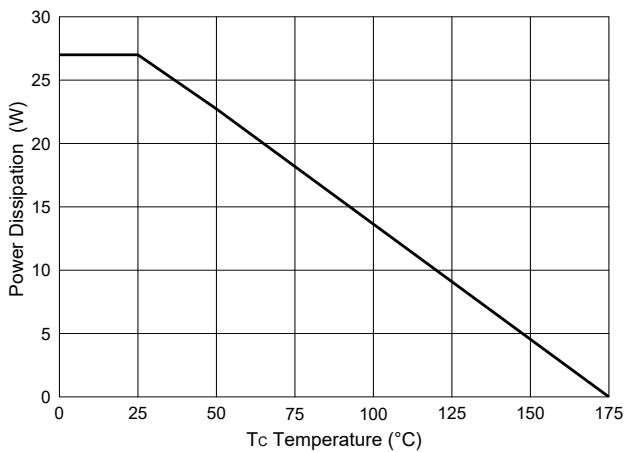
**Fig.9 - I<sub>S</sub> - V<sub>SD</sub>**



**Fig.10 - Drain Current**



**Fig.11-PD Dissipation**



Curve Characteristics

Fig. 12 - Safe Operation Area

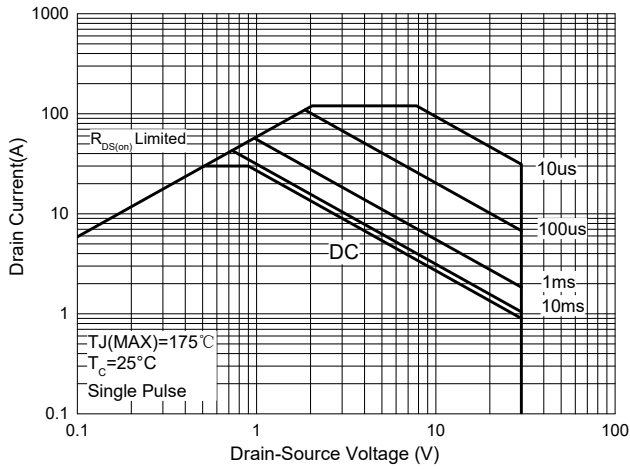
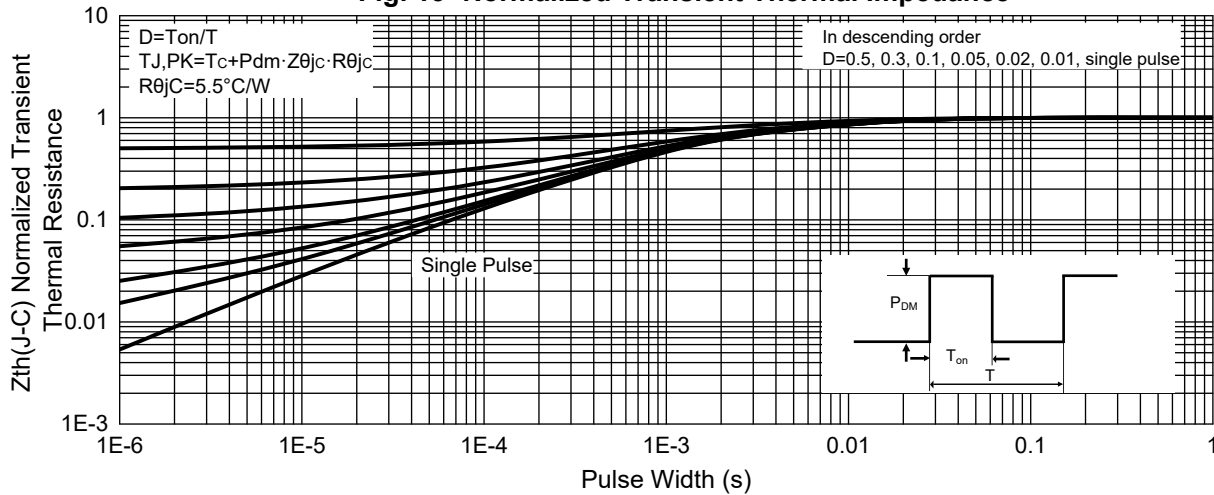


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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