



**THE DATASHEET OF  
MCQ18N03-TP**



**Features**

- Trench Power LV MOSFET Technology
- High Density Cell Design for Low  $R_{DS(ON)}$
- High Speed Switching
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free. "Green" Device<sup>(Note 1)</sup>
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

**Maximum Ratings**

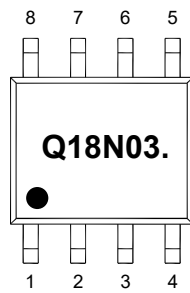
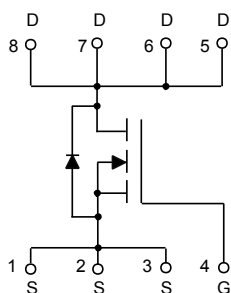
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 60°C/W Junction to Ambient<sup>(Note 2)</sup>

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	18
		$T_A=70^\circ\text{C}$	14.5
Pulsed Drain Current <sup>(Note 3)</sup>	$I_{DM}$	65	A
Total Power Dissipation <sup>(Note 4)</sup>	$P_D$	2.1	W
Single Pulsed Avalanche Energy <sup>(Note 5)</sup>	$E_{AS}$	121	mJ

Note:

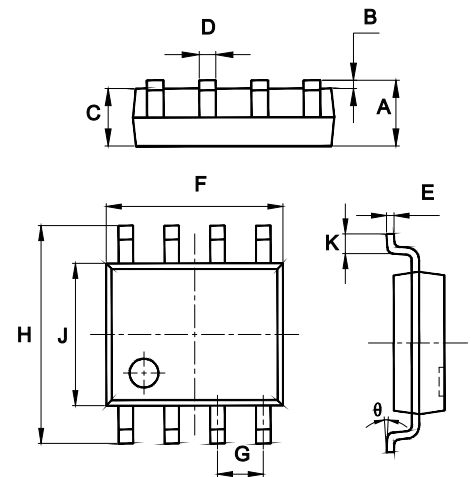
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The Power dissipation  $P_{DSM}$  is based on  $R_{\theta JA} t \leq 10s$  and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-Ambient thermal resistance.
5.  $T_J=25^\circ\text{C}$ ,  $V_{DD}=25V$ ,  $V_{GS}=10V$ ,  $L=0.5mH$ .

**Internal Structure and Marking Code**



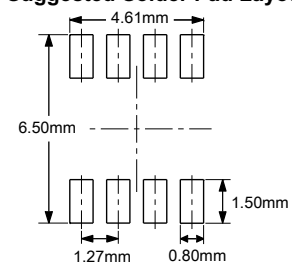
**N-CHANNEL  
MOSFET**

**SOP-8**



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.053	0.069	1.35	1.75	
B	0.004	0.010	0.10	0.25	
C	0.053	0.061	1.35	1.55	
D	0.013	0.020	0.33	0.51	
E	0.007	0.010	0.17	0.25	
F	0.185	0.200	4.70	5.10	
G	0.050		1.270		TYP.
H	0.228	0.244	5.80	6.20	
J	0.150	0.157	3.80	4.00	
K	0.016	0.050	0.40	1.27	
θ	0°	8°	0°	8°	

**Suggested Solder Pad Layout**



**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	1.3	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=18A$		4.8	7	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$		7	10	
Gate Resistance	$R_g$	F=1MHZ, Open drain		2.3		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				18	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=12A$		0.85	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_S=12A, di/dt=100A/\mu s$		23		ns
Reverse Recovery Charge	$Q_{rr}$			10		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, f=1MHz$		1765		pF
Output Capacitance	$C_{oss}$			298		
Reverse Transfer Capacitance	$C_{rss}$			266		
Total Gate Charge	$Q_g$	$V_{DS}=15V, V_{GS}=10V, I_D=12A$		38		nC
Gate-Source Charge	$Q_{gs}$			4		
Gate-Drain Charge	$Q_{gd}$			10		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DD}=20V, I_D=4A, R_{GEN}=3\Omega$		7.8		ns
Turn-On Rise Time	$t_r$			10		
Turn-Off Delay Time	$t_{d(off)}$			35		
Turn-Off Fall Time	$t_f$			20		

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

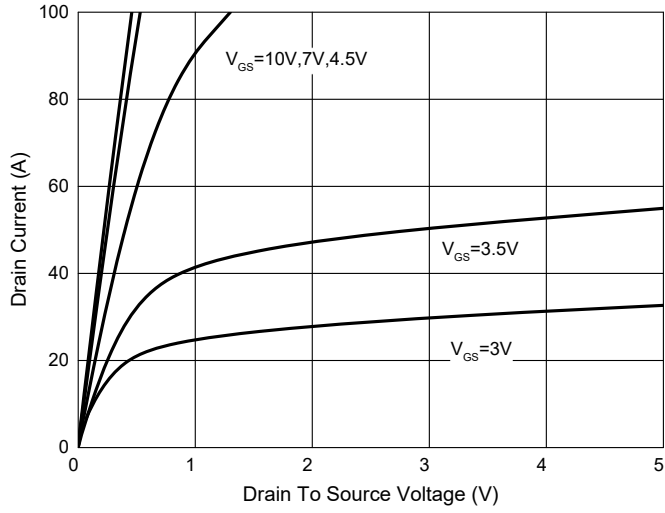


Fig. 2 - Transfer Characteristics

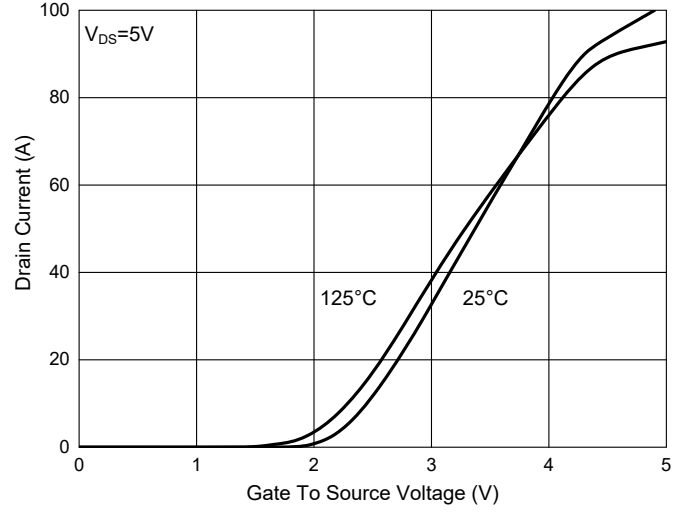


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

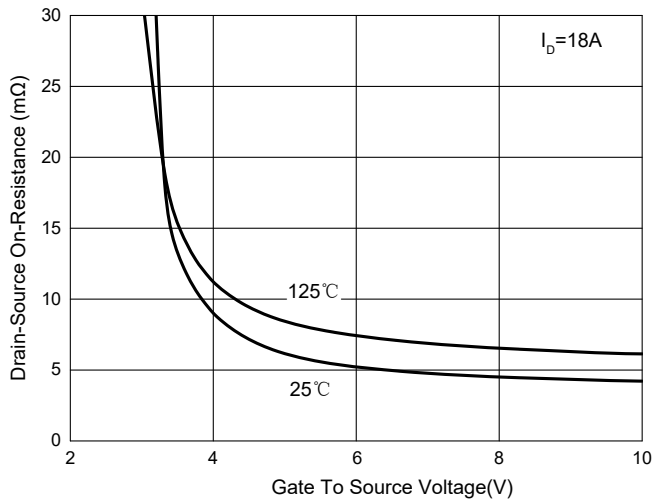


Fig. 4 -  $R_{DS(ON)} - I_D$

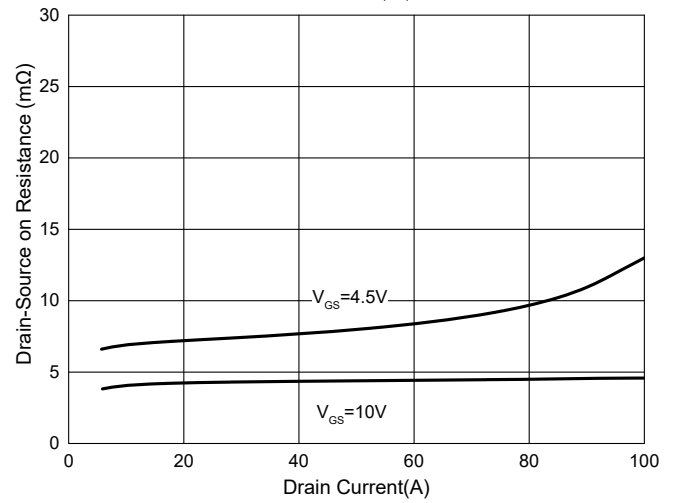


Fig. 5 - Capacitance Characteristics

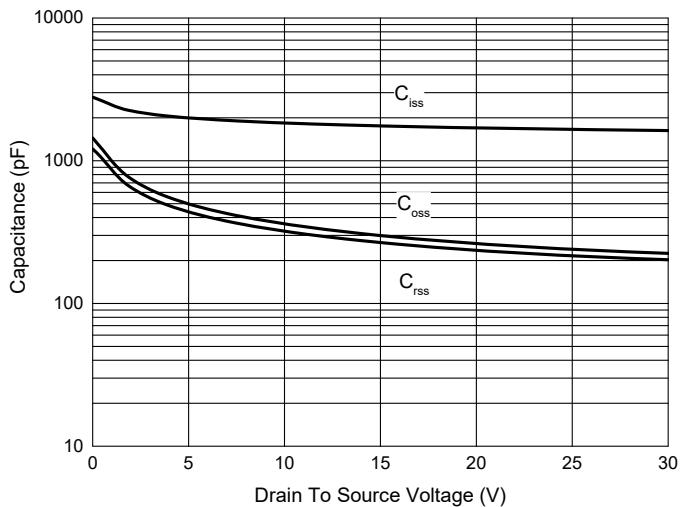
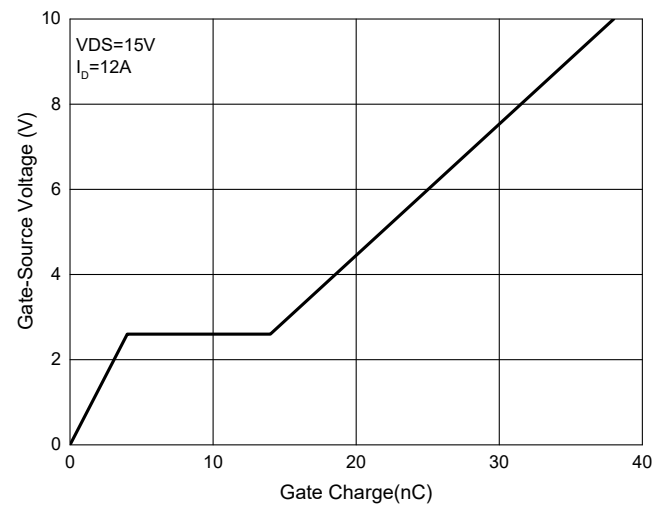


Fig. 6 - Gate Charge



**Curve Characteristics**

Fig. 7 - Normalized On Resistance Characteristics

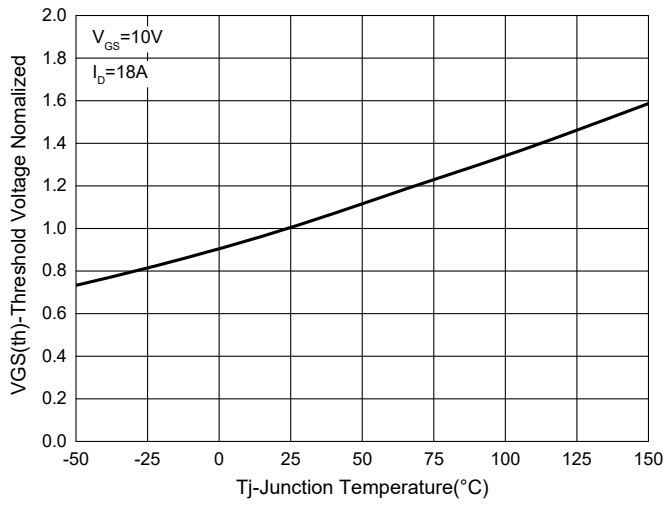


Fig. 8 - Normalized Threshold voltage

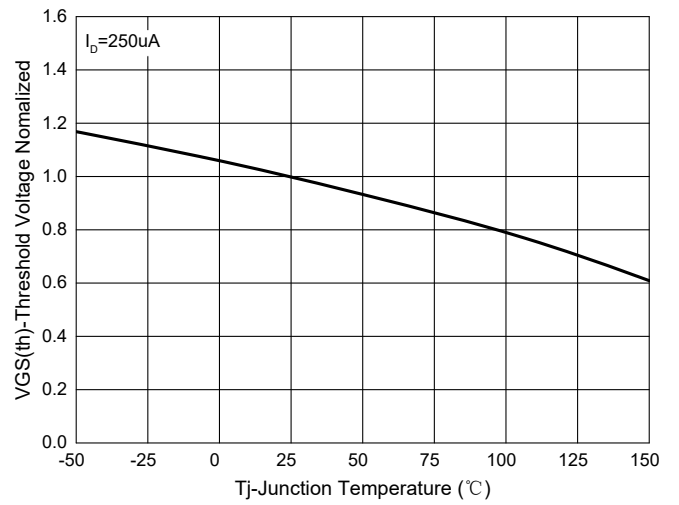


Fig. 9 -  $I_S - V_{SD}$

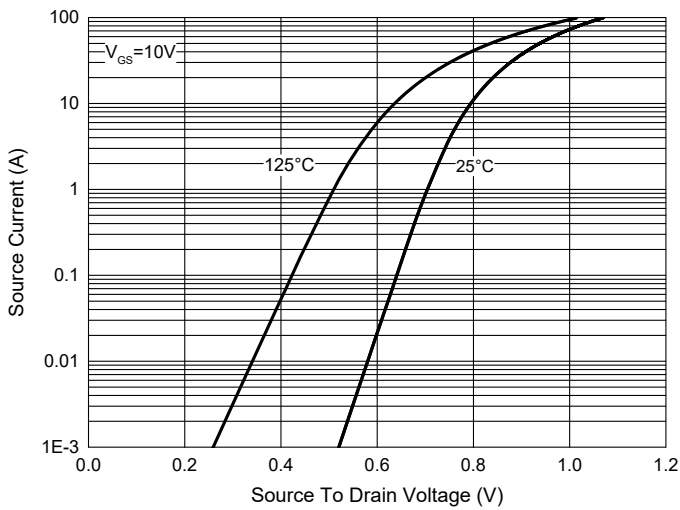


Fig. 10 - Drain Current

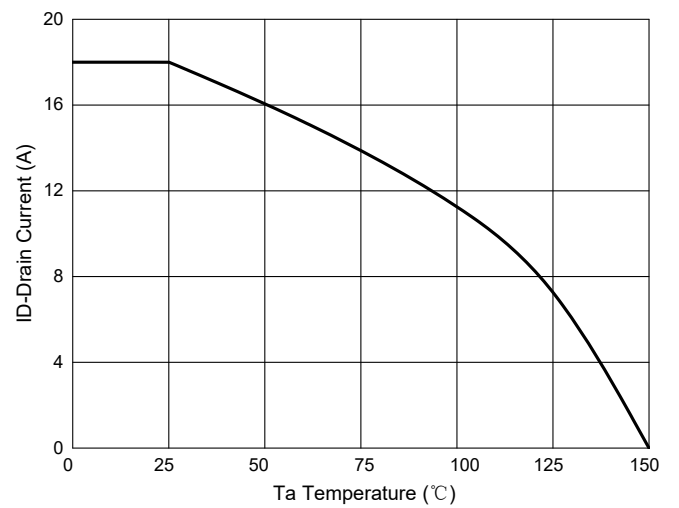
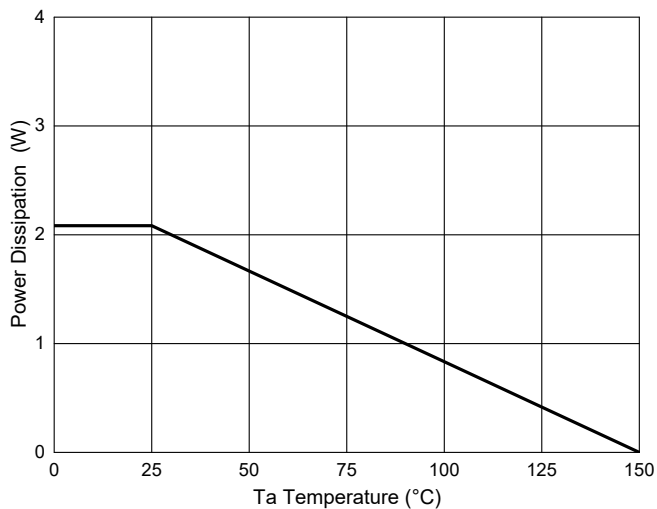


Fig. 11 - PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

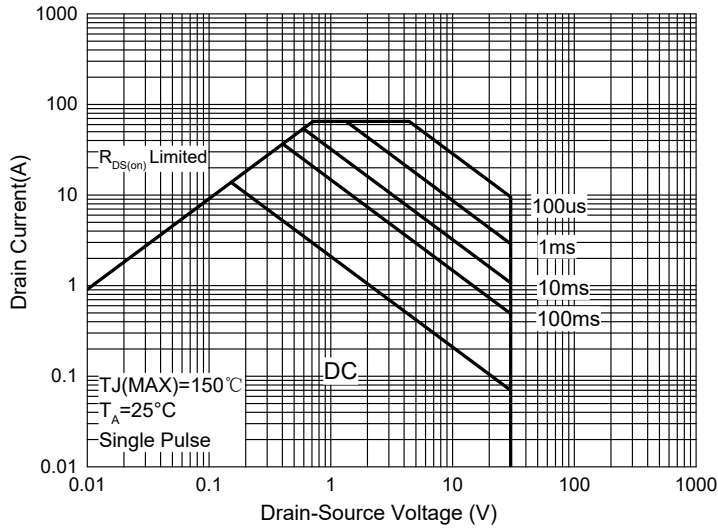
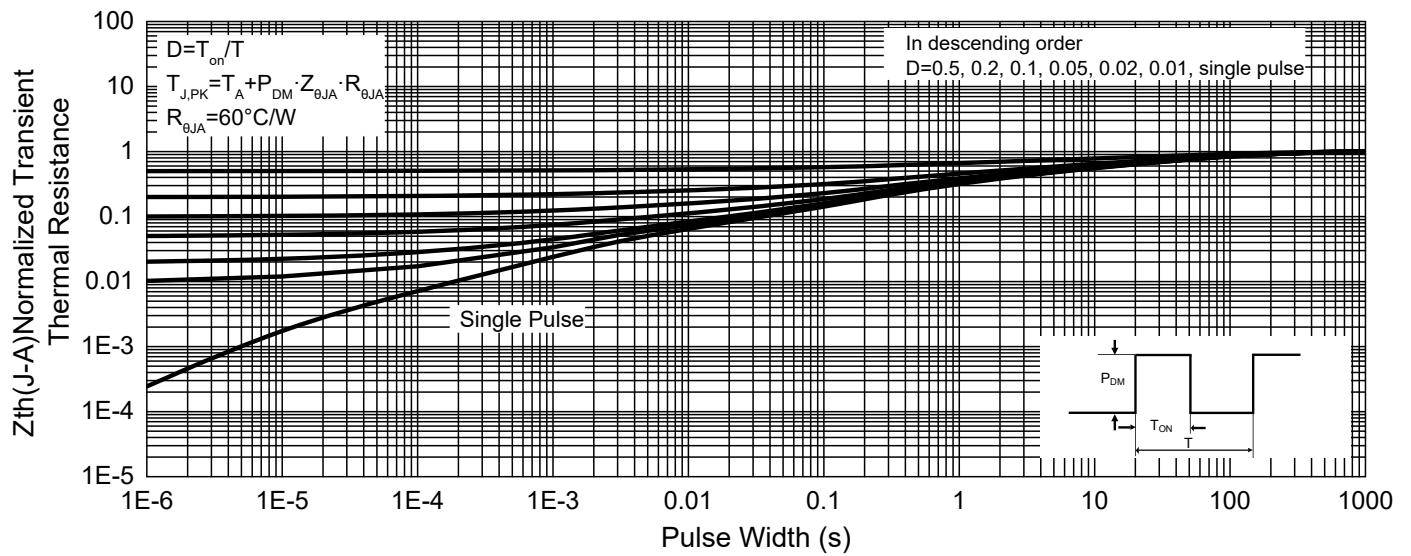


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 4Kpcs/Reel

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