

### Features

- Split Gate Trench MOSFET Technology
- High Density Cell Design for Low  $R_{DS(on)}$
- 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

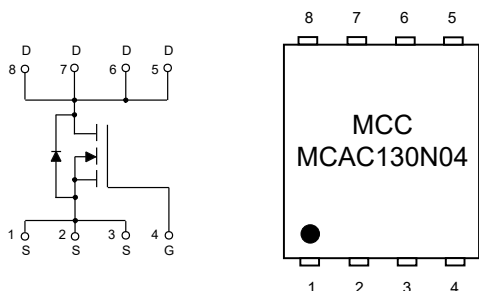
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 50°C/W Junction to Ambient (Note 2)
- Thermal Resistance: 1.08°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	130
		$T_C=100^\circ\text{C}$	82
Pulsed Drain Current (Note 3)	$I_{DM}$	520	A
Total Power Dissipation (Note 4)	$P_D$	115	W
Single Pulse Avalanche Energy (Note 5)	$E_{AS}$	600	mJ

Note:

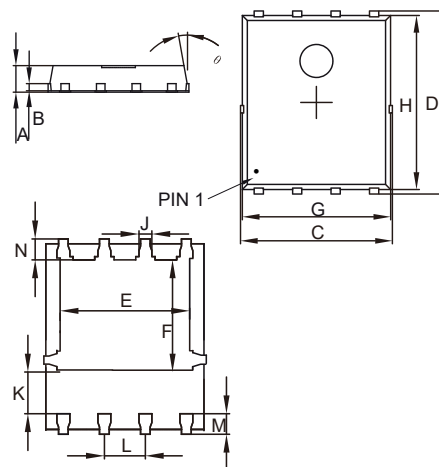
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ . The 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 Steady-State junction-ambient thermal resistance.
5.  $T_J=25$ ,  $V_{DD}=30\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $L=3\text{mH}$ .

### Internal Structure and Marking Code



## N-CHANNEL MOSFET

### DFN5060



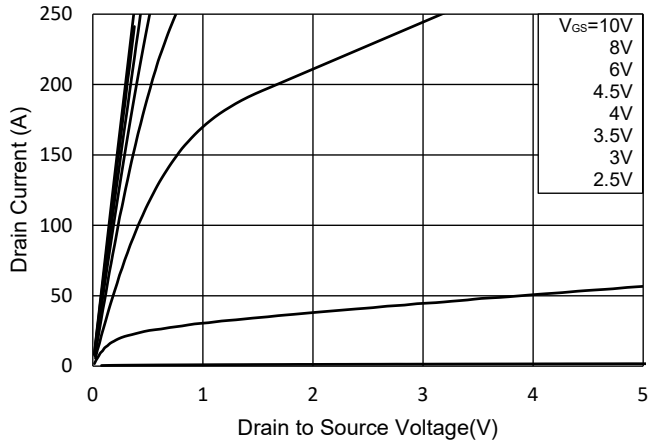
DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.031	0.047	0.80	1.20	
B	0.010		0.254		TYP.
C	0.193	0.222	4.90	5.64	
D	0.232	0.250	5.90	6.35	
E	0.148	0.167	3.75	4.25	
F	0.126	0.154	3.20	3.92	
G	0.189	0.213	4.80	5.40	
H	0.222	0.239	5.65	6.06	
K	0.045	0.059	1.15	1.50	
J	0.012	0.020	0.30	0.50	
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)**

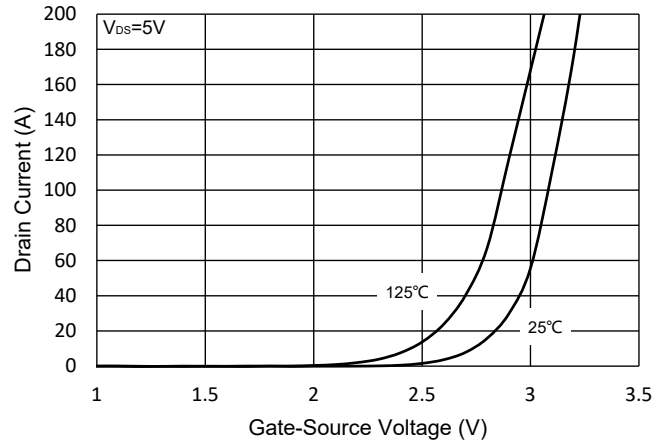
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	40			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$			1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.8	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		1.45	1.75	m $\Omega$
		$V_{GS}=4.5V, I_D=20A$		1.9	2.5	
Gate Resistance	$R_G$	f=1MHz, Open Drain		2.6		$\Omega$
<b>Dynamic Characteristics</b>						
Maximum Body-Diode Continuous Current	$I_S$				130	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=20A$			1.2	V
Reverse Recovery Charge	$Q_{rr}$	$I_F=20A, di/dt=100A/\mu s$		75		nC
Reverse Recovery Time	$t_{rr}$			57		ns
<b>Switching Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=20V, V_{GS}=0V, f=1MHz$		6853		pF
Output Capacitance	$C_{oss}$			1489		
Reverse Transfer Capacitance	$C_{rss}$			107		
Total Gate Charge	$Q_g$	$V_{GS}=10V, V_{DS}=20V, I_D=20A$		125		nC
Gate-Source Charge	$Q_{gs}$			18		
Gate-Drain Charge	$Q_{gd}$			26		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DS}=20V, I_{DS}=20A, R_{GEN}=2.2\Omega$		12		ns
Turn-On Rise Time	$t_r$			34		
Turn-Off Delay Time	$t_{d(off)}$			139		
Turn-Off Fall Time	$t_f$			68		

**Curve Characteristics**

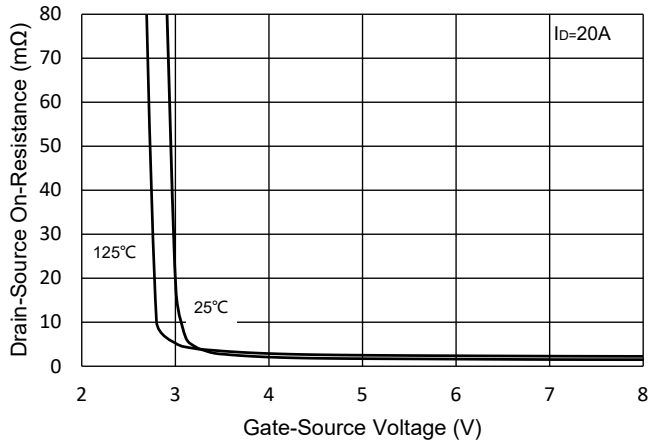
**Fig. 1 - Typical Output Characteristics**



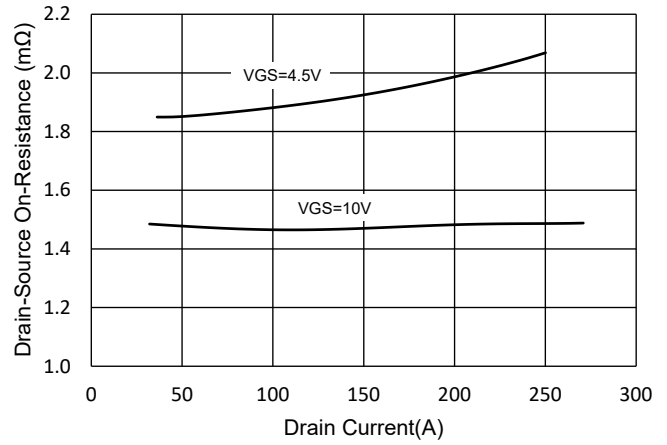
**Fig.2 Transfer Characteristic**



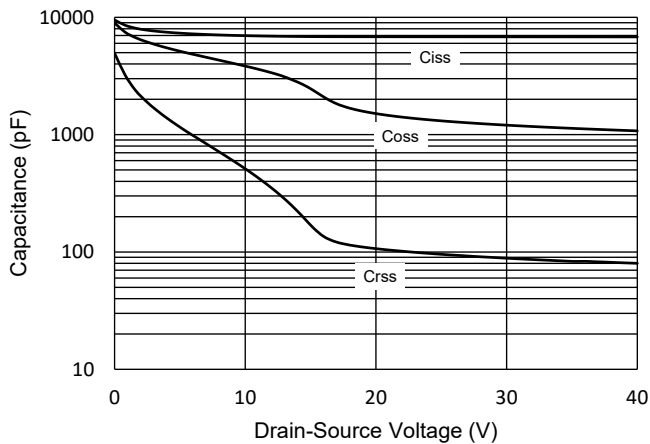
**Fig.3 Rds(on)-Vgs**



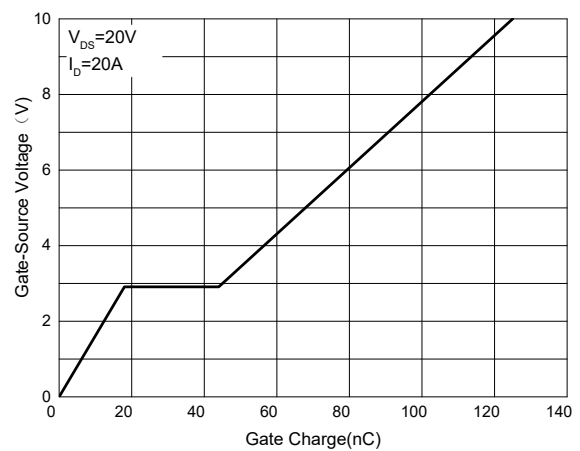
**Fig.4 RDS(ON)-ID**



**Fig.5 Capacitance Characteristics**



**Fig. 6 - Gate Charge**



## Curve Characteristics

Fig.7 Threshold Voltage

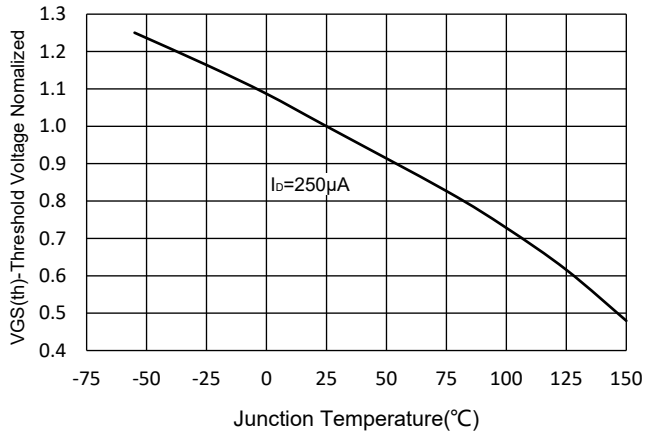


Fig.8 Normalized On Resistance Characteristics

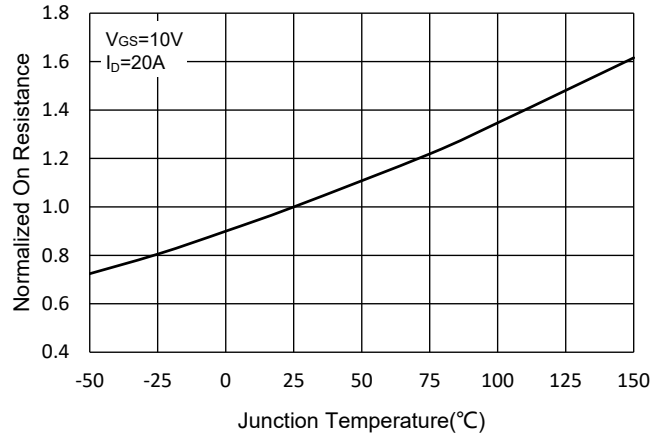


Fig.9 -  $I_S - V_{SD}$

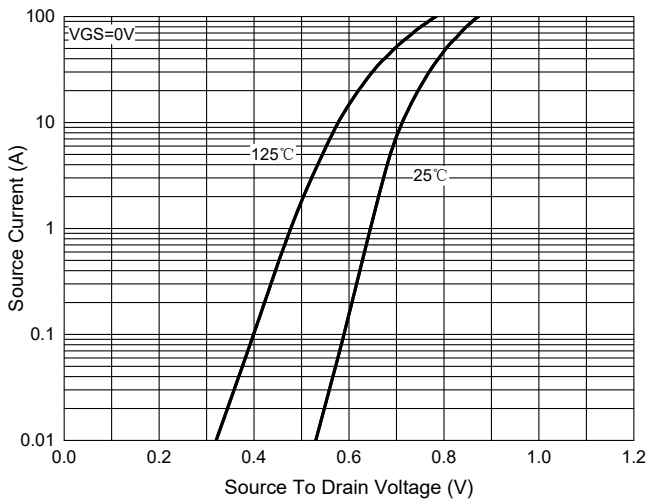


Fig. 10 - Drain Current

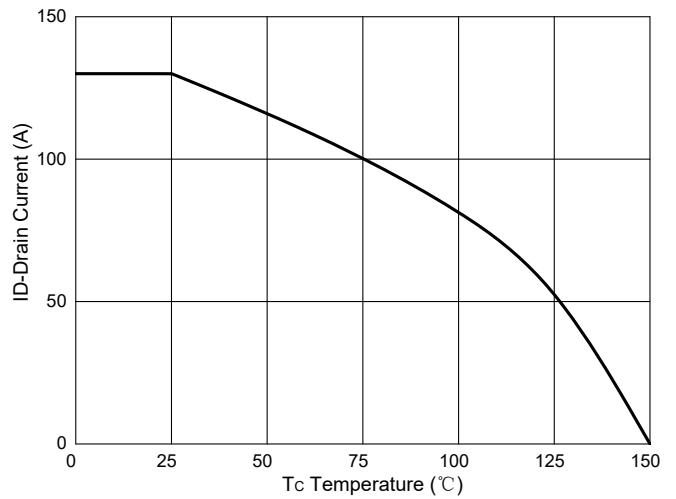
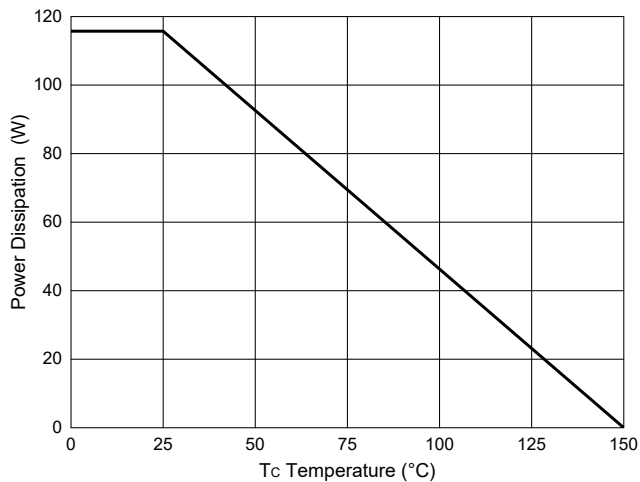


Fig.11-PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

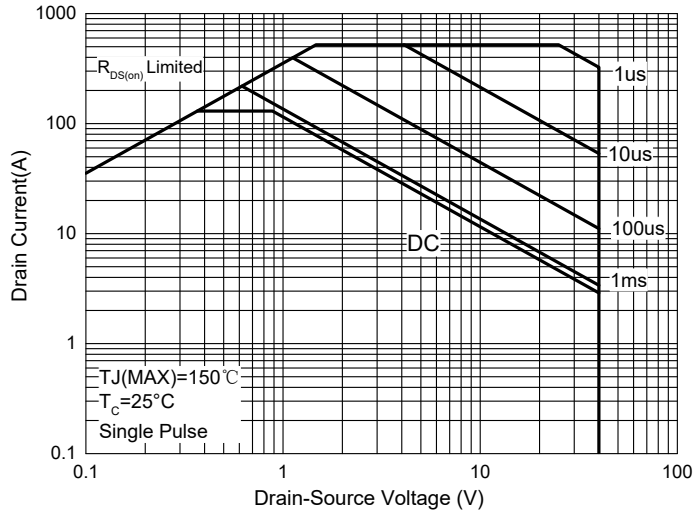
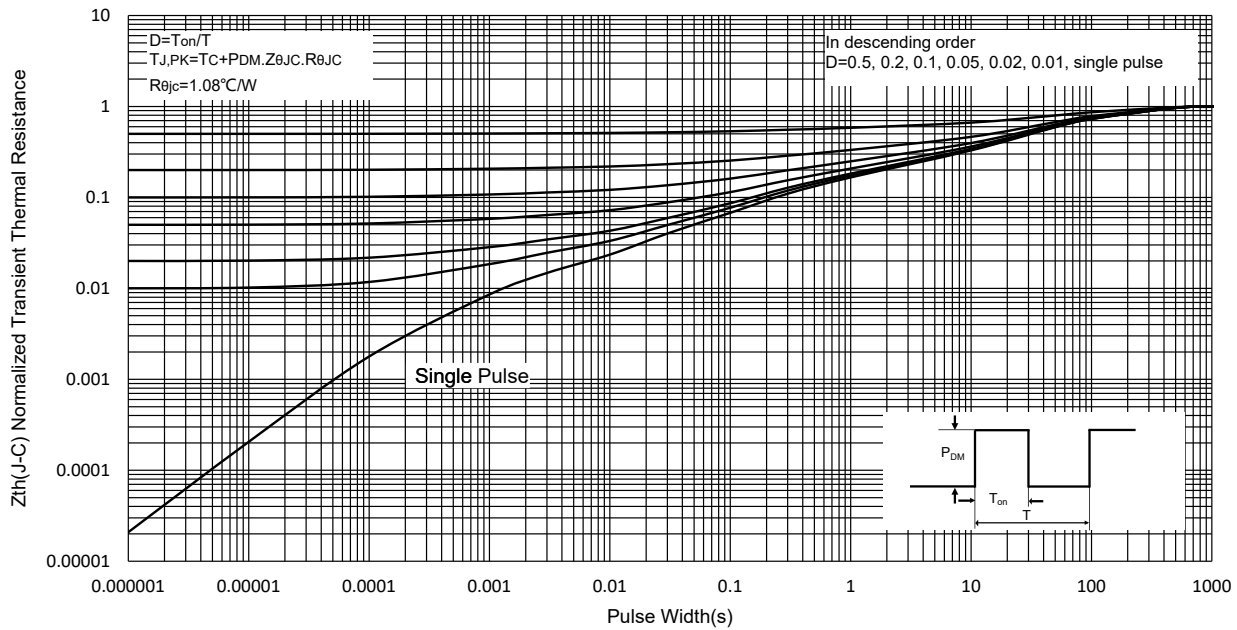


Fig.13 Normalized Transient Thermal Impedance



## Ordering Information

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

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