

## Features

- Split Gate Trench MOSFET Technology
- Excellent Package for Heat Dissipation
- 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

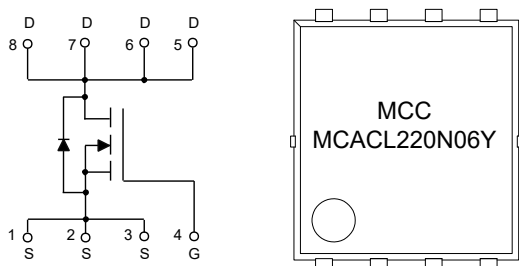
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 50°C/W Junction to Ambient<sup>(Note 2)</sup>
- Thermal Resistance: 0.85°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	220
		$T_C=100^\circ\text{C}$	139
Pulsed Drain Current <sup>(Note 3)</sup>	$I_{DM}$	800	A
Total Power Dissipation <sup>(Note 4)</sup>	$P_D$	147	W
Avalanche Energy <sup>(Note 5)</sup>	$E_{AS}$	676	mJ

Note:

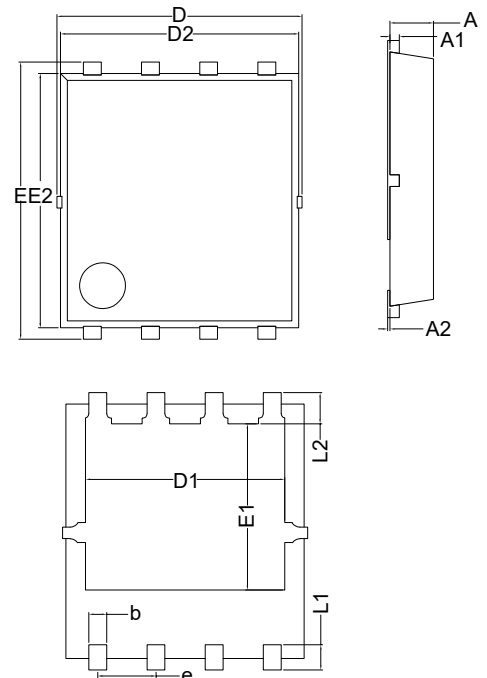
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment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

## Internal Structure and Marking Code



# N-CHANNEL MOSFET

## DFN5060-C



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
D	0.203	0.218	5.15	5.55	
D2	0.201	0.209	5.10	5.30	
E	0.234	0.242	5.95	6.15	
E2	0.215	0.222	5.45	5.65	
A	0.033	0.041	0.85	1.05	
A1	0.008		0.203		BSC
A2	0.000	0.004	0.00	0.10	
D1	0.167	0.175	4.25	4.45	
E1	0.139	0.147	3.52	3.73	
L1	0.018	0.026	0.45	0.65	
L2	0.027		0.68		BSC
b	0.012	0.020	0.30	0.50	
e	0.050		1.27		BSC

**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	1.8	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		1.3	1.6	m $\Omega$
		$V_{GS}=4.5V, I_D=20A$		1.7	2.4	
Gate Resistance	$R_g$	f=1 MHz, Open drain		1.5		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				220	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=110A$			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=110A, di/dt=100A/\mu s$		90		ns
Reverse Recovery Charge	$Q_{rr}$			143		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz$		7500		pF
Output Capacitance	$C_{oss}$			1450		
Reverse Transfer Capacitance	$C_{riss}$			80		
Total Gate Charge	$Q_g$	$V_{DS}=30V, V_{GS}=10V, I_D=110A$		119		nC
Gate-Source Charge	$Q_{gs}$			25		
Gate-Drain Charge	$Q_{gd}$			20		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DD}=30V, I_D=110A, R_{GEN}=2.2\Omega$		20		ns
Turn-On Rise Time	$t_r$			250		
Turn-Off Delay Time	$t_{d(off)}$			50		
Turn-Off Fall Time	$t_f$			15		

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

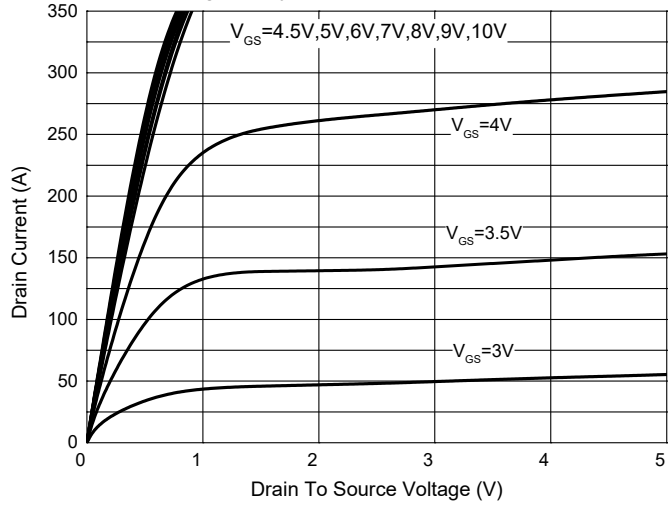


Fig. 2 - Transfer Characteristics

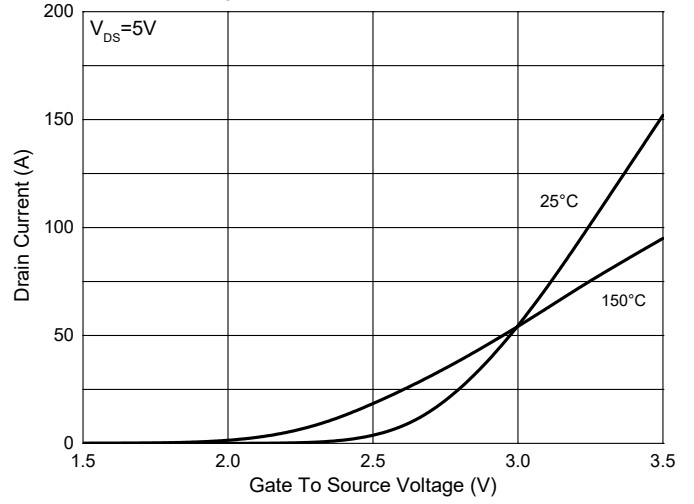


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

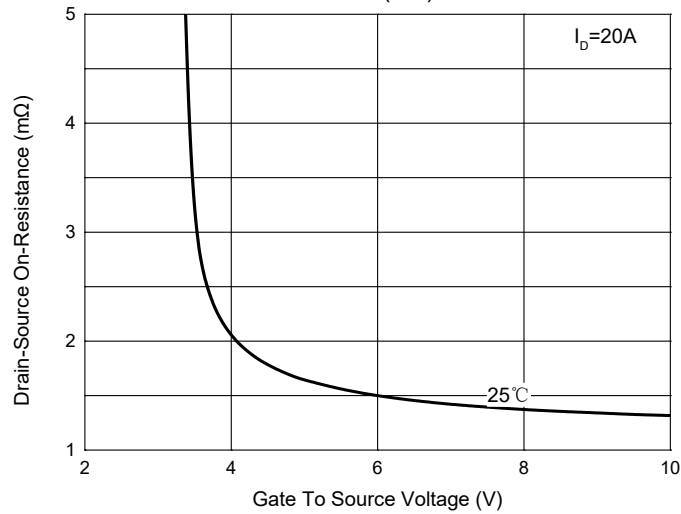


Fig. 4 -  $R_{DS(ON)} - I_D$

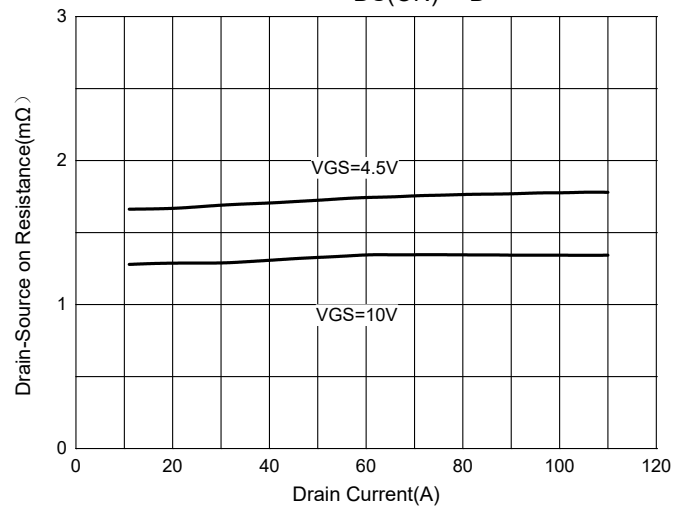


Fig. 5 - Capacitance Characteristics

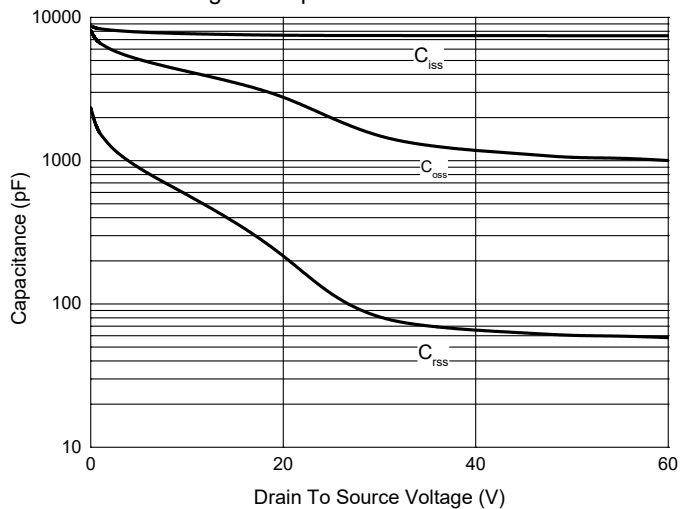
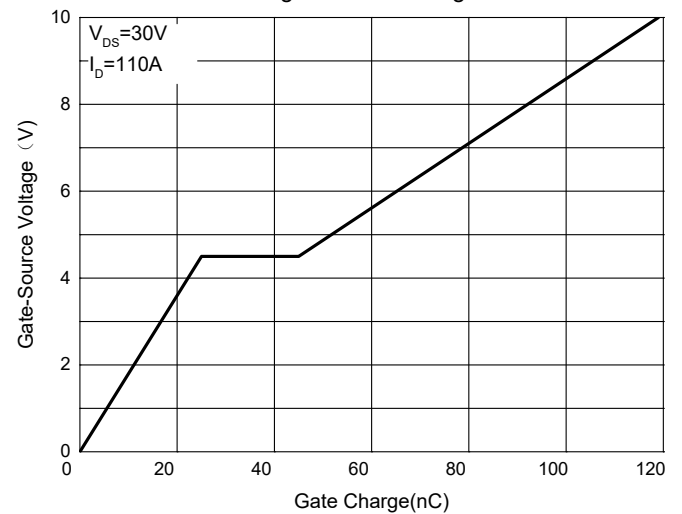


Fig. 6 - Gate Charge



**Curve Characteristics**

Fig. 7 - Normalized Threshold Voltage

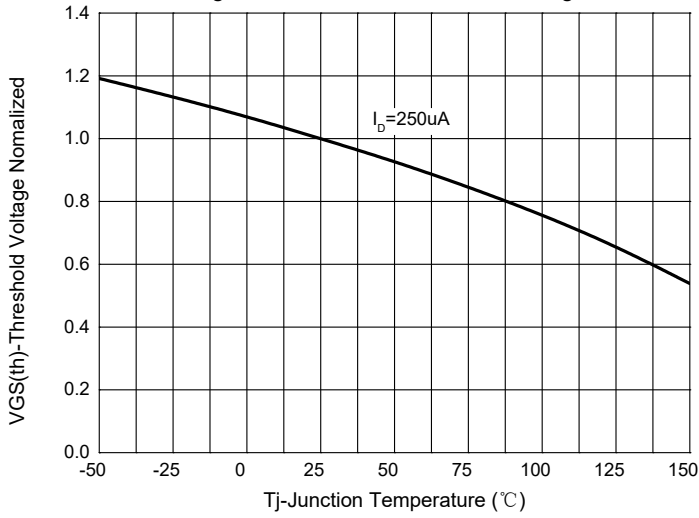


Fig.8-Normalized On Resistance Characteristics

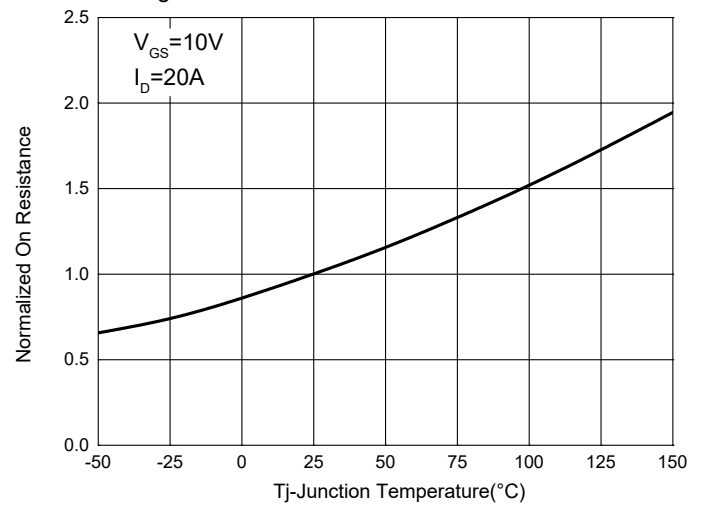


Fig.9 - I<sub>S</sub>—V<sub>SD</sub>

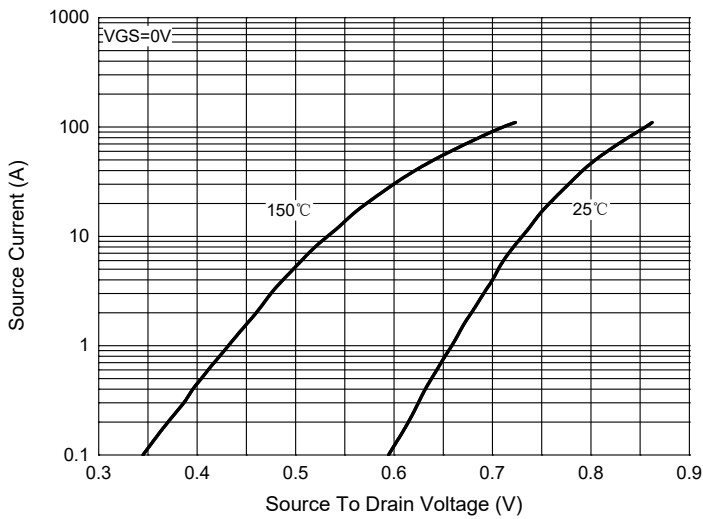


Fig. 10 - Drain Current

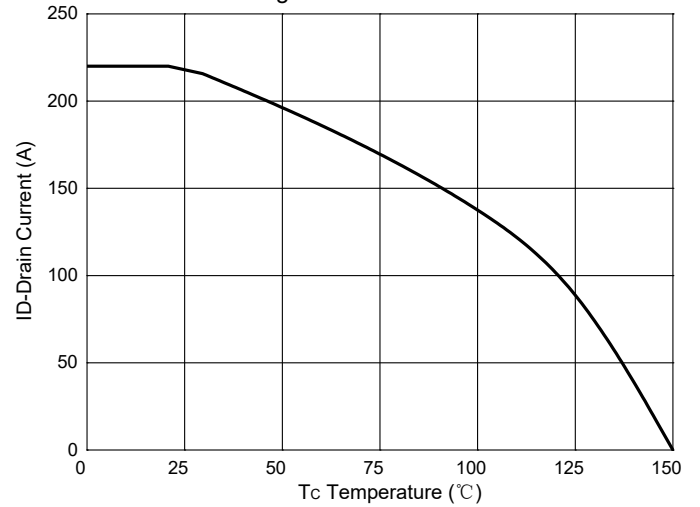
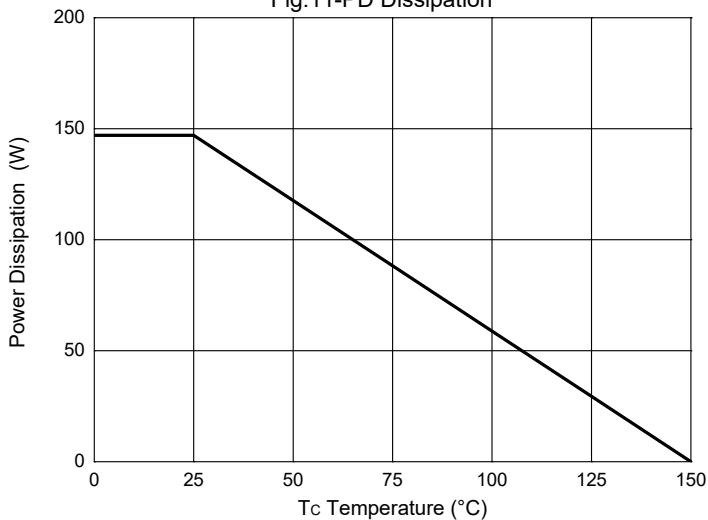


Fig.11-PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

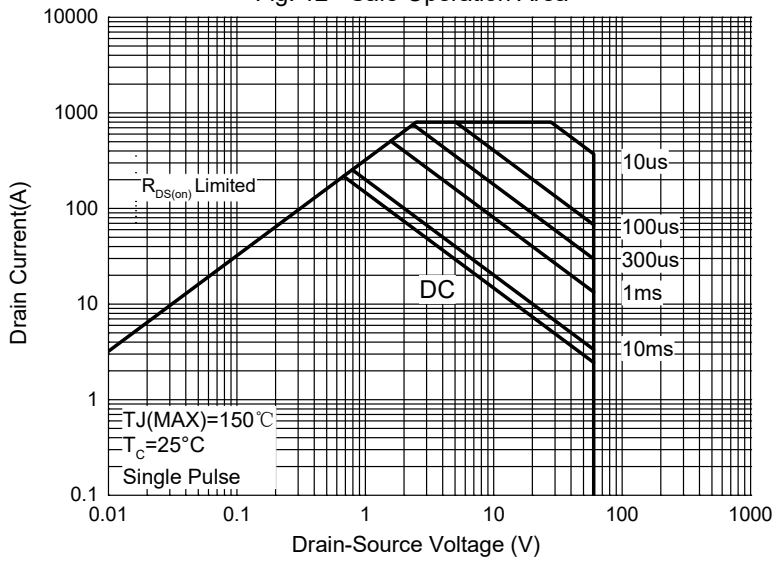
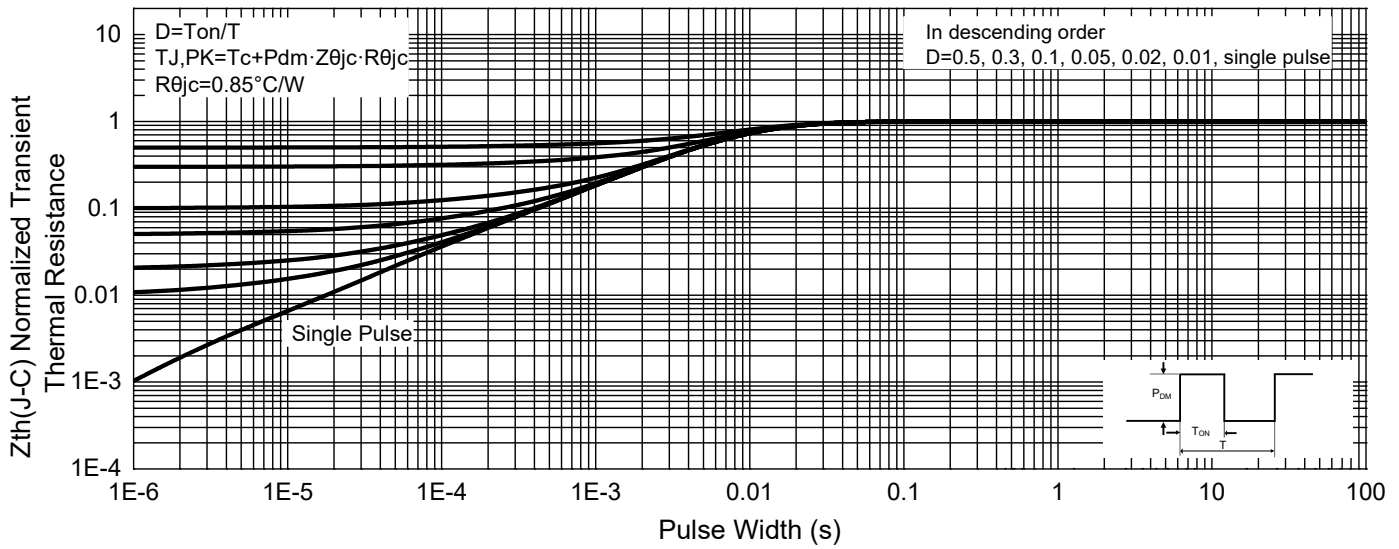


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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