

**Features**

- Split Gate Trench MOSFET Technology
- Low  $R_{DS(on)}$  & FOM
- Low  $C_{rss}$
- Extremely Low Switching Loss
- Excellent Stability and Uniformity
- 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)
- Moisture Sensitivity Level 1

**Maximum Ratings**

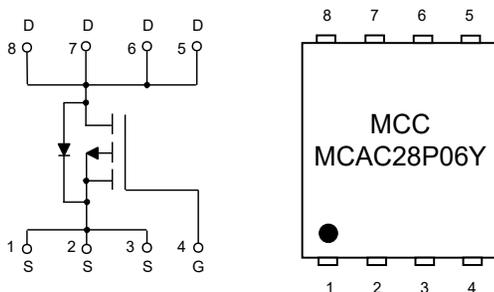
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 20°C/W Junction to Ambient( $t \leq 10s$ )<sup>(2)</sup>
- Thermal Resistance: 50°C/W Junction to Ambient(Steady-State)<sup>(2)</sup>
- Thermal Resistance: 2.1°C/W Junction to Case(Steady-State)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	-60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	-28	A
Pulsed Drain Current <sup>(3)</sup>	$I_{DM}$	-86	A
Total Power Dissipation <sup>(4)</sup>	$P_D$	60	W
Single Pulsed Avalanche Energy <sup>(5)</sup>	$E_{AS}$	81	mJ

Note:

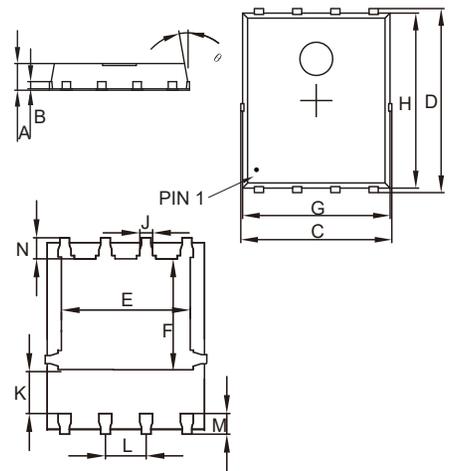
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ C$ . The Power dissipation PDSM is based on  $R_{\theta JA} \leq 10s$  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-case thermal resistance.
5.  $V_{DD} = 50V$ ,  $R_G = 25\Omega$ ,  $L = 0.5mH$ ,  $I_{AS} = 25A$ .

**Internal Structure and Marking Code**



**P-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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.5	-2.1	-2.7	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-20A$		30	40	m $\Omega$
		$V_{GS}=-4.5V, I_D=-10A$		41	55	m $\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				-28	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-20A$			-1.3	V
Reverse Recovery Time	$t_{rr}$	$I_S=-20A, di/dt=100A/\mu s$		19		ns
Reverse Recovery Charge	$Q_{rr}$			3.9		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-30V, V_{GS}=0V, f=1MHz$		1050		pF
Output Capacitance	$C_{oss}$			340		
Reverse Transfer Capacitance	$C_{rss}$			62		
Total Gate Charge	$Q_g$	$V_{DS}=-30V, V_{GS}=-10V, I_D=-20A$		19.3		nC
Gate-Source Charge	$Q_{gs}$			5.3		
Gate-Drain Charge	$Q_{gd}$			3.1		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=-30V, V_{GS}=-10V, R_G=6\Omega, R_L=2.5\Omega$		6		ns
Turn-On Rise Time	$t_r$			45.6		
Turn-Off Delay Time	$t_{d(off)}$			42.8		
Turn-Off Fall Time	$t_f$			75.6		

## Curve Characteristics

Fig. 1 - Typical Output Characteristics

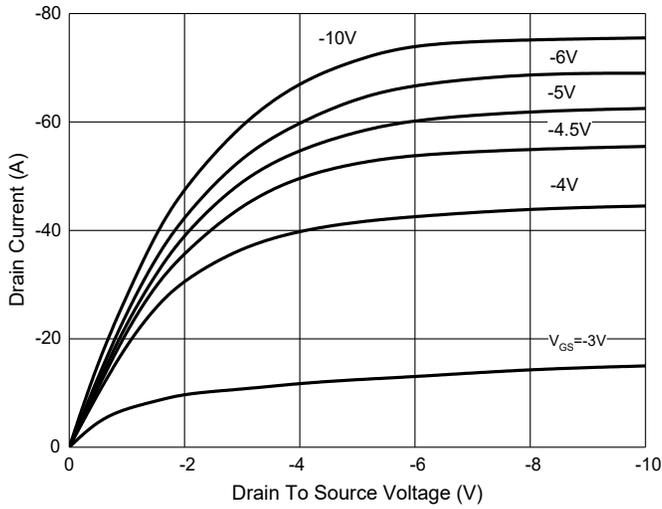


Fig. 2 - Transfer Characteristics

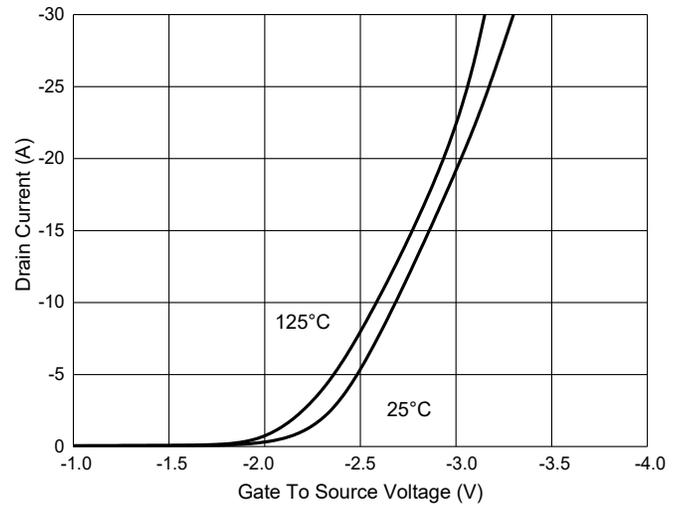


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

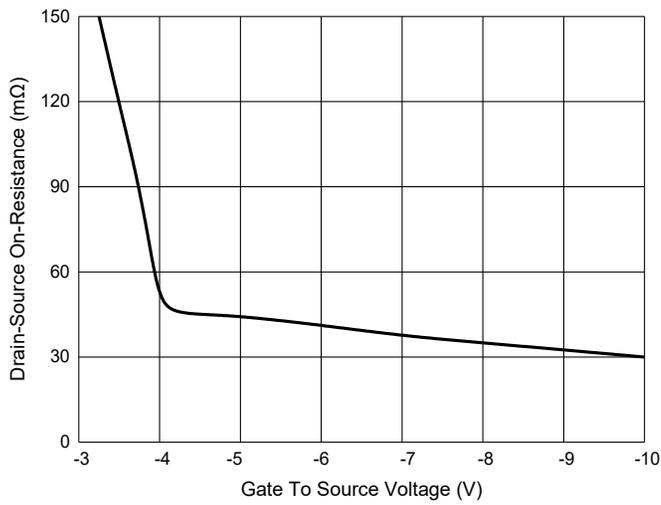


Fig. 4 - Normalized On Resistance Characteristics

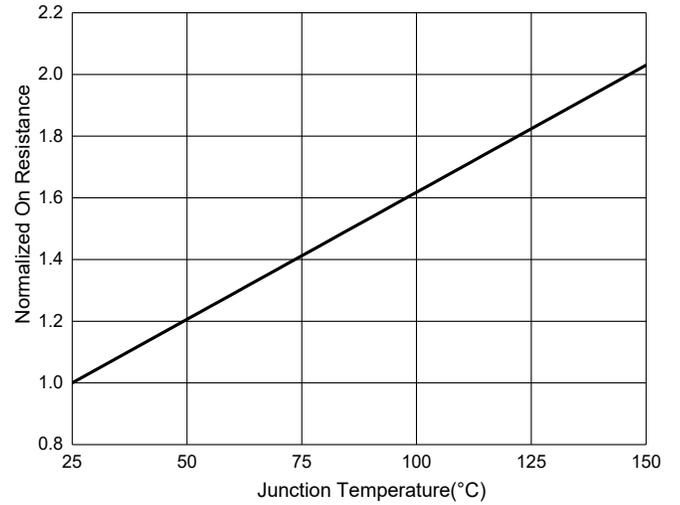


Fig. 5 - Capacitance Characteristics

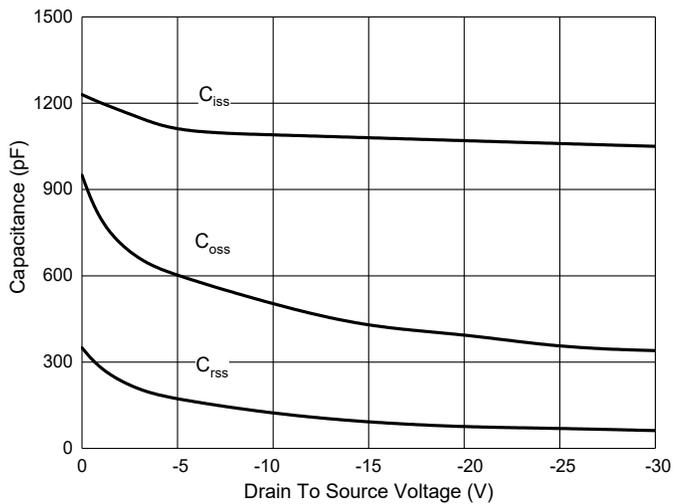
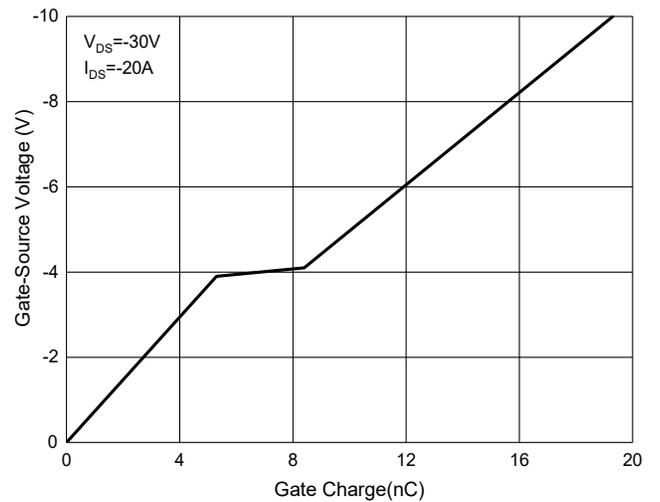


Fig. 6 - Gate Charge



Curve Characteristics

Fig. 7 - Safe Operation Area

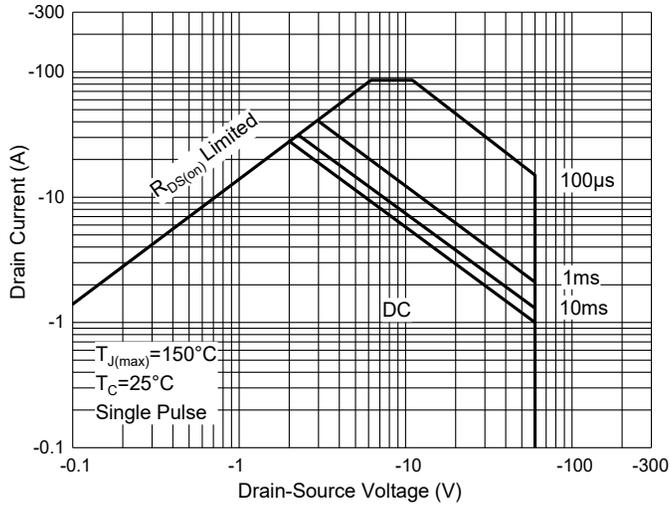
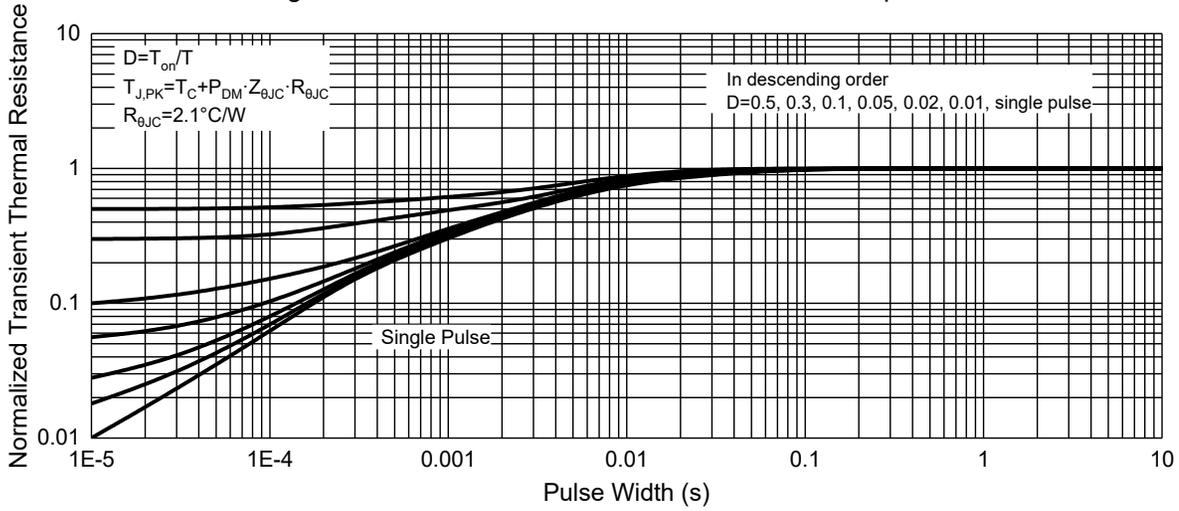


Fig. 8 - Normalized Maximum Transient Thermal Impedance



## Ordering Information

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

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