150V N-Channel Automotive Grade MOSFET

Product Summary

Parameter	Rating
V_{DS}	150V
I_D	70 A
$R_{DS(on)}$ Max	17 mΩ

DFN5060

Features

- AEC-Q101 qualified
- Split Gate Trench technology
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Low Q_g for fast response
- Excellent package for heat dissipation

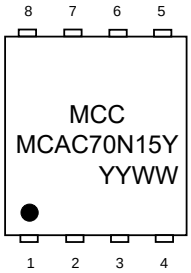
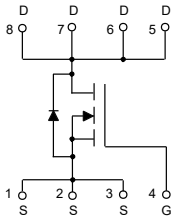
Applications

- Motors driver
- DC-DC converter
- Solar Inverter

Mechanical Data

- Package: DFN5060
- Moisture Sensitivity: Level N, per J-STD-020
- 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)
- Weight: 0.0878g (approximate)

Body Marking and Pin Layout

Marking Code	Internal Structure
	

4 codes in total
YY = year code
WW= week code

Ordering Information

Product Name	Packing info
MCAC70N15YHE3-TP	5,000pcs/reel

For packaging details, visit our website at https://www.mccsemi.com/Package/List

Maximum Ratings (T_J=25°C unless otherwise specified)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	±20	V
Continuons Drain Curent	T_C=25°C, V_{GS}=10V	I_D	70	A
	T_C=100°C, V_{GS}=10V		49	
	T_A=25°C, V_{GS}=10V		9	
	T_A=100°C, V_{GS}=10V		6	
Pulsed Drain Current (Note2)		I_{DM}	280	A
Total Power Dissipation	T_C=25°C, V_{GS}=10V	P_D	150	W
	T_C=100°C, V_{GS}=10V		75	
	T_A=25°C, V_{GS}=10V		3	
	T_A=100°C, V_{GS}=10V		1.5	
Single Pulsed Avalanche Energy	T_J=25°C, V_{DD}=80V, V_{GS}=10V, R_G=25Ω, L=0.5mH	E_{AS}	81	mJ
Avalanche Current		I_{AS}	25.7	A
Operating Junction Temperature Range		T_J	-55 to +175	°C
Storage Temperature Range		T_{STG}	-55 to +175	°C

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. Repetitive rating; pulse width limited by max. junction temperature

Thermal Characteristics

Parameter	Symbol	Rating	Unit
Thermal Resistance from Junction to Ambient (Note 3)	$R_{\theta JA}$	50	°C/W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.0	°C/W

Note:

3. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design

Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	150			V
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 120V, V_{GS}=0V			1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2.0	2.9	4.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=20A		13	17	mΩ
		V_{GS}=6V, I_D=10A		17	22	
Gate Resistance	Rg	F=1 MHz, Open drain		0.9		Ω
Diode Characteristics						
Continuous Body Diode Current	I_S				70	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=20A			1.2	V
Reverse Recovery Time	t_{rr}	I_F=20A, dI_{SD}/dt=100A/μs			93	ns
Reverse Recovery Charge	Q_{rr}			214		nC
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=75V, V_{GS}=0V, f=1MHz		2527		pF
Output Capacitance	C_{oss}			207		
Reverse Transfer Capacitance	C_{rss}			7		
Total Gate Charge	Q_g	V_{DS}=75V, V_{GS}=10V, I_D=20A		40		nC
Gate-Source Charge	Q_{gs}			10		
Gate-Drain Charge	Q_{gd}			11		
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=75V, V_{GS}=10V, R_{GEN}=4.5Ω, I_{DS}=20A		15		ns
Turn-On Rise Time	t_r			14		
Turn-Off Delay Time	$t_{d(off)}$			29		
Turn-Off Fall Time	t_f			13		

Curve Characteristics

Fig. 1 - Typical Output Characteristics

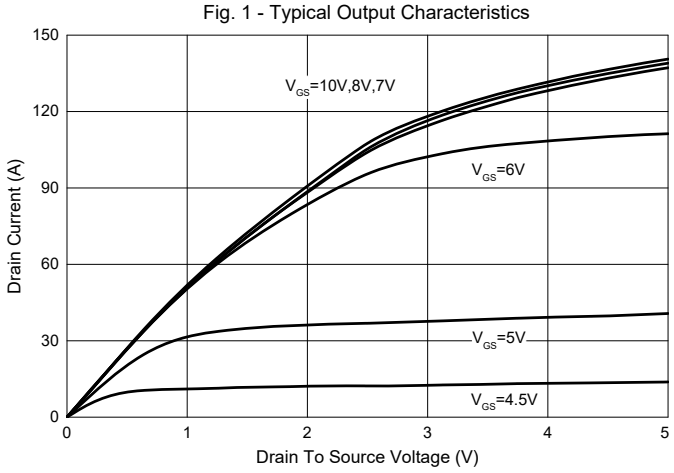


Fig. 2 - Transfer Characteristics

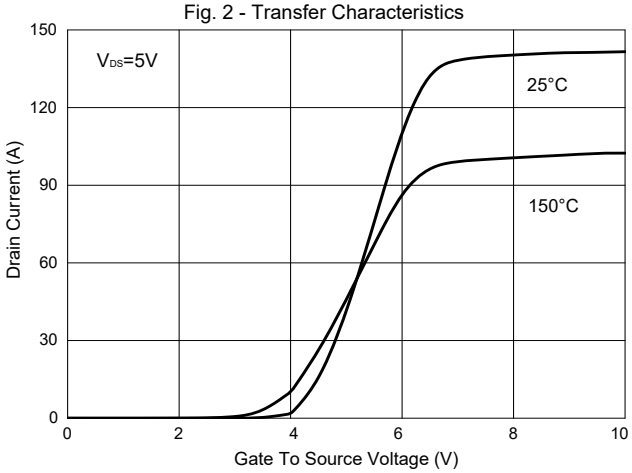


Fig. 3 - $R_{DS(ON)}$—V_{GS}

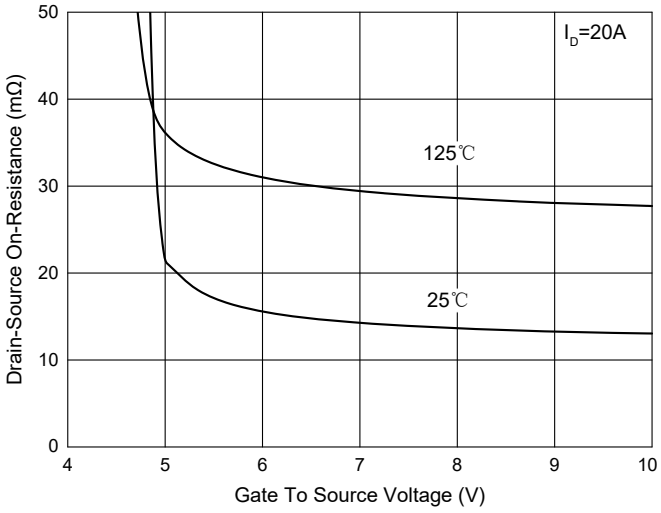


Fig. 4 - $R_{DS(ON)}$—I_D

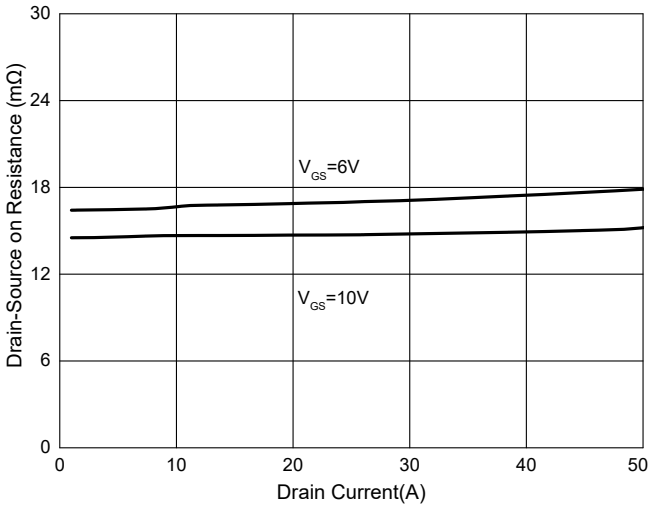


Fig. 5 - Capacitance Characteristics

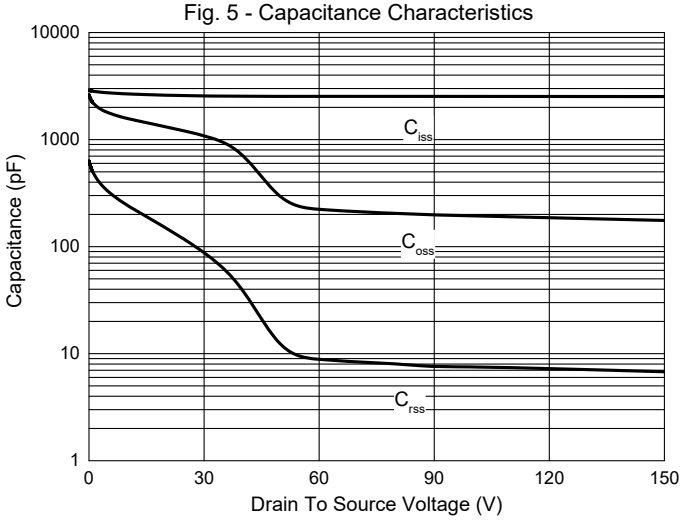
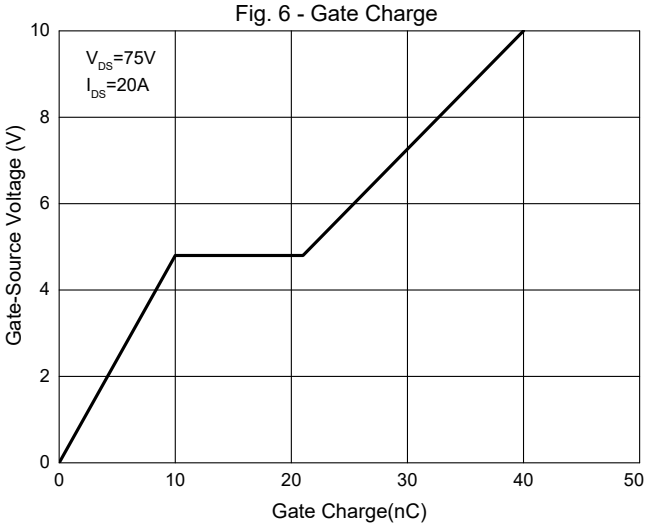


Fig. 6 - Gate Charge



Curve Characteristics

Fig. 7 - Nomalized Threshold Voltage

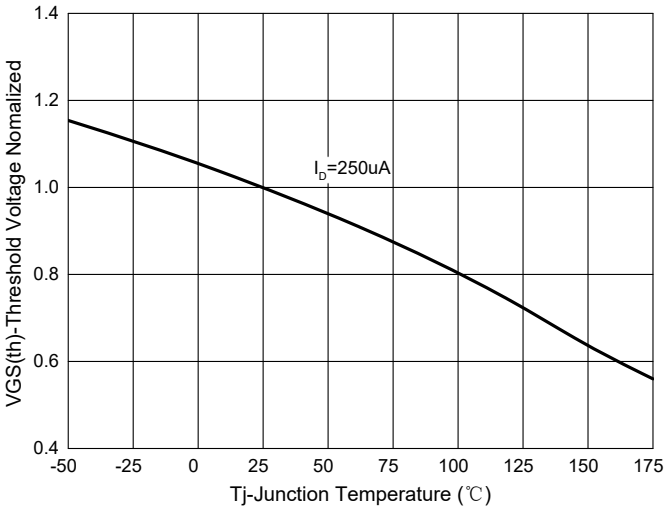


Fig.8-Normalized On Resistance Characteristics

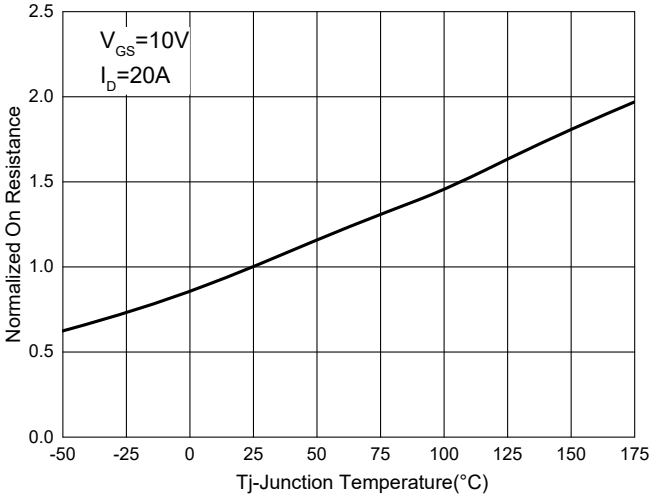


Fig. 9 - I_S—V_{SD}

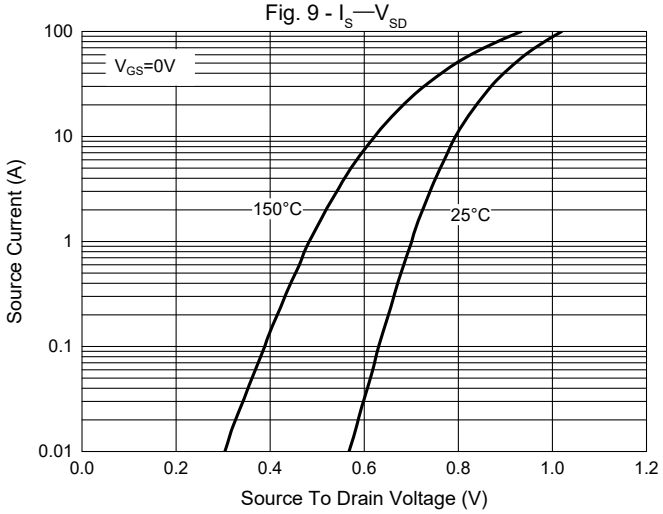


Fig. 10 - Drain Current

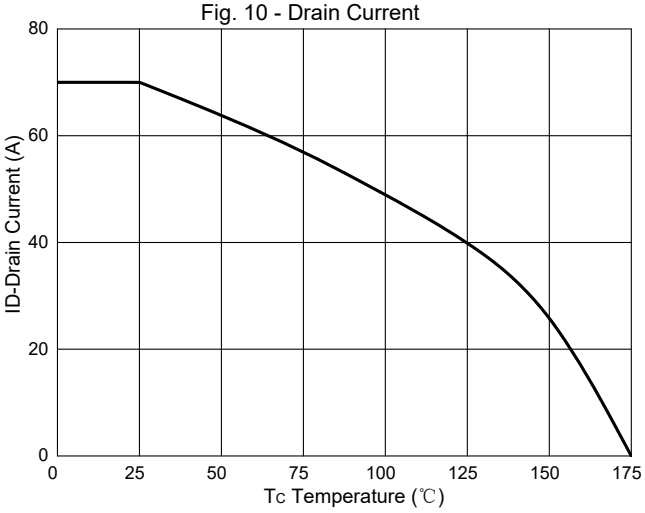
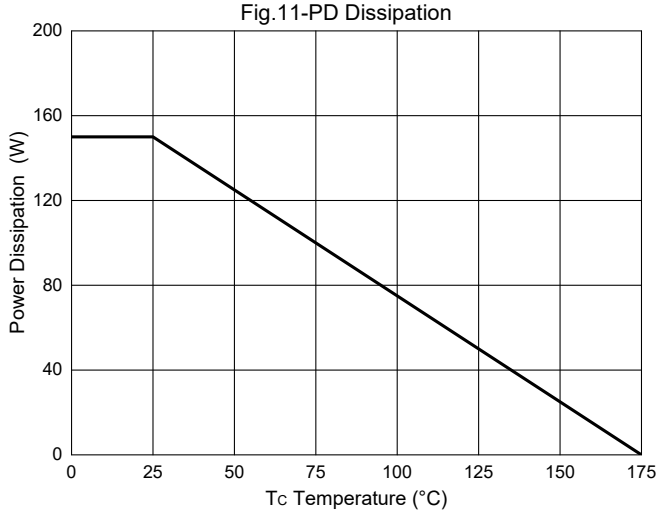


Fig.11-PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

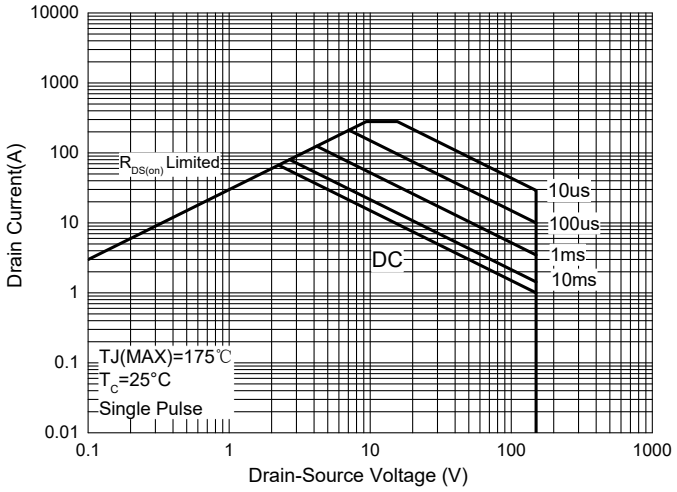
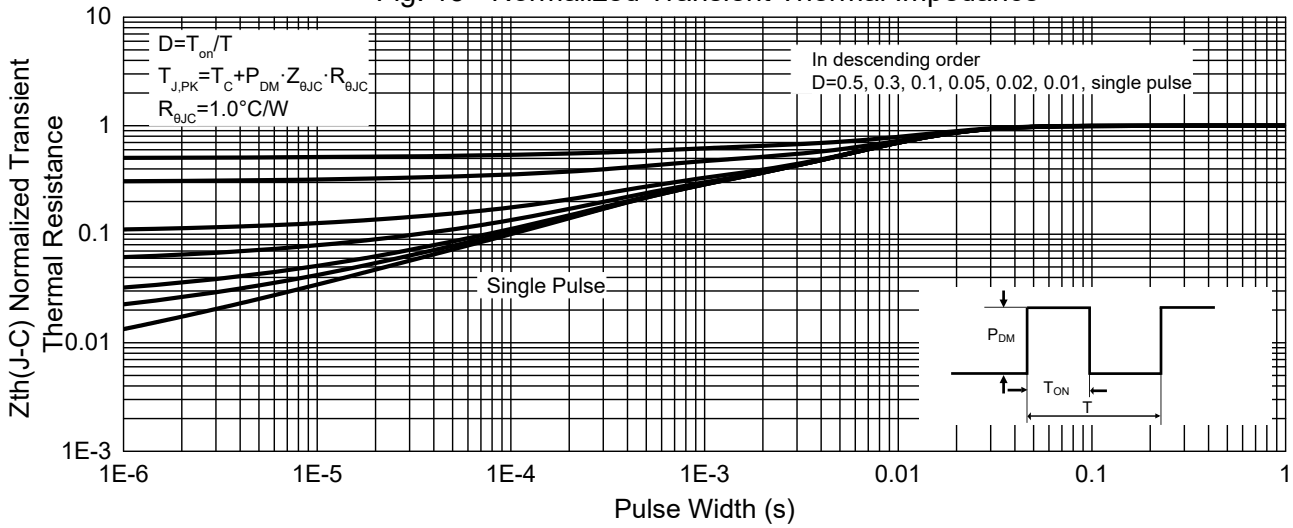
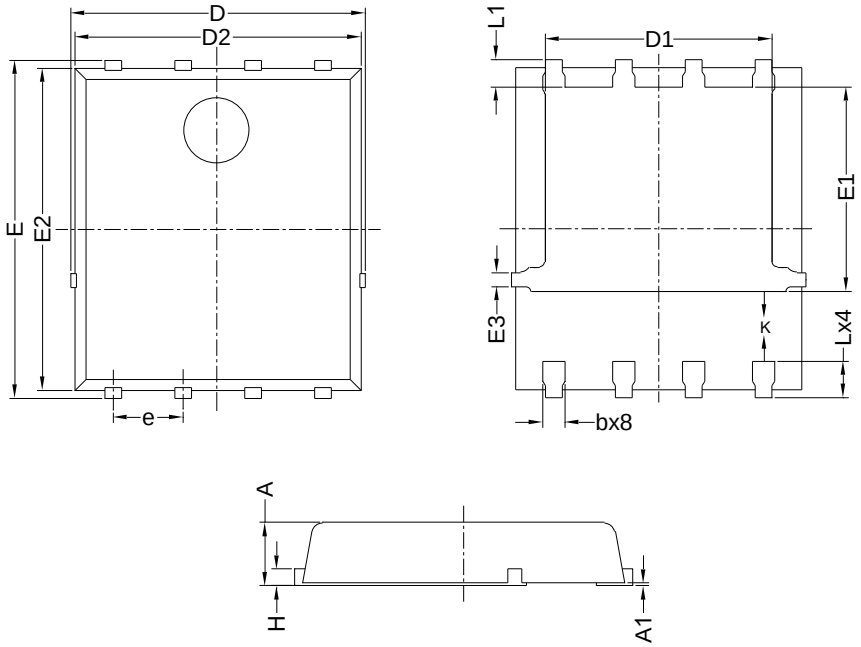


Fig. 13 - Normalized Transient Thermal Impedance

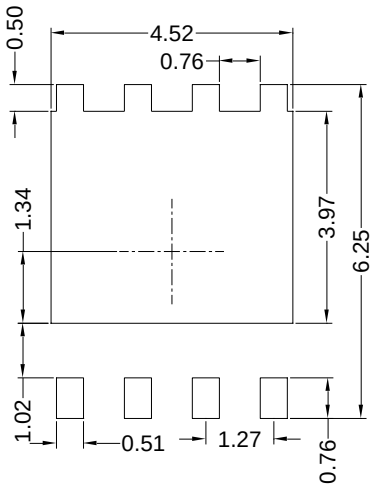


Package Outline



DIM	INCH		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.039	0.047	1.00	1.20	
A1		0.003		0.10	
b	0.012	0.020	0.30	0.50	
D	0.193	0.222	4.90	5.64	
D1	0.148	0.167	3.75	4.25	
D2	0.189	0.213	4.80	5.40	
E	0.232	0.250	5.90	6.35	
E1	0.126	0.154	3.20	3.92	
E2	0.222	0.239	5.65	6.06	
E3	0.010		0.254		REF
e	0.046	0.054	1.17	1.37	
H	0.010		0.254		BSC
K	0.045	0.059	1.15	1.50	
L	0.012	0.028	0.30	0.71	
L1	0.016	0.028	0.40	0.71	

Suggested Pad Layout (Unit:mm)



Notes:

1. The suggested land pattern dimensions have been provided for reference only.
2. For further information, please reference document IPC-7351A.

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