

## Features

- Fully Automotive Qualified to AEC-Q101
- Split Gate Trench Mosfet Technology
- Excellent Stability and Uniformity
- Moisture Sensitivity Level 1
- Halogen Free "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note2)("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

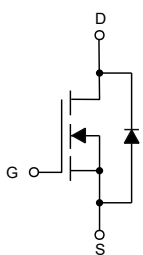
- Operating Junction Temperature Range: -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance: 45°C/W Junction to Ambient (Note 3)
- Thermal Resistance: 1.4°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain -Source Voltage	$V_{DS}$	60	V
Gate -Source Voltage	$V_{GS}$	±20	V
Drain Current-Continuous	$I_D$	$T_C=25^\circ\text{C}$	85
		$T_C=100^\circ\text{C}$	60
Drain Current-Pulse (Note 4)	$I_{DM}$	340	A
Power Dissipation (Note 5)	$P_D$	107	W
Single Pulsed Avalanche Energy (Note 6)	$E_{AS}$	121	mJ

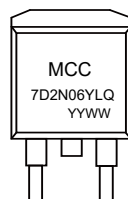
Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemption Applied, see EU Directive Annex 7a.
3. The value of RθJA is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C.
4. Repetitive rating; pulse width limited by max. junction temperature.
5. P<sub>D</sub> is based on max. junction temperature, using junction-Case thermal resistance.
6. T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, V<sub>GS</sub>=10V, L=0.5mH.

## Internal Structure and Marking Code



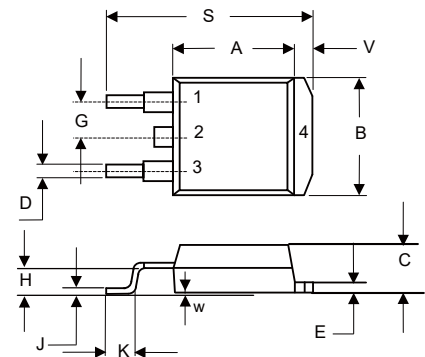
1. Gate
- 2,4. Drain
3. Source



4 codes in total  
YY is the year  
WW is the week

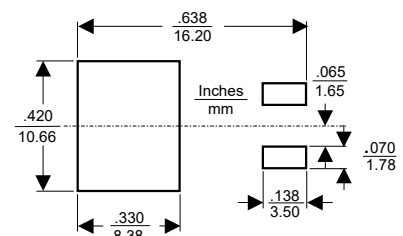
# N-CHANNEL MOSFET

## D<sup>2</sup>-PAK



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.331	0.370	8.40	9.40	
B	0.378	0.417	9.60	10.60	
C	0.165	0.189	4.20	4.80	
D	0.027	0.037	0.68	0.94	
E	0.045	0.055	1.14	1.40	
G	0.10		2.54		TYP.
H	0.096	0.134	2.43	3.40	
J	0.011	0.025	0.28	0.64	
K	0.071	0.131	1.80	3.32	
S	0.575	0.625	14.60	15.87	
V	0.042	0.058	1.07	1.47	
W	0.000	0.010	0.00	0.25	

### Suggested Solder Pad Layout

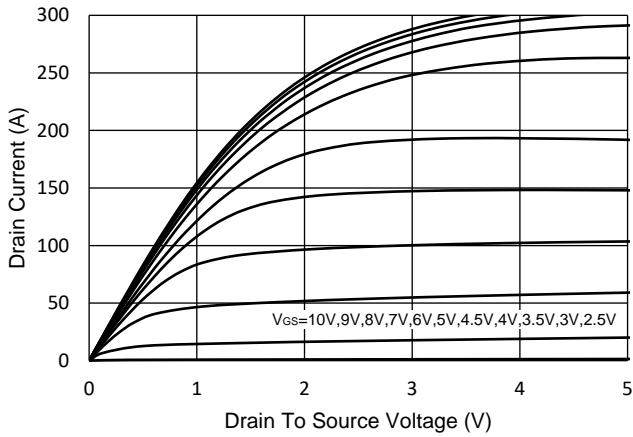


**Electrical Characteristics @ 25°C (Unless Otherwise Noted)**

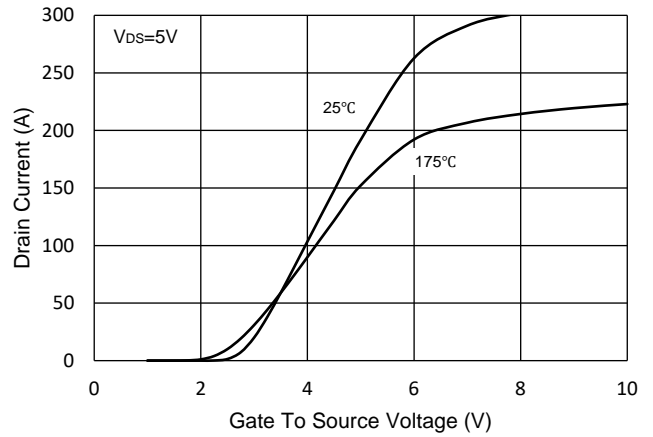
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			1	$\mu A$
Gate-Source 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	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		5.5	7.2	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$		7.2	9.7	
Gate resistance	$R_G$	$V_{GS}=0V, f=1MHz$		1.5		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				85	A
Body Diode Voltage	$V_{SD}$	$I_{SD}=20A, V_{GS}=0V$			1.2	V
Reverse Recovery Charge	$Q_{rr}$	$I_F=20A, di/dt=100A/\mu s$		17.3		nC
Reverse Recovery Time	$t_{rr}$			23.3		ns
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz$		2060		pF
Output Capacitance	$C_{oss}$			340		
Reverse Transfer Capacitance	$C_{rss}$			16.8		
Total Gate Charge	$Q_g$	$V_{DS}=30V, V_{GS}=10V, I_D=20A$		27.2		nC
Gate-Source Charge	$Q_{gs}$			5.6		
Gate-Drain Charge	$Q_{gd}$			3.9		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=20A, V_{GS}=10V, R_G=2.7\Omega$		11.6		ns
Turn-On Rise Time	$t_r$			58		
Turn-Off Delay Time	$t_{d(off)}$			27.4		
Turn-Off Fall Time	$t_f$			5.8		

## Curve Characteristics

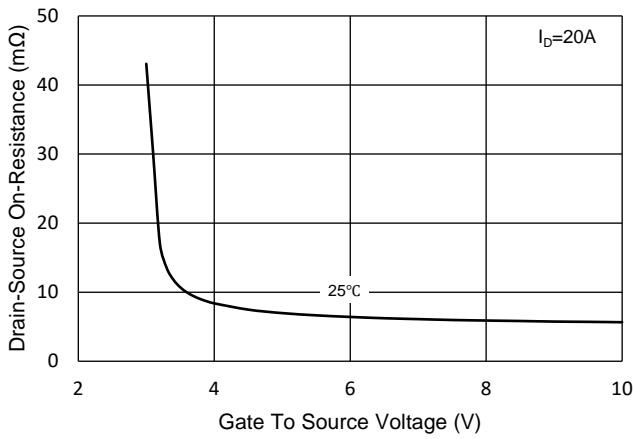
**Fig.1 - Typical Output Characteristics**



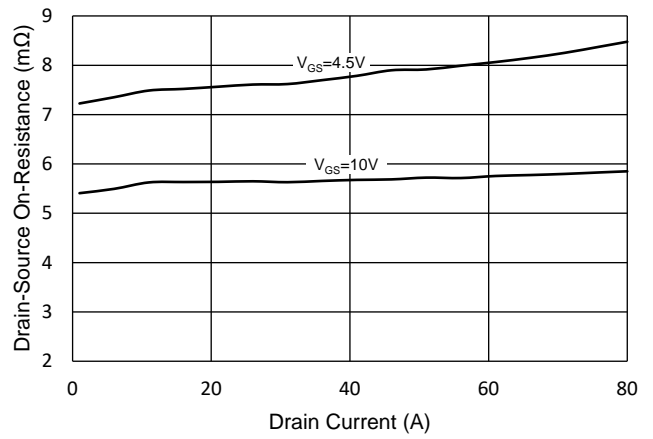
**Fig.2 - Transfer Characteristics**



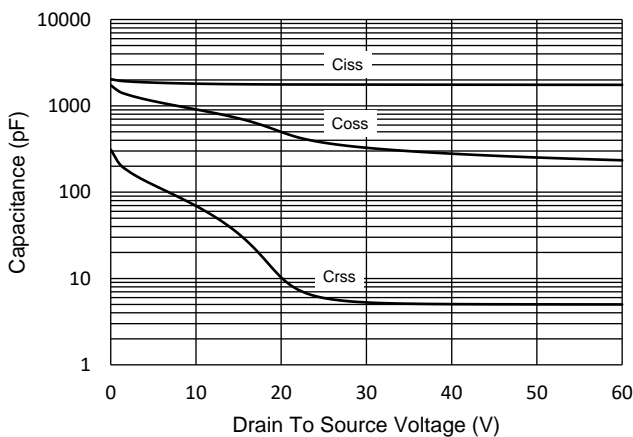
**Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$**



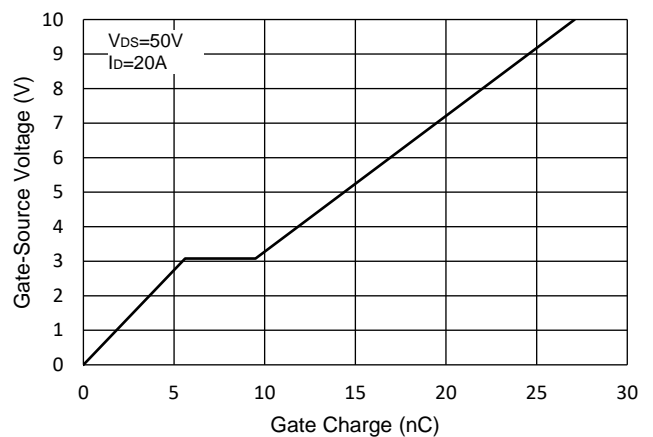
**Fig.4 -  $R_{DS(ON)}$  -  $I_D$**



**Fig.5 - Capacitance Characteristics**

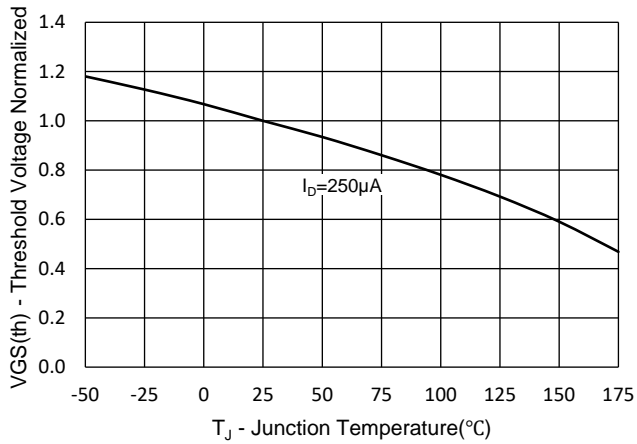


**Fig.6 - Gate Charge**

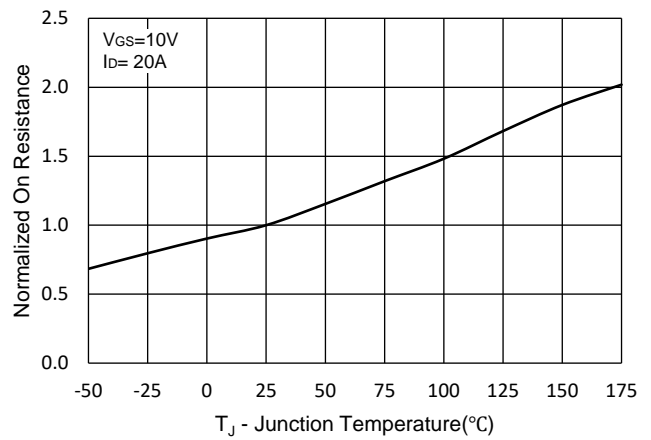


## Curve Characteristics

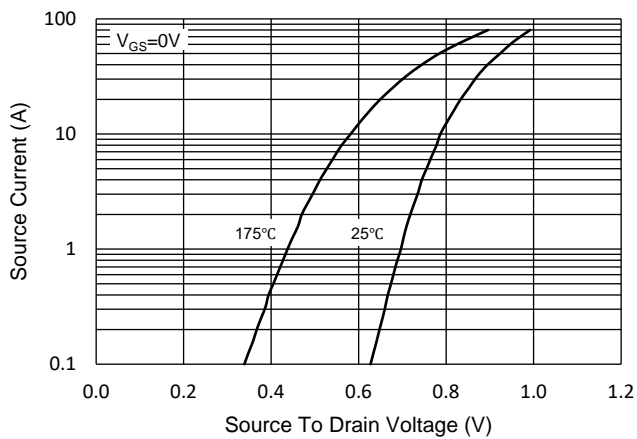
**Fig.7 - Normalized Threshold Voltage**



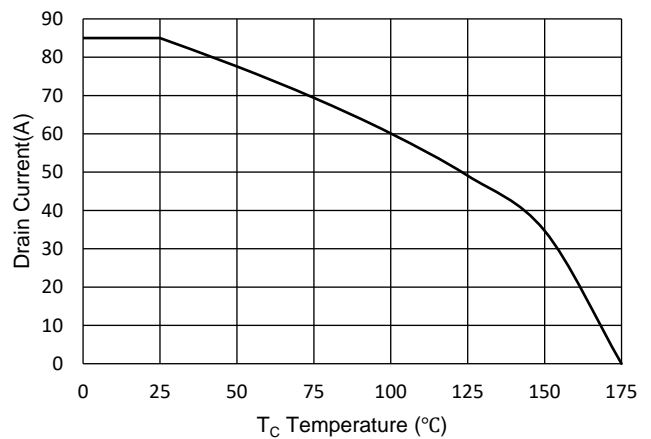
**Fig.8 - Normalized On Resistance Characteristics**



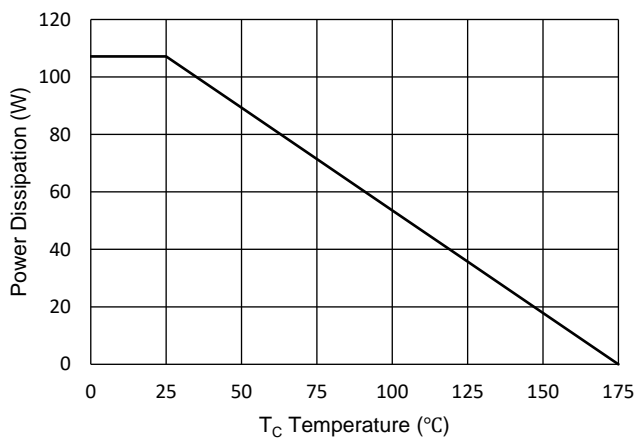
**Fig.9 -  $I_S - V_{SD}$**



**Fig.10 - Drain Current**



**Fig.11 - PD Dissipation**



## Curve Characteristics

Fig.12 - Safe Operation Area

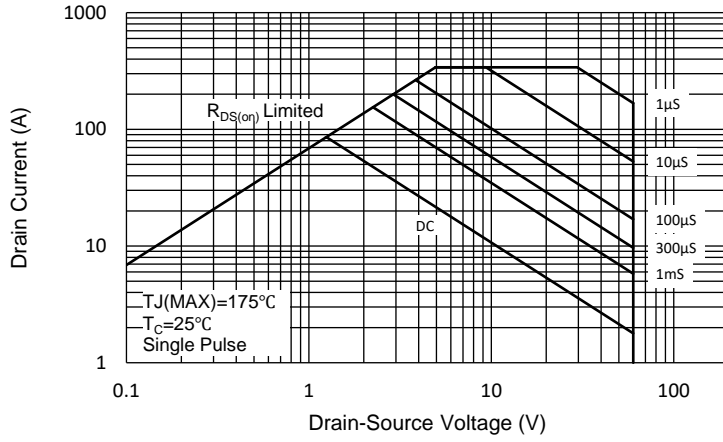
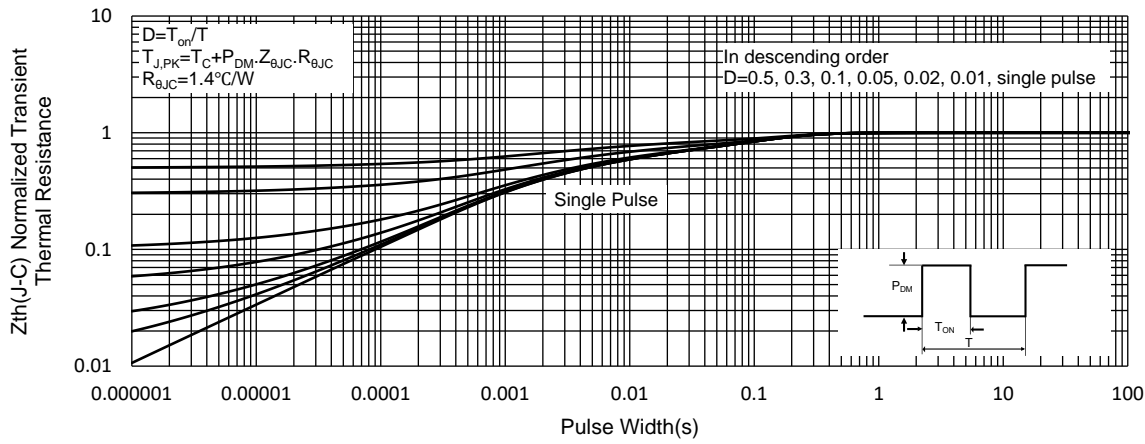


Fig.13 - Normalized Transient Thermal Impedance



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 800pcs/Reel

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