

## Features

- High Density Cell Design for Ultra Low  $R_{DS(on)}$
- Fully Characterized Avalanche Voltage and Current
- Excellent Package for Good Heat Dissipation
- Special Process Technology for High ESD Capability
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

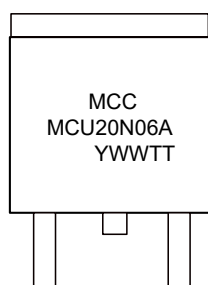
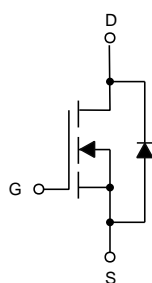
## Maximum Ratings

- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 100°C/W Junction to Ambient

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	20	A
Pulsed Drain Current	$I_{DM}$	60	A
Single Pulse Avalanche Energy (Note 1)	$E_{AS}$	72	mJ

Note: 1.  $V_{DD}=30V$ ,  $L=0.5mH$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ C$ .

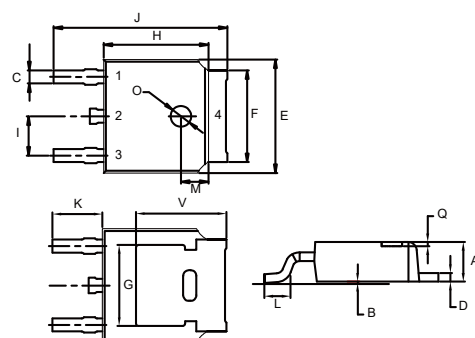
## Internal Structure and Marking Code



YWWTT: 5 codes in total  
Y is the year  
WW is the cycle  
TT is the line type

## N-CHANNEL MOSFET

### DPAK(TO-252)



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

DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.087	0.094	2.20	2.40	
B	0.000	0.005	0.00	0.13	
C	0.026	0.034	0.66	0.86	
D	0.018	0.023	0.46	0.58	
E	0.256	0.264	6.50	6.70	
F	0.201	0.215	5.10	5.46	
G	0.190		4.83		TYP.
H	0.236	0.244	6.00	6.20	
I	0.086	0.094	2.18	2.39	
J	0.386	0.409	9.80	10.40	
K	0.114		2.90		TYP.
L	0.055	0.067	1.40	1.70	
M	0.063		1.60		TYP.
O	0.043	0.051	1.10	1.30	
Q	0.000	0.012	0.00	0.30	
V	0.211		5.35		TYP.

### Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60			V
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			1	μA
Gate-Threshold Voltage <sup>(Note 2)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	2	3	V
Drain-Source On-Resistance <sup>(Note 2)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A		37	45	mΩ
Dynamic Characteristics <sup>(Note 3)</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =30V,V <sub>GS</sub> =0V,f=1MHz		500		pF
Output Capacitance	C <sub>oss</sub>			60		
Reverse Transfer Capacitance	C <sub>rss</sub>			25		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =48V,V <sub>GS</sub> =10V,I <sub>D</sub> =15A		12		nC
Gate-Source Charge	Q <sub>gs</sub>			4.1		
Gate-Drain Charge	Q <sub>gd</sub>			4.5		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =30V, R <sub>G</sub> =3Ω, I <sub>D</sub> =2A, V <sub>GS</sub> =10V		5		ns
Turn-On Rise Time	t <sub>r</sub>			2.6		
Turn-Off Delay Time	t <sub>d(off)</sub>			16.1		
Turn-Off Fall Time	t <sub>f</sub>			2.3		
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I <sub>S</sub>				20	A
Pulsed Diode Forward Current	I <sub>SM</sub>				60	
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V			1.2	V

Note 2. Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

3. Guaranteed by Design, Not Subject to Production Testing.

## Curve Characteristics

Fig. 1 - Output Characteristics

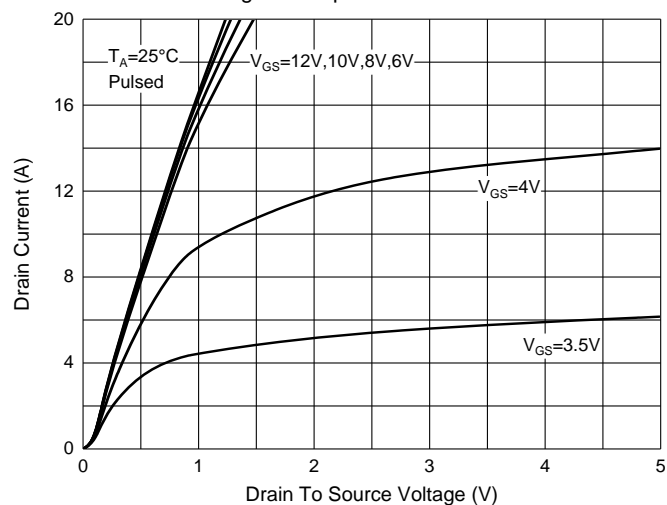


Fig. 2 - Transfer Characteristics

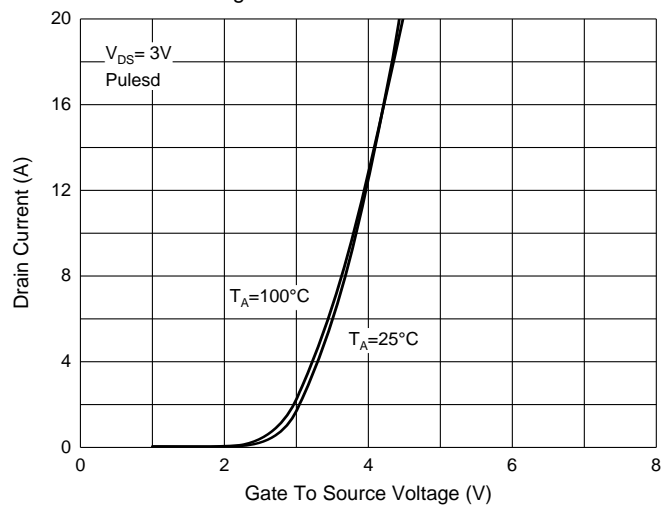


Fig. 3 -  $R_{DS(ON)} - I_D$

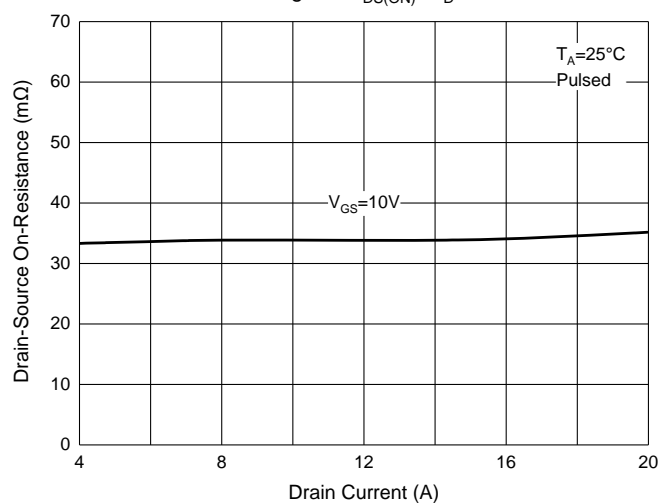


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

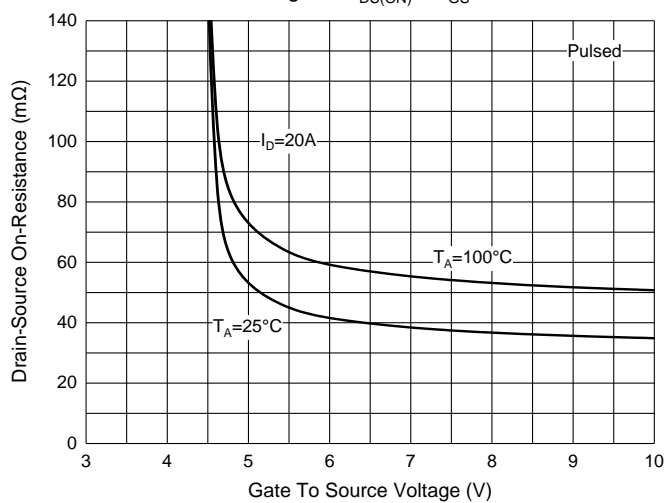


Fig. 5 -  $I_S - V_{SD}$

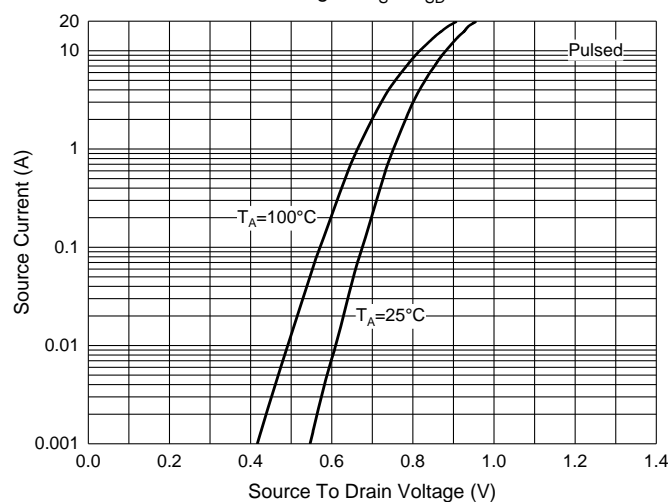
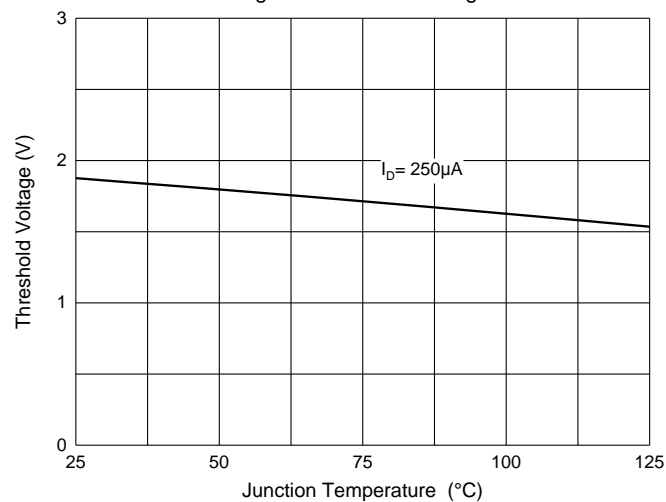


Fig. 6 - Threshold Voltage



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 2.5Kpcs/Reel

Note : Adding "-HF" Suffix for Halogen Free, eg. Part Number-TP-HF

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