

**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)

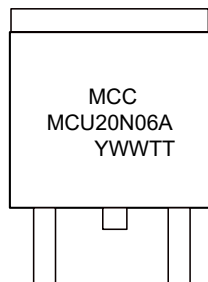
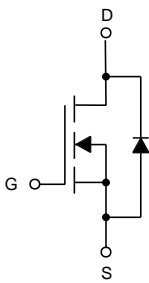
**Maximum Ratings**

- 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	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	20	A
Pulsed Drain Current	$I_{DM}$	60	A
Single Pulse Avalanche Energy <sup>(Note 1)</sup>	$E_{AS}$	72	mJ

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

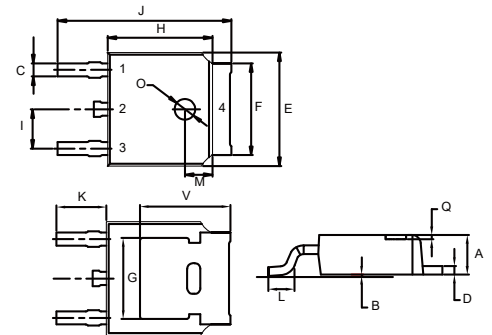
**Internal Structure and Marking Code**



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

DIM	DIMENSIONS				NOTE
	INCHES		MM		
	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
<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 <sup>(Note 2)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	2	3	V
Drain-Source On-Resistance <sup>(Note 2)</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		37	45	m $\Omega$
<b>Dynamic Characteristics<sup>(Note 3)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz$		500		pF
Output Capacitance	$C_{oss}$			60		
Reverse Transfer Capacitance	$C_{rss}$			25		
Total Gate Charge	$Q_g$	$V_{DS}=48V, V_{GS}=10V, I_D=15A$		12		nC
Gate-Source Charge	$Q_{gs}$			4.1		
Gate-Drain Charge	$Q_{gd}$			4.5		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, R_G=3\Omega, I_D=2A, V_{GS}=10V$		5		ns
Turn-On Rise Time	$t_r$			2.6		
Turn-Off Delay Time	$t_{d(off)}$			16.1		
Turn-Off Fall Time	$t_f$			2.3		
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				20	A
Pulsed Diode Forward Current	$I_{SM}$				60	
Body Diode Voltage	$V_{SD}$	$I_S=20A, V_{GS}=0V$			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

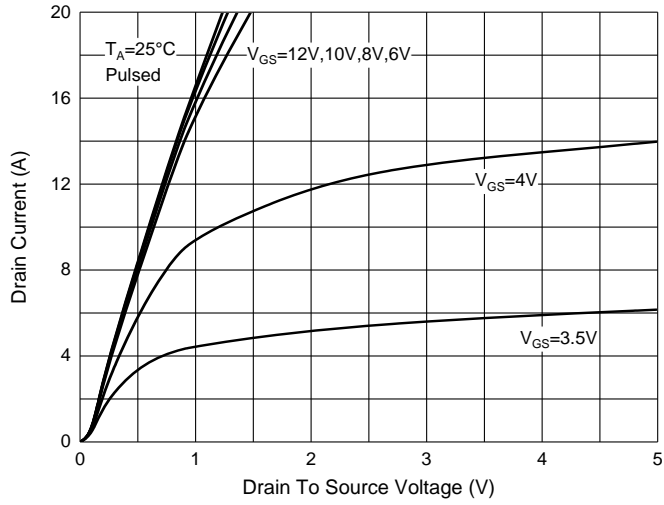


Fig. 2 - Transfer Characteristics

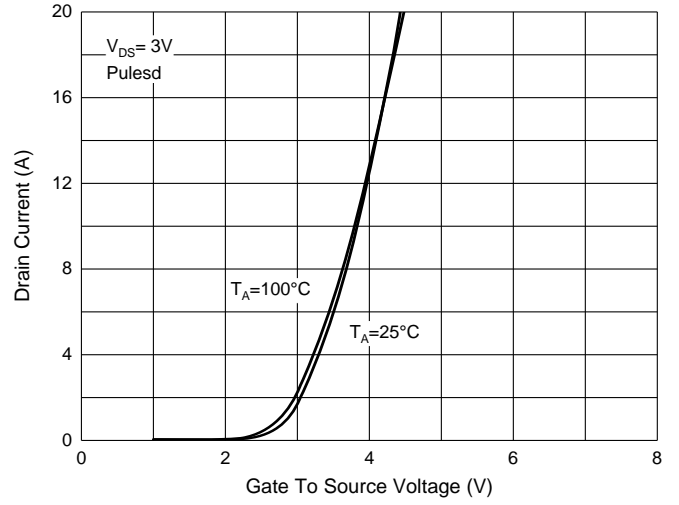


Fig. 3 -  $R_{DS(ON)} - I_D$

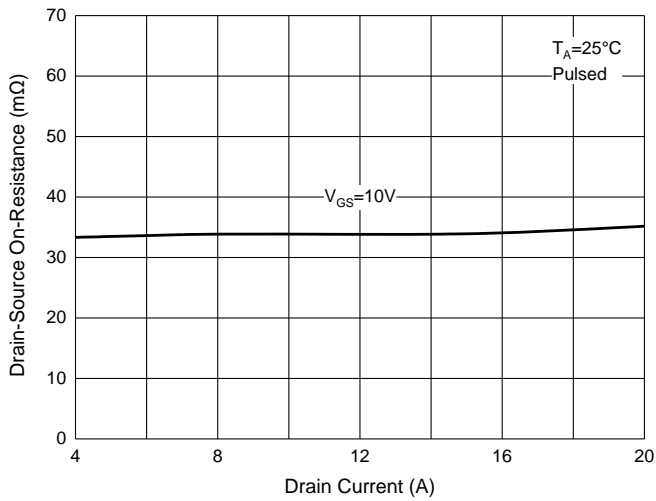


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

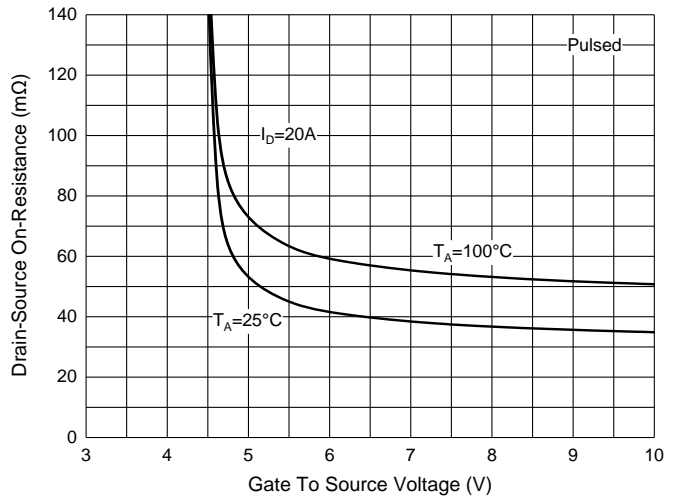


Fig. 5 -  $I_S - V_{SD}$

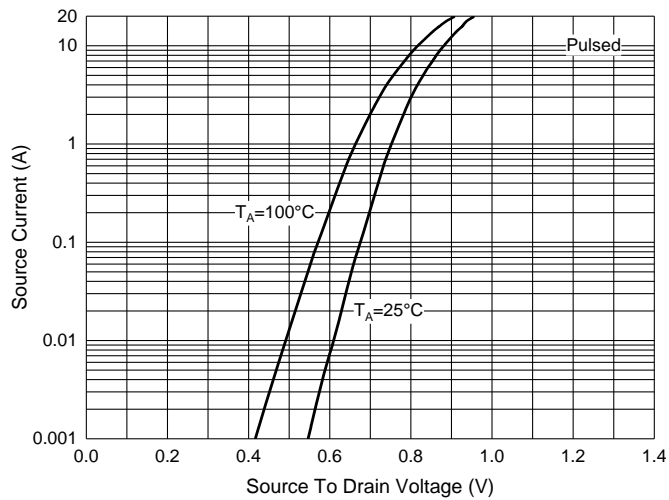
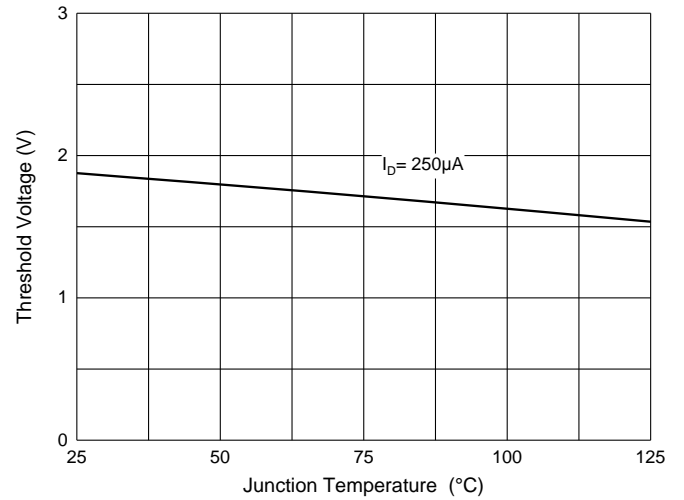


Fig. 6 - Threshold Voltage



## 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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