

## Features

- Low On-resistance and Low Conduction Loss
- Super Junction technology for High Voltage Application
- Soft Switching with Fast Reverse Recovery Diode
- Ultra Low Gate Charge Cause Lower Driving Requirement
- Low impedance Kelvin source pin-out
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free. "Green" Device<sup>(Note 1)</sup>
- Lead Free Finish/RoHS Compliant. "P" Suffix Designates RoHS Compliant. See Ordering Information

## Maximum Ratings

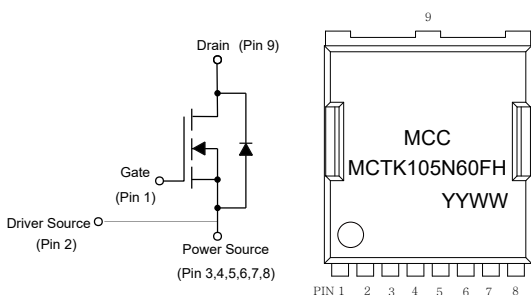
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance Junction to Ambient, Max<sup>(Note 2)</sup>: 60°C/W
- Thermal Resistance Junction to Case, Max : 1.17°C/W

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	600	V
Gate-Source Voltage	$V_{GS}$	±30	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	17.5
		$T_C=100^\circ\text{C}$	11
Pulsed Drain Current <sup>(Note 3)</sup>	$I_{DM}$	70	A
Total Power Dissipation, $T_C=25^\circ\text{C}$	$P_D$	107	W
Single Avalanche Energy <sup>(Note 4)</sup>	$E_{AS}$	365	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. Device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. single-sided Copper, in a still air environment with  $T_A=25^\circ\text{C}$ .
3. Repetitive rating; pulse width limited by max. junction temperature.
4. Starting  $T_J=25^\circ\text{C}$ ,  $V_{DD}=50\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $I_{AS}=7.8\text{A}$ .

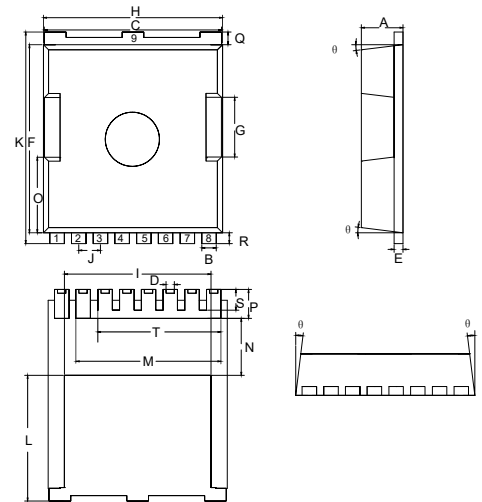
## Internal Structure and Marking Code



Device Code: MCTK105N60FH  
Date Code: YYWW (Year & Week)

# N-CHANNEL Super-Junction Power MOSFET

## TOLL-8L-KS



### DIMENSIONS

DIM	INCHES		mm		NOTE
	MIN	MAX	MIN	MAX	
A	0.087	0.094	2.20	2.40	
B	0.028	0.035	0.70	0.90	
C	0.382	0.390	9.70	9.90	
D	0.017	0.020	0.42	0.50	
E	0.016	0.024	0.40	0.60	
F	0.405	0.417	10.28	10.58	
G	0.122	0.138	3.10	3.50	
H	0.382	0.398	9.70	10.10	
I	0.311	0.327	7.90	8.30	
J	0.047		1.20		BSC
K	0.452	0.468	11.48	11.88	
L	0.266	0.281	6.75	7.15	
M	0.315		8.00		
N	0.118	0.130	3.00	3.30	
O	0.157	0.172	3.98	4.38	
P	0.055	0.071	1.40	1.80	
Q	0.024	0.031	0.60	0.80	
R	0.020	0.028	0.50	0.70	
S	0.039	0.051	1.00	1.30	
theta	4°	10°	4°	10°	
T	0.268		6.80		BSC

**Electrical Characteristics** ( $T_J = 25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=1mA$	600			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 30V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=600V, V_{GS}=0V$			10	$\mu\text{A}$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=2.1mA$	3	4.2	5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15.3A$		95	105	m $\Omega$
Gate Resistance	$R_g$	$f=1MHz, \text{open drain}$		1.3		$\Omega$
<b>Diode Characteristics</b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=15.3A$		0.9	1.2	V
Reverse Recovery Time	$t_{rr}$	$V_R=400V, I_F=15.3A$ $di_F/dt=100A/\mu s$		105		ns
Reverse Recovery Charge	$Q_{rr}$			595		nC
Peak Reverse Recovery Current	$I_{rrm}$			10		A
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=100V, V_{GS}=0V, f=1MHz$		2240		pF
Output Capacitance	$C_{oss}$			99		
Output capacitance - energy related	$C_{o(er)}$	$V_{DS}=0 \text{ to } 400V, V_{GS}=0V$		93		
Output capacitance - time related	$C_{o(tr)}$			598		
Total Gate Charge	$Q_g$	$V_{DS}=400V, V_{GS}=10V, I_D=15.3A$		57		nC
Gate-Source Charge	$Q_{gs}$			15		
Gate-Drain Charge	$Q_{gd}$			28		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=400V, V_{GS}=10V$ $R_G=10\Omega, I_D=15.3A$		100		ns
Turn-On Rise Time	$t_r$			35		
Turn-Off Delay Time	$t_{d(off)}$			65		
Turn-Off Fall Time	$t_f$			22		

**Typical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Fig. 1 - Typical Output Characteristics ( $T_J=25^\circ\text{C}$ )

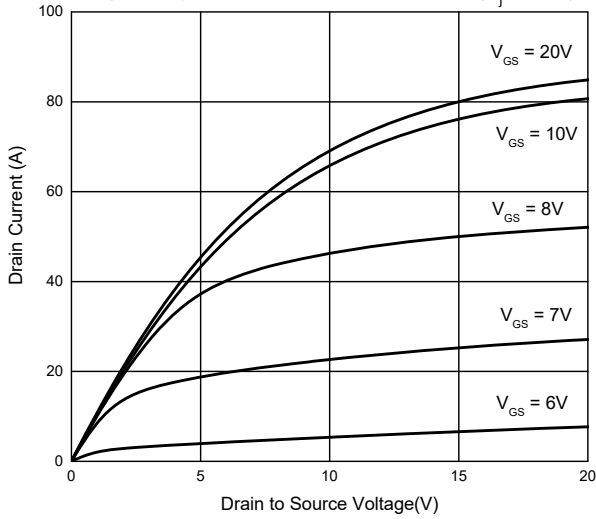


Fig. 2 - Typical Transfer Characteristics

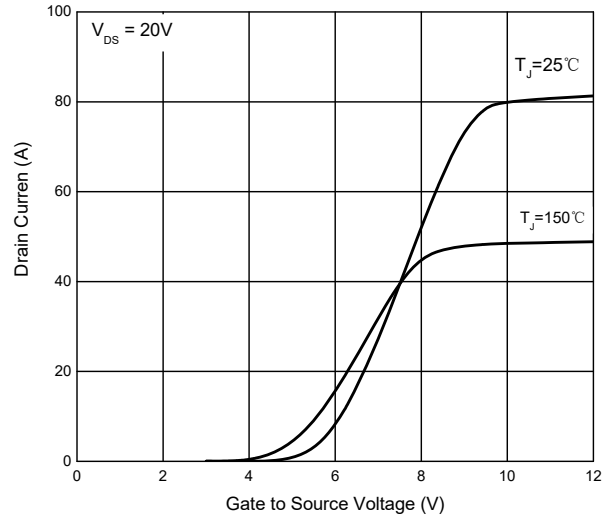


Fig. 3 - On-Resistance vs Gate Bias

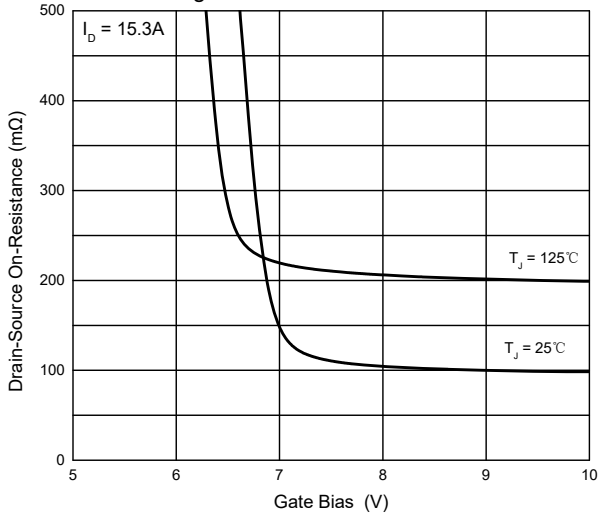


Fig. 4 - On-Resistance vs Drain Current

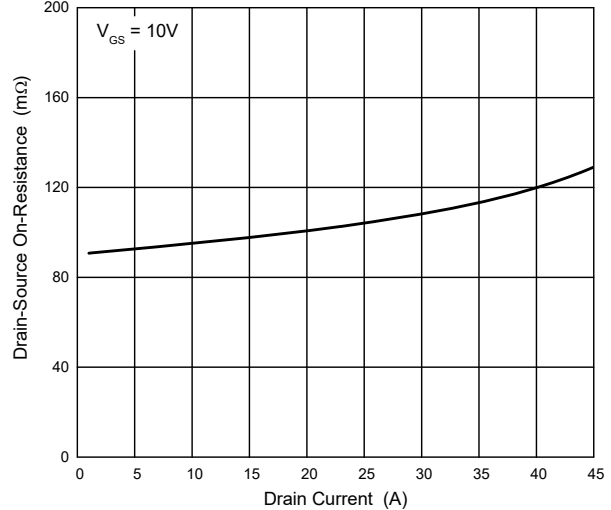


Fig. 5 - Capacitance Characteristic

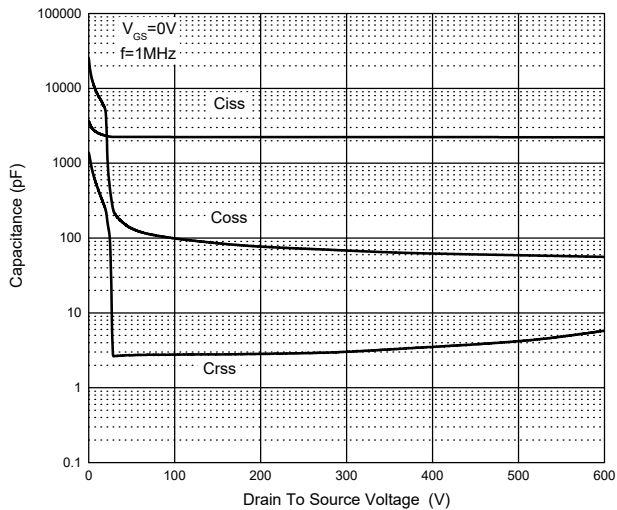
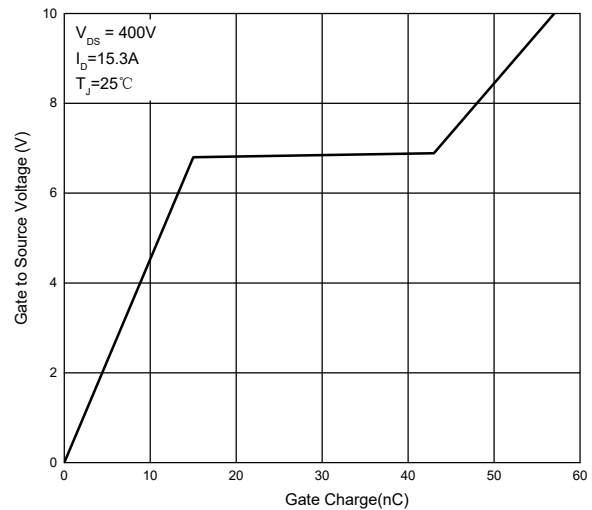


Fig. 6 - Typical Gate Charge



Typical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Fig. 7 - Gate-Threshold Voltage vs Junction Temperature

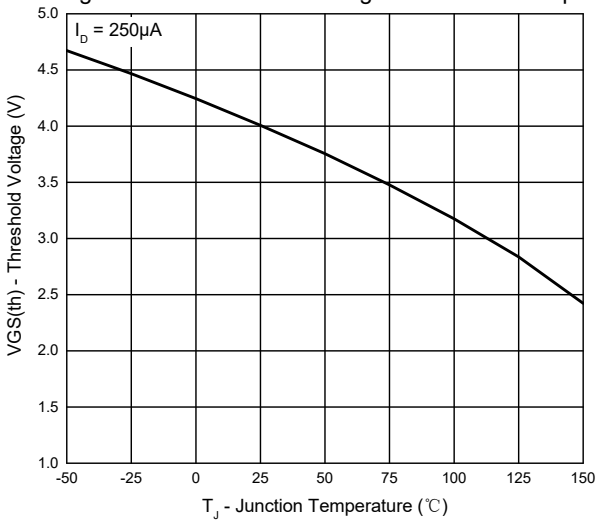


Fig. 8 - Normalized On-Resistance

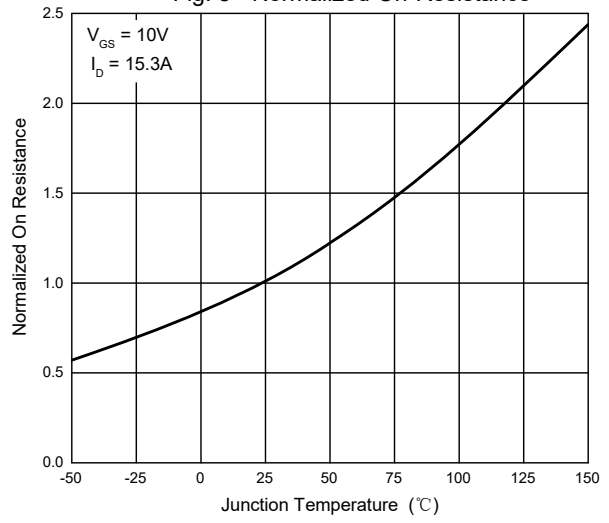


Fig. 9 - Forward Characteristics

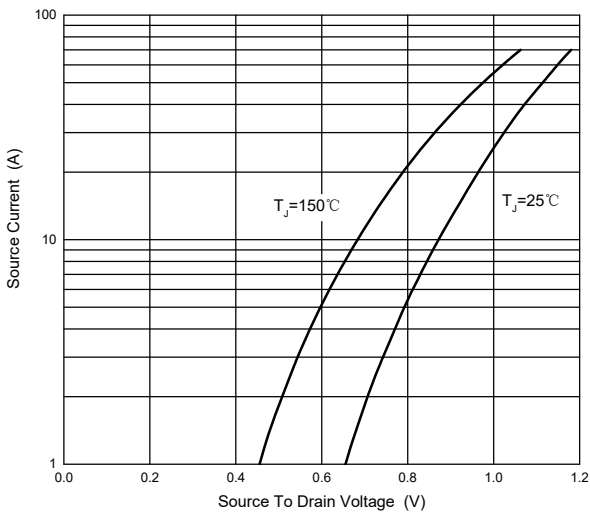


Fig. 10 - Drain Current

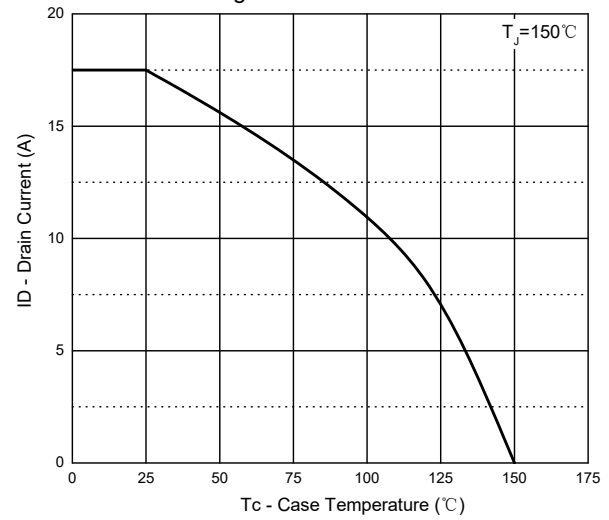


Fig. 11 - Power Dissipation

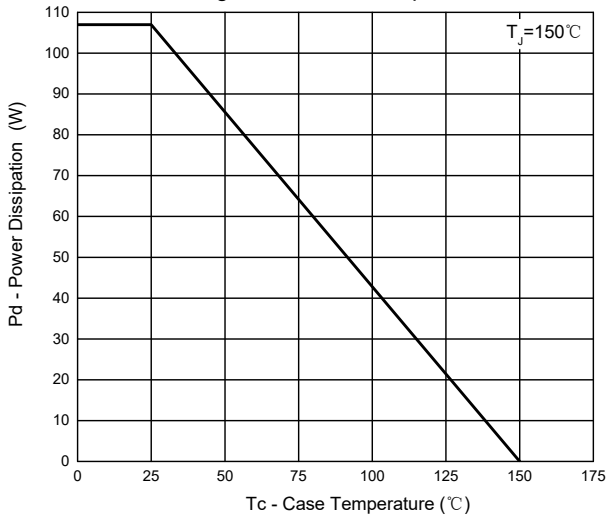
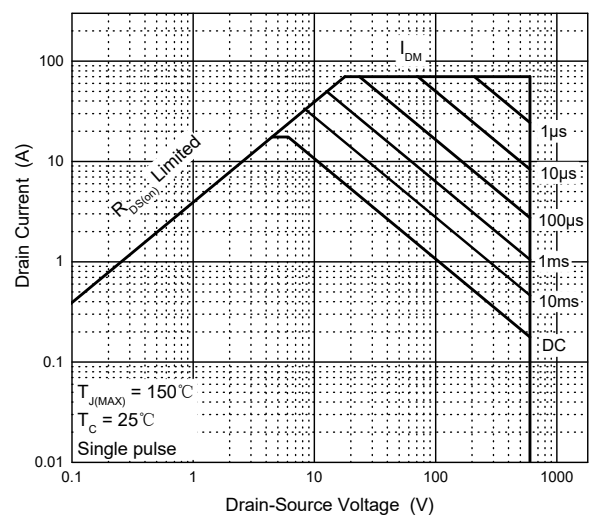
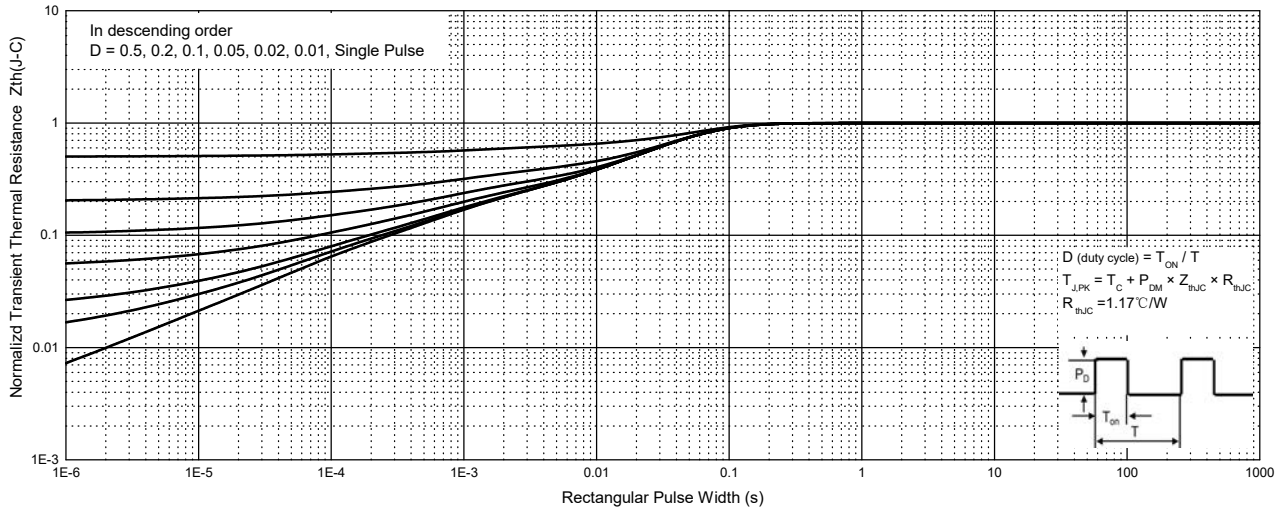


Fig. 12 - Safe Operating Area



Typical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Fig.13 - Normalized Transient Thermal Impedance, Junction-Case



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 2Kpcs/Reel

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