

## Features

- Split Gate Trench MOSFET Technology
- Excellent Stability and Uniformity
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 3
- Halogen Free. "Green" Device <sup>(Note 1)</sup>

## Maximum Ratings

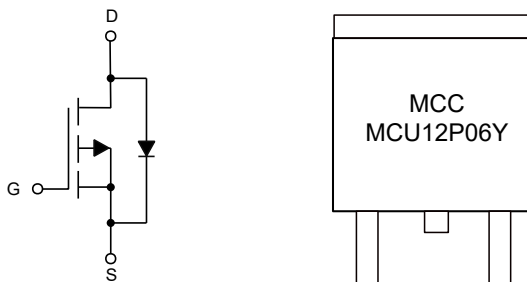
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 4.23°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	-60	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	-12
		$T_C=100^\circ\text{C}$	-7.6
Pulsed Drain Current <sup>(Note2)</sup>	$I_{DM}$	-30	A
Total Power Dissipation	$P_D$	30	W
Single Pulsed Avalanche Energy <sup>(Note3)</sup>	$E_{AS}$	35	mJ

### Notes:

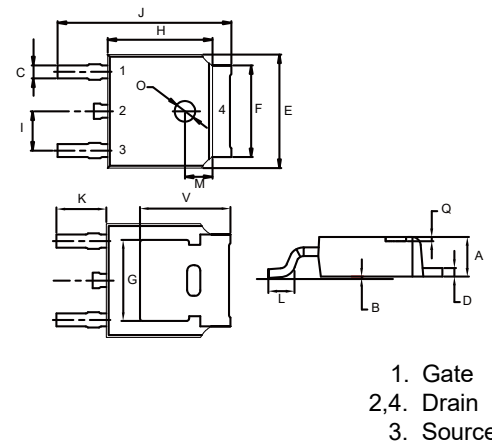
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3.  $V_{DD}=-50\text{V}$ ,  $R_G=25\Omega$ ,  $L=0.5\text{mH}$ , Starting  $T_J=25^\circ\text{C}$ .

## Internal Structure and Marking Code



## P-Channel MOSFET

### DPAK(TO-252)



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>(Note2)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.8	-2.5	V
Drain-Source On-Resistance <sup>(Note2)</sup>	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-4A$		65	85	m $\Omega$
		$V_{GS}=-4.5V, I_D=-2A$		90	120	
Gate Resistance	$R_g$	F=1 MHz, Open drain		3.0		$\Omega$
<b>Diode Characteristics</b>						
Source-Drain Current <sup>(Note2)</sup>	$I_{SDM}$				-30	A
Continuous Body Diode Current	$I_S$				-12	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-1A$			-1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=1A, dI_F/dt=100A/\mu s$		20		ns
Reverse Recovery Charge	$Q_{rr}$			18		nC
<b>Dynamic Characteristics<sup>(Note4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$		505		pF
Output Capacitance	$C_{oss}$			133		
Reverse Transfer Capacitance	$C_{rss}$			30		
Total Gate Charge	$Q_g$	$V_{DS}=-30V, V_{GS}=-4.5V, I_D=-3.1A$		4.27		nC
Gate-Source Charge	$Q_{gs}$			2.39		
Gate-Drain Charge	$Q_{gd}$			1.1		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=-30V, V_{GS}=-4.5V, R_{GEN}=1\Omega, I_{DS}=-2.4A$		11		ns
Turn-On Rise Time	$t_r$			33.8		
Turn-Off Delay Time	$t_{d(off)}$			12.4		
Turn-Off Fall Time	$t_f$			23.2		

Note4. Guaranteed by Design, Not Subject to Production Testing.

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

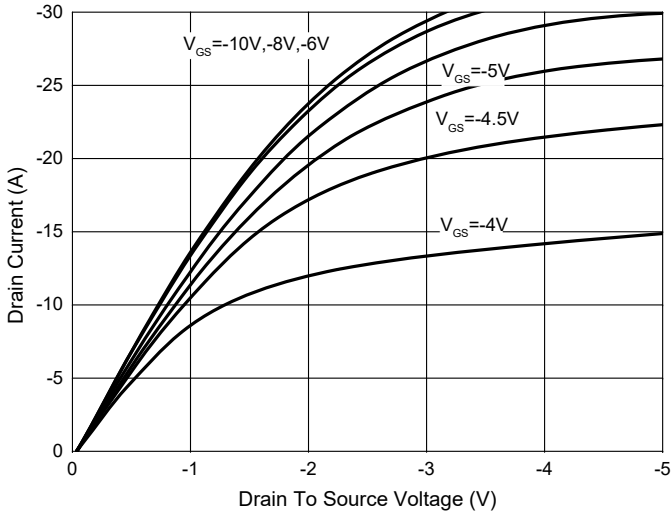


Fig. 2 - Transfer Characteristics

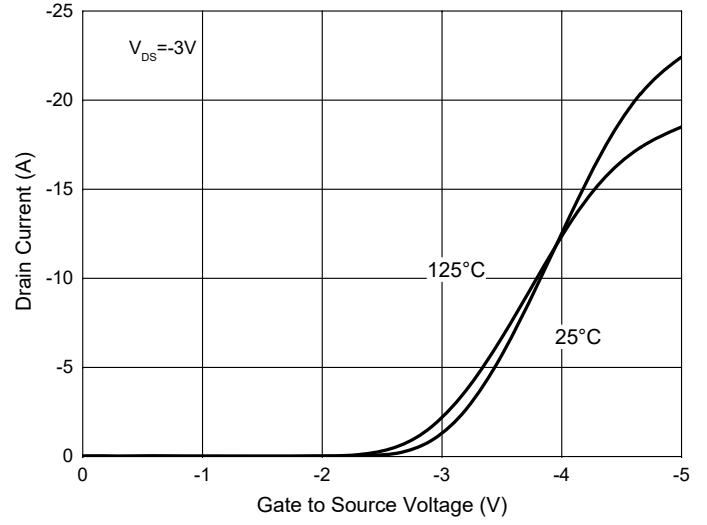


Fig.3- $R_{DS(ON)} - I_D$

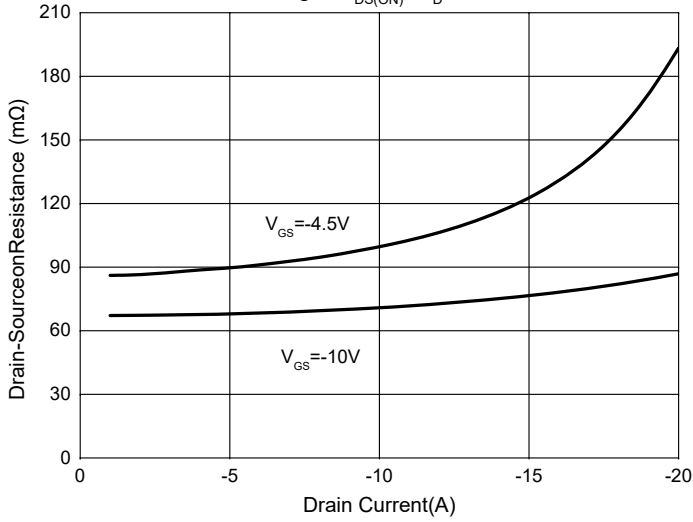


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

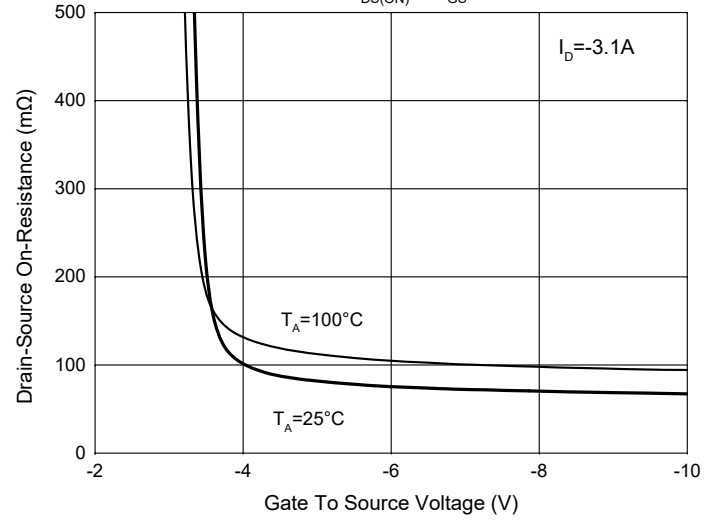


Fig. 5 - Gate Charge

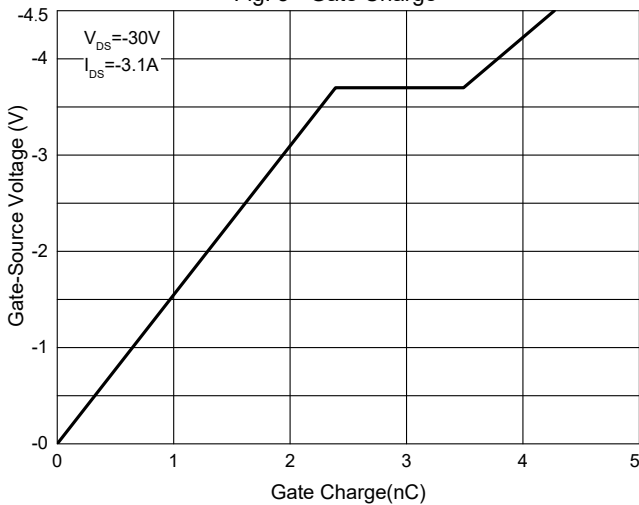
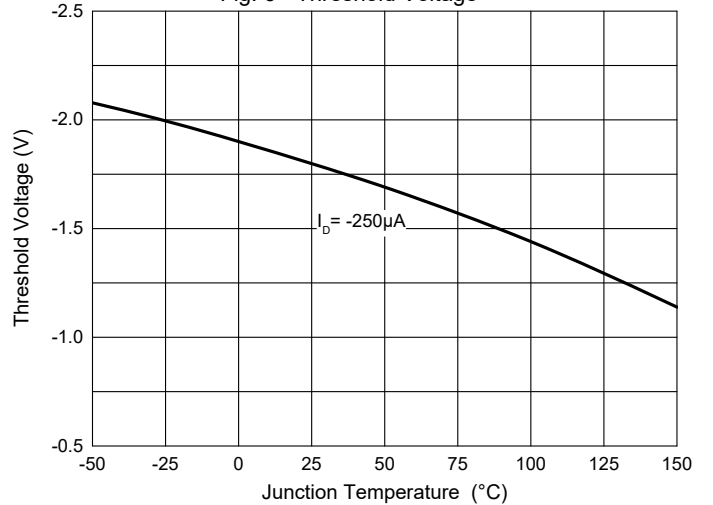


Fig. 6 - Threshold Voltage



## Curve Characteristics

Fig. 7 - Normalized On Resistance Characteristics

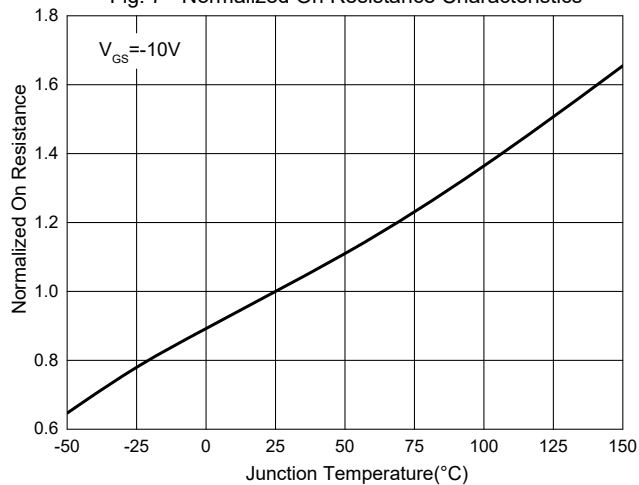


Fig. 8 - Capacitance Characteristics

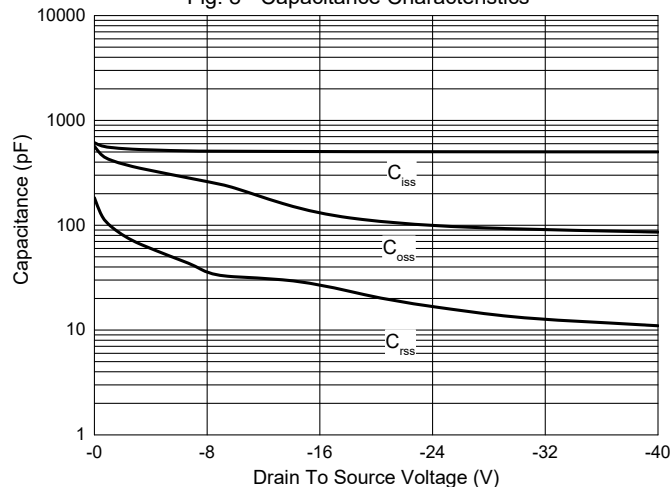


Fig. 9 -  $I_s - V_{sd}$

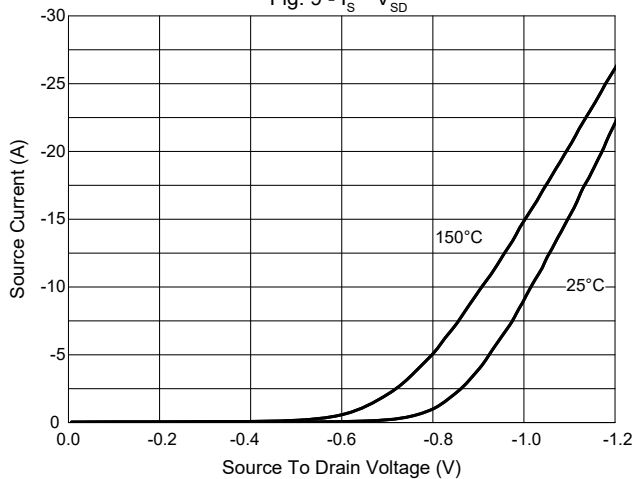


Fig. 10 - Current Dissipation

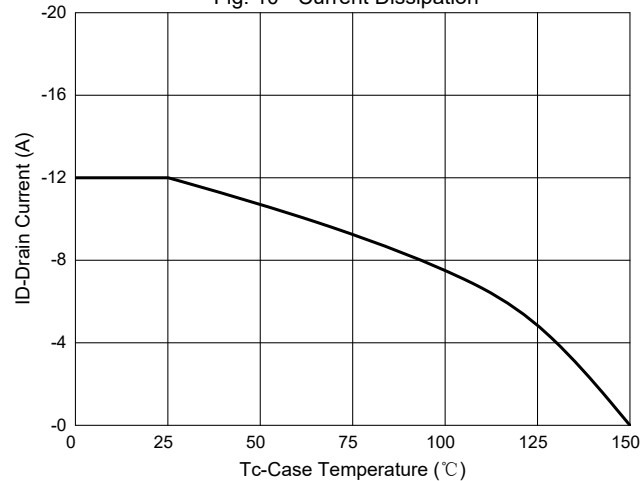
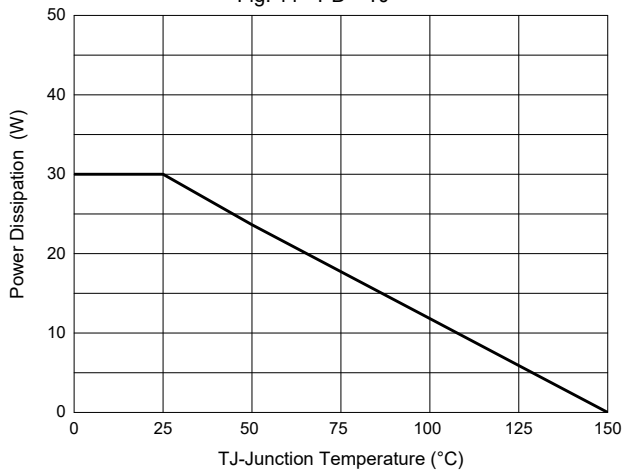


Fig. 11 - PD—TJ



Curve Characteristics

Fig. 12 - Safe Operation Area

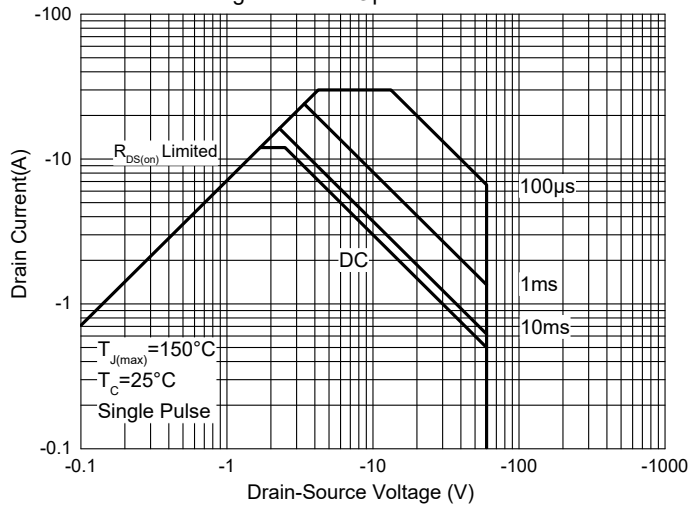
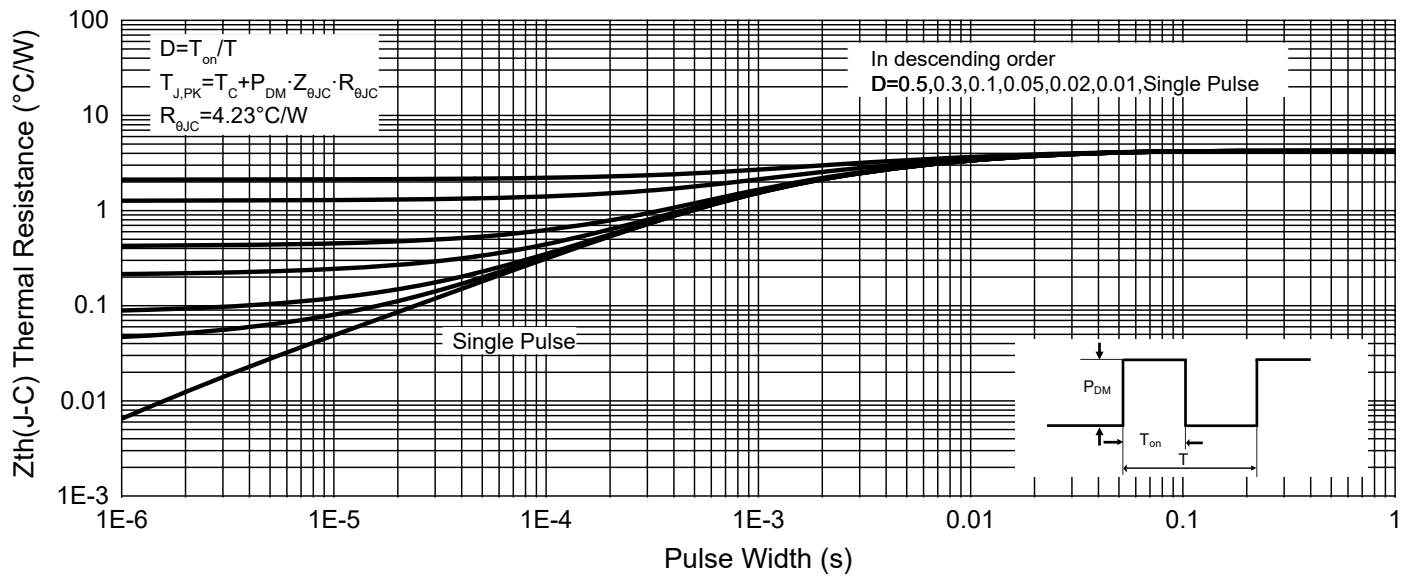


Fig. 13 - Maximum Transient Thermal Impedance



## Ordering Information

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

## Revision History

Datasheet status	Version No	Release date	Update content
New product datasheet	Rev4-1	20230102	

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