



**THE DATASHEET OF  
MC7252KDW-TP**



## Features

- ESD Protected up to 2KV(HBM)
- Low Threshold
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

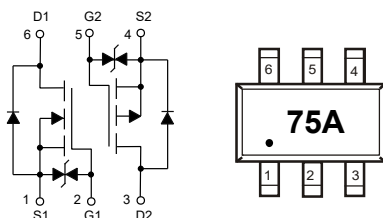
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 390°C/W Junction to Ambient (Note 2)

Parameter	Symbol	Rating	Unit
Total Power Dissipation (Note 3)	$P_D$	320	mW
<b>N-Channel MOSFET</b>			
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	0.34
		$T_A=100^\circ\text{C}$	0.22
Pulsed Drain Current (Note 4)	$I_{DM}$	1.36	A
<b>P-Channel MOSFET</b>			
Drain-Source Voltage	$V_{DS}$	-50	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	-0.18
		$T_A=100^\circ\text{C}$	-0.11
Pulsed Drain Current (Note 4)	$I_{DM}$	-0.72	A

Note:

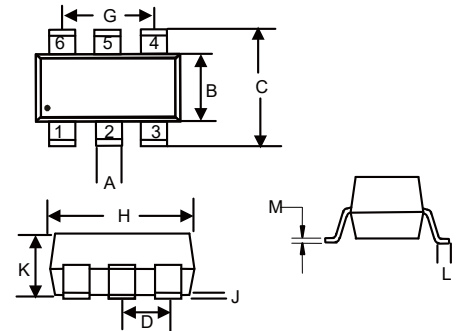
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on the minimum recommend pad size, in the still air environment with  $T_A = 25^\circ\text{C}$ .
3.  $P_D$  is based on max. junction temperature, using junction-ambient thermal resistance.
4. Repetitive rating; pulse width limited by max. junction temperature.

## Internal Structure and Marking Code



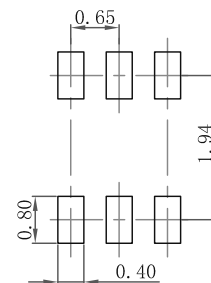
# Dual N&P-Channel MOSFET

## SOT-363



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.006	0.014	0.15	0.35	
B	0.045	0.053	1.15	1.35	
C	0.079	0.096	2.00	2.45	
D	0.026		0.65		TYP.
G	0.047	0.055	1.20	1.40	
H	0.071	0.087	1.80	2.20	
J	-----	0.004	-----	0.10	
K	0.031	0.043	0.80	1.10	
L	0.010	0.018	0.26	0.46	
M	0.003	0.006	0.08	0.15	

### Suggested Solder Pad Layout



**N-Channel MOSFET Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

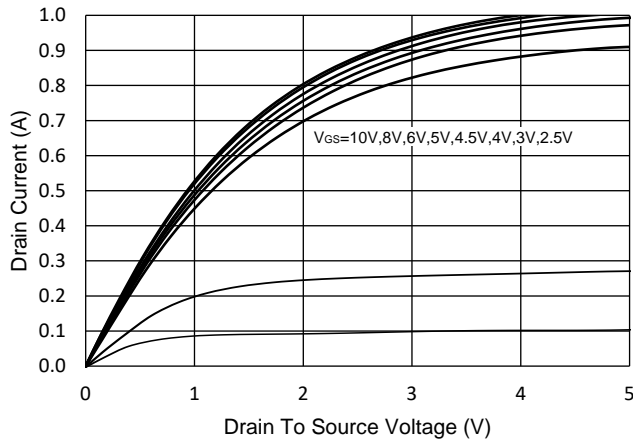
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 10$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.3	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=0.3A$		1.7	2.5	$\Omega$
		$V_{GS}=4.5V, I_D=0.2A$		1.9	3	
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-0.13A$		0.37		S
Gate Resistance	$R_G$	f=1MHz, Open drain		133		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				0.34	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=0.3A$			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=0.3A, di_F/dt=100A/\mu s$		11		ns
Reverse Recovery Charge	$Q_{rr}$			3		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz$		15.2		$\mu F$
Output Capacitance	$C_{oss}$			5.2		
Reverse Transfer Capacitance	$C_{rss}$			2.3		
Total Gate Charge	$Q_g$	$V_{DS}=30V, V_{GS}=10V, I_D=0.3A$		0.8		nC
Gate-Source Charge	$Q_{gs}$			0.1		
Gate-Drain Charge	$Q_{gd}$			0.2		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, R_G=6\Omega, I_D=0.3A$		2.2		ns
Turn-On Rise Time	$t_r$			2.8		
Turn-Off Delay Time	$t_{d(off)}$			5.8		
Turn-Off Fall Time	$t_f$			10		

**P-Channel Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

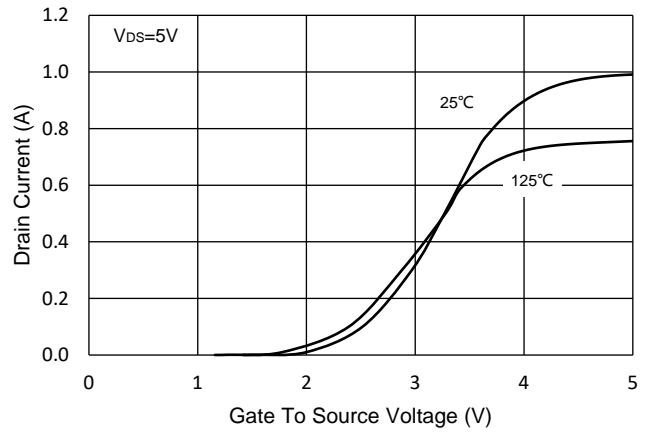
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-50			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 10$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-50V, V_{GS}=0V$			-1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.9	-1.62	-2	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-0.5A$		2.1	6	$\Omega$
		$V_{GS}=-4.5V, I_D=-0.2A$		2.5	7	
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-0.13A$		0.37		S
Gate Resistance	$R_G$	f=1MHz, Open drain		878		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				-0.18	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-0.5A$			-1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=-0.15A, di_F/dt=100A/\mu s$		11		ns
Reverse Recovery Charge	$Q_{rr}$			4		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-25V, V_{GS}=0V, f=1MHz$		37		pF
Output Capacitance	$C_{oss}$			6		
Reverse Transfer Capacitance	$C_{rss}$			4		
Total Gate Charge	$Q_g$	$V_{DS}=-25V, V_{GS}=-10V, I_D=-0.15A$		2.7		nC
Gate-Source Charge	$Q_{gs}$			0.4		
Gate-Drain Charge	$Q_{gd}$			0.2		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=-25V, V_{GS}=-10V, R_G=2.5\Omega, I_D=-0.15A$		8		ns
Turn-On Rise Time	$t_r$			3.8		
Turn-Off Delay Time	$t_{d(off)}$			38.6		
Turn-Off Fall Time	$t_f$			23.5		

**Curve Characteristics(N-Channel)**

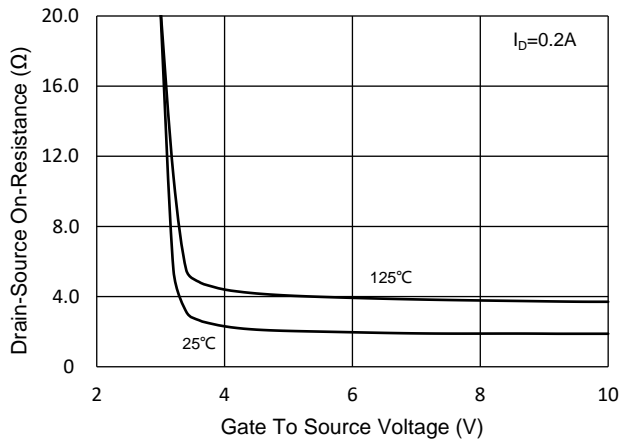
**Fig.1 - Typical Output Characteristics**



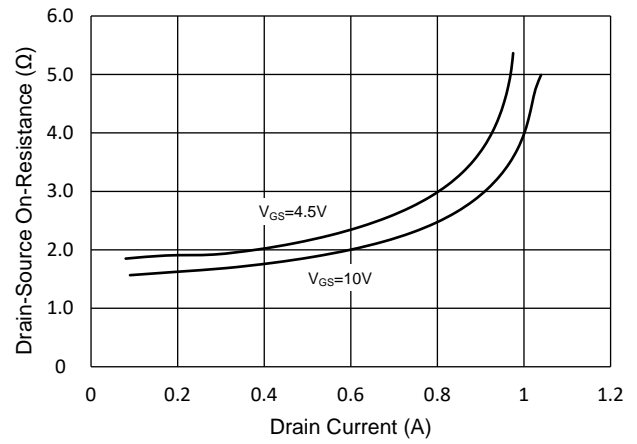
**Fig.2 - Transfer Characteristic**



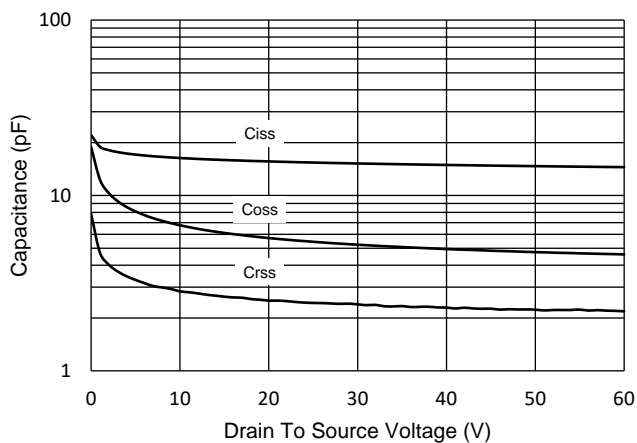
**Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$**



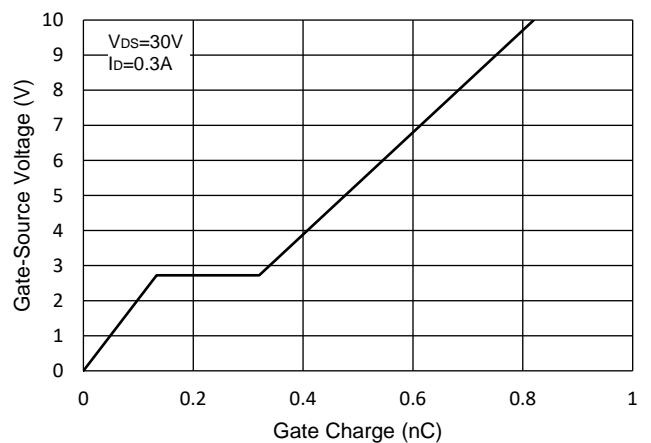
**Fig.4 -  $R_{DS(ON)}$  -  $I_D$**



**Fig.5 - Capacitance Characteristics**

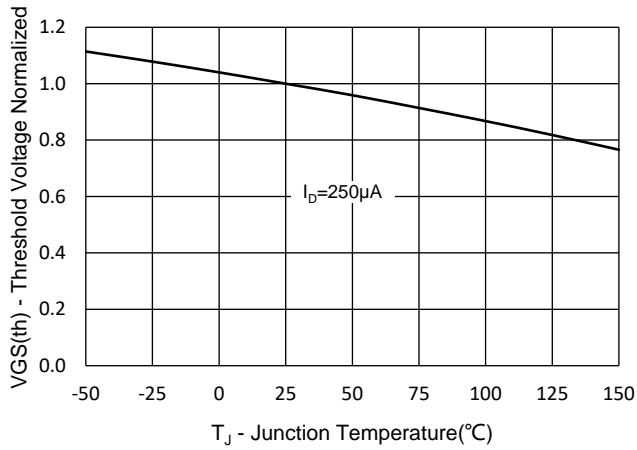


**Fig.6 - Gate Charge**

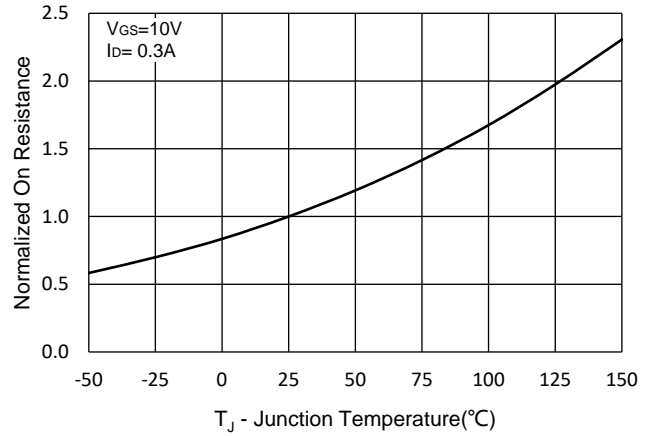


**Curve Characteristics(N-Channel)**

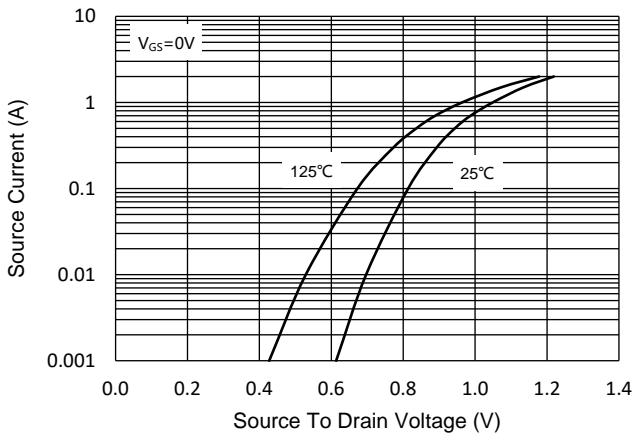
**Fig.7 - Normalized Threshold Voltage**



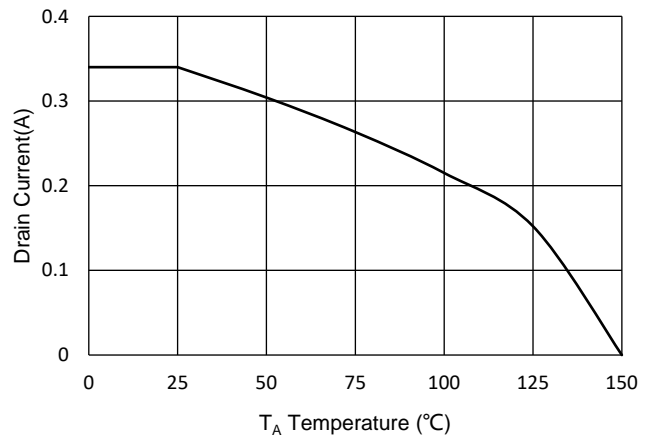
**Fig.8 - Normalized On Resistance Characteristics**



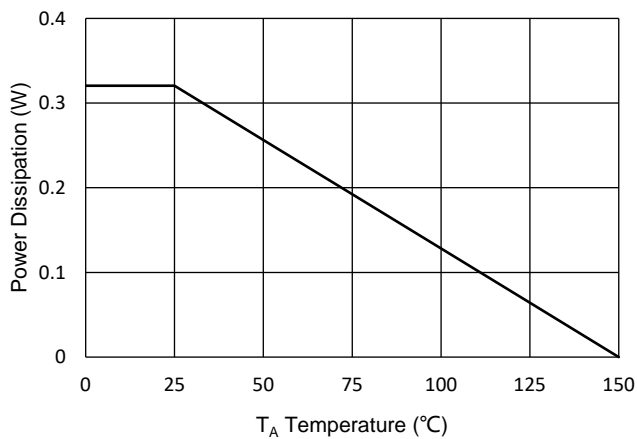
**Fig.9 - I<sub>S</sub> - V<sub>SD</sub>**



**Fig.10 - Drain Current**



**Fig.11 - PD Dissipation**



Curve Characteristics(N-Channel)

Fig.12 - Safe Operation Area

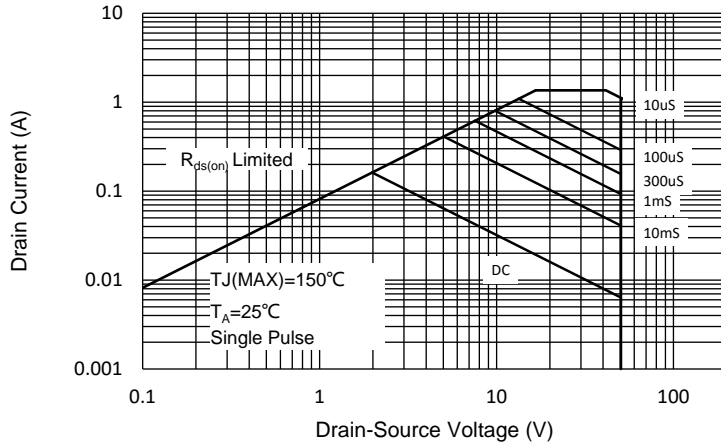
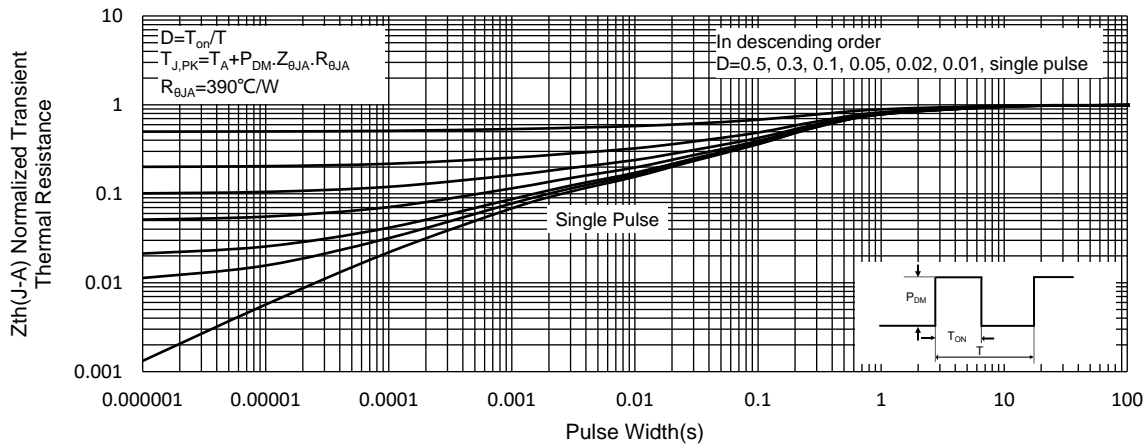
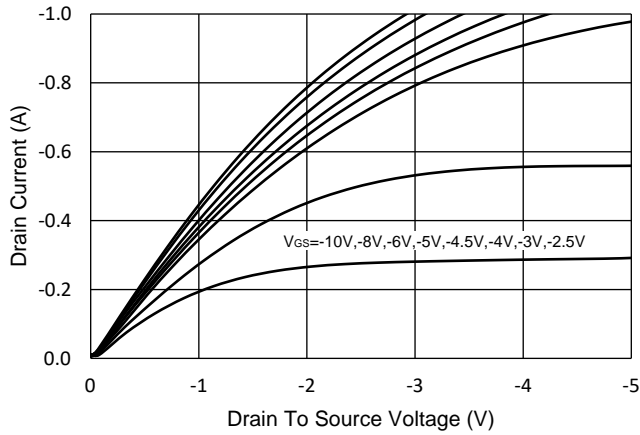


Fig.13 - Normalized Transient Thermal Impedance

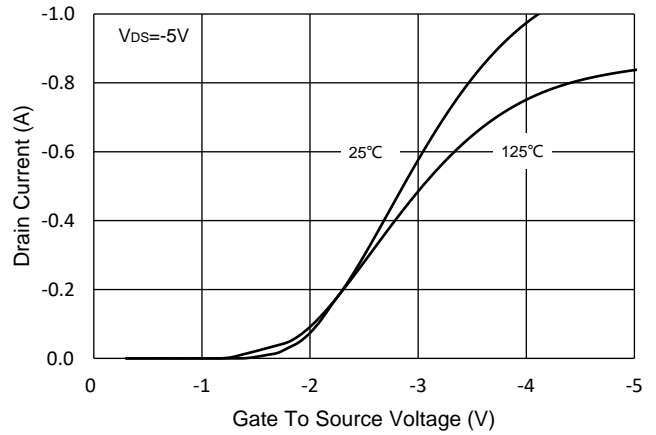


## Curve Characteristics(P-Channel)

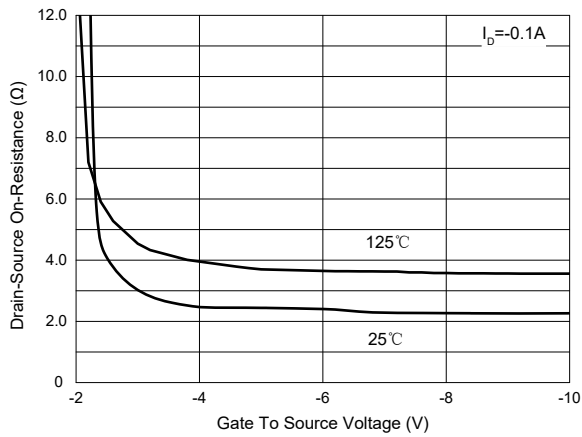
**Fig.1 - Typical Output Characteristics**



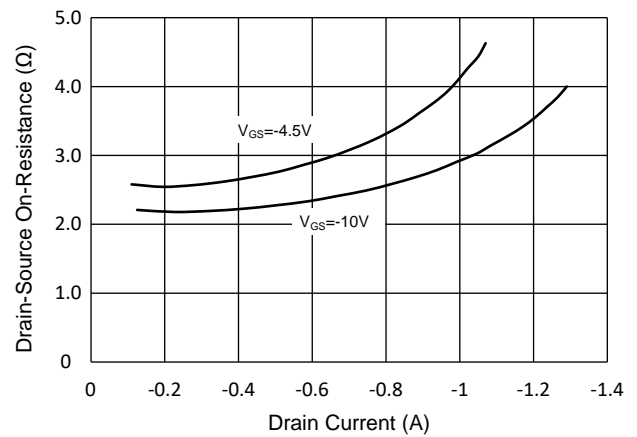
**Fig.2 - Transfer Characteristic**



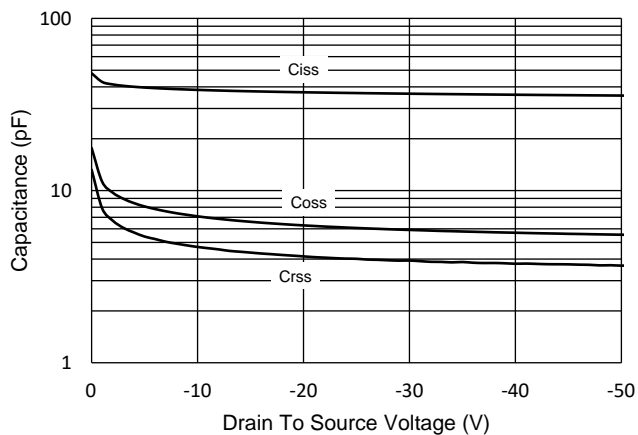
**Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$**



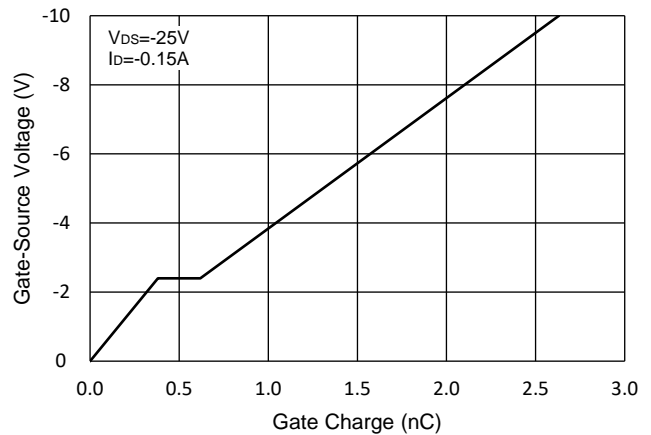
**Fig.4 -  $R_{DS(ON)}$  -  $I_D$**



**Fig.5 - Capacitance Characteristics**

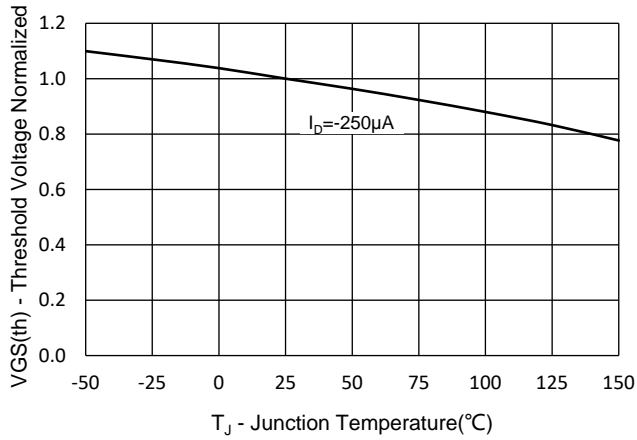


**Fig.6 - Gate Charge**

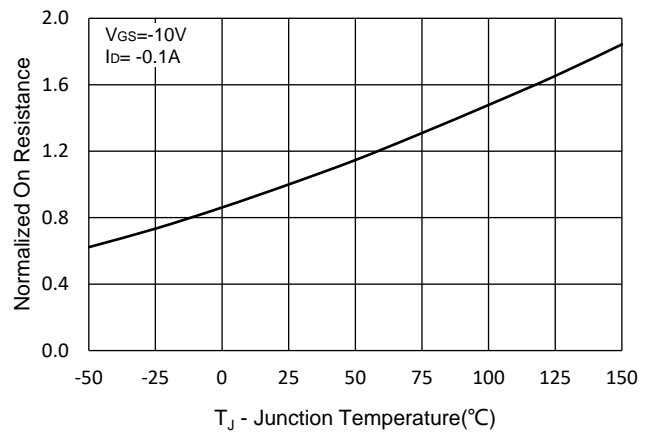


**Curve Characteristics(P-Channel)**

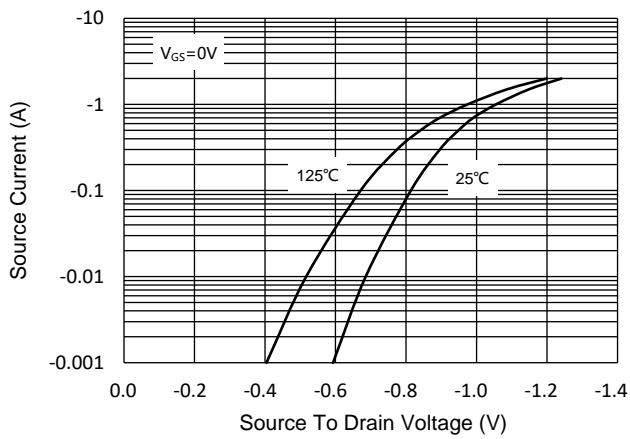
**Fig.7 - Normalized Threshold Voltage**



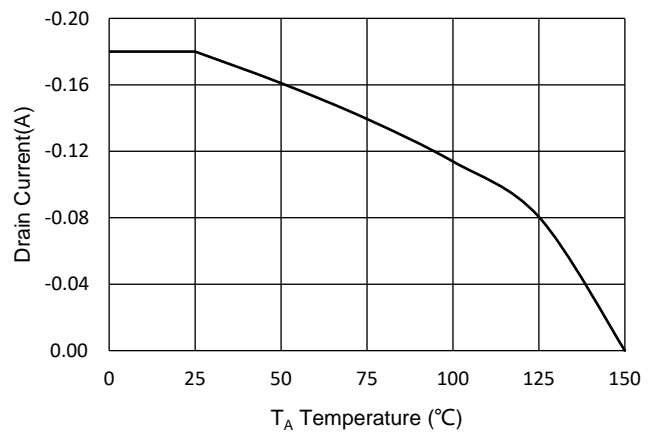
**Fig.8 - Normalized On Resistance Characteristics**



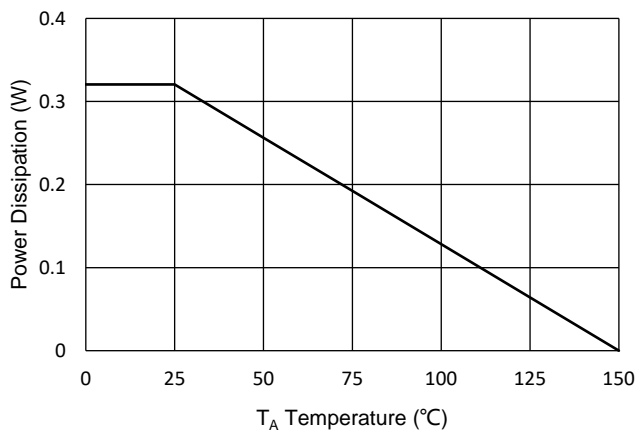
**Fig.9 - I<sub>S</sub> - V<sub>SD</sub>**



**Fig.10 - Drain Current**



**Fig.11 - PD Dissipation**



Curve Characteristics(P-Channel)

Fig.12 - Safe Operation Area

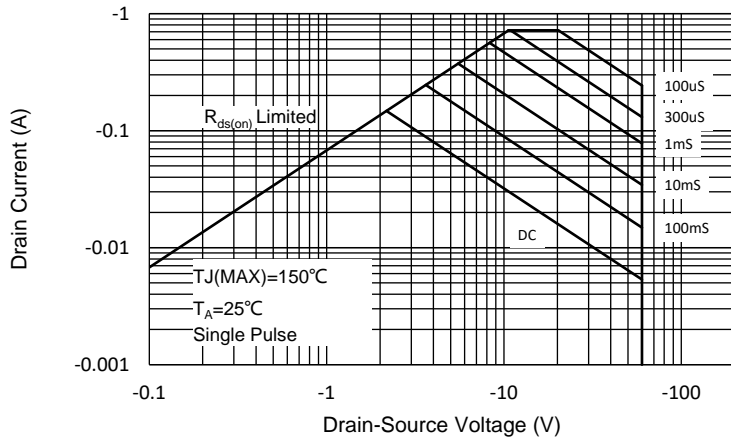
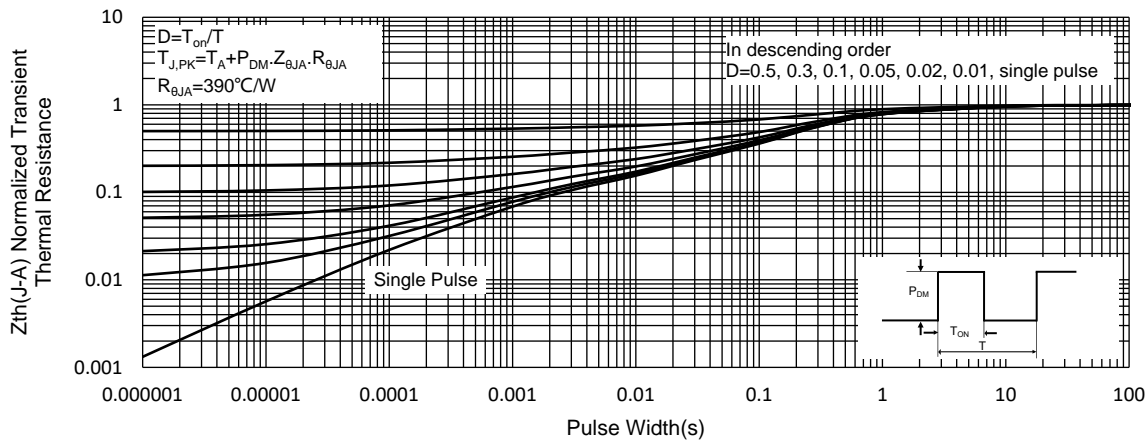


Fig.13 - Normalized Transient Thermal Impedance



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel

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