

## Features

- Fully Automotive Qualified to AEC-Q101
- Split Gate Trench LV MOSFET Technology
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device<sup>(Note1)</sup>
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

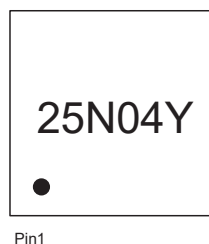
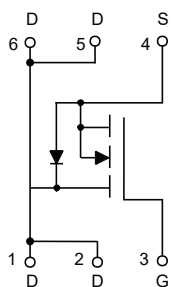
- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance: 90°C/W Junction to Ambient<sup>(Note 2)</sup>
- Thermal Resistance: 14°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	15
		$T_C=100^\circ\text{C}$	10.6
Pulsed Drain Current <sup>(Note 3)</sup>	$I_{DM}$	60	A
Total Power Dissipation <sup>(Note 4)</sup>	$P_D$	10.7	W

Note:

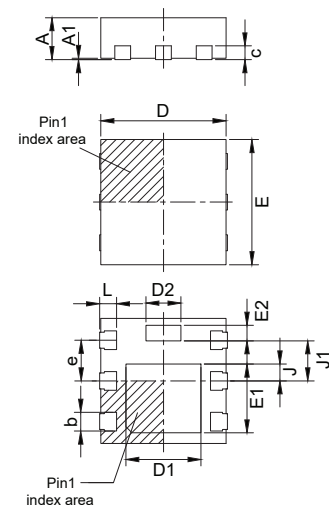
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment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

## Internal Structure and Marking Code



# N-CHANNEL MOSFET

## DFN2020-6(SWF)



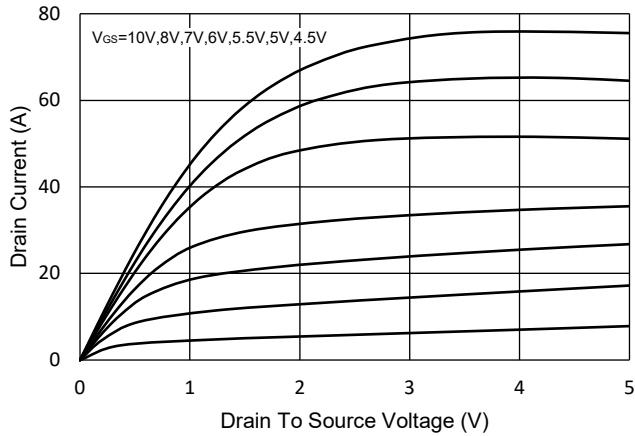
DIM	INCH		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.019	0.034	0.50	0.85	
A1	0.000	0.004	0.00	0.10	
c	0.008		0.20		TYP
D	0.074	0.083	1.90	2.10	
E	0.074	0.083	1.90	2.10	
D1	0.043	0.052	1.10	1.30	
E1	0.039	0.048	1.00	1.20	
D2	0.018	0.026	0.46	0.66	
E2	0.005	0.014	0.15	0.35	
J	0.011		0.27		TYP
J1	0.025		0.64		TYP
b	0.007	0.016	0.20	0.40	
e	0.026		0.65		TYP
L	0.005	0.014	0.15	0.35	

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

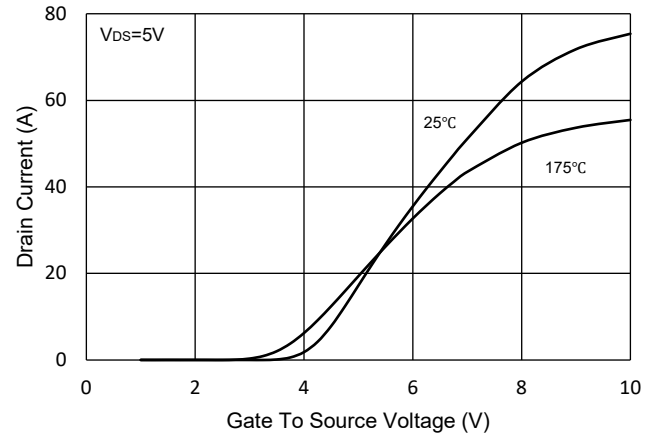
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	40			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	2.8	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=9A$		19.2	25	m $\Omega$
Gate Resistance	$R_g$	f=1MHz, Open Drain		3		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				14	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=9A$			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=9A, dI_F/dt=100A/\mu s$		14.6		ns
Reverse Recovery Charge	$Q_{rr}$			8		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=20V, V_{GS}=0V, f=1MHz$		240		pF
Output Capacitance	$C_{oss}$			92		
Reverse Transfer Capacitance	$C_{rss}$			3.5		
Total Gate Charge	$Q_g$	$V_{DS}=20V, V_{GS}=10V, I_D=9A$		4		nC
Gate-Source Charge	$Q_{gs}$			1.2		
Gate-Drain Charge	$Q_{gd}$			1		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=10V, I_D=9A, R_G=3\Omega$		5.2		ns
Turn-On Rise Time	$t_r$			2.3		
Turn-Off Delay Time	$t_{d(off)}$			8.1		
Turn-Off Fall Time	$t_f$			2.5		

## Curve Characteristics

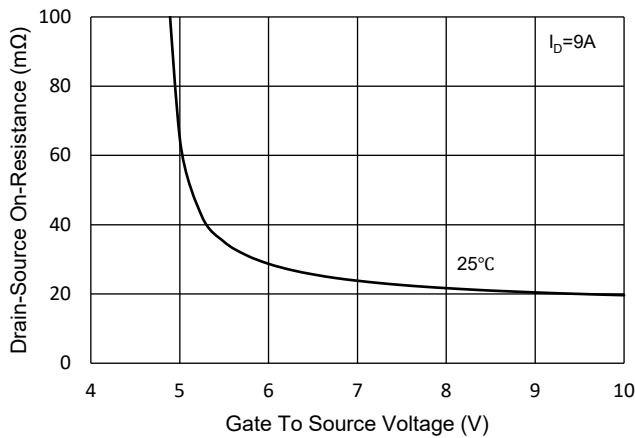
**Fig.1 - Typical Output Characteristics**



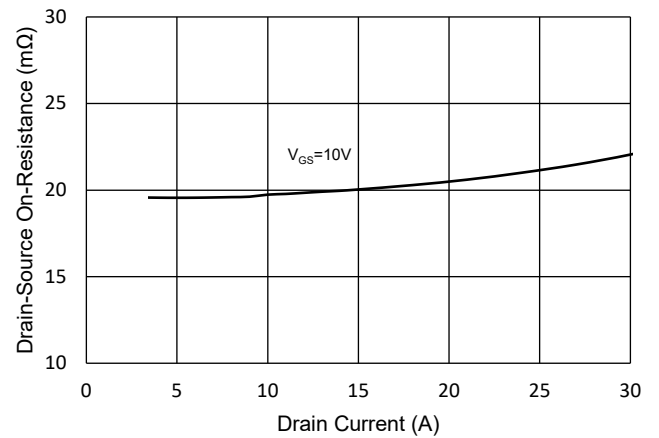
**Fig.2 - Transfer Characteristics**



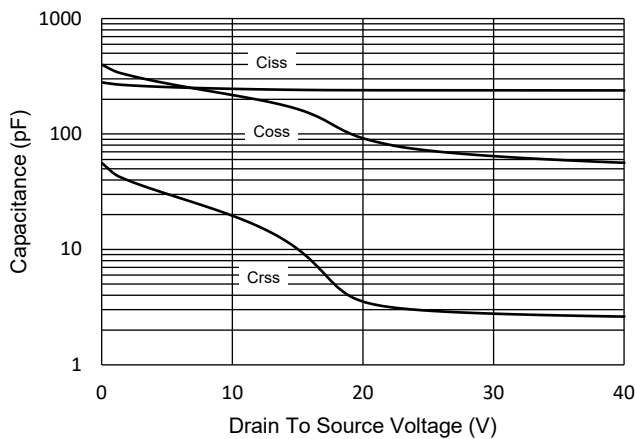
**Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$**



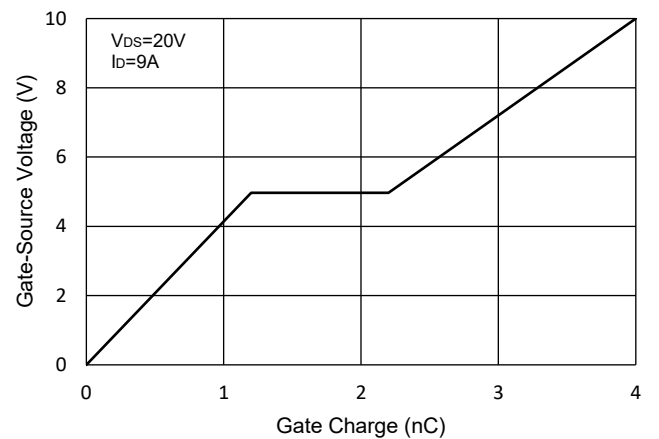
**Fig.4 -  $R_{DS(ON)}$  -  $I_D$**



**Fig.5 - Capacitance Characteristics**

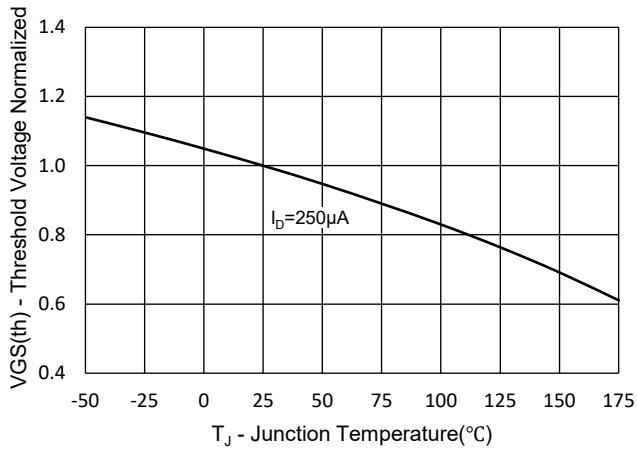


**Fig.6 - Gate Charge**

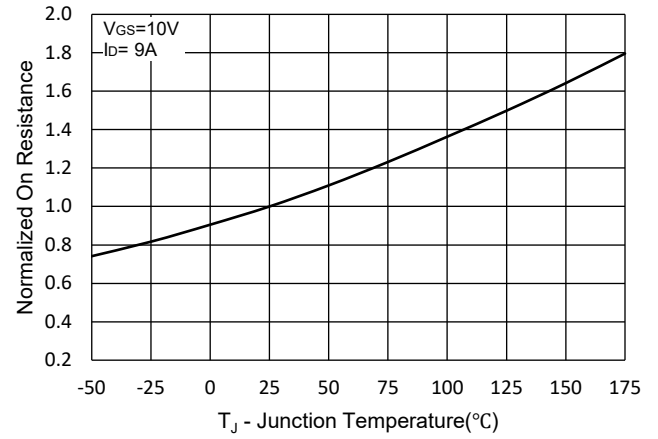


**Curve Characteristics**

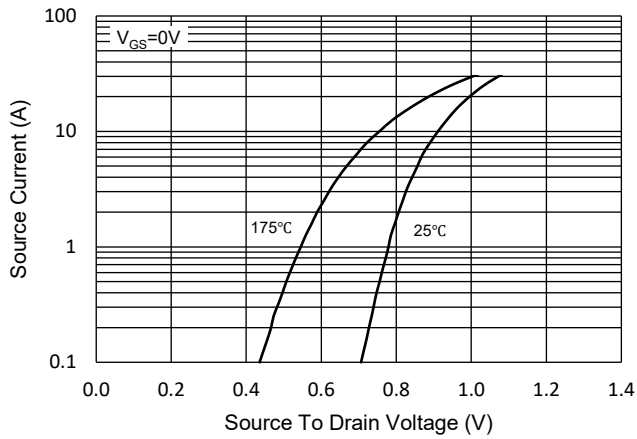
**Fig.7 - Normalized Threshold Voltage**



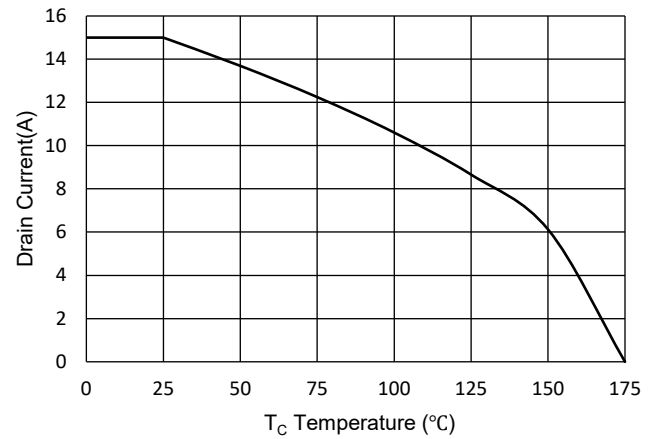
**Fig.8 - Normalized On Resistance Characteristics**



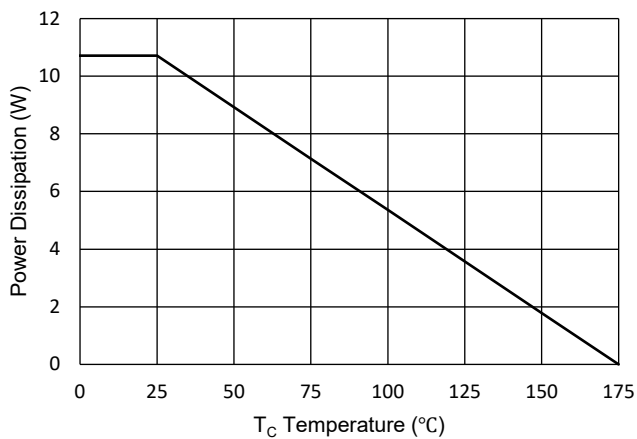
**Fig.9 - I<sub>S</sub> - V<sub>SD</sub>**



**Fig.10 - Drain Current**



**Fig.11 - PD Dissipation**



Curve Characteristics

Fig. 12 - Safe Operation Area

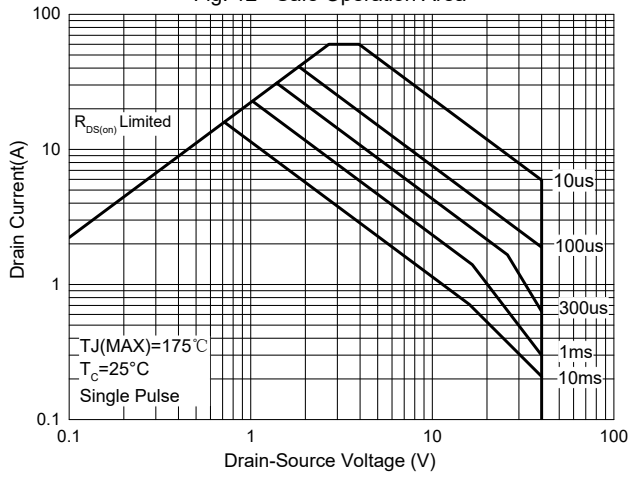
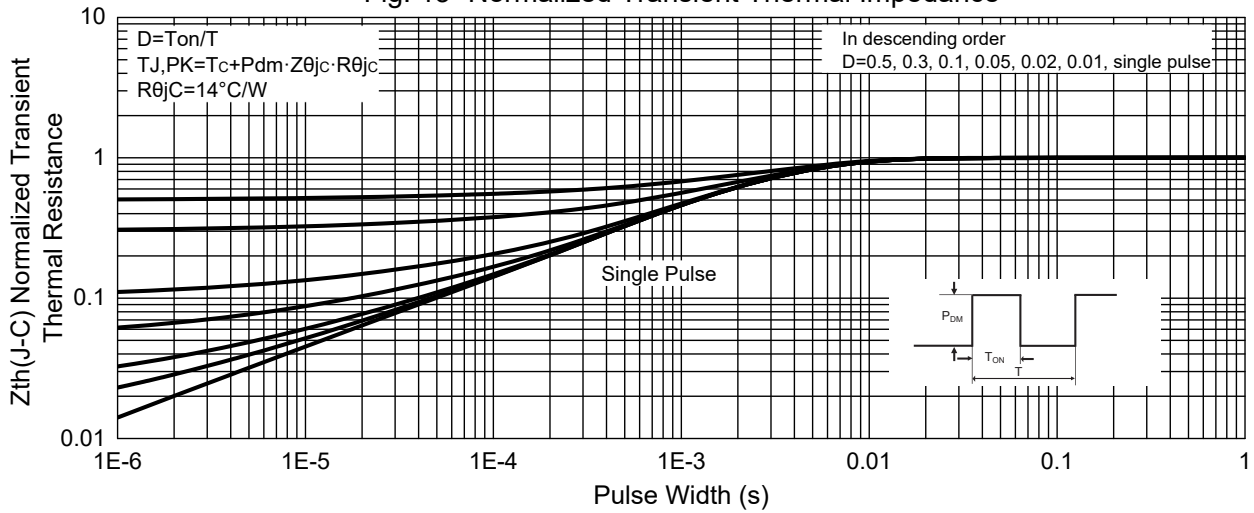


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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