

## Features

- AEC-Q101 Qualified
- Trench MV MOSFET Technology
- ESD HBM Class 2
- 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

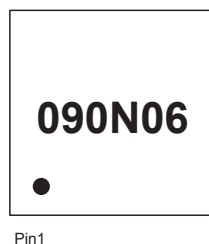
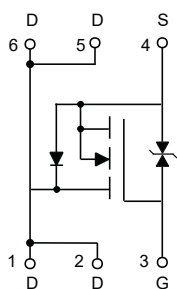
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 85°C/W Junction to Ambient<sup>(Note 2)</sup>
- Thermal Resistance: 10°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	8.1
		$T_C=100^\circ\text{C}$	5.1
Pulsed Drain Current <sup>(Note 3)</sup>	$I_{DM}$	32.4	A
Total Power Dissipation <sup>(Note 4)</sup>	$P_D$	12.5	W

Note:

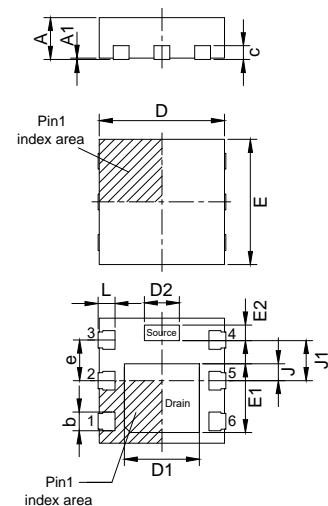
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment 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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	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	1.6	2.1	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=2A$		75	90	m $\Omega$
		$V_{GS}=4.5V, I_D=1A$		85	115	
Gate Resistance	$R_g$	f=1 MHz, Open Drain		6.3		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				8.1	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=2A$			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=2A, di_F/dt=100A/\mu s$		13		ns
Reverse Recovery Charge	$Q_{rr}$			8		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz$		315		pF
Output Capacitance	$C_{oss}$			20		
Reverse Transfer Capacitance	$C_{rss}$			16		
Total Gate Charge	$Q_g$	$V_{DS}=30V, V_{GS}=10V, I_D=2A$		6.4		nC
Gate-Source Charge	$Q_{gs}$			0.97		
Gate-Drain Charge	$Q_{gd}$			1.3		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, I_D=2A, R_G=3\Omega$		4.7		ns
Turn-On Rise Time	$t_r$			2.6		
Turn-Off Delay Time	$t_{d(off)}$			14.2		
Turn-Off Fall Time	$t_f$			2.7		

Curve Characteristics

Fig. 1 - Typical Output Characteristics

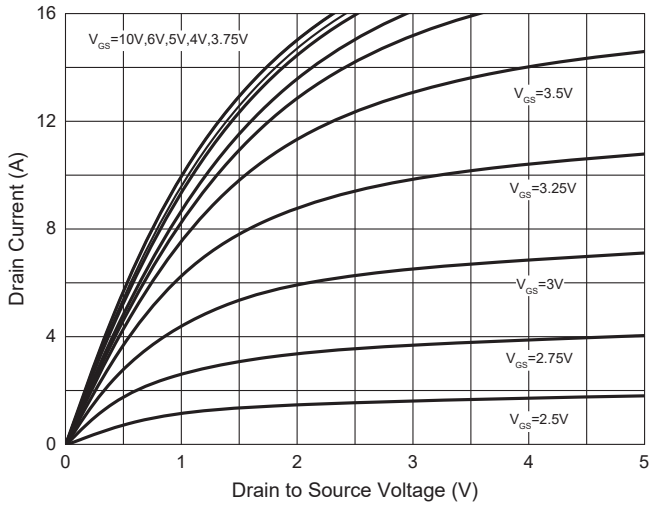


Fig. 2 - Transfer Characteristics

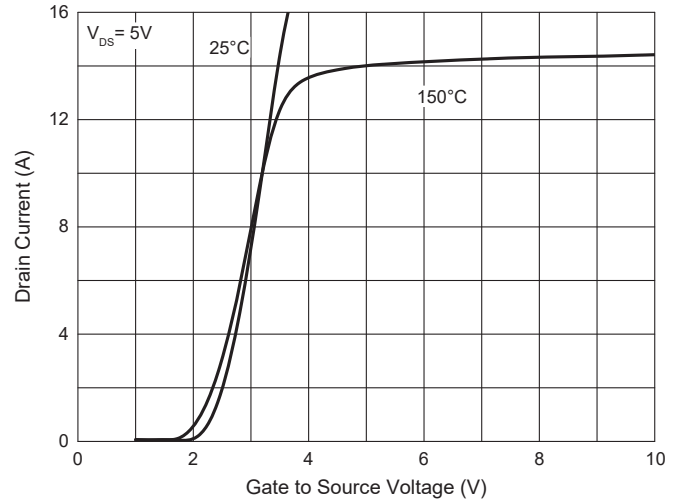


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

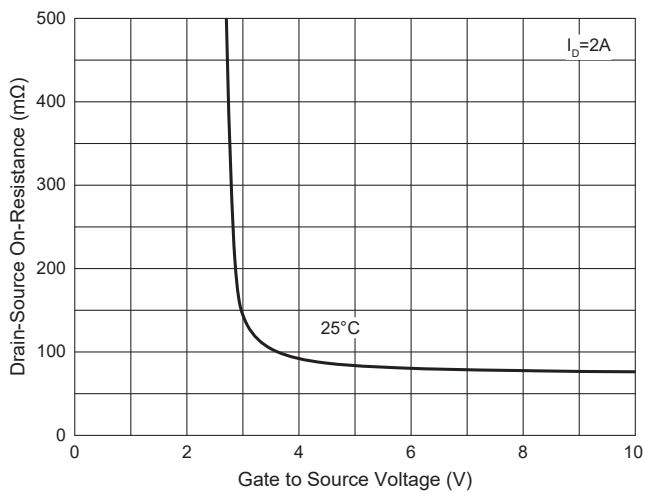


Fig. 4 -  $R_{DS(ON)} - I_D$

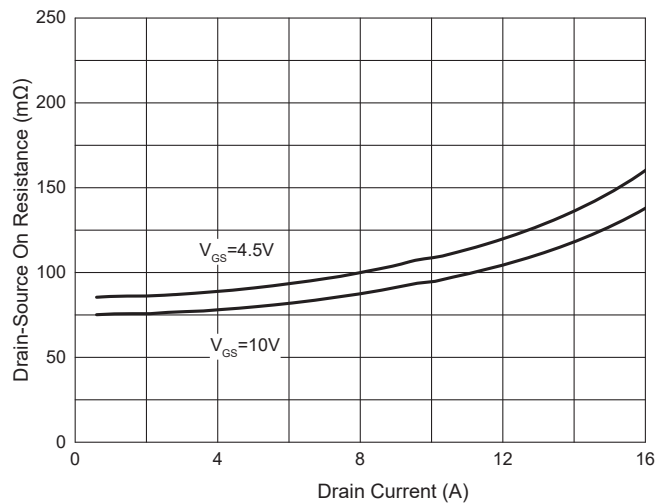


Fig. 5 - Capacitance Characteristics

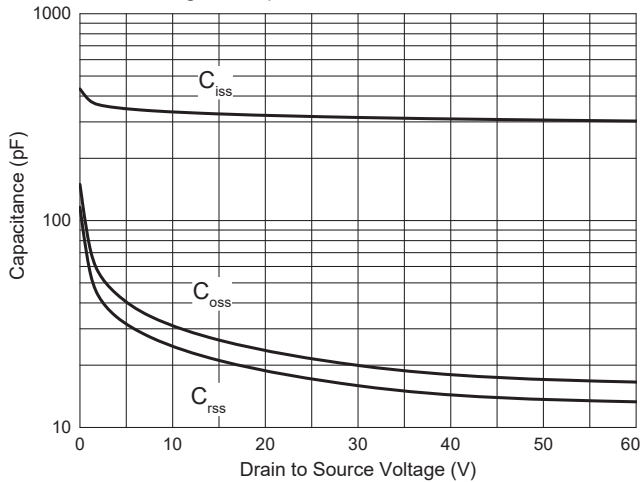
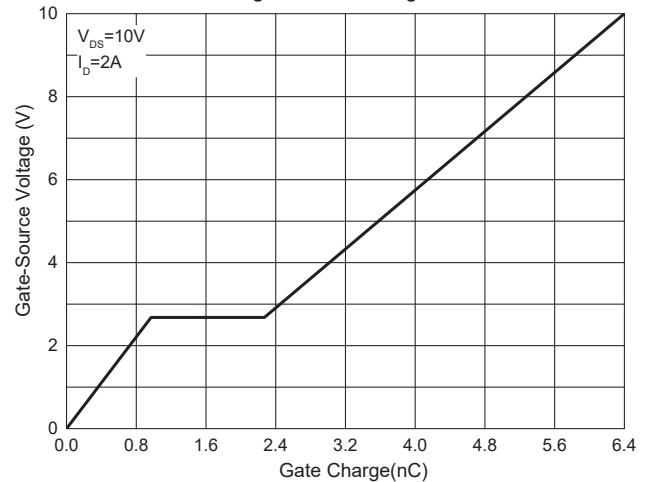


Fig. 6 - Gate Charge



**Curve Characteristics**

Fig. 7 - Normalized Threshold Voltage

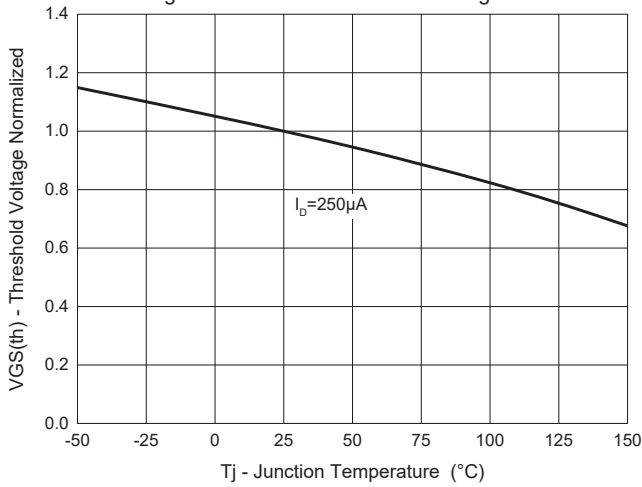


Fig. 8 - Normalized On Resistance Characteristics

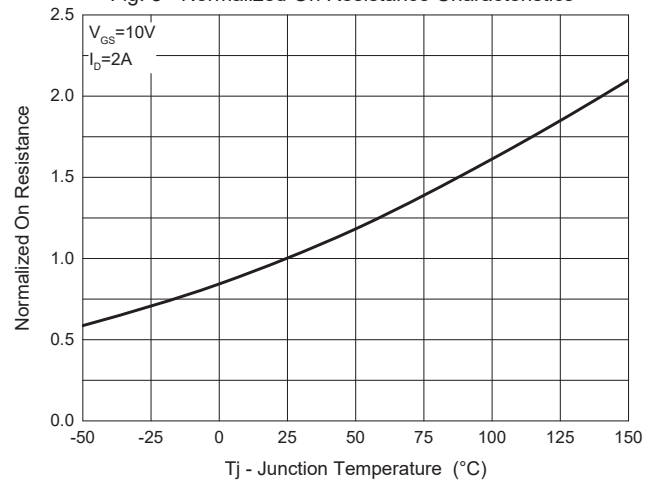


Fig. 9 - Is - VSD

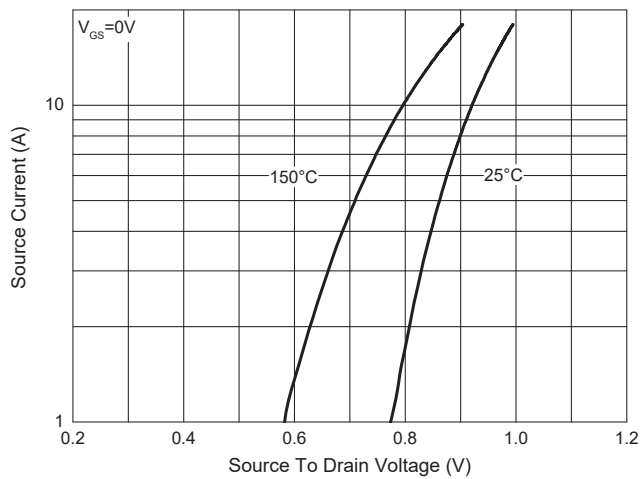


Fig. 10 - Drain Current

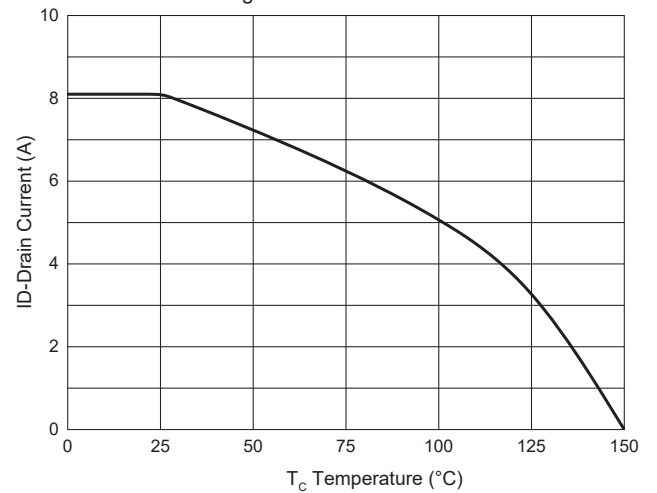
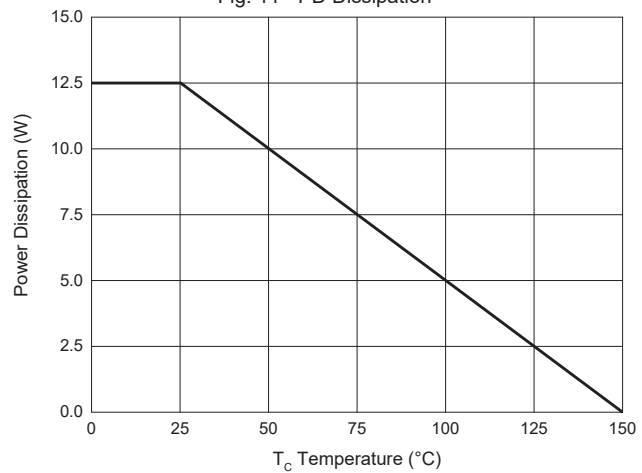


Fig. 11 - PD Dissipation



**Curve Characteristics**

Fig. 12 - Safe Operation Area

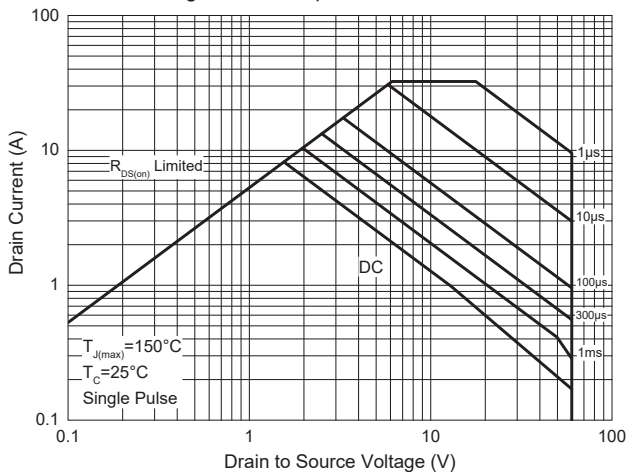
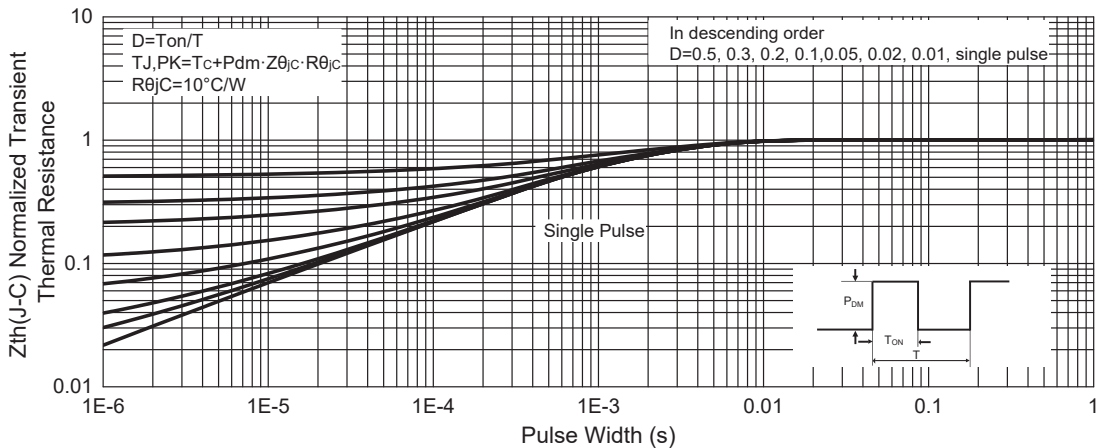


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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