

**Features**

- Trench Power LV MOSFET Technology
- Excellent Package For Heat Dissipation
- High Density Cell Design For Low  $R_{DS(ON)}$
- 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**

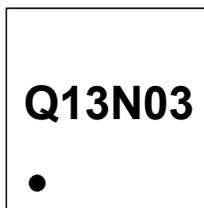
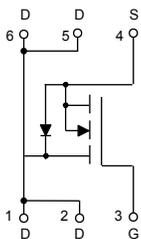
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 55°C/W Junction to Ambient (Note2)
- Thermal Resistance: 10°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_C=25^\circ C$	13
		$T_C=100^\circ C$	8
Pulsed Drain Current (Note3)	$I_{DM}$	55	A
Total Power Dissipation (Note4)	$P_D$	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 RθJA is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ C$ .
3. Repetitive rating; pulse width limited by max. junction temperature.
4. PD is based on max. junction temperature, using junction-case thermal resistance.

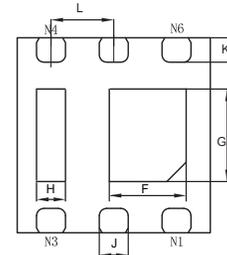
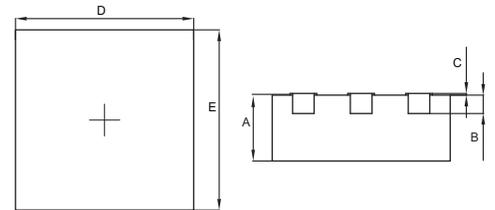
**Internal Structure and Marking Code**



Pin1

**N-CHANNEL  
MOSFET**

**DFN2020-6LE**



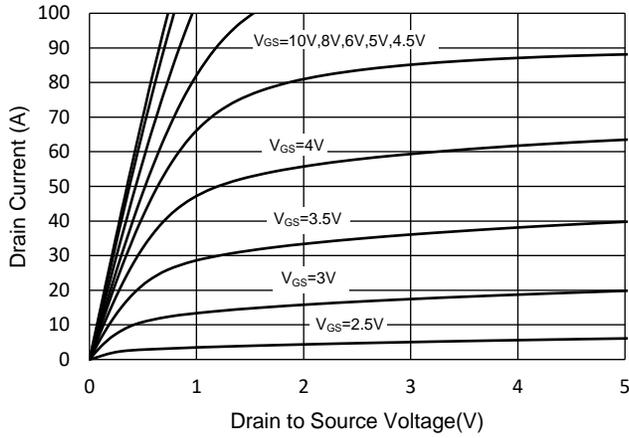
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.030	0.033	0.750	0.850	
B	0.008		0.200		REF.
C	0.000	0.002	0.000	0.050	
D	0.075	0.083	1.900	2.100	
E	0.075	0.083	1.900	2.100	
F	0.024	0.031	0.610	0.810	
G	0.028	0.036	0.710	0.910	
H	0.008	0.016	0.200	0.400	
J	0.010	0.014	0.250	0.350	
K	0.008	0.012	0.200	0.300	
L	0.026		0.650		TYP.

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

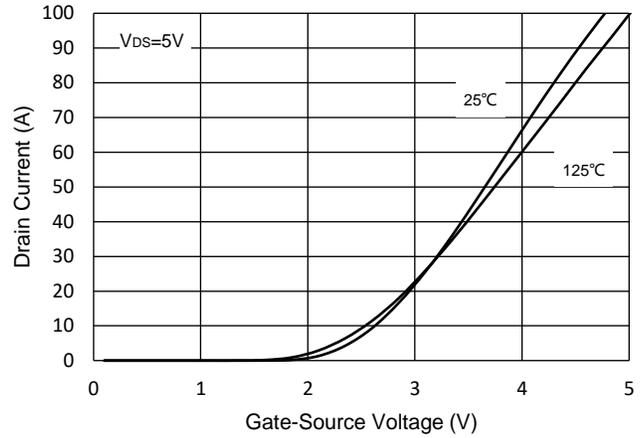
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.5	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=8A$		7	12	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$		11	15	
Gate Resistance	$R_G$	f=1MHz, Open drain		3		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				13	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=13A$			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=15A, di_F/dt=230A/\mu s$		13		ns
Reverse Recovery Charge	$Q_{rr}$			12		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, f=1MHz$		1015		pF
Output Capacitance	$C_{oss}$			185		
Reverse Transfer Capacitance	$C_{rss}$			156		
Total Gate Charge	$Q_g$	$V_{DS}=10V, V_{GS}=10V, I_D=20A$		21		nC
Gate-Source Charge	$Q_{gs}$			3.5		
Gate-Drain Charge	$Q_{gd}$			5		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=10V,$ $R_G=2.2\Omega, I_{DS}=2A$		7		ns
Turn-On Rise Time	$t_r$			13		
Turn-Off Delay Time	$t_{d(off)}$			21		
Turn-Off Fall Time	$t_f$			8		

**Curve Characteristics**

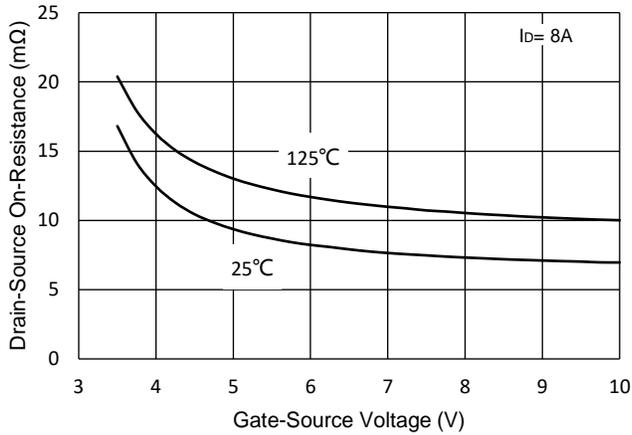
**Fig. 1 Typical Output Characteristics**



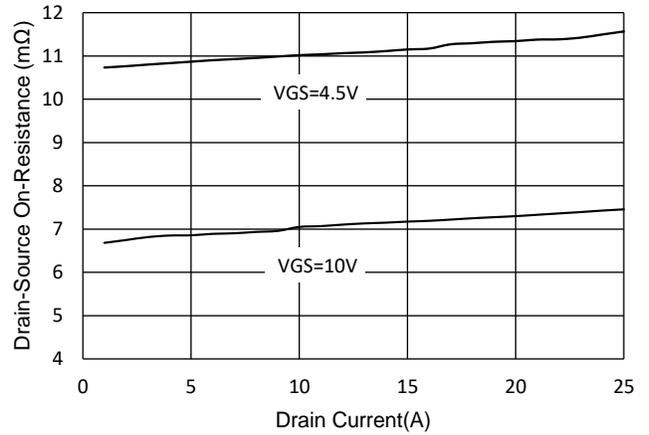
**Fig.2 Transfer Characteristic**



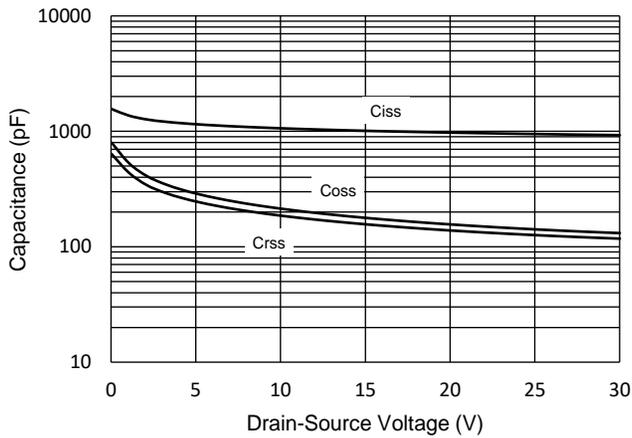
**Fig.3 Rds(on)-Vgs**



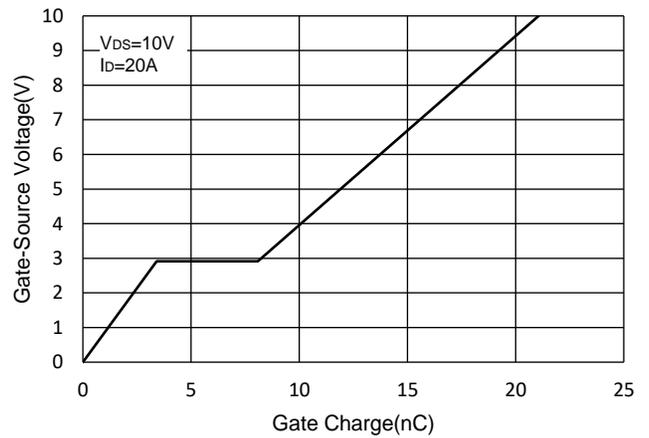
**Fig.4 RDS(ON)-ID**



**Fig.5 Capacitance Characteristics**

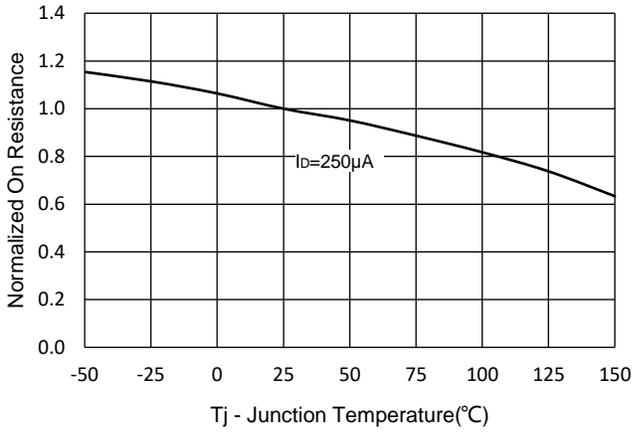


**Fig.6 Gate Charge**

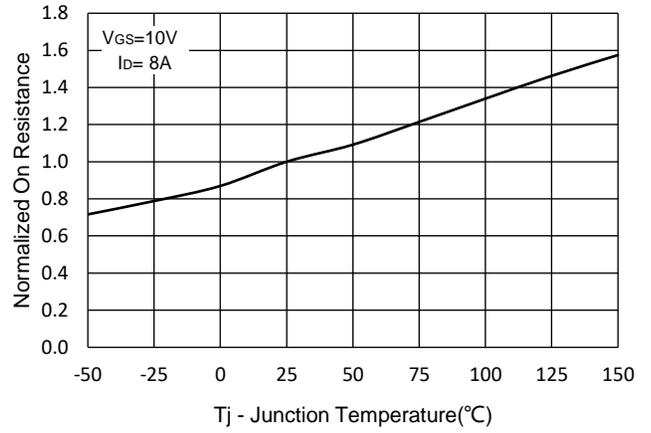


**Curve Characteristics**

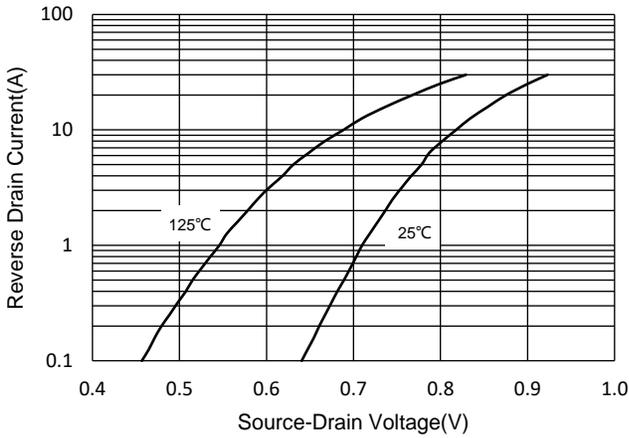
**Fig.7 Normalized Threshold Voltage**



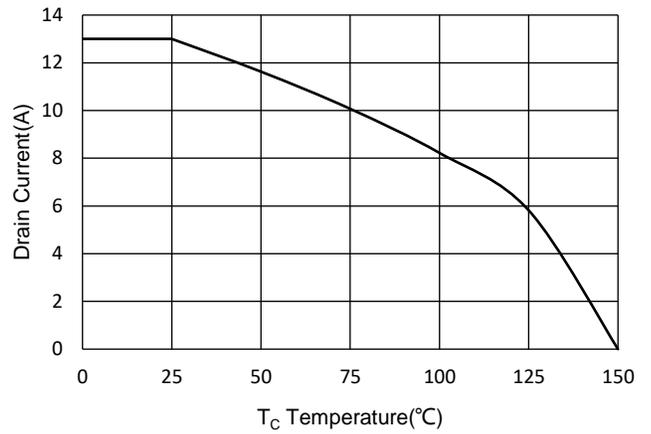
**Fig.8 Normalized On Resistance Characteristics**



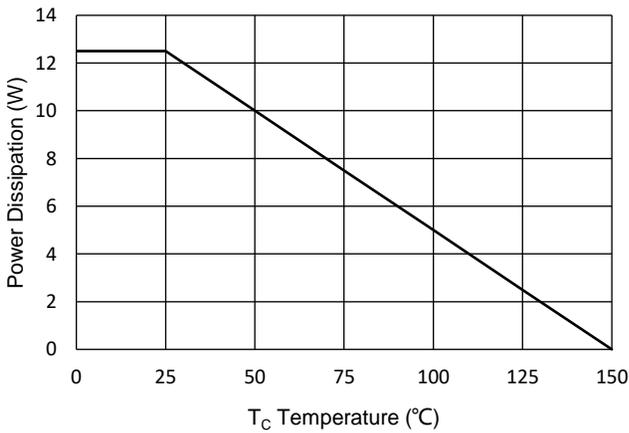
**Fig.9 IS-VSD**



**Fig.10 Drain Current vs. Case Temperature**

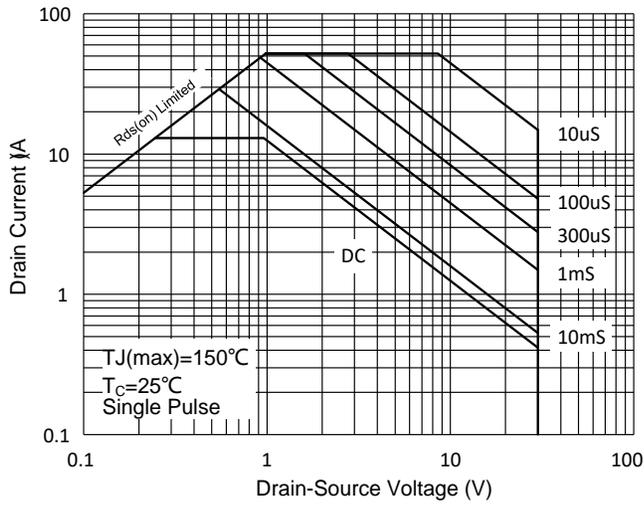


**Fig.11 Power Dissipation**

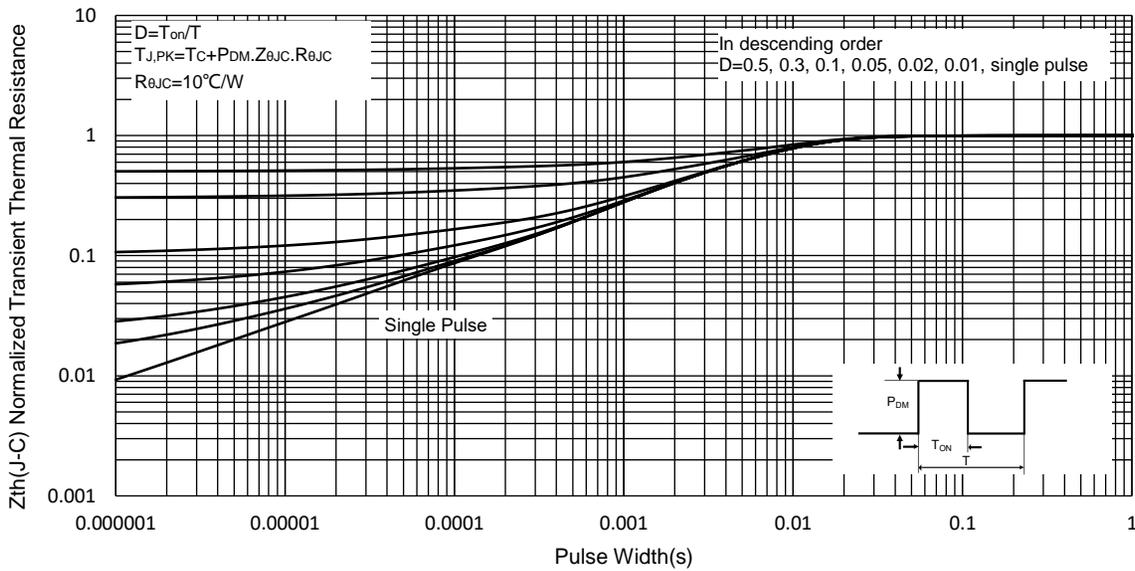


**Curve Characteristics**

**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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