

Features

- Advanced Trench Cell Design
- Low Thermal Resistance
- 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

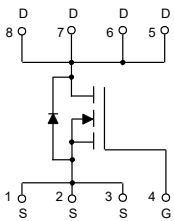
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 6°C/W Junction to Case⁽²⁾

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±10	V
Continuous Drain Current	I_D	13	A
Pulsed Drain Current ^(3,4)	I_{DM}	88	A
Total Power Dissipation	P_D	20.8	W
Single Pulsed Avalanche Energy ⁽⁵⁾	E_{AS}	45	mJ

Note:

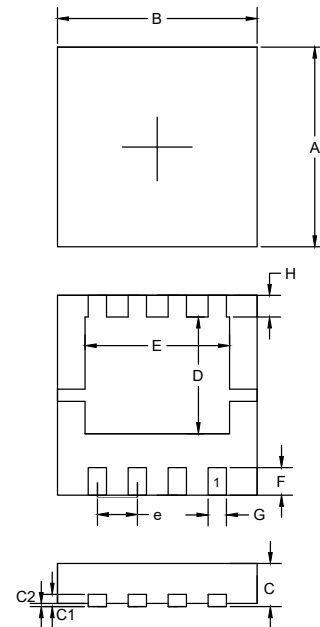
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. Surface Mounted on minimum footprint pad area.
3. Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.
4. Limited by bonding wire.
5. $T_J=25^\circ\text{C}$, $V_{DD}=20\text{V}$, $L=1.0\text{mH}$.

Internal Structure



N-CHANNEL MOSFET

DFN3333



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.126	0.130	3.20	3.30	
B	0.126	0.130	3.20	3.30	
C	0.030	0.033	0.75	0.85	
C1	0.007	0.009	0.18	0.22	
C2	---	0.002	---	0.05	
D	0.071	0.079	1.80	2.00	
E	0.087	0.098	2.20	2.50	
F	0.016	0.020	0.40	0.50	
G	0.010	0.014	0.25	0.35	
H	0.012	0.016	0.30	0.40	
e	0.024	0.028	0.60	0.70	

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 10V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16V, V_{GS}=0V$			1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5		1	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=20A$		11.2	13.5	m Ω
		$V_{GS}=2.5V, I_D=10A$		14.5	18.2	m Ω
		$V_{GS}=1.8V, I_D=5A$		21.2	27.6	m Ω
Diode Characteristics						
Continuous Body Diode Current	I_S				13	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=10A$			1.2	V
Reverse Recovery Time	t_{rr}	$I_S=10A, di/dt=100A/\mu s$		17		ns
Reverse Recovery Charge	Q_{rr}			7.8		nC
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=10V, V_{GS}=0V, f=1MHz$		673		pF
Output Capacitance	C_{oss}			102		
Reverse Transfer Capacitance	C_{riss}			94		
Total Gate Charge	Q_g	$V_{DS}=10V, V_{GS}=4.5V, I_D=10A$		10		nC
Gate-Source Charge	Q_{gs}			2.6		
Gate-Drain Charge	Q_{gd}			2.9		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=10V, V_{GS}=4.5V,$ $R_G=4.5\Omega, R_L=0.5\Omega,$ $I_D=10A$		6.2		ns
Turn-On Rise Time	t_r			78		
Turn-Off Delay Time	$t_{d(off)}$			35		
Turn-Off Fall Time	t_f			34		

Curve Characteristics

Fig. 1 - Typical Output Characteristics

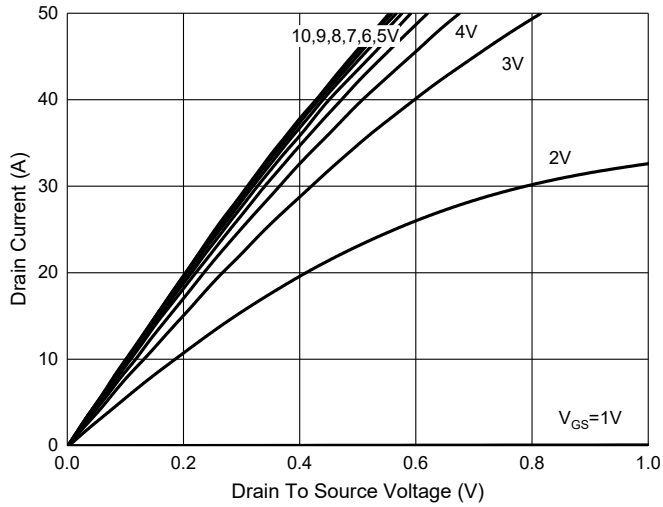


Fig. 2 - I_S-V_{SD}

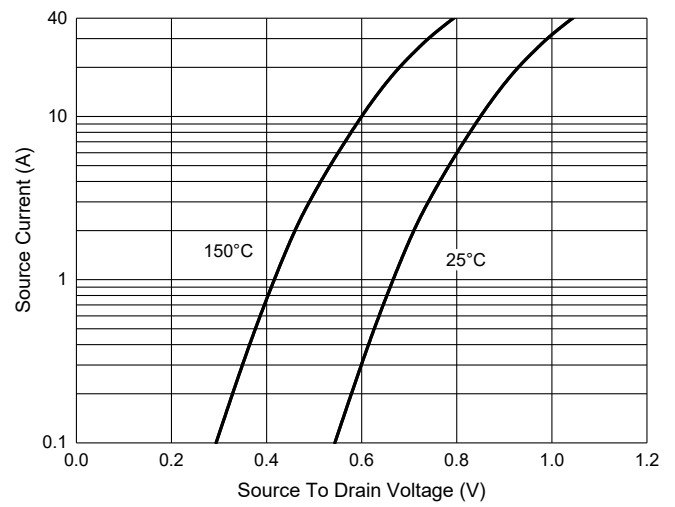


Fig. 3 - $R_{DS(ON)}-I_D$

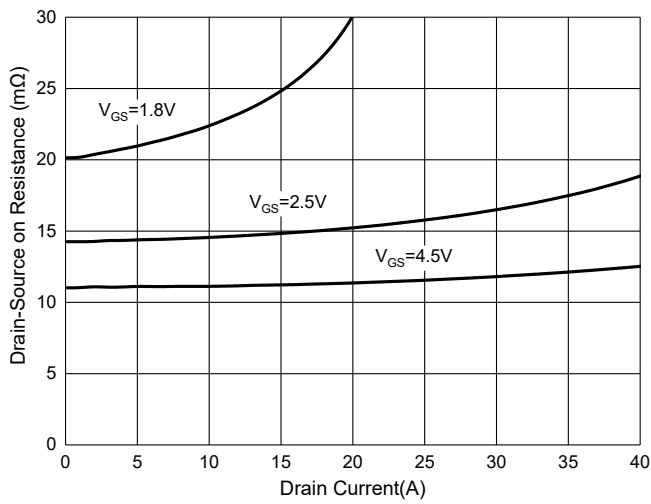


Fig. 4 - Normalized On Resistance Characteristics

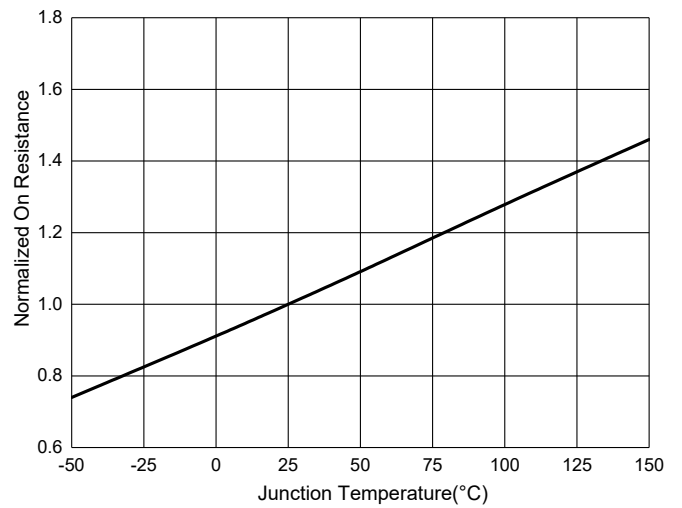


Fig. 5 - Capacitance Characteristics

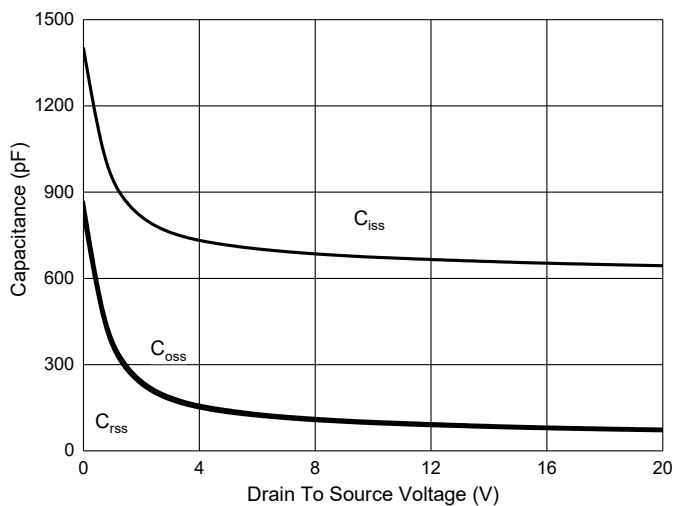
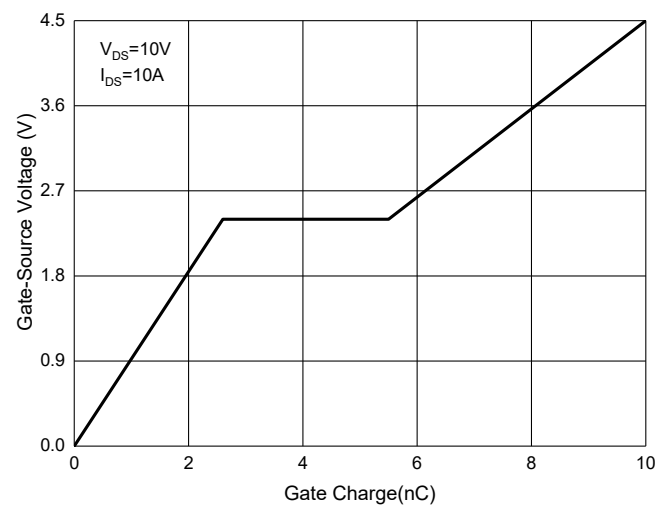
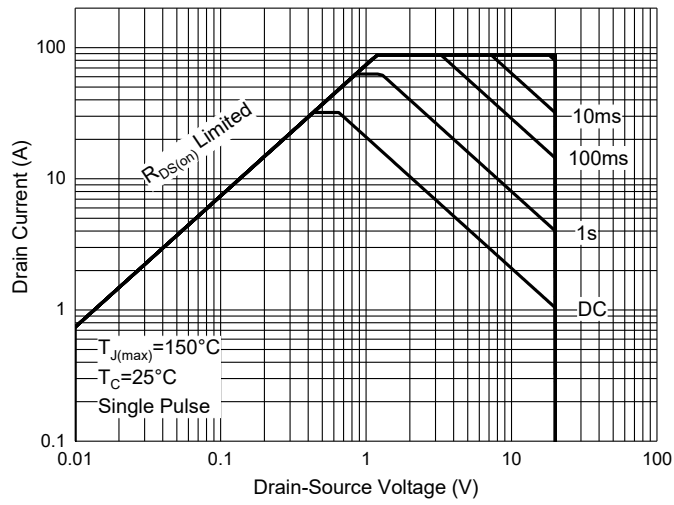


Fig. 6 - Gate Charge



Curve Characteristics

Fig. 7 - Safe Operation Area



Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 5Kpcs/Reel

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