

Features

- Split Gate Trench MOSFET Technology
- High Speed Switching
- Moisture Sensitivity Level 3
- High Density Cell Design for Low $R_{DS(ON)}$
- 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

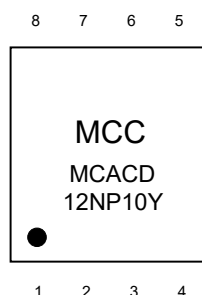
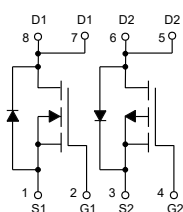
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +50°C
- Thermal Resistance: 80°C/W Junction to Ambient
- Thermal Resistance: 3°C/W Junction to Case

Parameter	Symbol	Rating	Unit
N-Channel MOSFET			
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	$T_C=25^\circ C$	25
		$T_C=100^\circ C$	15
Pulsed Drain Current ^(Note 2)	I_{DM}	80	A
Single Pulsed Avalanche Energy ^(Note3)	E_{AS}	64	mJ
P-Channel MOSFET			
Drain-Source Voltage	V_{DS}	-100	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	$T_C=25^\circ C$	-12
		$T_C=100^\circ C$	-7
Pulsed Drain Current ^(Note 2)	I_{DM}	-40	A
Single Pulsed Avalanche Energy ^(Note3)	E_{AS}	72	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.

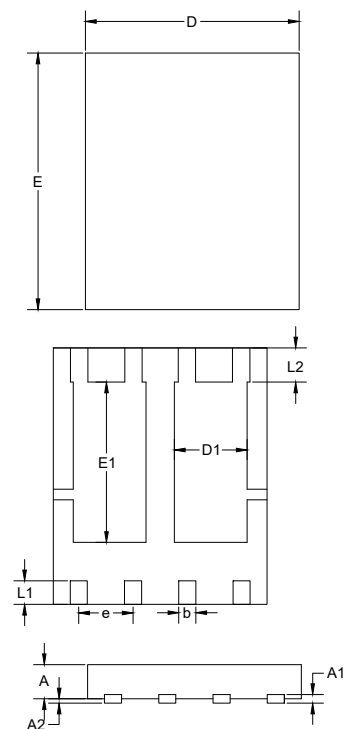
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
3. NMOS: $T_J=25^\circ C$, $V_{DD}=50V$, $V_G=10V$, $R_G=25\Omega$, $L=0.5mH$, $I_{AS}=16A$.
PMOS: $T_J=25^\circ C$, $V_{DD}=-50V$, $V_G=-10V$, $R_G=25\Omega$, $L=0.5mH$, $I_{AS}=-17A$.

Internal Structure and Marking Code



**Dual
N&P-CHANNEL
MOSFET**

DFN5060-8D



DIMENSIONS

DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
D	0.193	0.201	4.90	5.10	
E	0.232	0.240	5.90	6.10	
A	0.028	0.035	0.70	0.90	
A1	0.008		0.20		BSC
A2	0.000	0.004	0.00	0.10	
D1	0.063	0.071	1.60	1.80	
E1	0.144	0.152	3.65	3.85	
L1	0.018	0.026	0.45	0.65	
L2	0.031		0.80		BSC
b	0.012	0.020	0.30	0.50	
e	0.050		1.27		BSC

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	100			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$			1	μA
		$V_{DS}=100V, V_{GS}=0V, T_j=150^\circ C$			100	
Gate-Threshold Voltage ^(Note4)	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.7	2.5	V
Drain-Source On-Resistance ^(Note4)	$R_{DS(on)}$	$V_{GS}=10V, I_D=25A$		19	26	m Ω
		$V_{GS}=6V, I_D=10A$		21	27	
		$V_{GS}=4.5V, I_D=5A$		22	30	
Diode Forward Voltage ^(Note4)	V_{SD}	$V_{GS}=0V, I_S=20A$		0.9	1.3	V
Maximum Body-Diode Continuous Current	I_S				25	A
Gate Resistance	R_G	f=1MHz, Open Drain		1.5		Ω
Dynamic Characteristics^(Note5)						
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$		1200		μF
Output Capacitance	C_{oss}			400		
Reverse Transfer Capacitance	C_{rss}			10		
Switching Characteristics^(Note5)						
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=50V, I_D=12.5A$		32		nC
Gate-Source Charge	Q_{gs}			11		
Gate-Drain Charge	Q_{gd}			5		
Reverse Recovery Charge	Q_{rr}	$I_F=12.5A, di/dt=100A/\mu s$		85		nC
Reverse Recovery Time	t_{rr}			52		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DD}=50V, I_{DS}=12.5A, R_G=2.2\Omega$		50		ns
Turn-On Rise Time	t_r			15		
Turn-Off Delay Time	$t_{d(off)}$			70		
Turn-Off Fall Time	t_f			20		

Notes:

4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

5. Guaranteed by Design, Not Subject to Production Testing.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-100			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-100V, V_{GS}=0V$			-1	μA
		$V_{DS}=-100V, V_{GS}=0V, T_j=150^\circ C$			-100	
Gate-Threshold Voltage ^(Note4)	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.2	-1.7	-2.5	V
Drain-Source On-Resistance ^(Note4)	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-12A$		90	120	m Ω
		$V_{GS}=-6V, I_D=-6A$		93	125	
		$V_{GS}=-4.5V, I_D=-3A$		98	130	
Diode Forward Voltage ^(Note4)	V_{SD}	$V_{GS}=0V, I_S=-12A$		-0.9	-1.2	V
Maximum Body-Diode Continuous Current	I_S				-12	A
Gate Resistance	R_G	f=1MHz, Open Drain		10		Ω
Dynamic Characteristics^(Note5)						
Input Capacitance	C_{iss}	$V_{DS}=-50V, V_{GS}=0V, f=1MHz$		1100		μF
Output Capacitance	C_{oss}			110		
Reverse Transfer Capacitance	C_{rss}			10		
Switching Characteristics^(Note5)						
Total Gate Charge	Q_g	$V_{GS}=-10V, V_{DS}=-50V, I_D=-6A$		20		nC
Gate-Source Charge	Q_{gs}			4		
Gate-Drain Charge	Q_{gd}			4.5		
Reverse Recovery Charge	Q_{rr}	$I_F=-6A, di/dt=100A/\mu s$		140		ns
Reverse Recovery Time	t_{rr}			70		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=-10V, V_{DD}=-50V, I_{DS}=-6A, R_G=2.2\Omega$		10		ns
Turn-On Rise Time	t_r			30		
Turn-Off Delay Time	$t_{d(off)}$			77		
Turn-Off Fall Time	t_f			80		

Notes:

4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

5. Guaranteed by Design, Not Subject to Production Testing.

Curve Characteristics(N-Channel)

Fig. 1 - Typical Output Characteristics

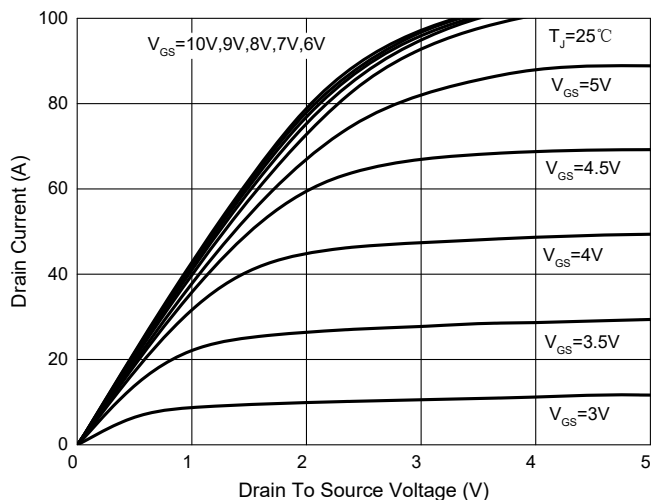


Fig. 2 - Transfer Characteristics

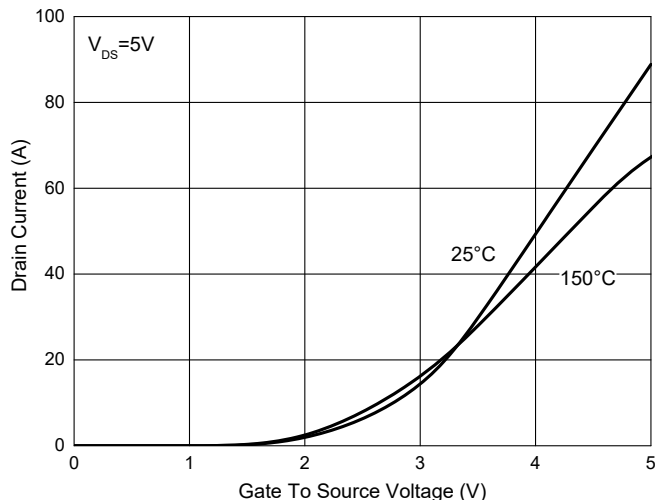


Fig. 3 - $R_{DS(ON)} - I_D$

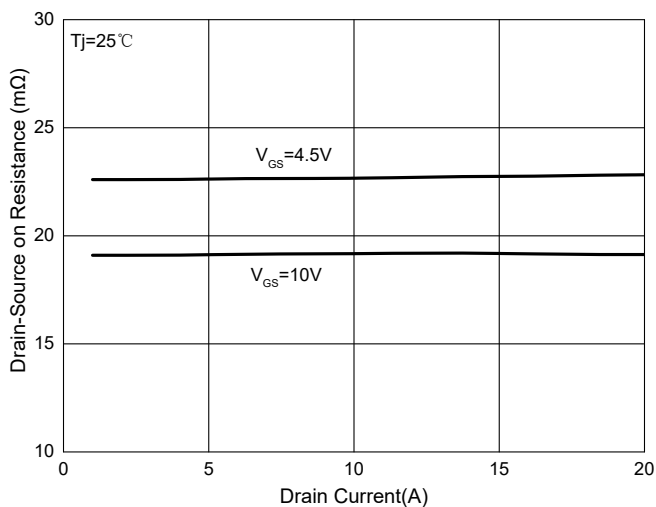


Fig. 4 - Normalized On Resistance Characteristics

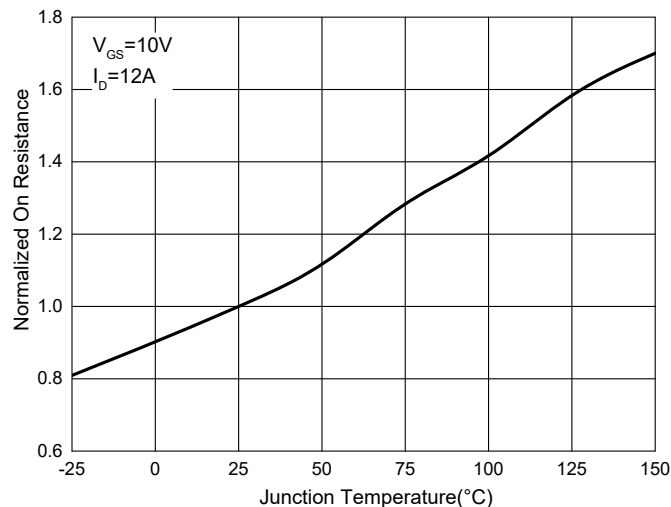


Fig. 5 - Capacitance Characteristics

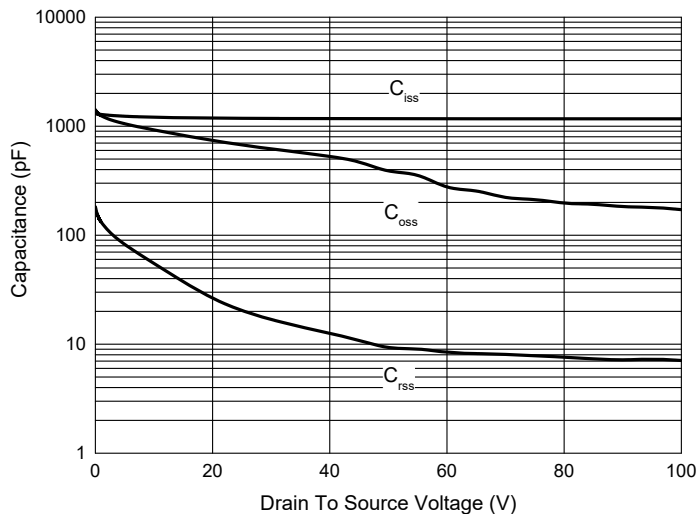
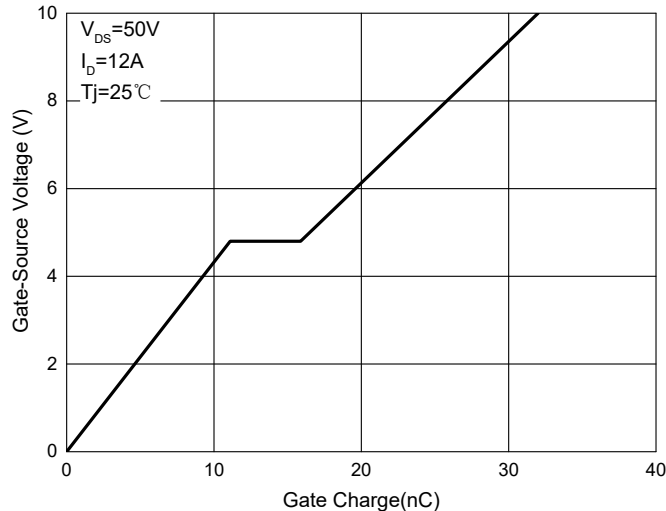


Fig. 6 - Gate Charge



Curve Characteristics(N-Channel)

Fig. 7 - $R_{DS(ON)} - V_{GS}$

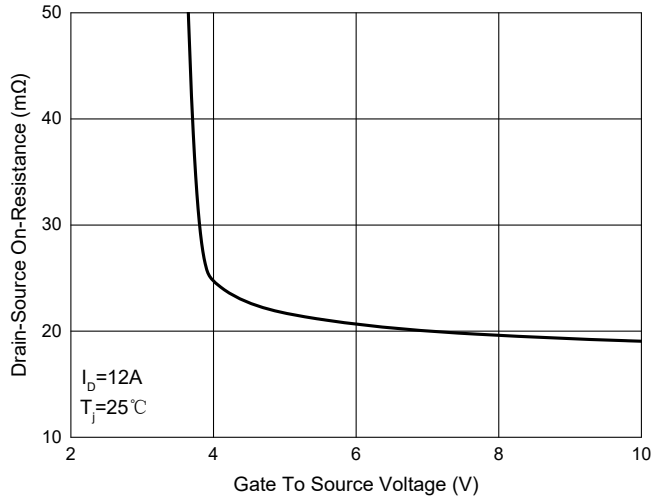


Fig. 8 - $I_S - V_{SD}$

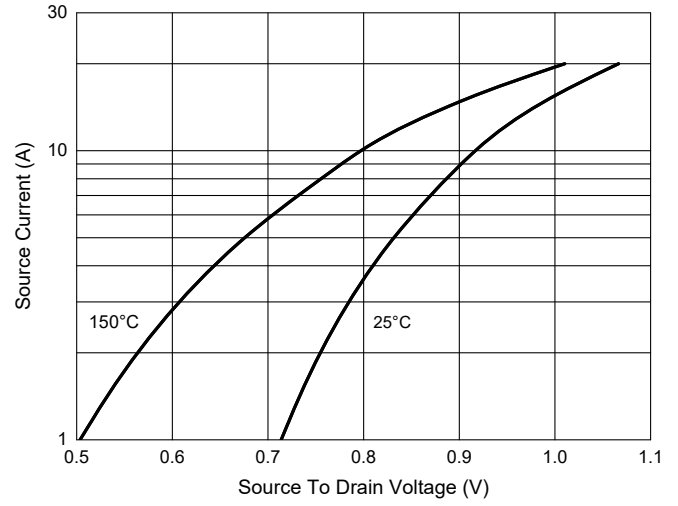


Fig. 9 - Normalized Breakdown voltage

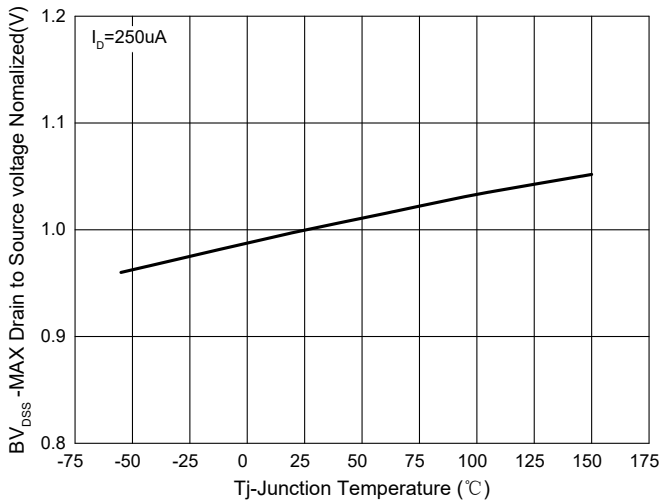


Fig. 10 - Normalized Threshold voltage

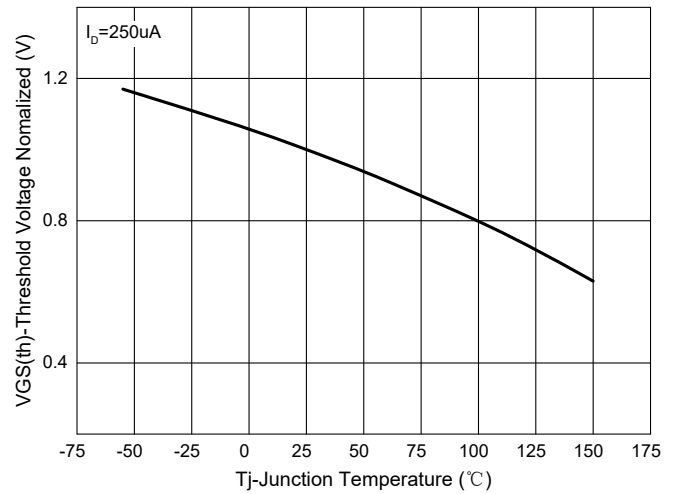


Fig. 11 - Power dissipation

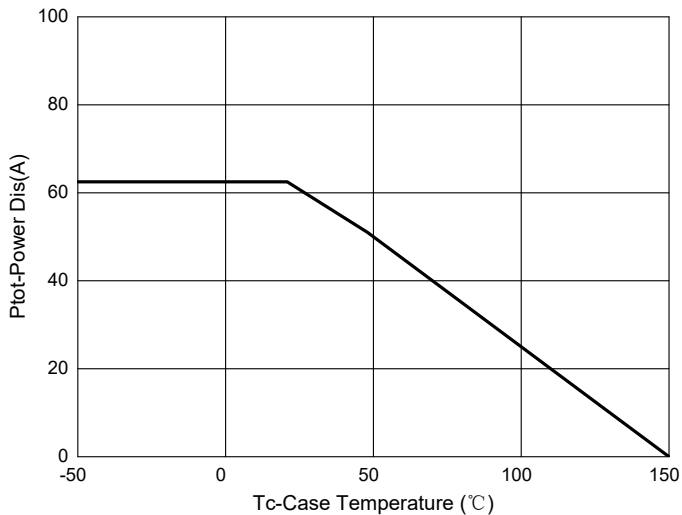
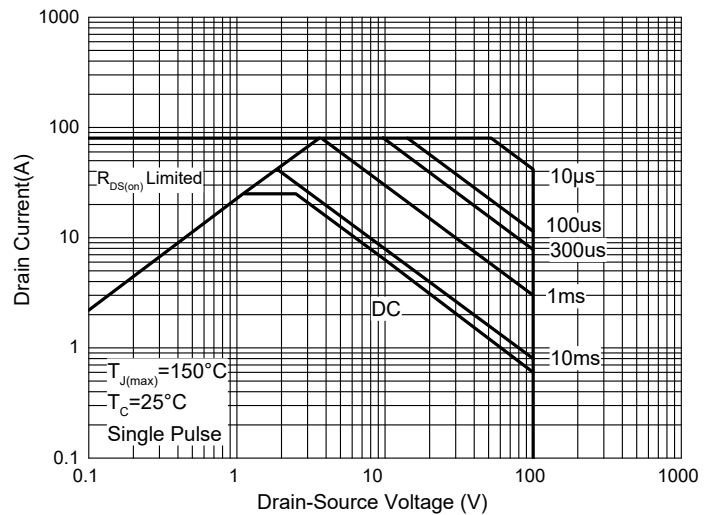


Fig. 12 - Safe Operation Area



Curve Characteristics(P-Channel)

Fig. 1 - Typical Output Characteristics

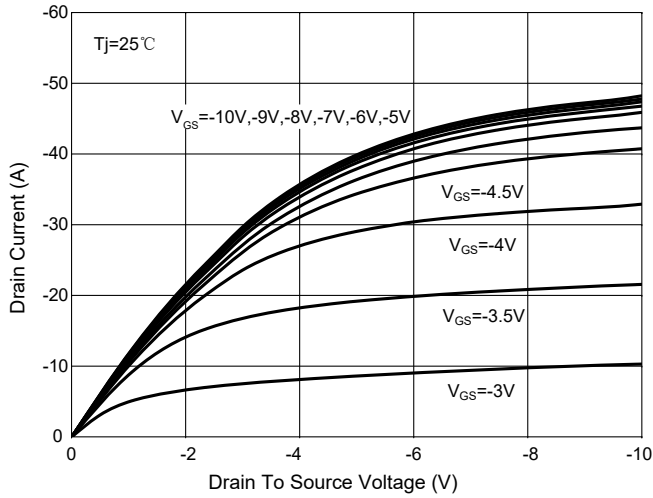


Fig. 2 - Transfer Characteristics

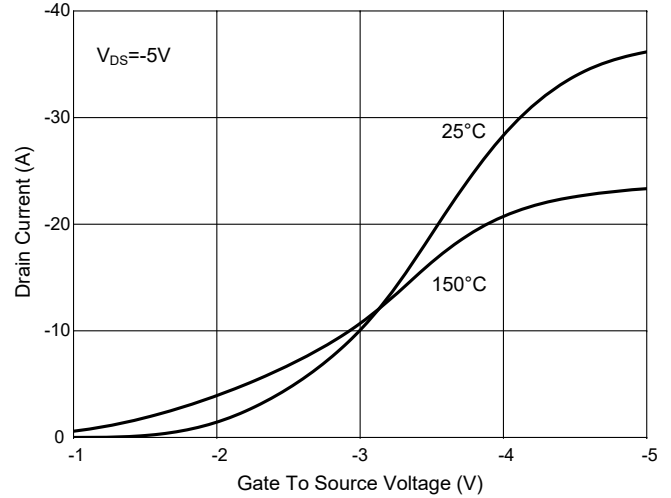


Fig. 3 - $R_{DS(ON)} - I_D$

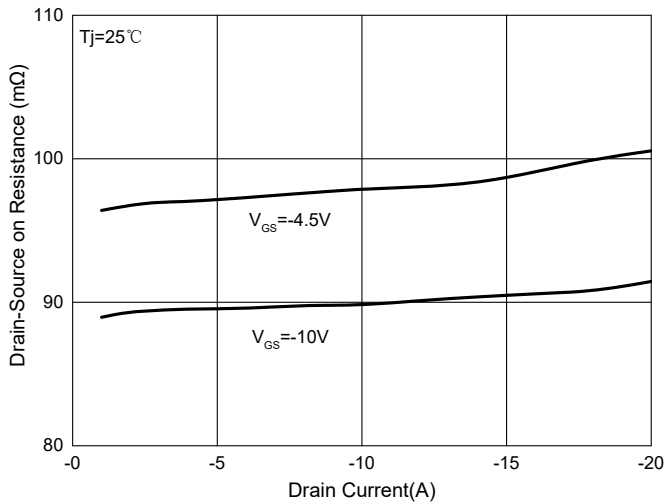


Fig.4-Normalized On Resistance Characteristics

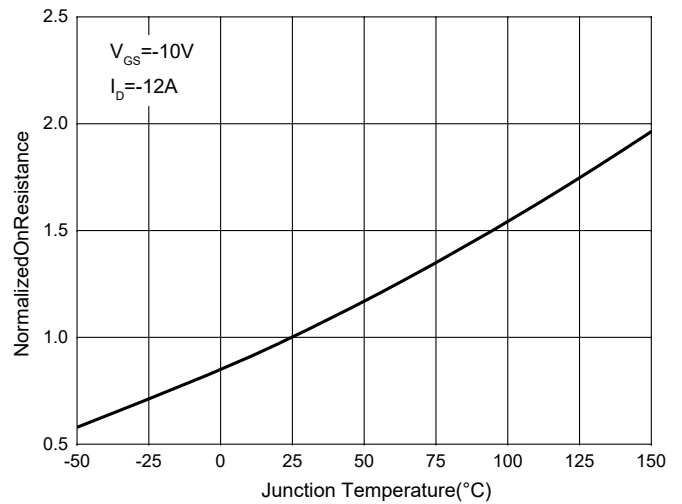


Fig. 5 - Capacitance Characteristics

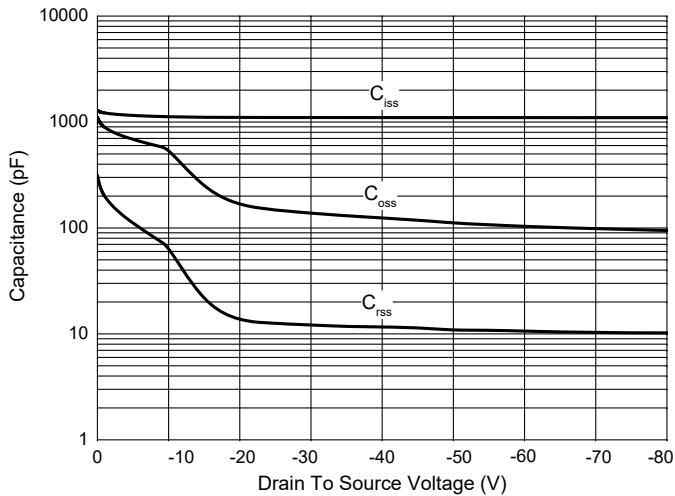
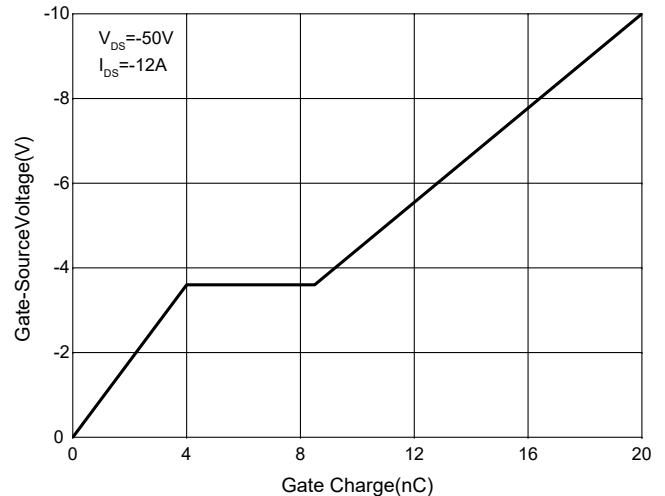


Fig. 6 - GateCharge



Curve Characteristics(P-Channel)

Fig. 7 - $R_{DS(ON)} - V_{GS}$

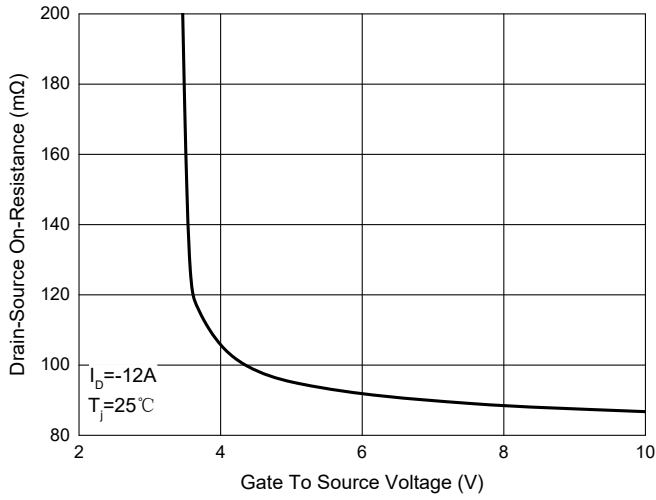


Fig. 8 - $I_S - V_{SD}$

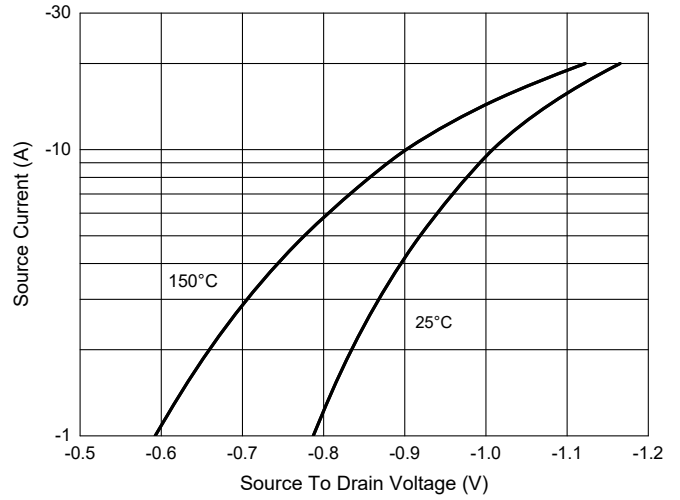


Fig. 9 - Normalized Breakdown voltage

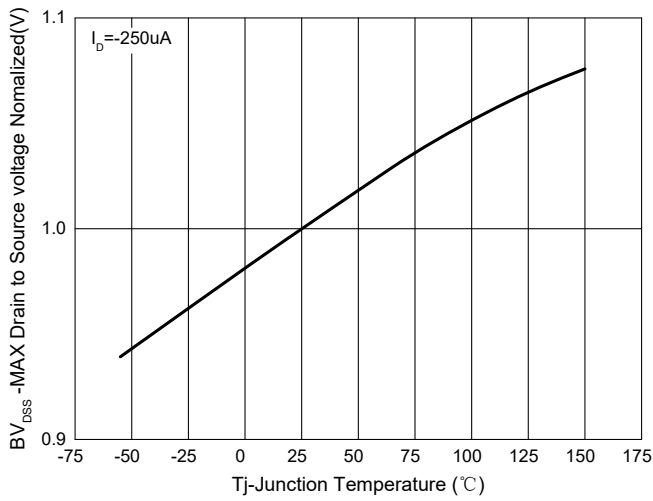


Fig. 10 - Normalized Threshold voltage

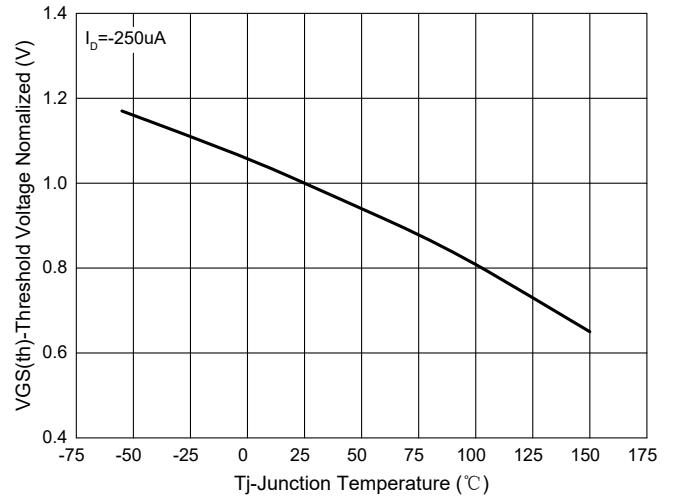


Fig. 11 - Power Dissipation

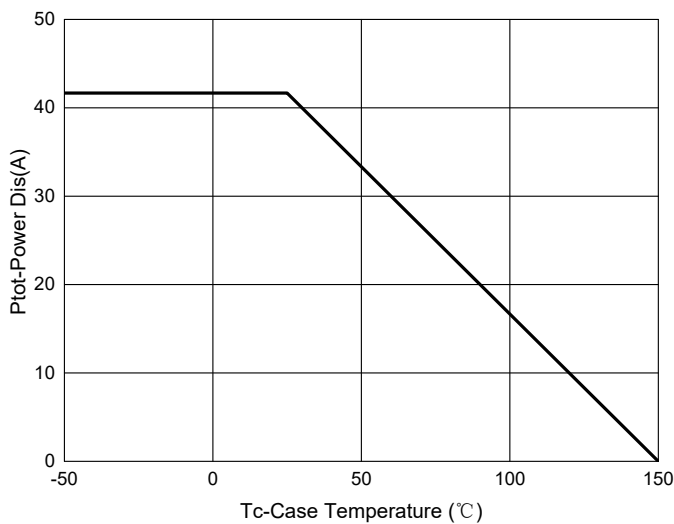
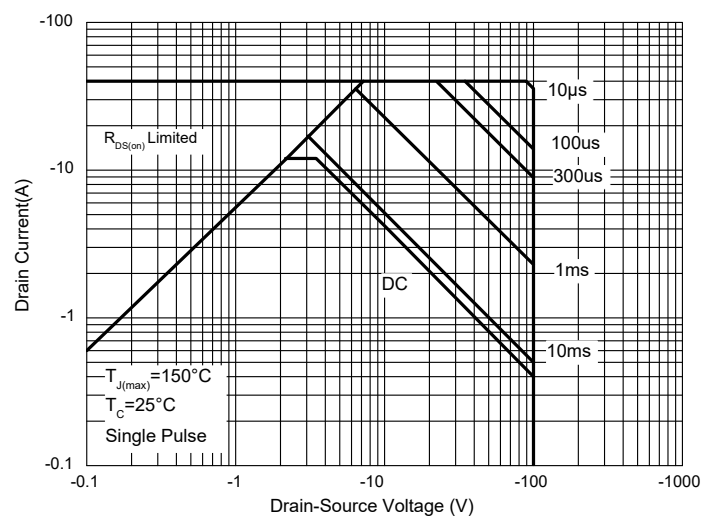


Fig. 12 - Safe Operation Area



Ordering Information

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

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