Features

- ESD HBM Class 2 for N Channel MOSFET
- 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)

Dual N&P-Channel MOSFET

Maximum Ratings

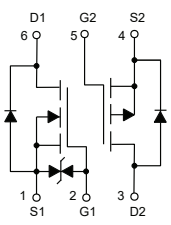
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 438°C/W Junction to Ambient(Note 2)

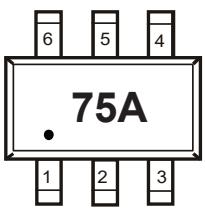
Parameter		Symbol	Rating	Unit
Total Power Dissipation(Note 3)		P_D	285	mW
N-Channel MOSFET				
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Volltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25°C	I_D	0.23	A
	T_A=100°C		0.14	
Pulsed Drain Current(Note 4)		I_{DM}	0.92	A
P-Channel MOSFET				
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Volltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25°C	I_D	-0.18	A
	T_A=100°C		-0.11	
Pulsed Drain Current(Note 4)		I_{DM}	-0.72	A

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 θ JA is measured with the device mounted on the minimum recommend pad size, in the still air environment with TA =25℃.
3. P_D is based on max. junction temperature, using junction-ambient thermal resistance.
4. Repetitive rating; pulse width limited by max. junction temperature.

Internal Structure and Marking Code





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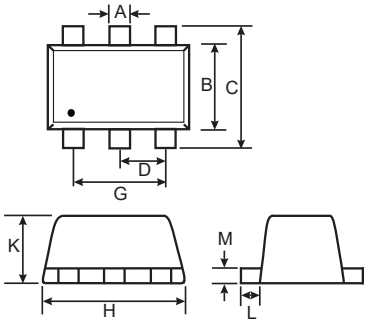
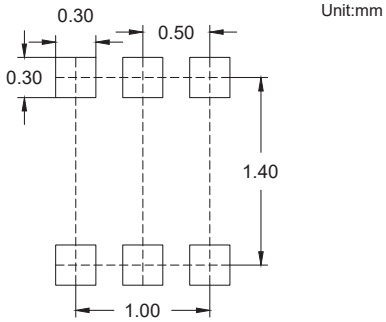


DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.006	0.011	0.15	0.30	
B	0.043	0.051	1.10	1.30	
C	0.059	0.067	1.50	1.70	
D	0.020		0.50		TYP.
G	0.035	0.043	0.90	1.10	
H	0.059	0.067	1.50	1.70	
K	0.022	0.026	0.55	0.65	
L	0.004	0.011	0.10	0.30	
M	0.004	0.007	0.10	0.18	

Suggested Solder Pad Layout



N-Channel MOSFET 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=250μA	60			V
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS} =±20V			±10	μA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.0	1.5	2.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=0.2A		1.5	2.5	Ω
		V_{GS}=4.5V, I_D=0.2A		1.8	3.0	
Gate Resistance	R_G	f=1MHz, Open drain		120		Ω
Diode Characteristics						
Continuous Body Diode Current	I_S				0.23	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=0.2A			1.2	V
Reverse Recovery Time	t_{rr}	I_F=0.3A, dI_F/dt=100A/μs		11		ns
Reverse Recovery Charge	Q_{rr}			4		nC
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=30V,V_{GS}=0V,f=1MHz		16.2		pF
Output Capacitance	C_{oss}			5.6		
Reverse Transfer Capacitance	C_{rss}			2.5		
Total Gate Charge	Q_g	V_{DS}=30V,V_{GS}=10V,I_D=0.3A		0.79		nC
Gate-Source Charge	Q_{gs}			0.07		
Gate-Drain Charge	Q_{gd}			0.1		
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=30V, V_{GS}=10V, R_G=30Ω, I_D=0.3A		3		ns
Turn-On Rise Time	t_r			3		
Turn-Off Delay Time	$t_{d(off)}$			11		
Turn-Off Fall Time	t_f			40		

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=-250μA	-60			V
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-60V, V_{GS}=0V			-1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.8	-1.3	-1.8	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=-10V, I_D=-0.2A		2.6	4.0	Ω
		V_{GS}=-4.5V, I_D=-0.2A		3.2	4.0	
Gate Resistance	R_G	f=1MHz, Open drain		38		Ω
Diode Characteristics						
Continuous Body Diode Current	I_S				-0.18	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-0.2A			-1.2	V
Reverse Recovery Time	t_{rr}	I_F=-0.5A, dI_F/dt=100A/μs		15		ns
Reverse Recovery Charge	Q_{rr}			9		nC
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=-30V,V_{GS}=0V,f=1MHz		25.2		pF
Output Capacitance	C_{oss}			5.6		
Reverse Transfer Capacitance	C_{rss}			2.9		
Total Gate Charge	Q_g	V_{DS}=-30V,V_{GS}=-10V,I_D=-0.5A		1.52		nC
Gate-Source Charge	Q_{gs}			0.08		
Gate-Drain Charge	Q_{gd}			0.23		
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=-30V, V_{GS}=-10V, R_G=30Ω, I_D=-0.5A		2.9		ns
Turn-On Rise Time	t_r			3		
Turn-Off Delay Time	$t_{d(off)}$			6.5		
Turn-Off Fall Time	t_f			22		

N-Channel Curve Characteristics

Fig. 1 - Typical Output Characteristics

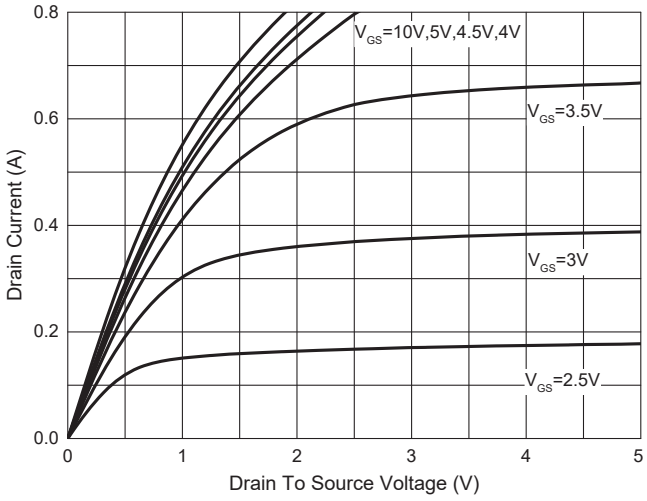


Fig. 2 - Transfer Characteristics

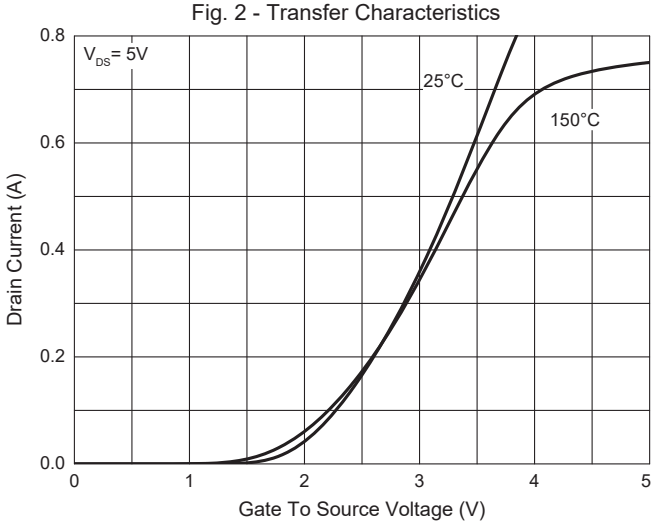


Fig.3-$R_{DS(ON)}$-V_{GS}

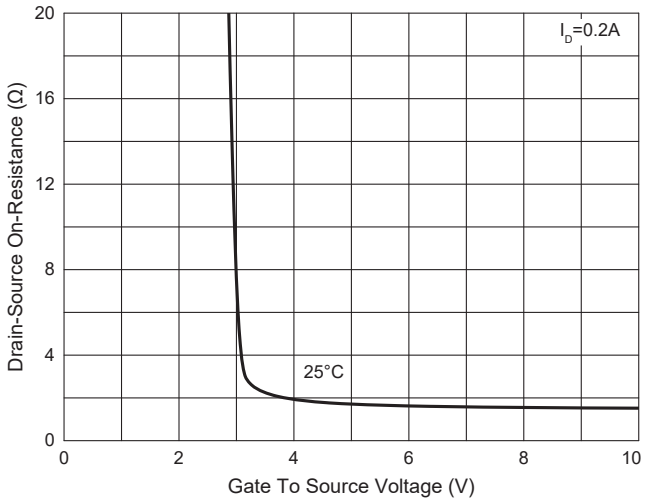


Fig.4-$R_{DS(ON)}$-I_D

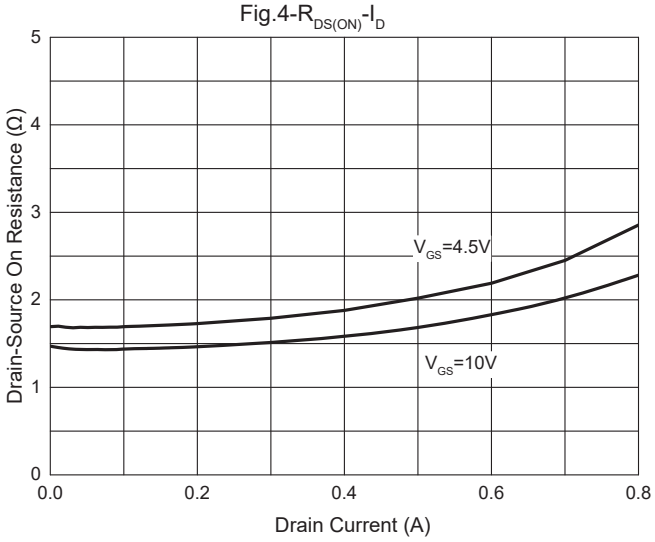


Fig. 5 - Capacitance Characteristics

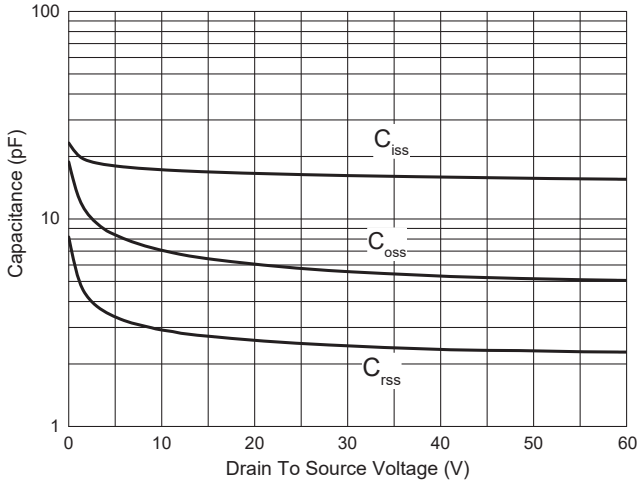
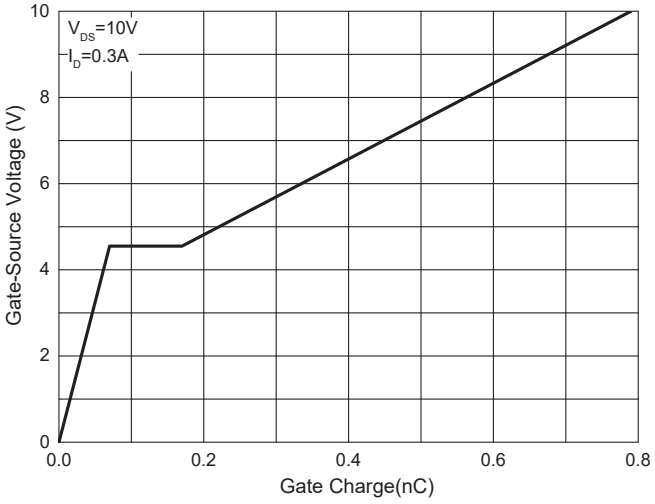


Fig. 6 - Gate Charge



N-Channel Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

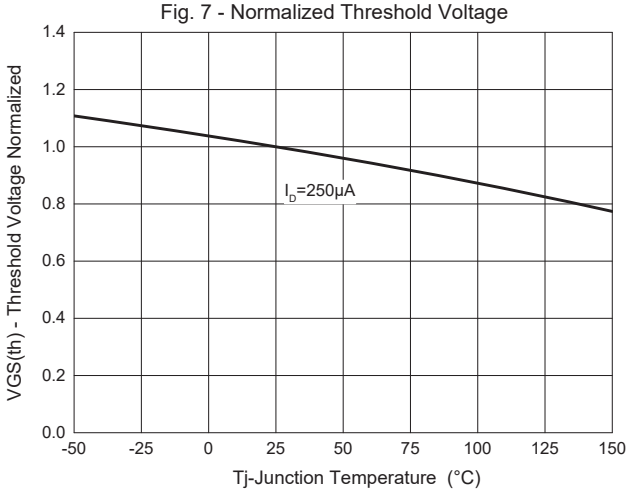


Fig. 8 - Normalized On Resistance Characteristics

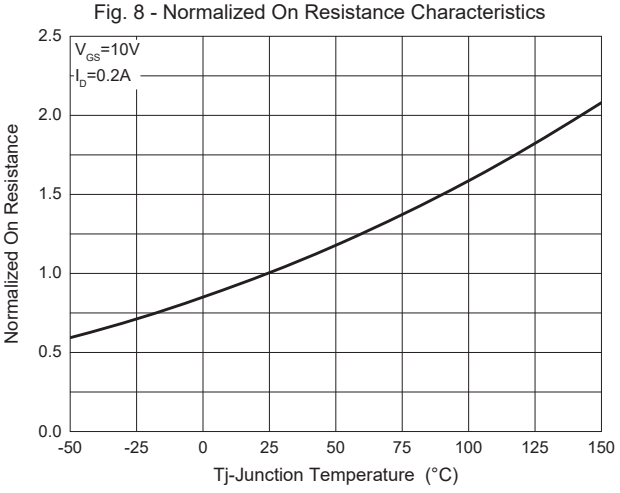


Fig.9-I_S-V_{SD}

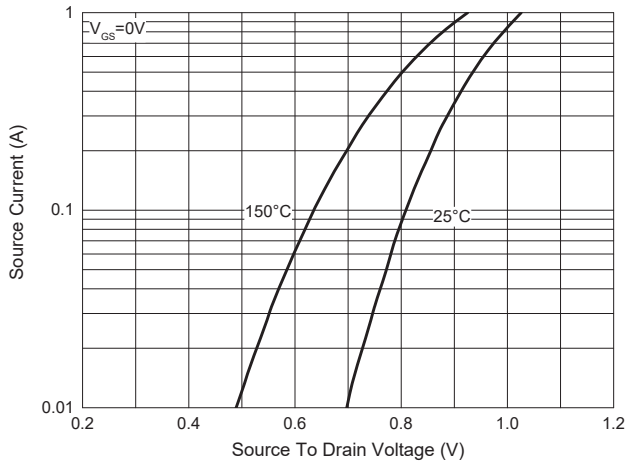


Fig. 10 - Drain Current

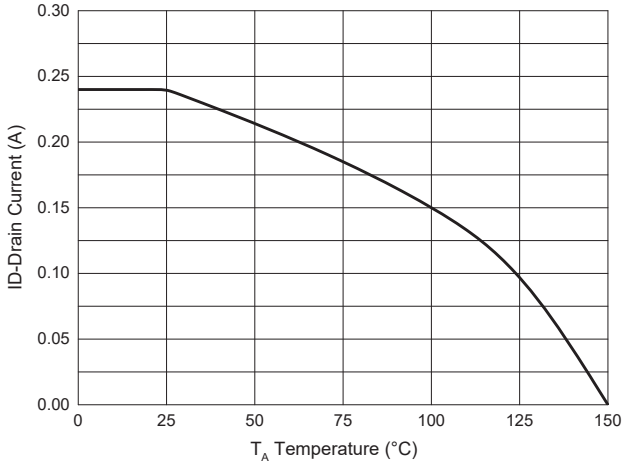
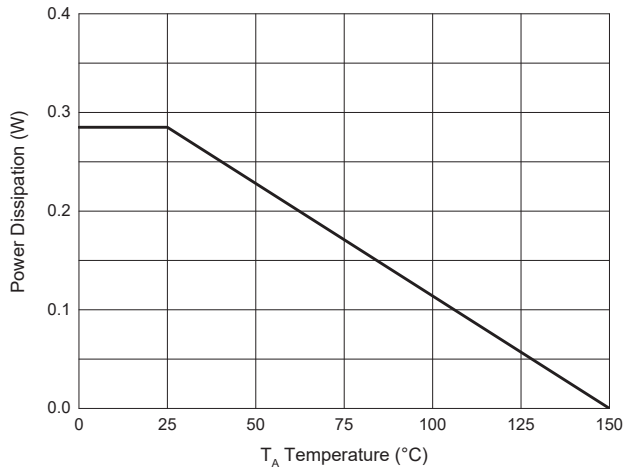


Fig. 11 - PD Dissipation



N-Channel Curve Characteristics

Fig. 12 - Safe Operation Area

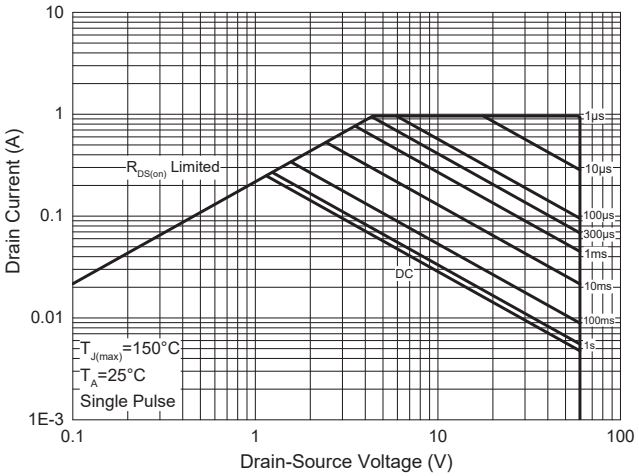
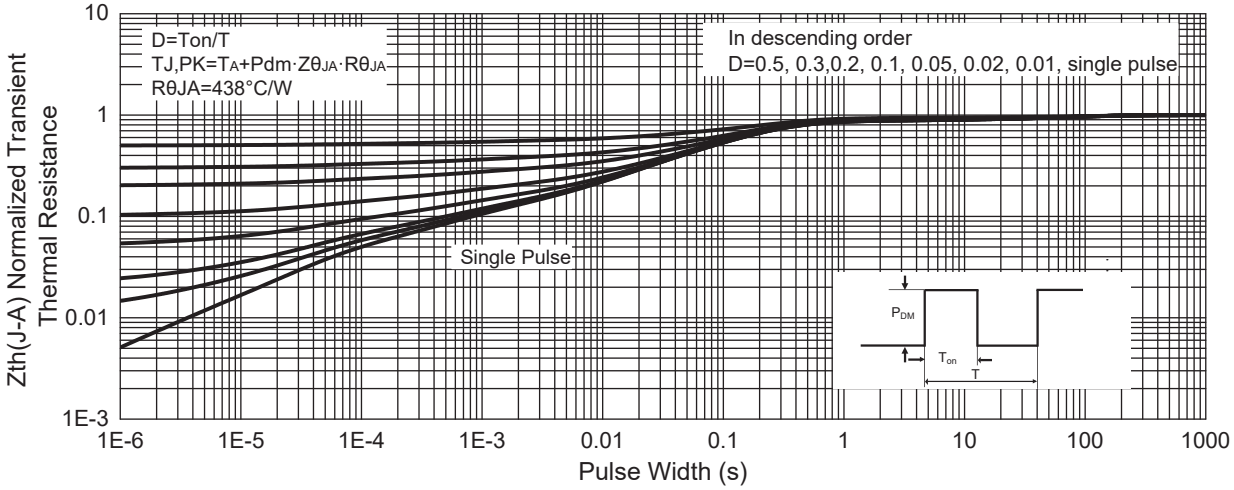


Fig. 13 - Normalized Transient Thermal Impedance



P-Channel Curve Characteristics

Fig. 1 - Typical Output Characteristics

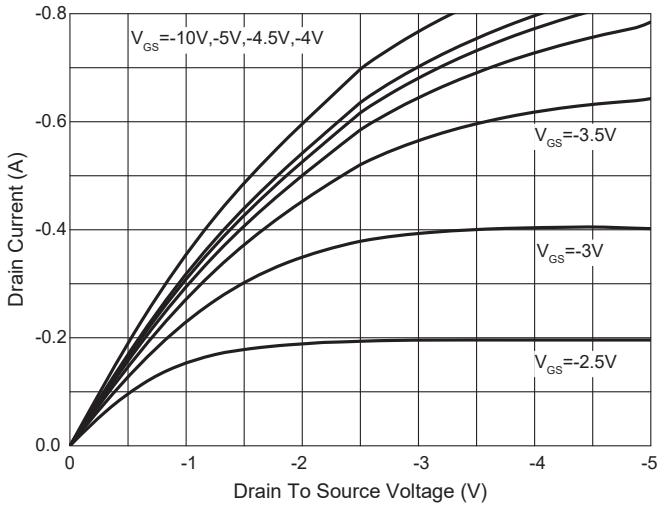


Fig. 2 - Transfer Characteristics

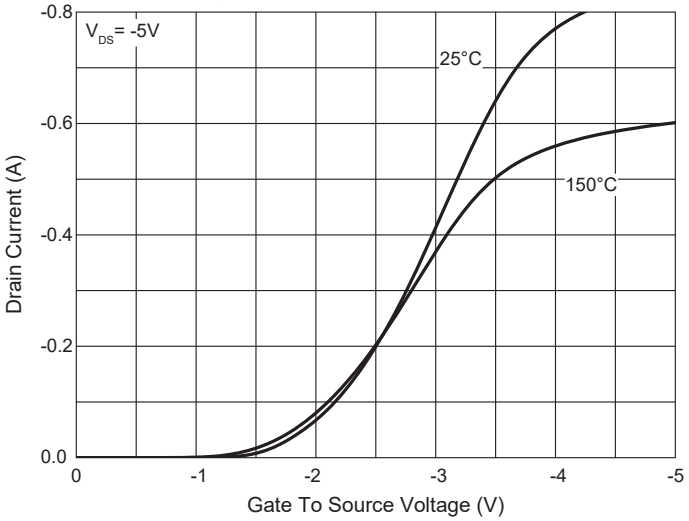


Fig.3-$R_{DS(ON)}$-V_{GS}

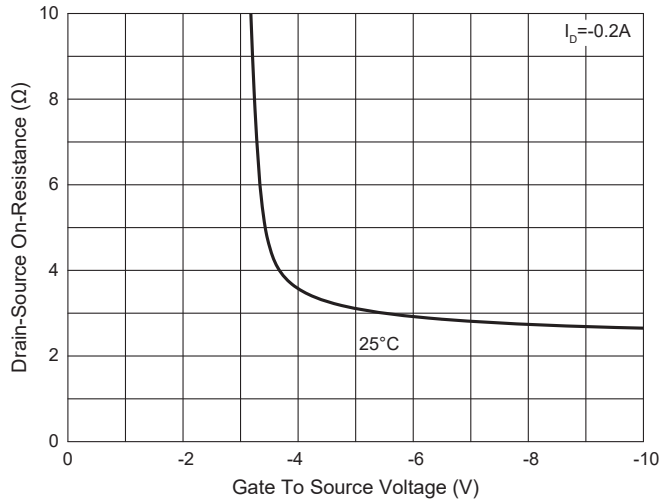


Fig.4-$R_{DS(ON)}$-I_D

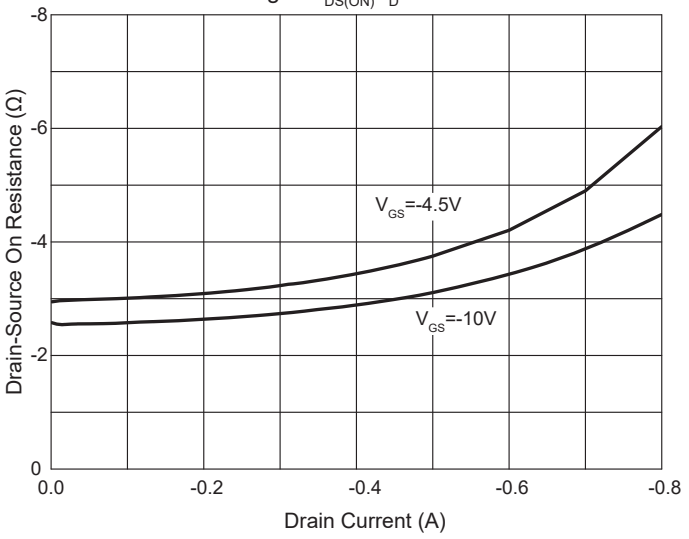


Fig. 5 - Capacitance Characteristics

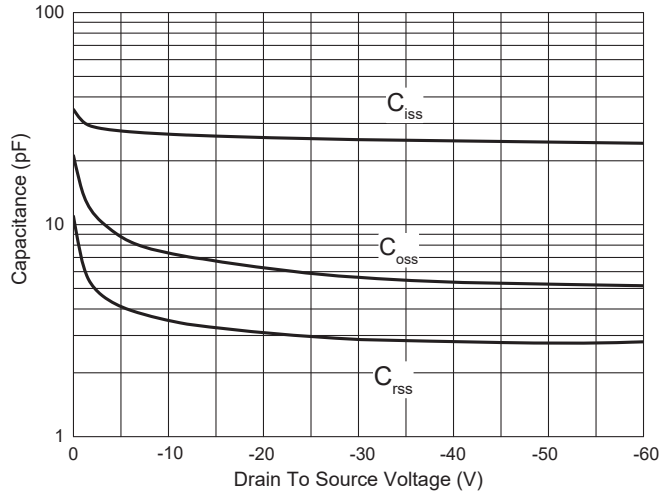
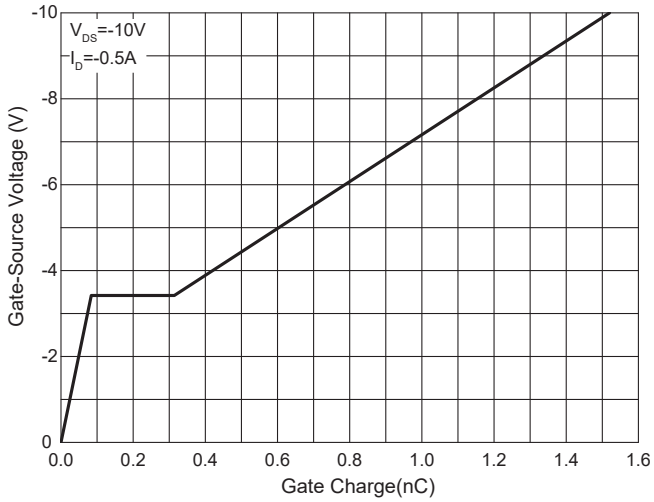


Fig. 6 - Gate Charge



P-Channel Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

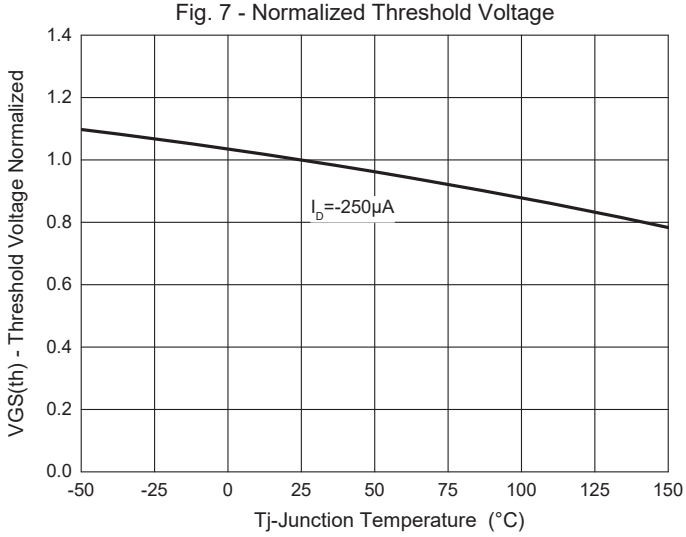


Fig. 8 - Normalized On Resistance Characteristics

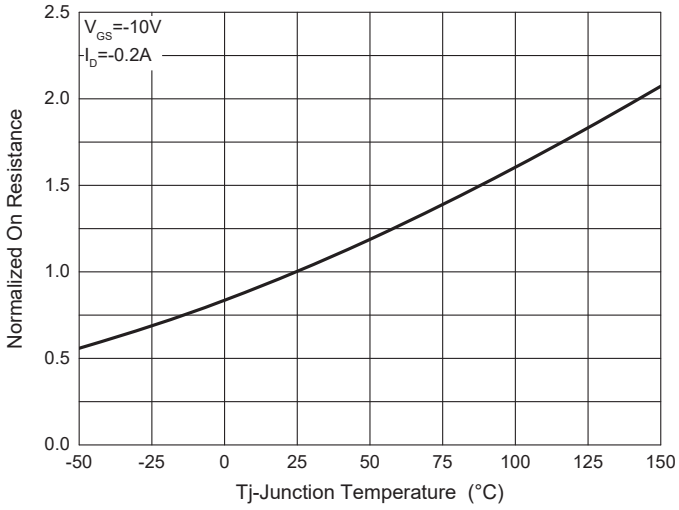


Fig.9-I_S-V_{SD}

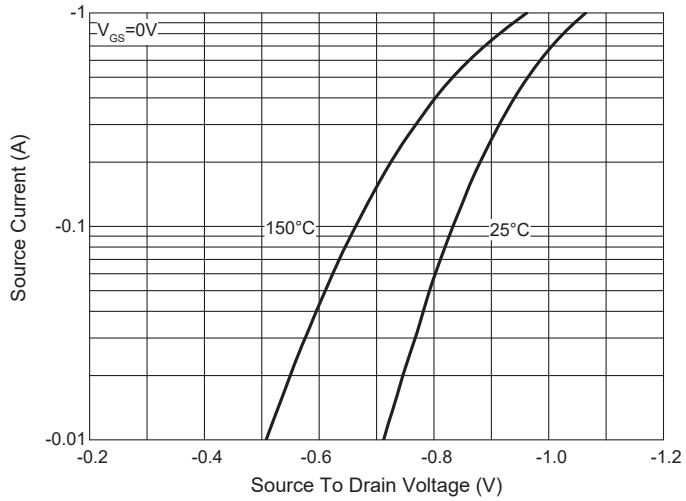


Fig. 10 - Drain Current

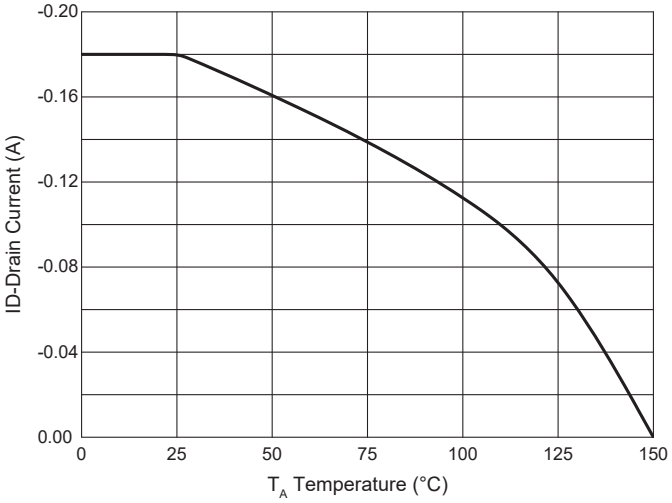
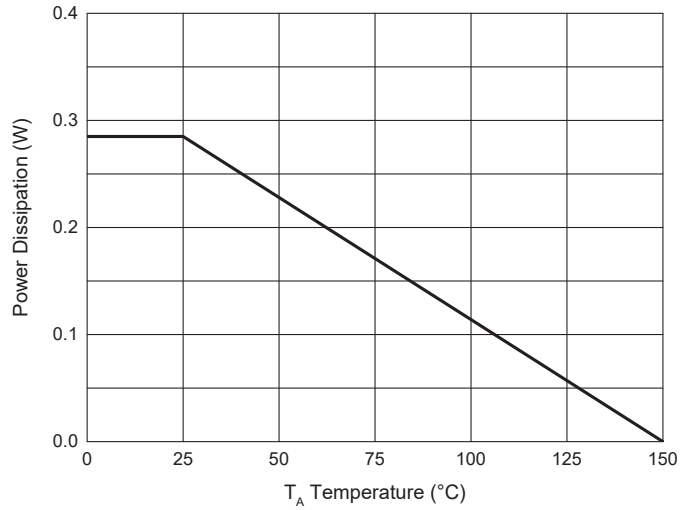


Fig. 11 - PD Dissipation



P-Channel Curve Characteristics

Fig. 12 - Safe Operation Area

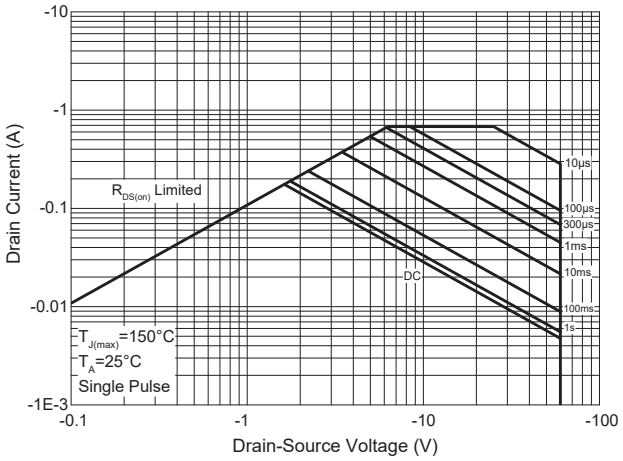
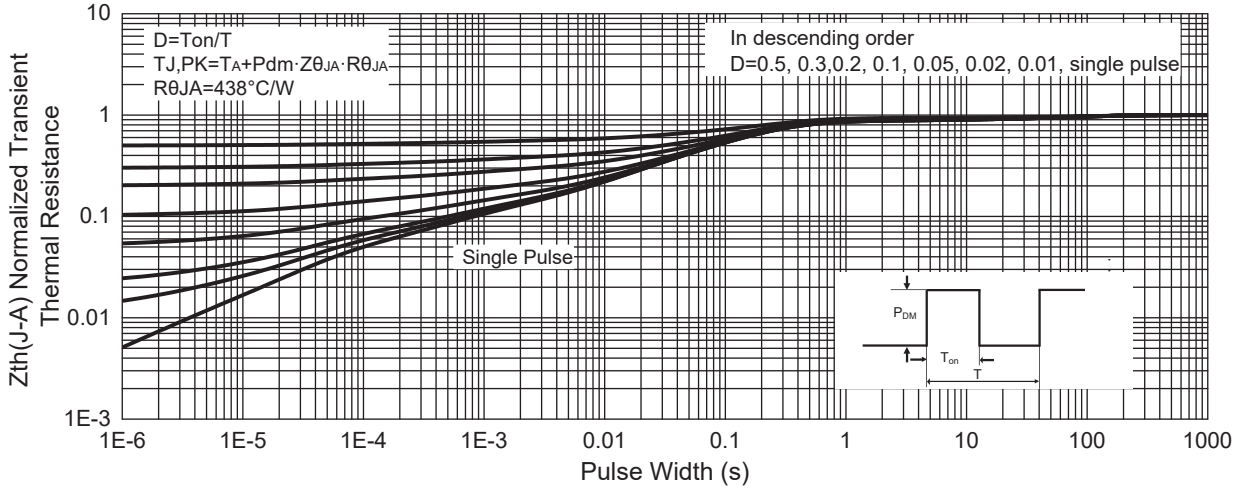


Fig. 13 - Normalized Transient Thermal Impedance



Ordering Information

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