

## 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)

## Maximum Ratings

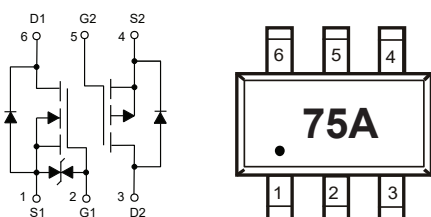
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 438°C/W Junction to Ambient (Note 2)

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

Note:

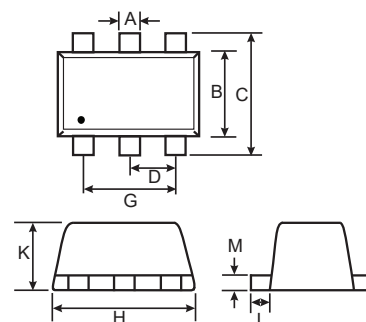
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on the minimum recommend pad size, in the still air environment with  $T_A = 25^\circ\text{C}$ .
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



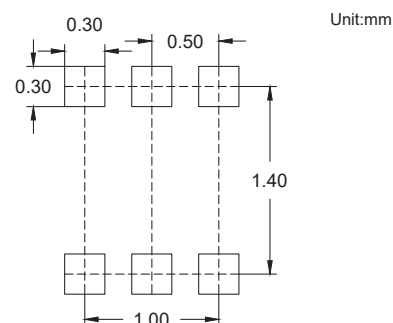
## Dual N&P-Channel MOSFET

### SOT-563



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 <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60			V
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±10	μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			1	μA
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.5	2.0	V
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =0.2A		1.5	2.5	Ω
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.2A		1.8	3.0	
Gate Resistance	R <sub>G</sub>	f=1MHz, Open drain		120		Ω
Diode Characteristics						
Continuous Body Diode Current	I <sub>S</sub>				0.23	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =0.2A			1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =0.3A, dI <sub>F</sub> /dt=100A/μs		11		ns
Reverse Recovery Charge	Q <sub>rr</sub>			4		nC
Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz		16.2		pF
Output Capacitance	C <sub>oss</sub>			5.6		
Reverse Transfer Capacitance	C <sub>rss</sub>			2.5		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =0.3A		0.79		nC
Gate-Source Charge	Q <sub>gs</sub>			0.07		
Gate-Drain Charge	Q <sub>gd</sub>			0.1		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =30Ω, I <sub>D</sub> =0.3A		3		ns
Turn-On Rise Time	t <sub>r</sub>			3		
Turn-Off Delay Time	t <sub>d(off)</sub>			11		
Turn-Off Fall Time	t <sub>f</sub>			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 <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-60			V
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V			-1	μA
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.8	-1.3	-1.8	V
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-0.2A		2.6	4.0	Ω
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-0.2A		3.2	4.0	
Gate Resistance	R <sub>G</sub>	f=1MHz, Open drain		38		Ω
Diode Characteristics						
Continuous Body Diode Current	I <sub>S</sub>				-0.18	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-0.2A			-1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =-0.5A, dI <sub>F</sub> /dt=100A/μs		15		ns
Reverse Recovery Charge	Q <sub>rr</sub>			9		nC
Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-30V,V <sub>GS</sub> =0V,f=1MHz		25.2		pF
Output Capacitance	C <sub>oss</sub>			5.6		
Reverse Transfer Capacitance	C <sub>rss</sub>			2.9		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-30V,V <sub>GS</sub> =-10V,I <sub>D</sub> =-0.5A		1.52		nC
Gate-Source Charge	Q <sub>gs</sub>			0.08		
Gate-Drain Charge	Q <sub>gd</sub>			0.23		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-30V, V <sub>GS</sub> =-10V, R <sub>G</sub> =30Ω, I <sub>D</sub> =-0.5A		2.9		ns
Turn-On Rise Time	t <sub>r</sub>			3		
Turn-Off Delay Time	t <sub>d(off)</sub>			6.5		
Turn-Off Fall Time	t <sub>f</sub>			22		

## N-Channel Curve Characteristics

Fig. 1 - Typical Output Characteristics

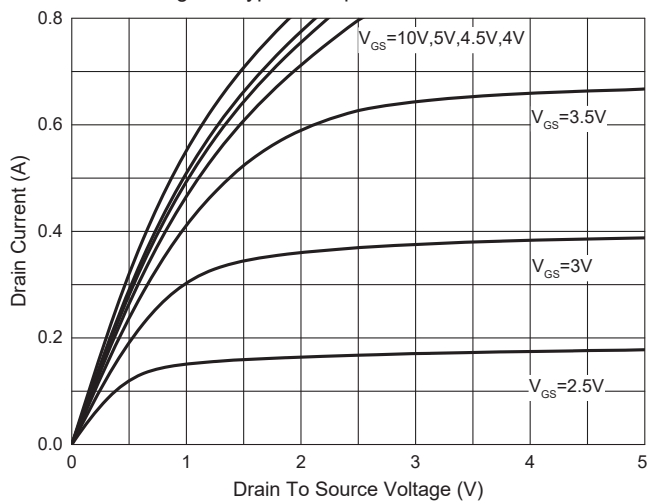


Fig. 2 - Transfer Characteristics

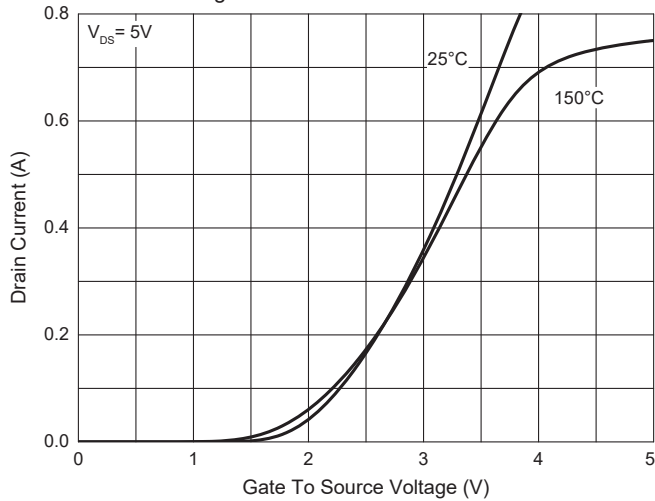


Fig. 3- $R_{DS(ON)}-V_{GS}$

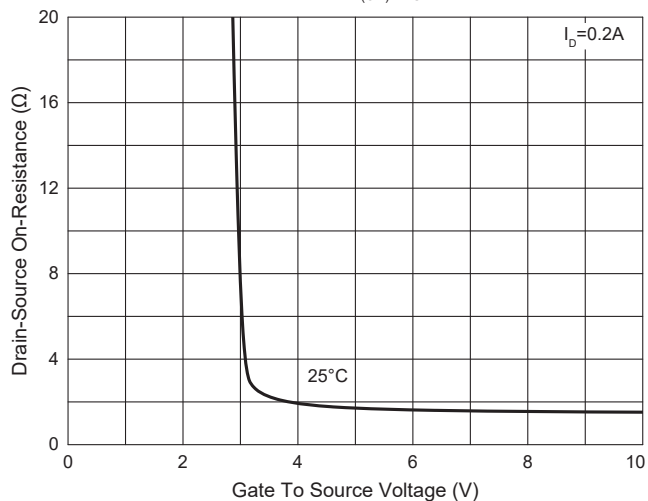


Fig. 4- $R_{DS(ON)}-I_D$

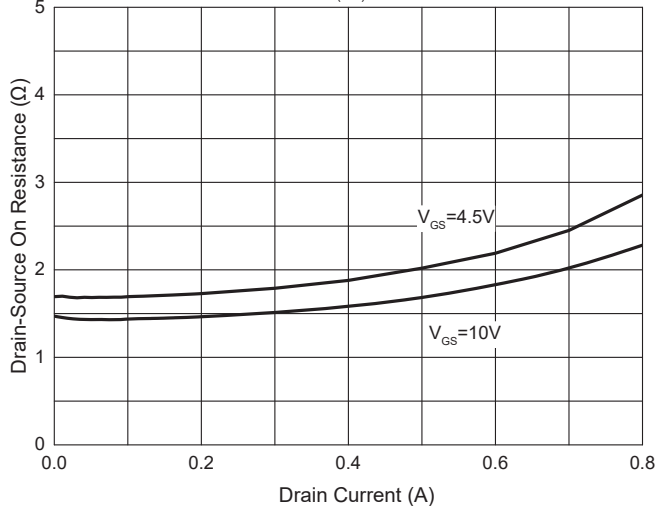


Fig. 5 - Capacitance Characteristics

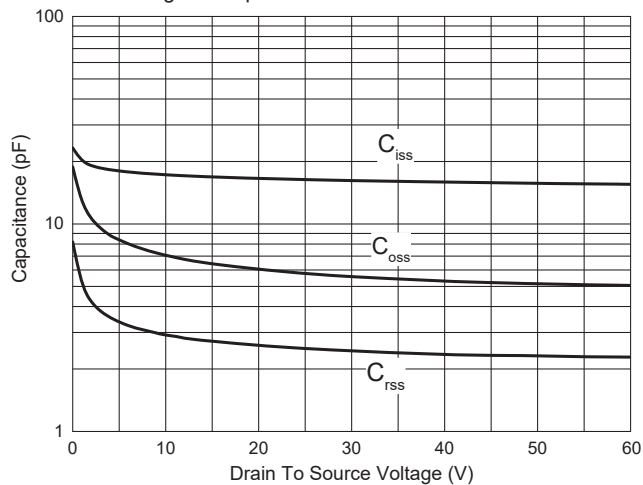
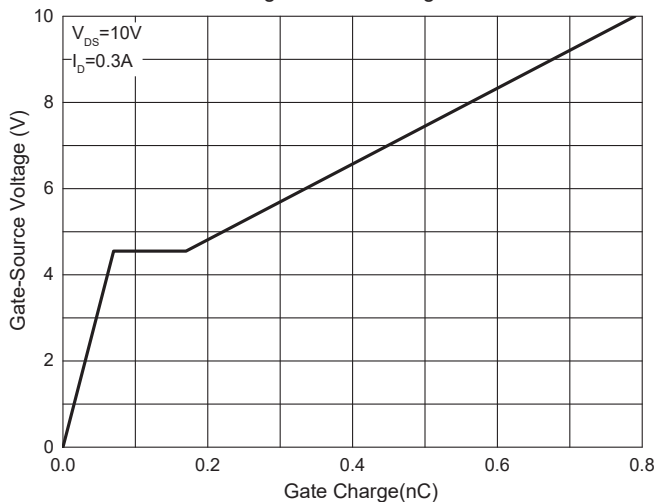


Fig. 6 - Gate Charge



## N-Channel Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

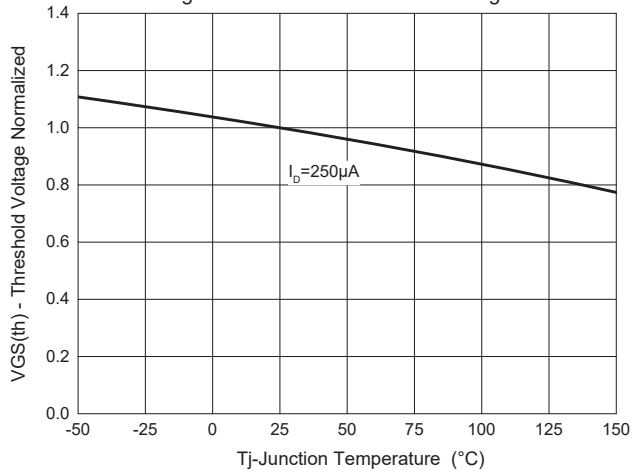


Fig. 8 - Normalized On Resistance Characteristics

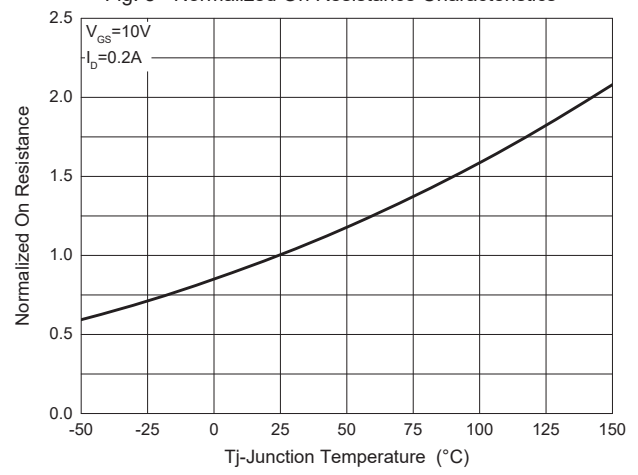


Fig. 9 -  $I_S - V_{SD}$

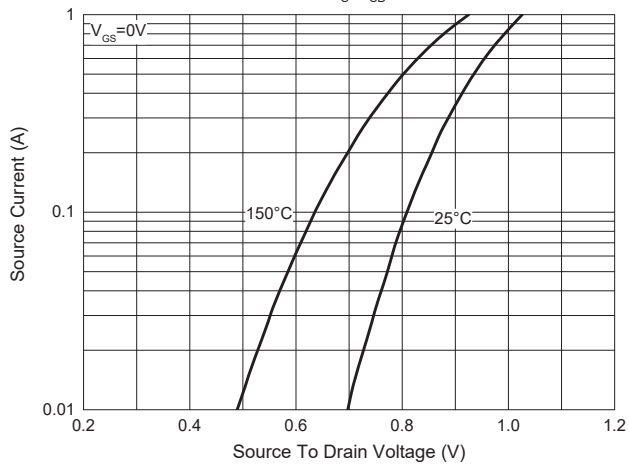


Fig. 10 - Drain Current

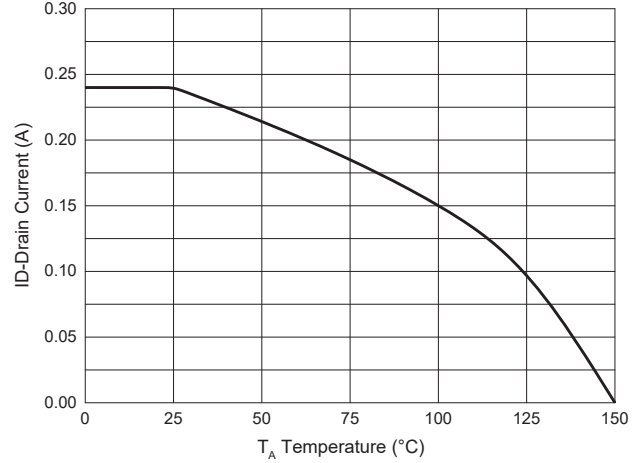
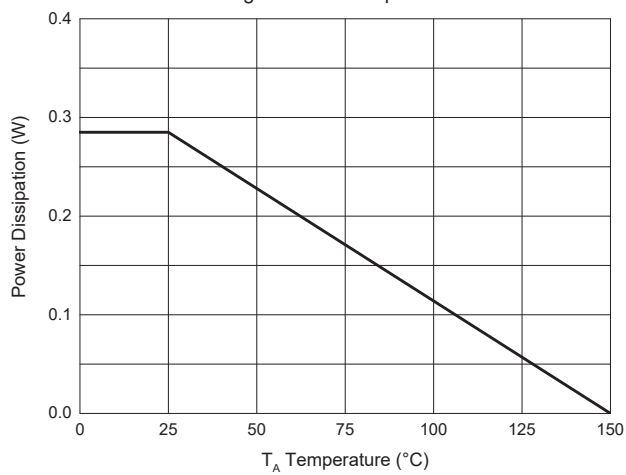


Fig. 11 - PD Dissipation



## N-Channel Curve Characteristics

Fig. 12 - Safe Operation Area

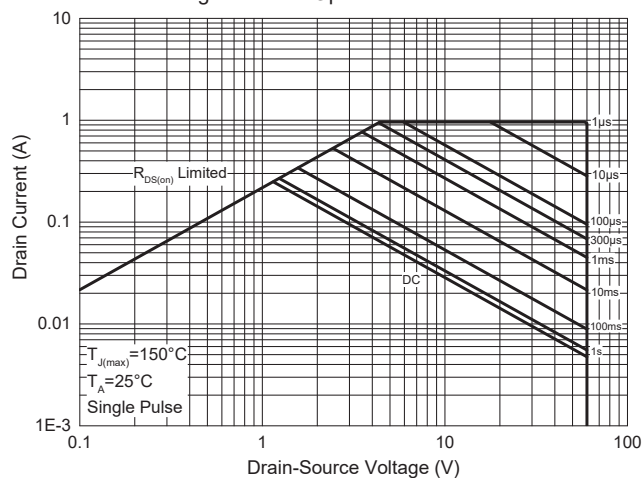
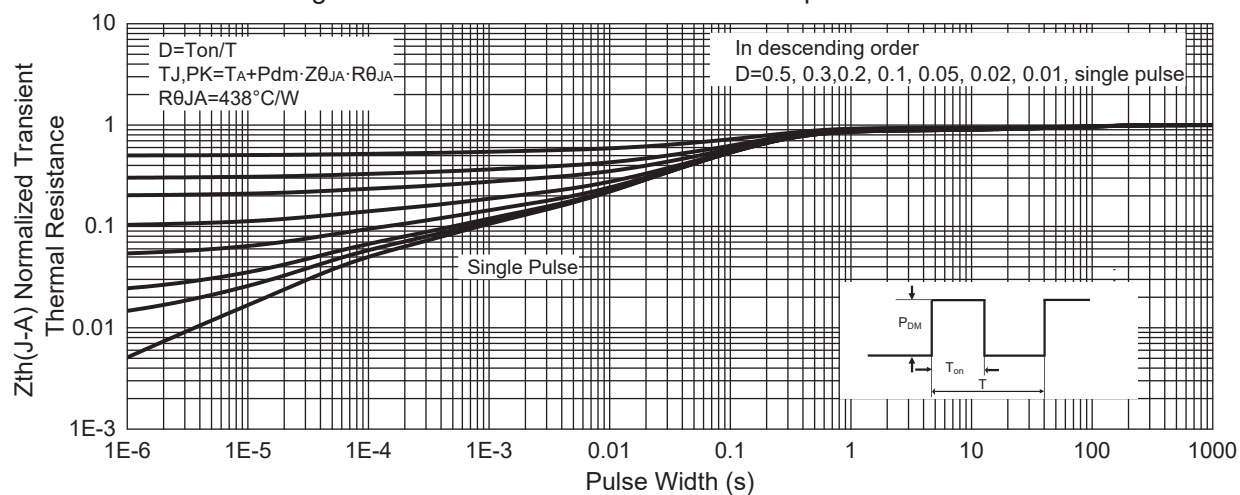


Fig. 13 - Normalized Transient Thermal Impedance



## P-Channel Curve Characteristics

Fig. 1 - Typical Output Characteristics

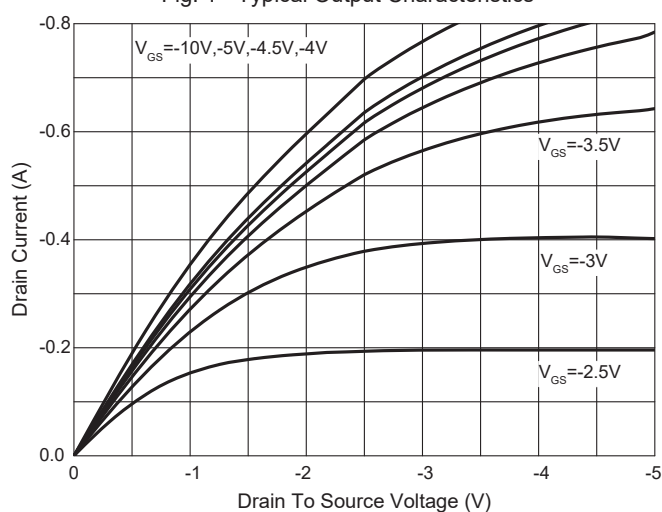


Fig. 2 - Transfer Characteristics

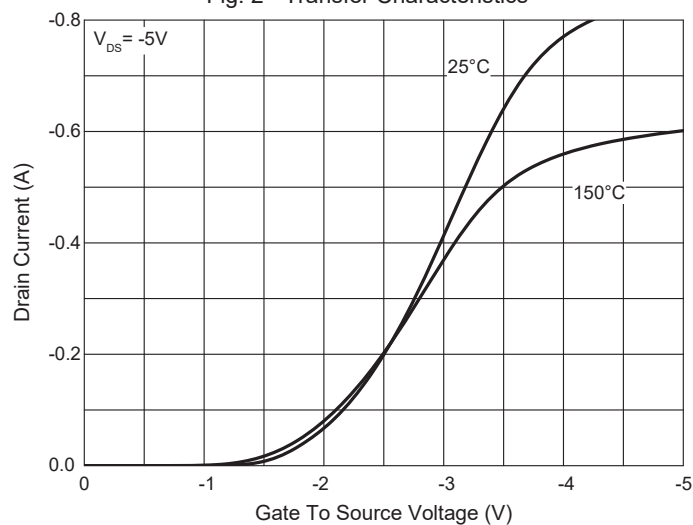


Fig.3- $R_{DS(ON)}-V_{GS}$

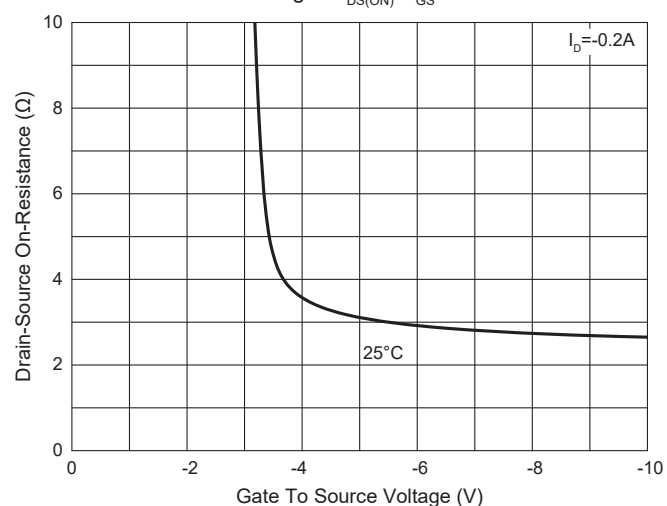


Fig.4- $R_{DS(ON)}-I_D$

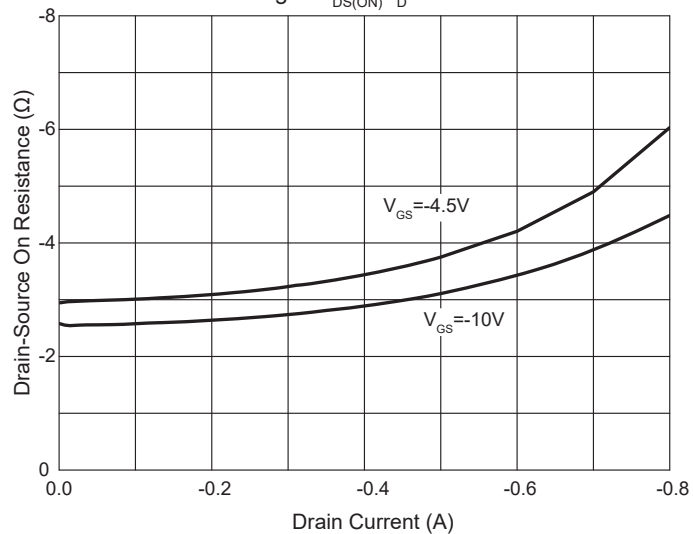


Fig. 5 - Capacitance Characteristics

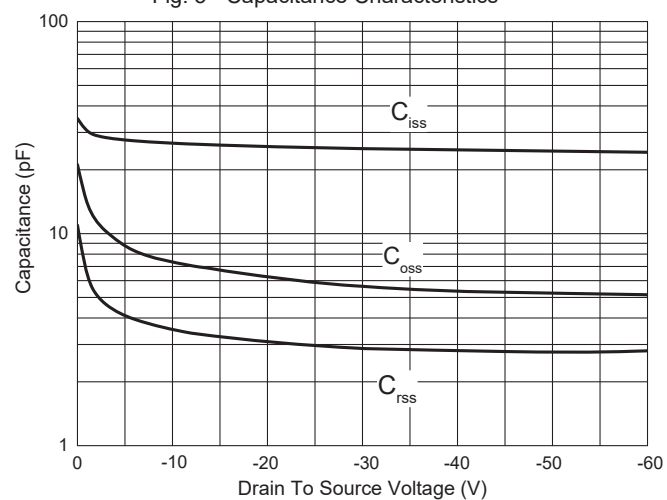
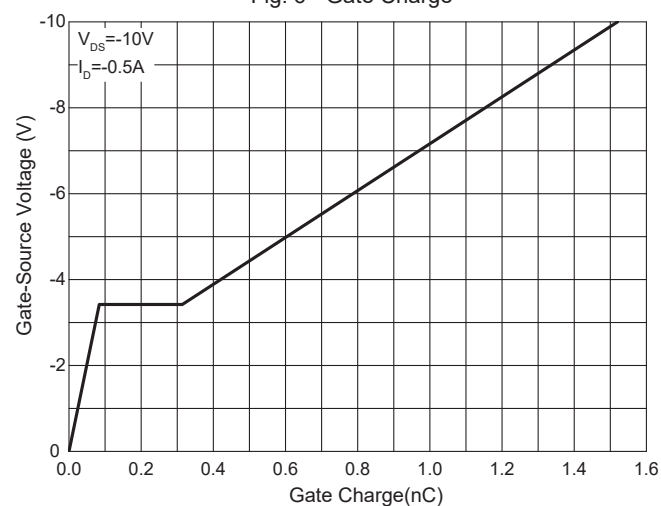


Fig. 6 - Gate Charge



## P-Channel Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

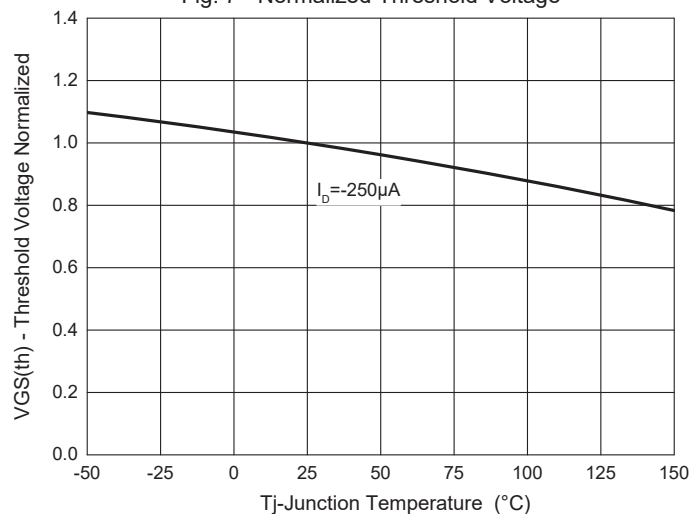


Fig. 8 - Normalized On Resistance Characteristics

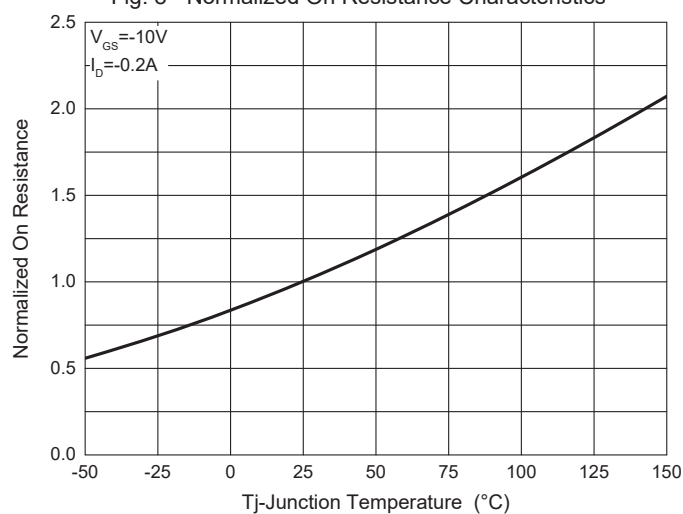


Fig. 9 -  $I_S - V_{SD}$

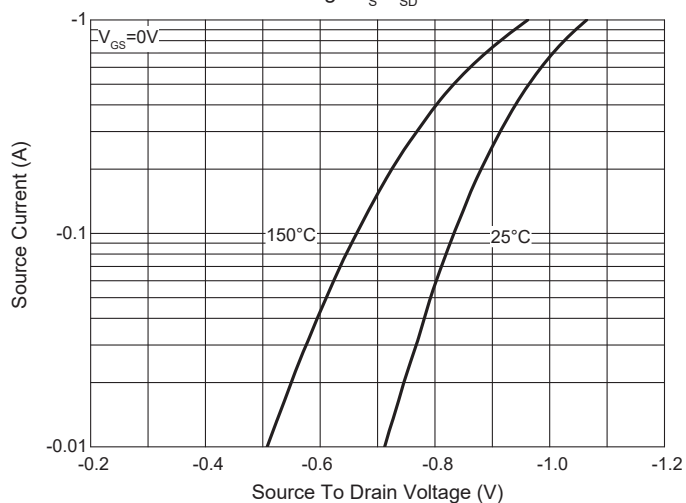


Fig. 10 - Drain Current

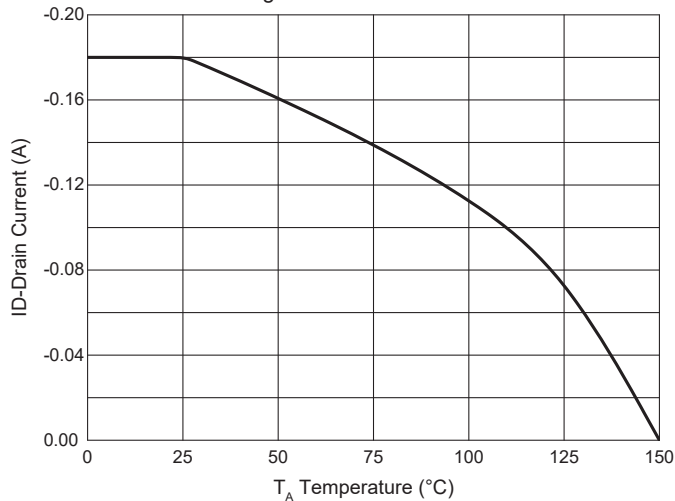
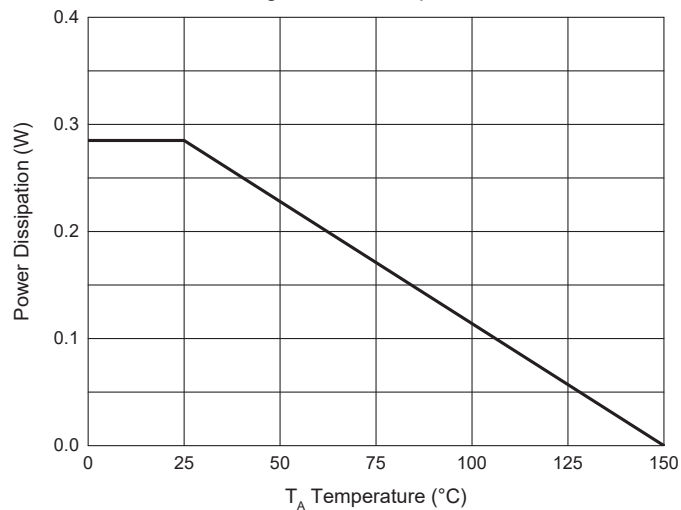


Fig. 11 - PD Dissipation





## P-Channel Curve Characteristics

Fig. 12 - Safe Operation Area

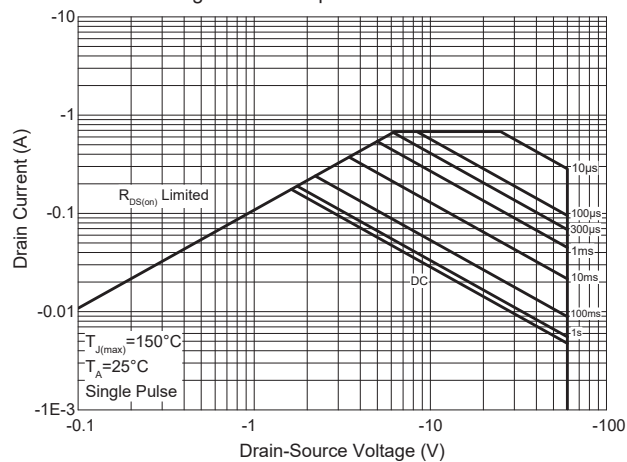
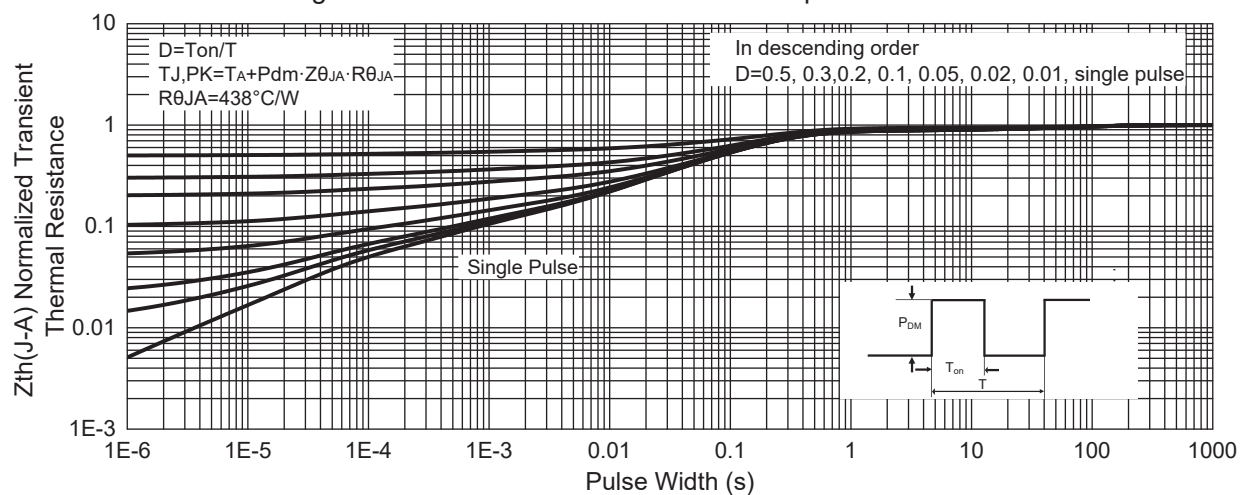


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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