

## Features

- Trench MV MOSFET Technology
- ESD Protected Up To 2KV (HBM)
- Operated At Low Logic Level Gate Drive
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

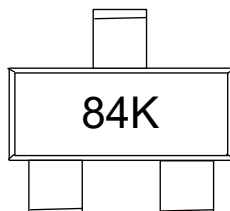
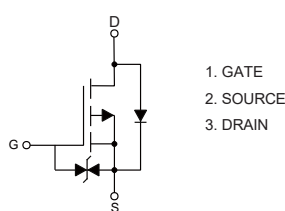
- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 461°C/W Junction to Ambient (Note2)

Parameter	Symbol	Rating	Unit
Drain -source Voltage	$V_{DS}$	-60	V
Gate -Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$T_A = 25^\circ\text{C}$	$I_D$	A
	$T_A = 100^\circ\text{C}$		
Pulsed Drain Current (Note3)	$I_{DM}$	-1.04	A
Power Dissipation (Note4)	$P_D$	0.27	W

Note:

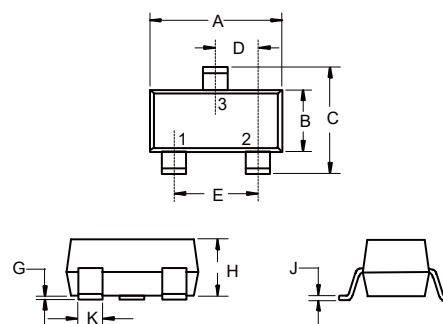
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-ambient thermal resistance.

## Internal Structure and Marking Code



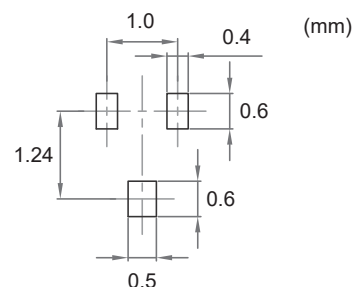
## P-Channel MOSFET

### SOT-523



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.059	0.067	1.50	1.70	
B	0.030	0.033	0.75	0.85	
C	0.057	0.069	1.45	1.75	
D	0.020		0.50		TYP.
E	0.035	0.043	0.90	1.10	
G	0.000	0.004	0.00	0.10	
H	0.024	0.031	0.60	0.80	
J	0.004	0.008	0.10	0.20	
K	0.006	0.014	0.15	0.35	

### Suggested Solder Pad Layout

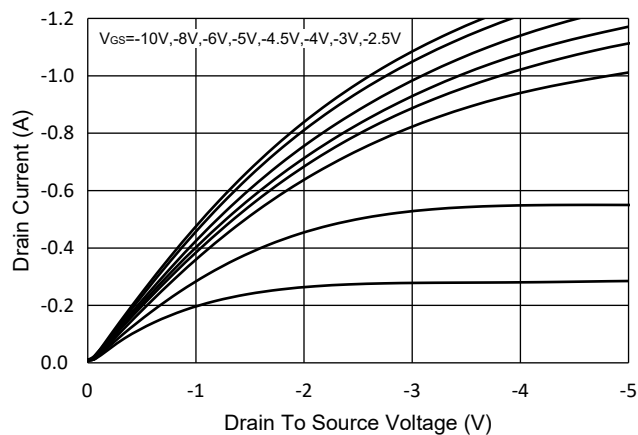


**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

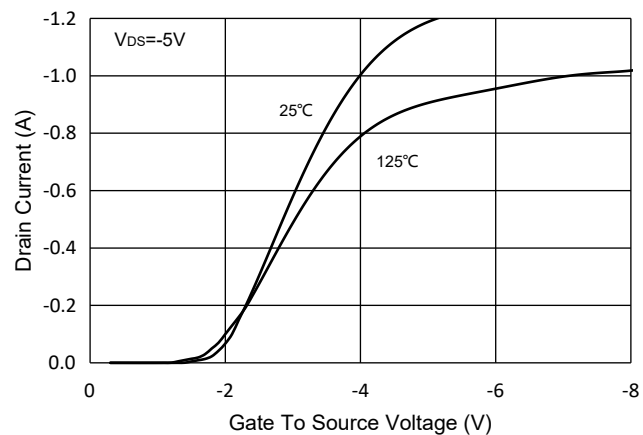
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-60			V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.0	-1.5	-2.0	V
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =± 20V, V <sub>DS</sub> =0V			±10	μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-48V, V <sub>GS</sub> =0V			-1	μA
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-0.2A		2.0	6	Ω
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-0.1A		2.3	7	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-0.1A		0.37		S
Gate Resistance	R <sub>g</sub>	f=1 MHz, Open drain		1270		Ω
Diode Characteristics						
Continuous Body Diode Current	I <sub>S</sub>				-0.26	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-0.2A			-1.3	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =-0.3A, dI <sub>F</sub> /dt=100A/μs		13		ns
Reverse Recovery Charge	Q <sub>rr</sub>			5.8		nC
Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V, f=1MHz		37		pF
Output Capacitance	C <sub>oss</sub>			6		
Reverse Transfer Capacitance	C <sub>rss</sub>			3.8		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-25V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-0.3A		2.2		nC
Gate-Source Charge	Q <sub>gs</sub>			0.4		
Gate-Drain Charge	Q <sub>gd</sub>			0.2		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-25V, V <sub>GS</sub> =-10V, R <sub>G</sub> =3.9Ω, I <sub>D</sub> =-0.3A		8.3		ns
Turn-On Rise Time	t <sub>r</sub>			4		
Turn-Off Delay Time	t <sub>d(off)</sub>			39		
Turn-Off Fall Time	t <sub>f</sub>			20		

## Curve Characteristics

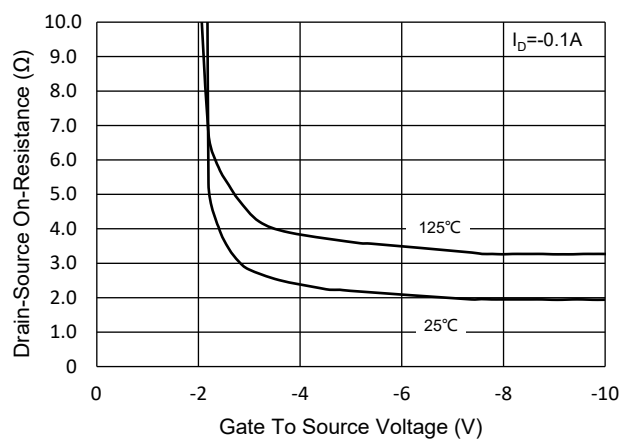
**Fig.1 - Typical Output Characteristics**



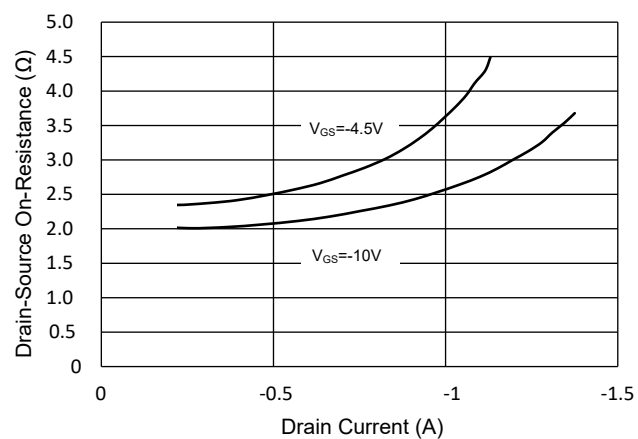
**Fig.2 - Transfer Characteristic**



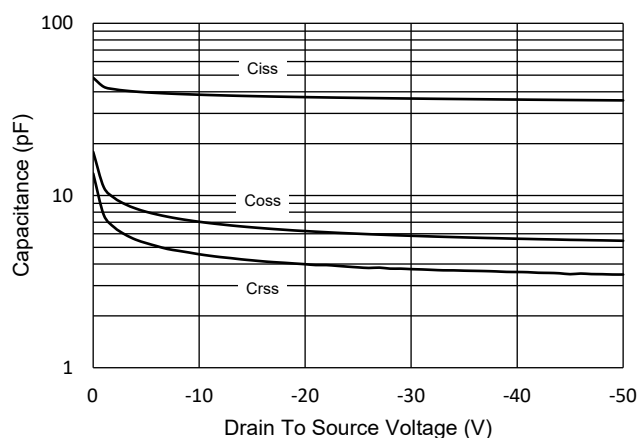
**Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$**



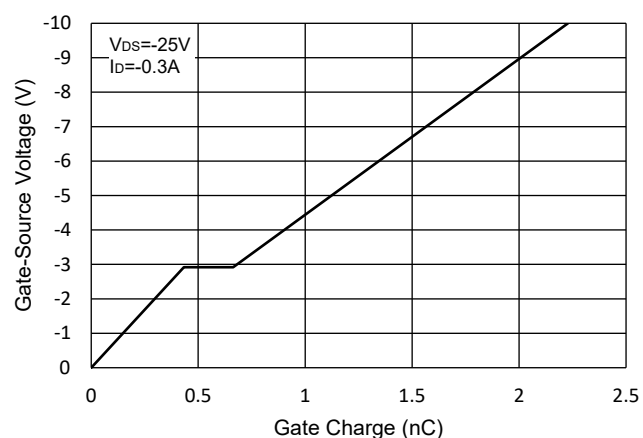
**Fig.4 -  $R_{DS(ON)}$  -  $I_D$**



**Fig.5 - Capacitance Characteristics**

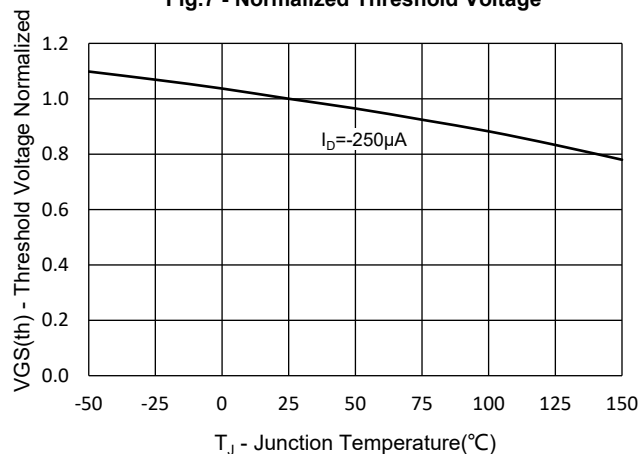


**Fig.6 - Gate Charge**

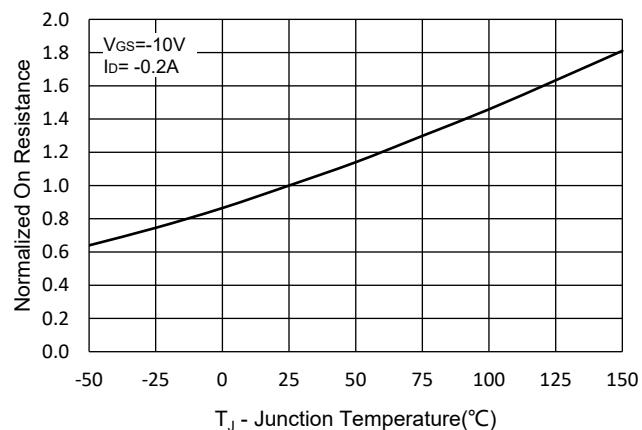


## Curve Characteristics

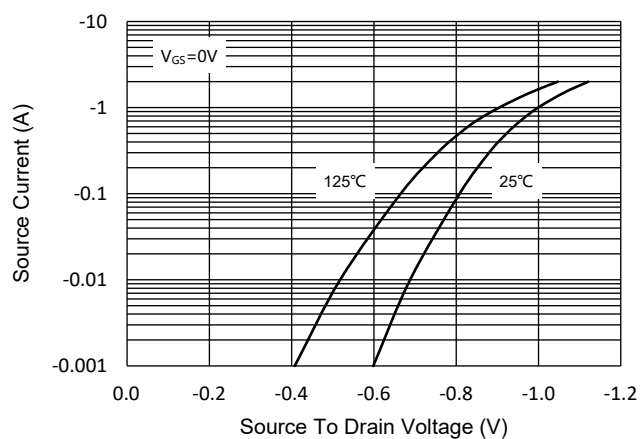
**Fig.7 - Normalized Threshold Voltage**



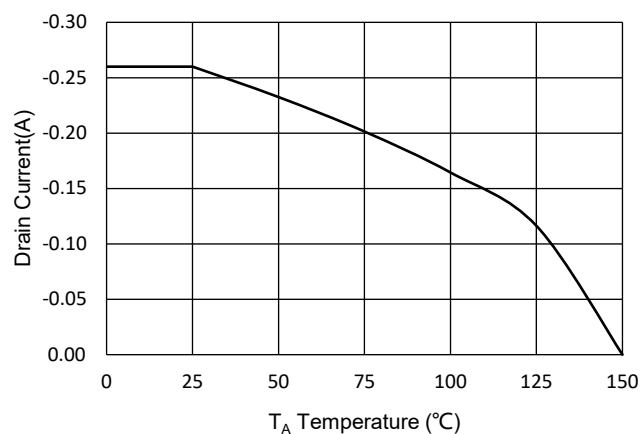
**Fig.8 - Normalized On Resistance Characteristics**



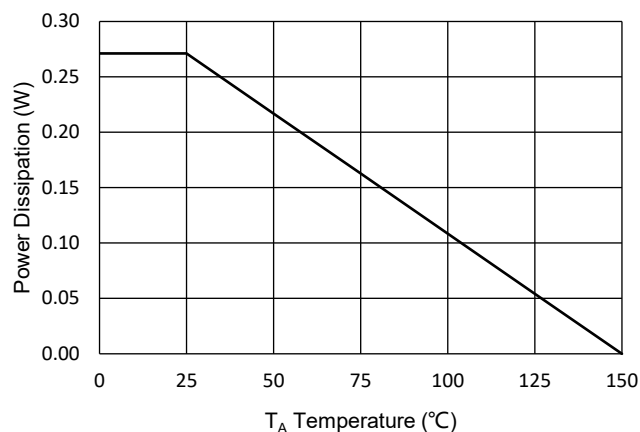
**Fig.9 -  $I_S$  -  $V_{SD}$**



**Fig.10 - Drain Current**

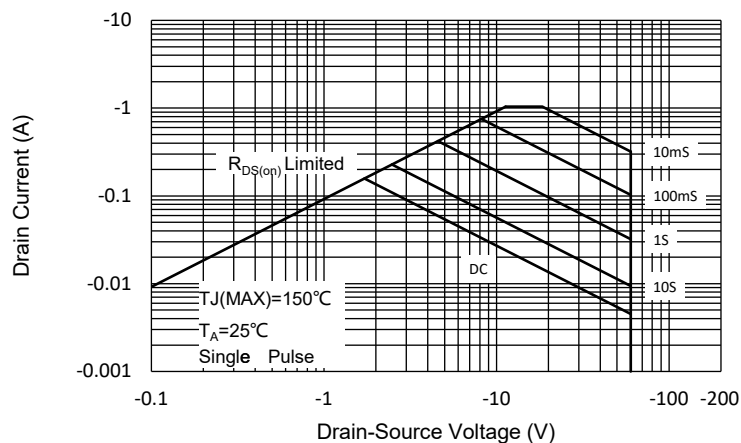


**Fig.11 - PD Dissipation**

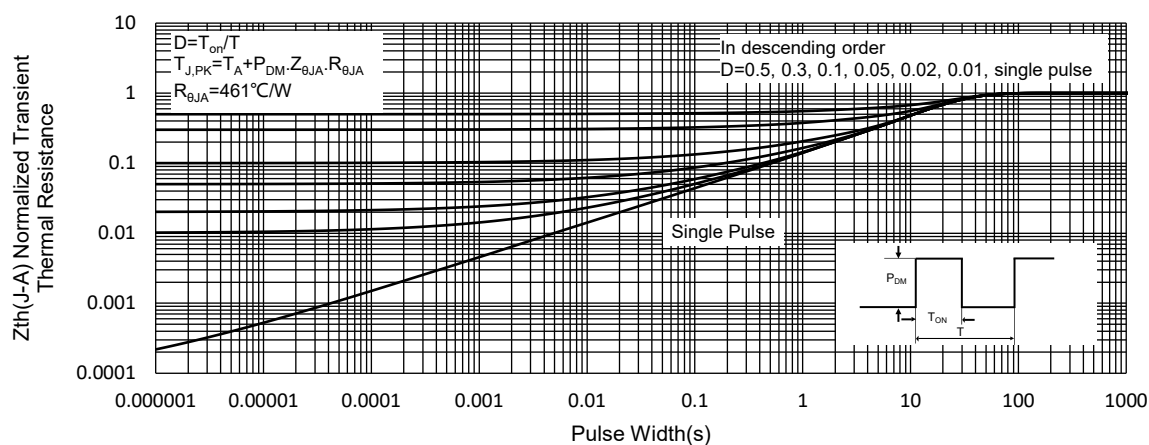


## Curve Characteristics

**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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