

RoHS Compliant Product
A suffix of "-C" specifies halogen and lead-free

DESCRIPTION

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $R_{DS(on)}$ and to ensure minimal power loss and heat dissipation.

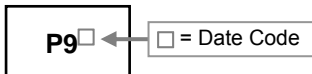
MECHANICAL DATA

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage

APPLICATION

- DC-DC converter circuit
- Load Switch

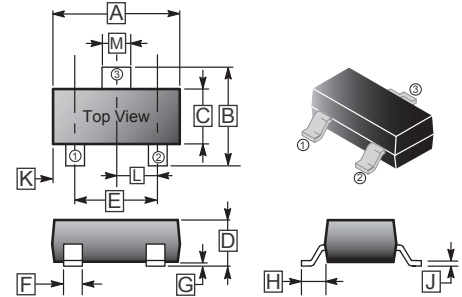
MARKING



PACKAGE INFORMATION

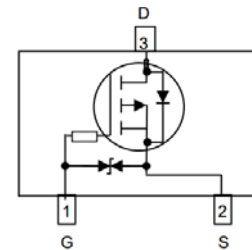
Package	MPQ	Leader Size
SOT-523	3K	7 inch

SOT-523



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	1.5	1.7	G	-	0.1
B	1.45	1.75	H	0.55 REF.	
C	0.7	0.9	J	0.1	0.2
D	0.7	0.9	K	-	
E	0.9	1.1	L	0.5 TYP.	
F	0.15	0.35	M	0.25	0.325

Top View



MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating		Unit	
		10S	Steady State		
Drain – Source Voltage	V_{DS}	-20		V	
Gate – Source Voltage	V_{GS}	± 5		V	
Continuous Drain Current ¹	I_D	$T_A = 25^\circ\text{C}$	-0.73	-0.62	A
		$T_A = 70^\circ\text{C}$	-0.58	-0.5	
Power Dissipation ¹	P_D	$T_A = 25^\circ\text{C}$	0.38	0.28	W
		$T_A = 70^\circ\text{C}$	0.24	0.18	
Continuous Drain Current ²	I_D	$T_A = 25^\circ\text{C}$	-0.61	-0.55	A
		$T_A = 70^\circ\text{C}$	-0.49	-0.44	
Power Dissipation ²	P_D	$T_A = 25^\circ\text{C}$	0.27	0.22	W
		$T_A = 70^\circ\text{C}$	0.17	0.14	
Pulsed Drain Current ³	I_{DM}	-1.2		A	
Lead Temperature	T_L	260		$^\circ\text{C}$	
Operating Junction & Storage Temperature Range	T_J, T_{STG}	150, -55~150		$^\circ\text{C}$	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Rating		Unit	
		Typ.	Max.		
Junction-to-Ambient Thermal Resistance ¹	$R_{\theta JA}$	$T \leq 10S$	285	325	°C / W
		Steady State	355	440	
Junction-to-Ambient Thermal Resistance ²	$R_{\theta JA}$	$T \leq 10S$	395	460	
		Steady State	465	560	
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	Steady State	280	320	

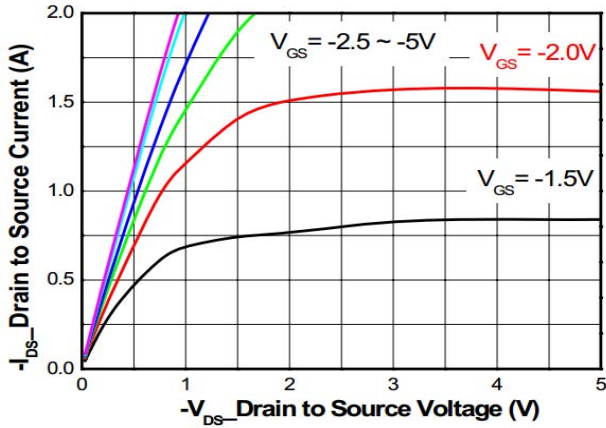
Note:

1. Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper.
2. Surface mounted on FR4 board using minimum pad size, 1oz copper
3. Repetitive rating, pulse width limited by junction temperature, $t_p=10\mu s$, Duty Cycle=1%
4. Repetitive rating, pulse width limited by junction temperature $T_J=150^\circ C$.

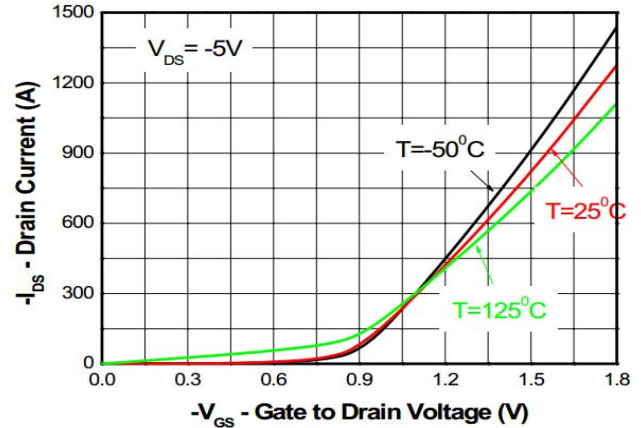
ELECTRICAL CHARACTERISTICS ($T_A=25^\circ C$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-20	-	-	V	$V_{GS}=0, I_D=-250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	-1	μA	$V_{DS}=-16V, V_{GS}=0$
Gate-Source Leakage	I_{GSS}	-	-	± 5	μA	$V_{DS}=0, V_{GS}=\pm 5V$
Gate-Threshold Voltage	$V_{GS(TH)}$	-0.4	-0.65	-0.9	V	$V_{DS}=V_{GS}, I_D=-250\mu A$
Drain-Source On Resistance	$R_{DS(ON)}$	-	480	810	m Ω	$V_{GS}=-4.5V, I_D=-0.45A$
		-	620	1050		$V_{GS}=-2.5V, I_D=-0.35A$
		-	780	1300		$V_{GS}=-1.8V, I_D=-0.25A$
Forward Transconductance	g_{FS}	-	1.25	-	S	$V_{DS}=-5V, I_D=-0.45A$
Body-Drain Diode Ratings						
Diode Forward On-Voltage	V_{SD}	-0.5	-0.65	-1.5	V	$I_S=-150mA, V_{GS}=0$
Dynamic Characteristics						
Input Capacitance	C_{ISS}	-	74.5	-	pF	$V_{DS}=-10V,$ $V_{GS}=0,$ $f=100KHz$
Output Capacitance	C_{OSS}	-	10.8	-		
Reverse Transfer Capacitance	C_{RSS}	-	10.2	-		
Total Gate Charge	$Q_{G(TOT)}$	-	1.8	-	nC	$V_{DS}=-10V,$ $V_{GS}=-4.5V,$ $I_D=-0.45A$
Threshold Gate Charge	$Q_{G(TH)}$	-	0.12	-		
Gate-to-Source Charge	Q_{GS}	-	0.18	-		
Gate-to-Drain Charge	Q_{GD}	-	0.74	-		
Turn-on Delay Time	$T_{d(ON)}$	-	45	-	nS	$V_{DD}=-10V,$ $I_D=-0.45A,$ $V_{GS}=-4.5V,$ $R_G=6\Omega.$
Rise Time	T_r	-	140	-		
Turn-off Delay Time	$T_{d(OFF)}$	-	1500	-		
Fall Time	T_f	-	2100	-		

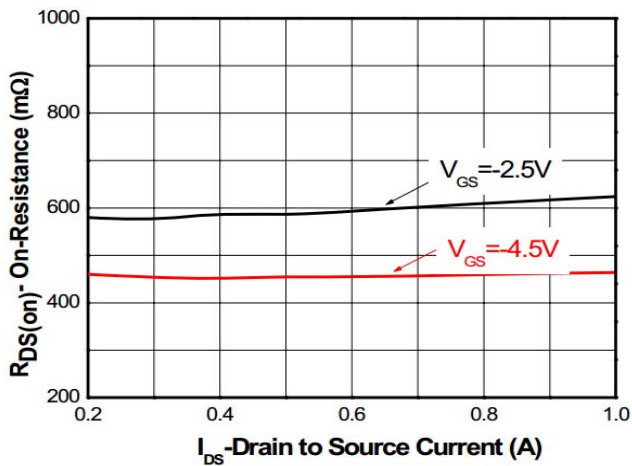
CHARACTERISTIC CURVES



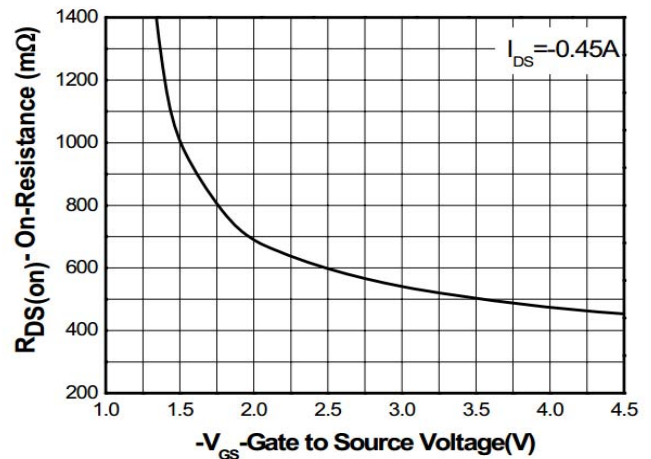
Output characteristics



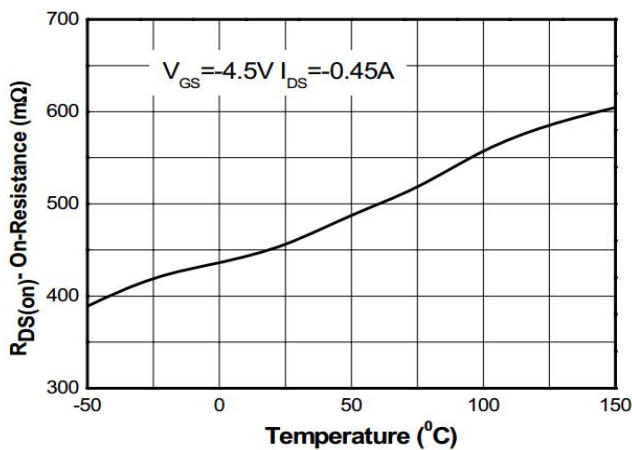
Transfer characteristics



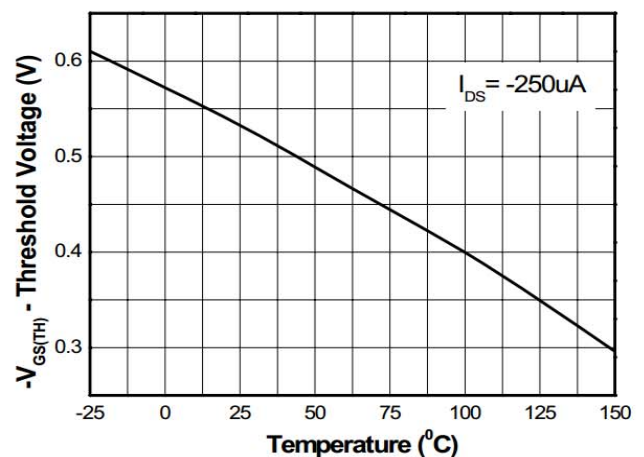
On-Resistance vs. Drain current



On-Resistance vs. Gate-to-Source voltage

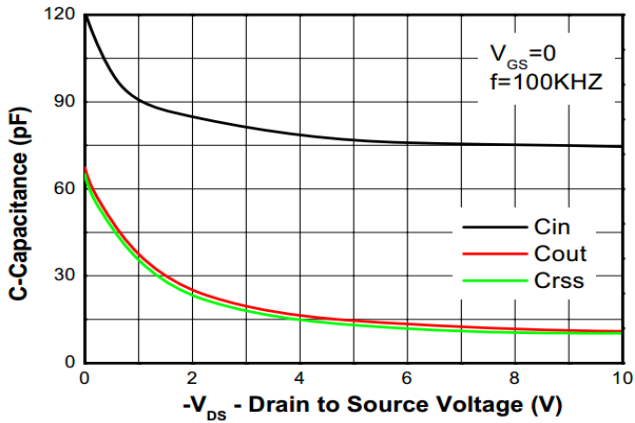


On-Resistance vs. Junction temperature

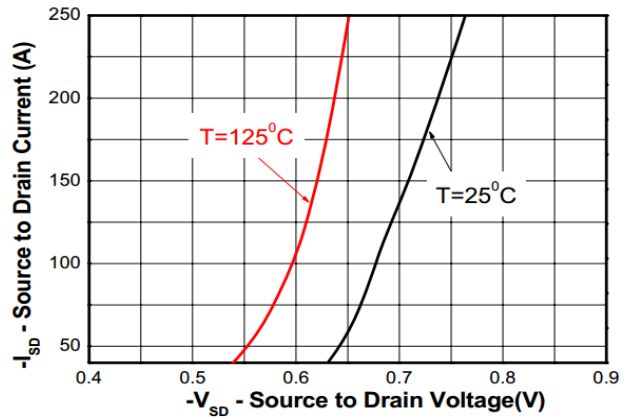


Threshold voltage vs. Temperature

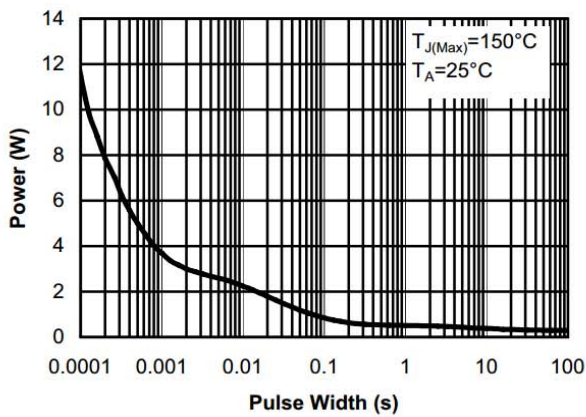
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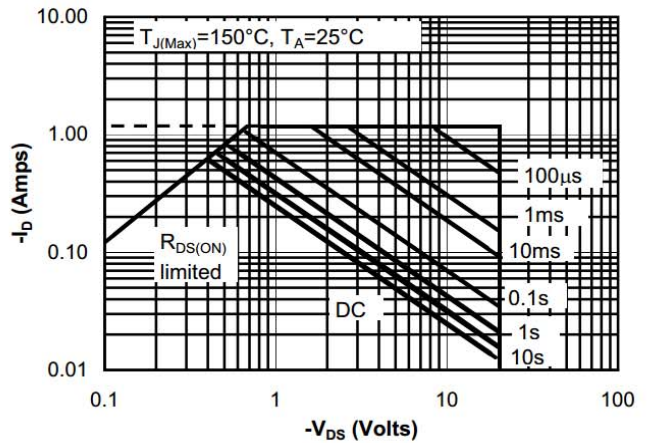
Capacitance



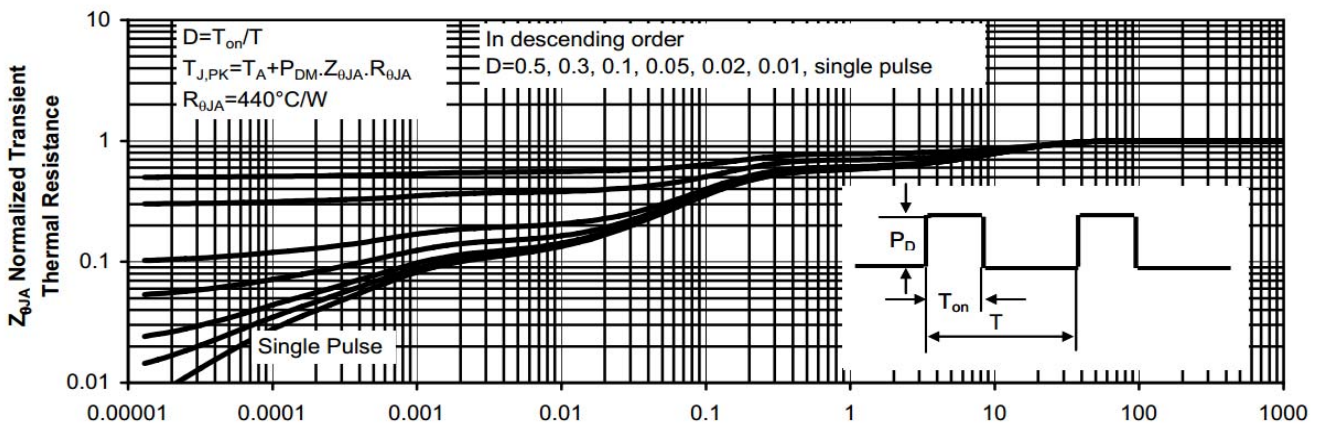
Body diode forward voltage



Single pulse power



Safe operating power



Transient thermal response (Junction-to-Ambient)