

RoHS Compliant Product  
A Suffix of "-C" specifies halogen & lead-free

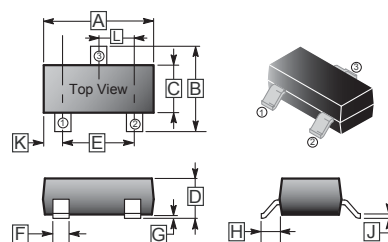
## DESCRIPTION

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. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

## FEATURES

- Low  $R_{DS(on)}$  provides higher efficiency and extends battery life.
- Low thermal impedance copper leadframe SOT-323 saves board space.
- Fast switching speed.
- High performance trench technology.

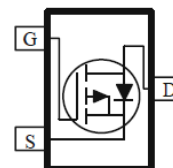
## SOT-323



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	1.80	2.20	G	0.1	REF.
B	1.80	2.45	H	0.525	REF.
C	1.1	1.4	J	0.08	0.25
D	0.80	1.10	K	0.8 TYP.	
E	1.20	1.40	L	0.65 TYP.	
F	0.15	0.40			

## PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-323	3K	7 inch



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

Parameter	Symbol	Ratings	Unit	
Drain – Source Voltage	$V_{DS}$	-20	V	
Gate – Source Voltage	$V_{GS}$	±8	V	
Continuous Drain Current <sup>1</sup>	$I_D @ T_A=25^\circ\text{C}$	-1.7	A	
	$I_D @ T_A=70^\circ\text{C}$	-1.4		
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	-2.5	A	
Continuous Source Current (Diode Conduction) <sup>1</sup>	$I_S$	±0.28	A	
Power Dissipation <sup>1</sup>	$P_D @ T_A=25^\circ\text{C}$	0.34	W	
	$P_D @ T_A=70^\circ\text{C}$	0.22		
Operating Junction & Storage Temperature Range	$T_J, T_{STG}$	-55~150	°C	
<b>Thermal Resistance Ratings</b>				
Maximum Thermal Resistance Junction-Ambient <sup>1</sup>	$t \leq 5$ sec	$R_{\theta JA}$	375	°C / W
	Steady-State		430	

Note:

1. Surface Mounted on 1" x 1" FR4 Board.
2. Pulse width limited by maximum junction temperature.

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate-Threshold Voltage	$V_{GS(th)}$	-0.4	-	-	V	$V_{DS} = V_{GS}$ , $I_D = -250\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{DS} = 0\text{V}$ , $V_{GS} = \pm 8\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	-1	$\mu\text{A}$	$V_{DS} = -16\text{V}$ , $V_{GS} = 0\text{V}$
		-	-	-10		$V_{DS} = -16\text{V}$ , $V_{GS} = 0\text{V}$ , $T_J = 55^\circ\text{C}$
On-State Drain Current <sup>1</sup>	$I_{D(on)}$	-5	-	-	A	$V_{DS} = -5\text{V}$ , $V_{GS} = -4.5\text{V}$
Drain-Source On-Resistance <sup>1</sup>	$R_{DS(ON)}$	-	-	79	mΩ	$V_{GS} = -4.5\text{V}$ , $I_D = -1.7\text{A}$
		-	-	110		$V_{GS} = -2.5\text{V}$ , $I_D = -1.5\text{A}$
Forward Transconductance <sup>1</sup>	$g_{FS}$	-	9	-	S	$V_{DS} = -5\text{V}$ , $I_D = -1.25\text{A}$
Diode Forward Voltage	$V_{SD}$	-	-0.65	-	V	$I_S = -0.46\text{A}$ , $V_{GS} = 0\text{V}$
<b>Dynamic <sup>2</sup></b>						
Total Gate Charge	$Q_g$	-	7.2	-	nC	$V_{DS} = -10\text{V}$ $V_{GS} = -4.5\text{V}$ $I_D = -1.7\text{A}$
Gate-Source Charge	$Q_{gs}$	-	1.7	-		
Gate-Drain Charge	$Q_{gd}$	-	1.5	-		
Turn-on Delay Time	$T_{d(ON)}$	-	10	-	nS	$V_{DD} = -10\text{V}$ $I_L = -1\text{A}$ $V_{GEN} = -4.5\text{V}$ $R_G = 6\Omega$
Rise Time	$T_R$	-	9	-		
Turn-off Delay Time	$T_{d(OFF)}$	-	27	-		
Fall Time	$T_F$	-	11	-		

Notes :

1. Pulse test :  $PW \leq 300\mu\text{s}$  duty cycle  $\leq 2\%$ .
2. Guaranteed by design, not subject to production testing.
3. Repetitive rating, pulse width limited by junction temperature.

**CHARACTERISTIC CURVES**

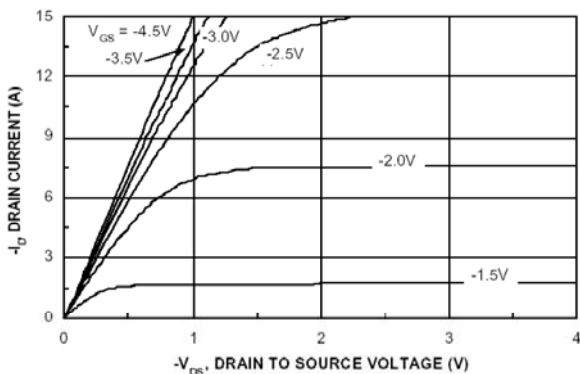


Figure 1. On-Region Characteristics

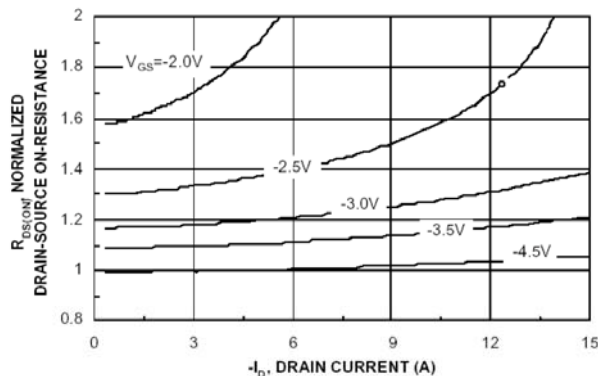


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

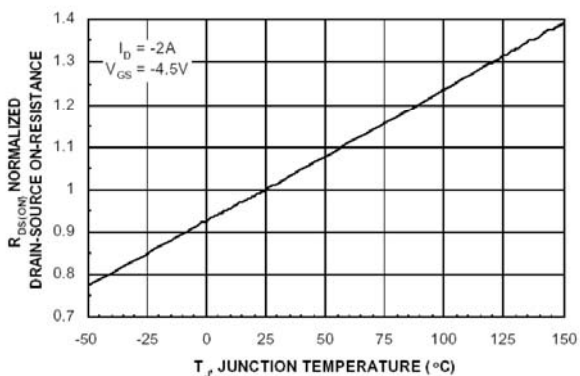


Figure 3. On-Resistance Variation with Temperature

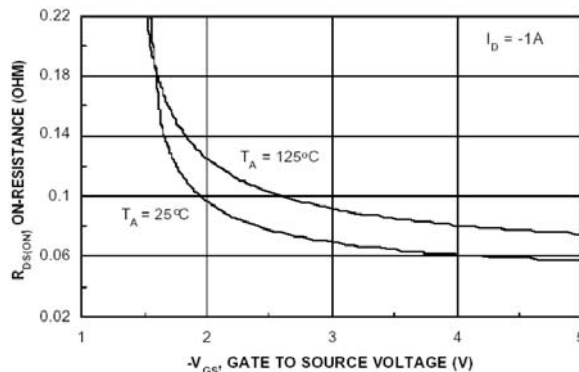


Figure 4. On-Resistance Variation with Gate to Source Voltage

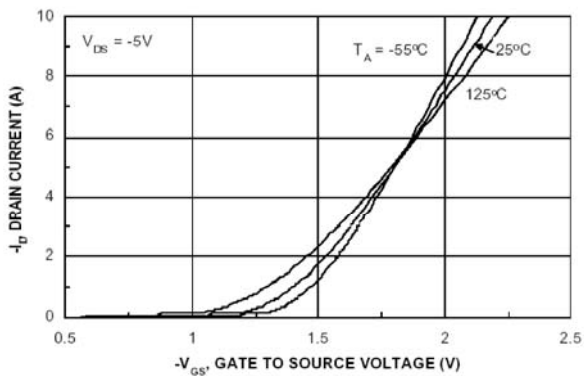


Figure 5. Transfer Characteristics

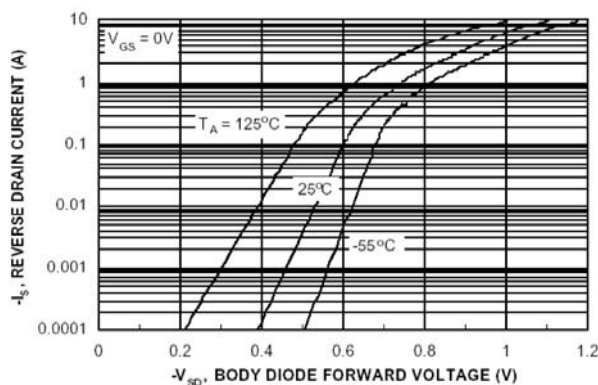
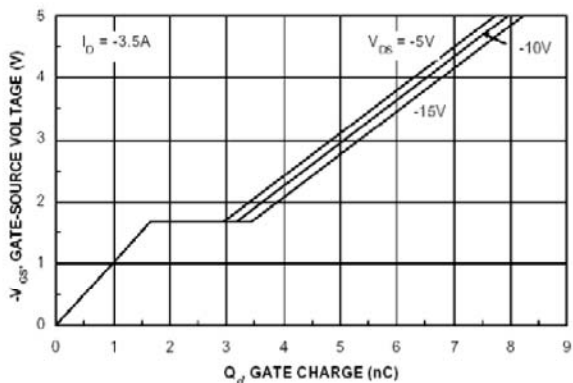
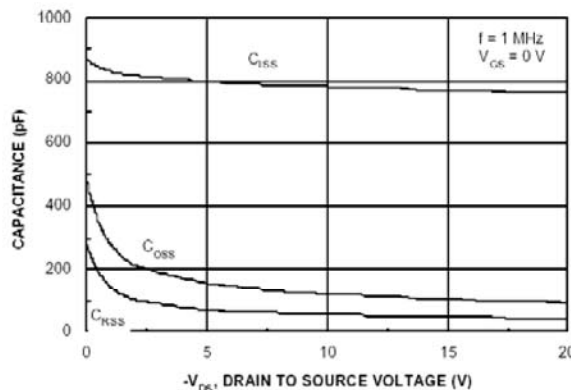


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

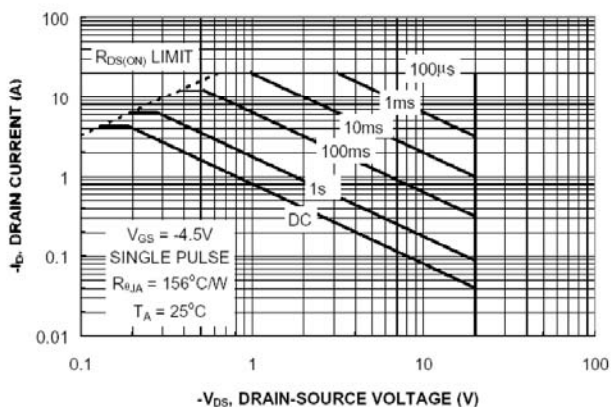
**CHARACTERISTIC CURVES**



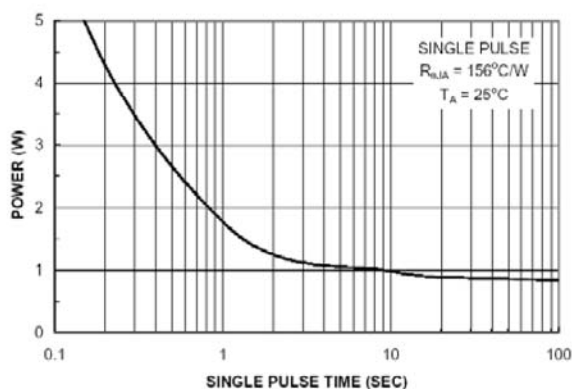
**Figure 7. Gate Charge Characteristic**



**Figure 8. Capacitance Characteristic**

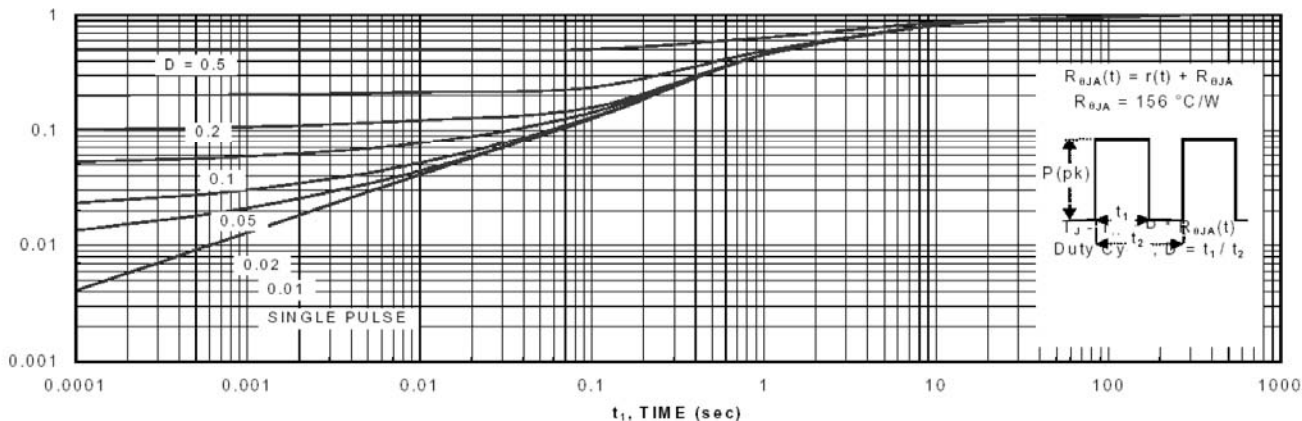


**Figure 9. Maximum Safe Operating Area**



**Figure 10. Single Pulse Maximum Power Dissipation**

**Normalized Thermal Transient Junction to Ambient**



**Figure 11. Transient Thermal Response Curve.**