

RoHS Compliant Product  
A suffix of "-C" specifies halogen 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.

## FEATURES

- Low  $R_{DS(on)}$  provides higher efficiency and extends battery life.
- Low thermal impedance copper leadframe TO-252 saves board space.
- Fast Switch Speed.
- High performance trench technology.

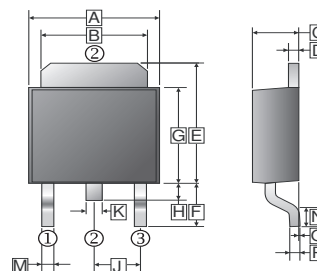
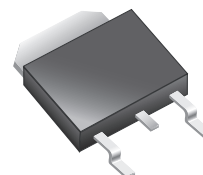
## APPLICATION

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

## PACKAGE INFORMATION

Package	MPQ	Leader Size
TO-252	2.5K	13 inch

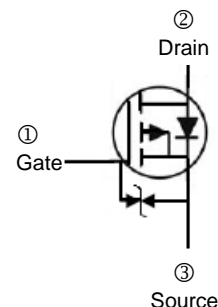
## TO-252(D-Pack)



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.35	6.80	J	2.30	REF.
B	5.20	5.50	K	0.64	0.90
C	2.15	2.40	M	0.50	1.1
D	0.45	0.58	N	0.9	1.65
E	6.8	7.5	O	0	0.15
F	2.40	3.0	P	0.43	0.58
G	5.40	6.25			
H	0.64	1.20			



ESD  
Protection  
Diode  
3KV



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

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	-40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup>	$I_D$	-36	A
Pulsed Drain Current @ $T_A=25^\circ\text{C}$ <sup>2</sup>	$I_{DM}$	-40	A
Continuous Source Current (Diode Conduction) <sup>1</sup>	$I_S$	-30	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$ <sup>1</sup>	$P_D$	50	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 ~ 175	$^\circ\text{C}$
Thermal Resistance Ratings			
Maximum Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	50	$^\circ\text{C} / \text{W}$
Maximum Thermal Resistance Junction-Case	$R_{\theta JC}$	3	$^\circ\text{C} / \text{W}$

Notes :

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

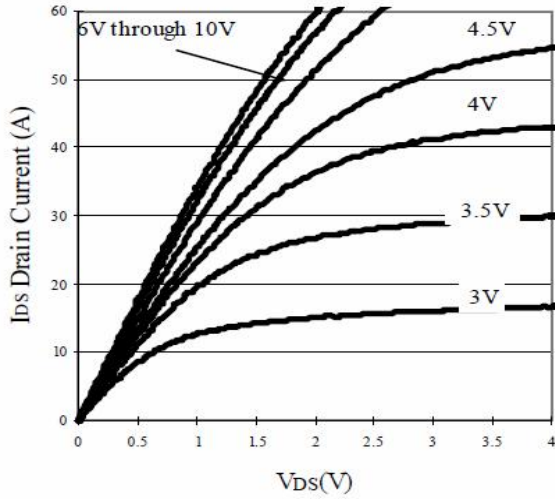
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>						
Gate-Threshold Voltage	$V_{GS(th)}$	-1	-	-	V	$V_{DS}=V_{GS}$ , $I_D = -250\mu\text{A}$
Gate-Body Leakage	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{DS}=0$ , $V_{GS}= \pm 25\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	-1	$\mu\text{A}$	$V_{DS}= -24\text{V}$ , $V_{GS}=0$
		-	-	-5		$V_{DS}= -24\text{V}$ , $V_{GS}=0$ , $T_J=55^\circ\text{C}$
On-State Drain Current <sup>1</sup>	$I_{D(on)}$	-41	-	-	A	$V_{DS}= -5\text{V}$ , $V_{GS}= -10\text{V}$
Drain-Source On-Resistance <sup>1</sup>	$R_{DS(ON)}$	-	-	30	m $\Omega$	$V_{GS}= -10\text{V}$ , $I_D= -36\text{A}$
		-	-	40		$V_{GS}= -4.5\text{V}$ , $I_D= -29\text{A}$
Forward Transconductance <sup>1</sup>	$g_{fs}$	-	31	-	S	$V_{DS}= -15\text{V}$ , $I_D= -36\text{A}$
Diode Forward Voltage	$V_{SD}$	-	-0.7	-	V	$I_S= -41\text{A}$ , $V_{GS}=0$
<b>Dynamic <sup>2</sup></b>						
Total Gate Charge	$Q_g$	-	13.9	30	nC	$V_{DS}= -15\text{V}$ $V_{GS}= -4.5\text{V}$ $I_D= -36\text{A}$
Gate-Source Charge	$Q_{gs}$	-	5.2	20		
Gate-Drain Charge	$Q_{gd}$	-	5.8	20		
Input Capacitance	$C_{iss}$	-	1583	4000	pF	$V_{DS}= -15\text{V}$ , $V_{GS}=0$ , $f=1\text{MHz}$
Output Capacitance	$C_{oss}$	-	278	600		
Reverse Transfer Capacitance	$C_{rss}$	-	183	400		
Turn-on Delay Time	$T_{d(on)}$	-	15	-	nS	$V_{DD}= -15\text{V}$ $I_D= -41\text{A}$ $V_{GEN}= -10\text{V}$ $R_L=15\Omega$ $R_G=6\Omega$
Rise Time	$T_r$	-	12	-		
Turn-off Delay Time	$T_{d(off)}$	-	62	-		
Fall Time	$T_f$	-	46	-		

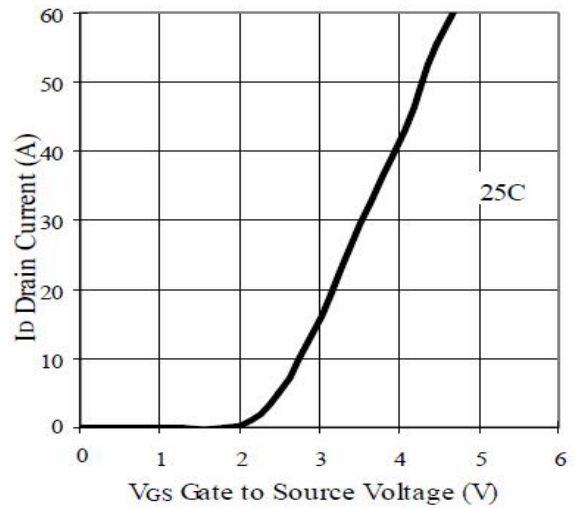
Notes:

1. Pulse test : Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
2. Guaranteed by design, not subject to production testing.

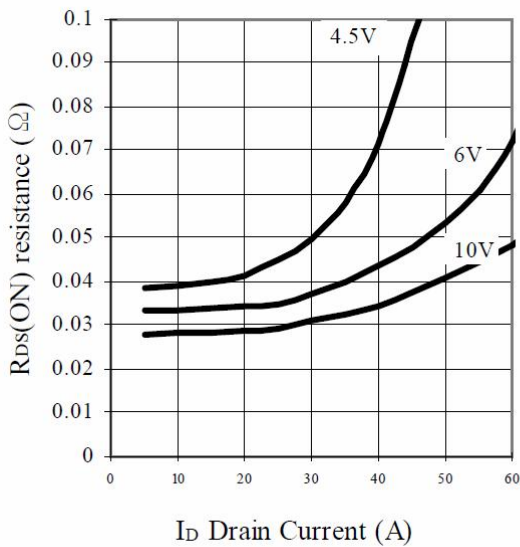
**CHARACTERISTIC CURVES**



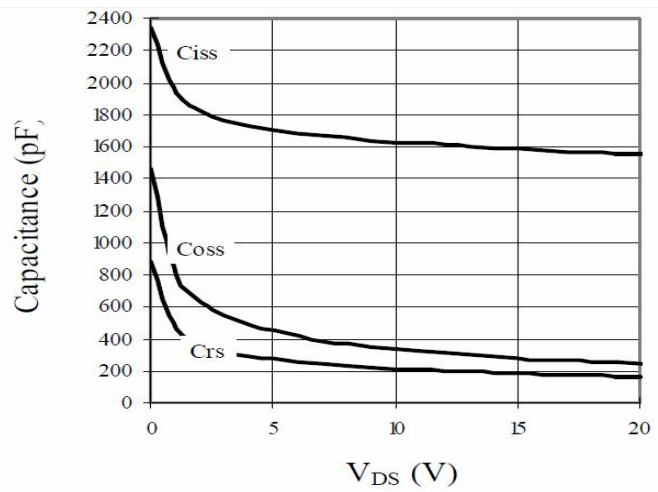
**Output Characteristics**



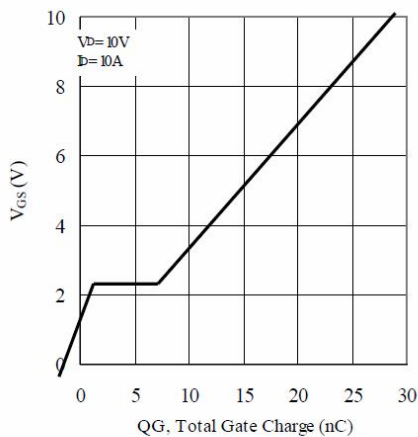
**Transfer Characteristics**



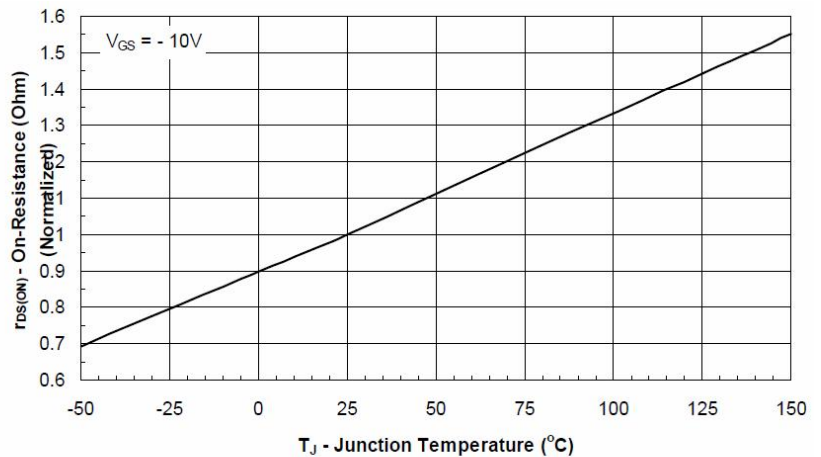
**On Resistance Vs Vgs Voltage**



**Capacitance**

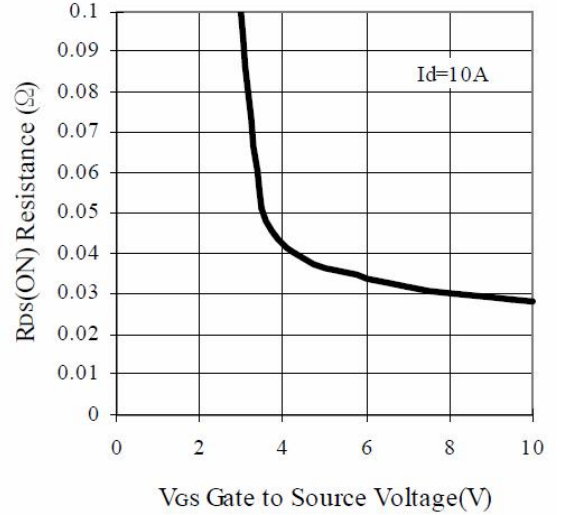
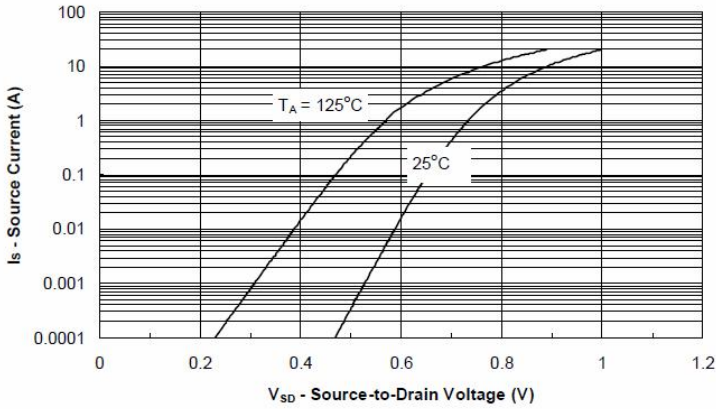


**Gate Charge**

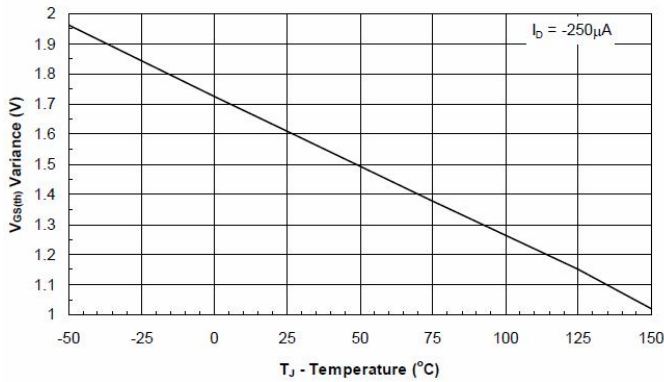


**On-Resistance vs. Junction Temperature**

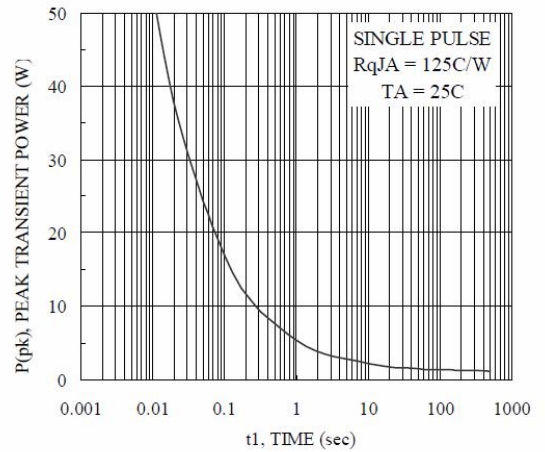
**CHARACTERISTIC CURVES**



**Source-Drain Diode Forward Voltage**



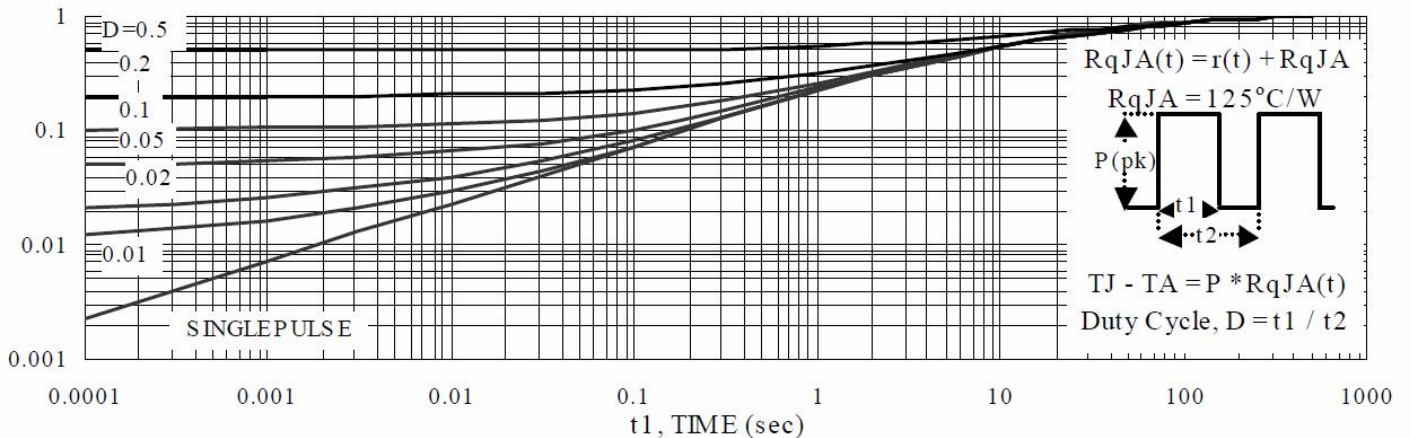
**On-Resistance with Gate to Source Voltage**



**Threshold Voltage**

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

**Normalized Thermal Transient Junction to Ambient**



**Figure 11. Transient Thermal Response Curve**