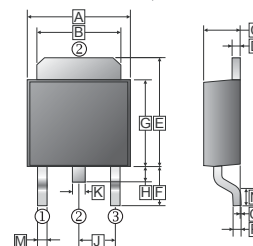
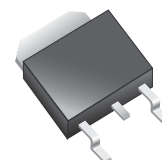


RoHS Compliant Product  
A suffix of "-C" specifies halogen free

## DESCRIPTION

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low R<sub>DS(on)</sub> 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.

### TO-252(D-Pack)

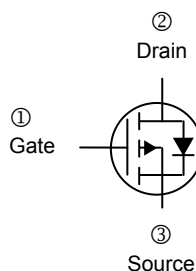


## FEATURES

- Low R<sub>DS(on)</sub> provides higher efficiency and extends battery life.
- Low thermal impedance copper leadframe DPAK saves board space.
- Fast switching speed.
- High performance trench technology.

## PRODUCT SUMMARY

PRODUCT SUMMARY		
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> m(Ω)	I <sub>D</sub> (A)
-30	59@V <sub>GS</sub> = -10V	24
	95@V <sub>GS</sub> = -4.5V	19



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.4	6.8	J	2.30	REF.
B	5.20	5.50	K	0.70	0.90
C	2.20	2.40	M	0.50	1.1
D	0.45	0.58	N	0.9	1.6
E	6.8	7.3	O	0	0.15
F	2.40	3.0	P	0.43	0.58
G	5.40	6.2			
H	0.8	1.20			

## ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V <sub>DS</sub>	-30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current <sup>a</sup>	I <sub>D</sub> @T <sub>A</sub> =25°C	24	A
Pulsed Drain Current <sup>b</sup>	I <sub>DM</sub>	±40	A
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	-30	A
Total Power Dissipation <sup>a</sup>	P <sub>D</sub> @T <sub>A</sub> =25°C	50	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 ~ 175	°C
THERMAL RESISTANCE RATINGS			
Maximum Thermal Resistance Junction-Ambient <sup>a</sup>	R <sub>θJA</sub>	50	°C / W
Maximum Thermal Resistance Junction-Case	R <sub>θJC</sub>	3.0	°C / W

Notes :

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

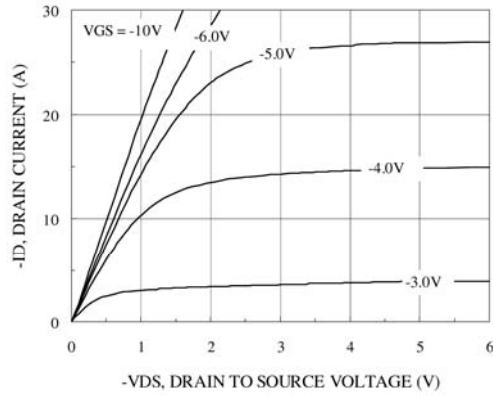
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
<b>Static</b>						
Gate-Threshold Voltage	$V_{GS(th)}$	-1	-	-		$V_{DS} = V_{GS}, I_D = -250 \mu\text{A}$
Gate-Body Leakage	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	-1	$\mu\text{A}$	$V_{DS} = -24\text{V}, V_{GS} = 0\text{V}$
		-	-	-5		$V_{DS} = -24\text{V}, V_{GS} = 0\text{V}, T_J = 55^\circ\text{C}$
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	-41	-	-	A	$V_{DS} = -5\text{V}, V_{GS} = -10\text{V}$
Drain-Source On-Resistance <sup>a</sup>	$R_{DS(ON)}$	-	-	59	m $\Omega$	$V_{GS} = -10\text{V}, I_D = -24\text{A}$
		-	-	95		$V_{GS} = -4.5\text{V}, I_D = -19\text{A}$
Forward Transconductance <sup>a</sup>	$g_{fs}$	-	31	-	S	$V_{DS} = -15\text{V}, I_D = -24\text{A}$
Diode Forward Voltage	$V_{SD}$	-	-0.7	-	V	$I_S = -41\text{A}, V_{GS} = 0\text{V}$
<b>Dynamic <sup>b</sup></b>						
Total Gate Charge	$Q_g$	-	6.4	-	nC	$V_{DS} = -15\text{V}$ $V_{GS} = -4.5\text{V}$ $I_D = -24\text{A}$
Gate-Source Charge	$Q_{gs}$	-	1.9	-		
Gate-Drain Charge	$Q_{gd}$	-	2.5	-		
Input Capacitance	$C_{ISS}$	-	520	-	pF	$V_{GS} = 0\text{V}$ $V_{DS} = -15\text{V}$ $f = 1\text{MHz}$
Output Capacitance	$C_{OSS}$	-	130	-		
Reverse Transfer Capacitance	$C_{RSS}$	-	70	-		
<b>Switching</b>						
Turn-on Delay Time	$T_{d(on)}$	-	10	-	nS	$V_{DD} = -15\text{V}$ $I_D = -24\text{A}$ $V_{GEN} = -10\text{V}$ $R_L = 15\Omega$ $R_G = 6\Omega$
Rise Time	$T_r$	-	2.8	-		
Turn-off Delay Time	$T_{d(off)}$	-	53.6	-		
Fall Time	$T_f$	-	46	-		

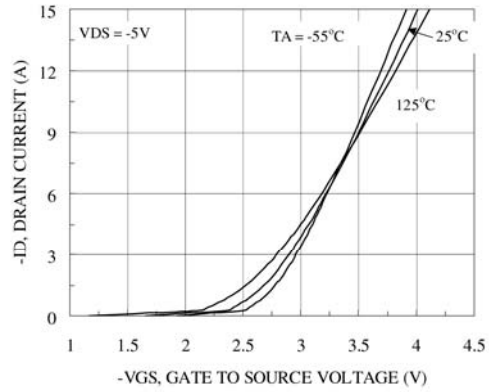
Notes

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

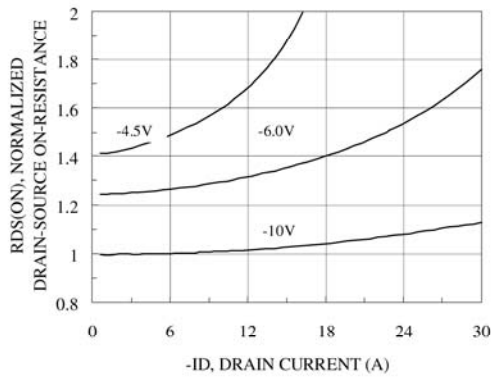
**CHARACTERISTIC CURVE**



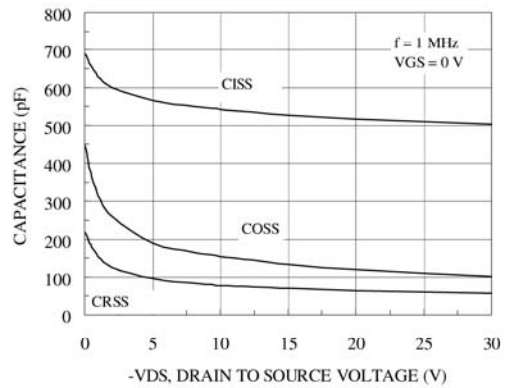
**Figure 1. On-Region Characteristics**



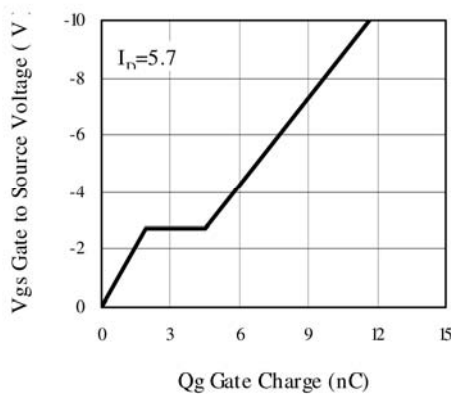
**Figure 2. Body Diode Forward Voltage Variation with Source Current and Temperature**



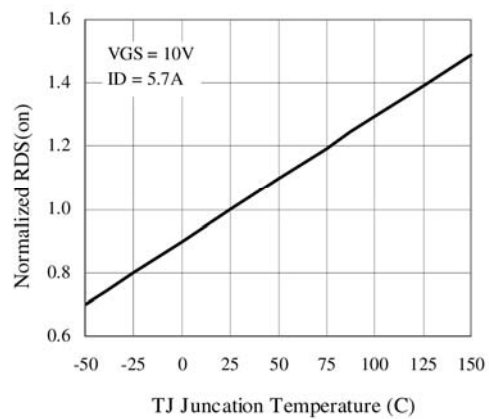
**Figure 3. On Resistance Vs Vgs Voltage**



**Figure 4. Capacitance Characteristics**



**Figure 5. Gate Charge Characteristics**



**Figure 6. On-Resistance Variation with Temperature**

**CHARACTERISTIC CURVE**

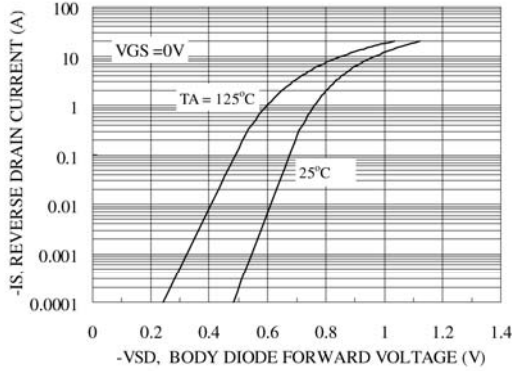


Figure 7. Transfer Characteristics

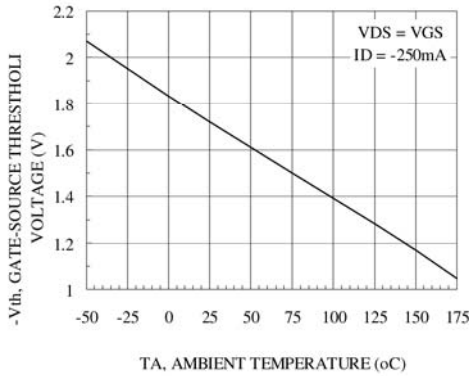


Figure 9.  $V_{th}$  Gate to Source Voltage Vs Temperature

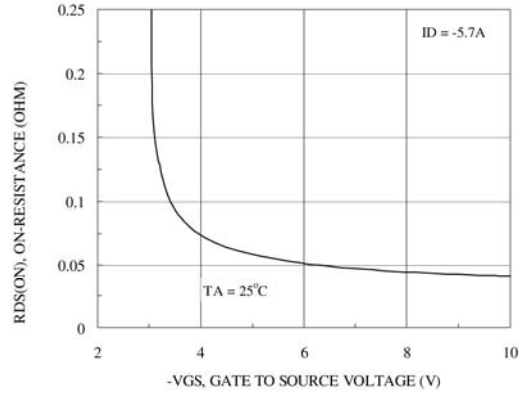


Figure 8. On-Resistance with Gate to Source Voltage

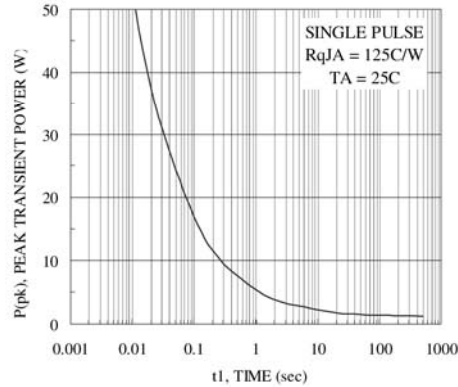


Figure 10. Single Pulse Maximum Power Dissipation

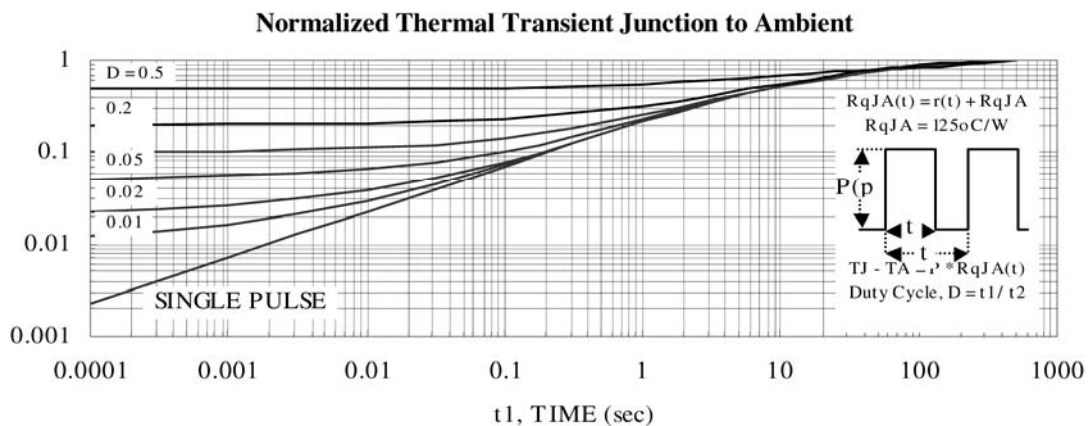


Figure 11. Transient Thermal Response Curve