

## Description

## P-channel Enhancement Mode Power MOSFET

## Features

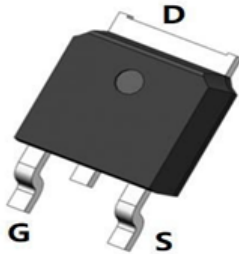
- -60V, -40A
- $R_{DS(ON)} < 28m\Omega @ V_{GS} = -10V$
- Advanced Split Gate Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge

## Applications

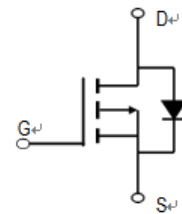
- Battery switching application
- Hard switched and high frequency circuits
- Power Management



100% UI TESTED!

100%  $\Delta V_{ds}$  TESTED!

TO-252-3L



Schematic Diagram

## Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel (pcs)	Per Carton (pcs)
OCG40P06K	OCG40P06K	TAPING	TO-252-3L	13"	2500	25000

Absolute Maximum Ratings (@  $T_C = 25^\circ\text{C}$  unless otherwise specified)

Symbol	Parameter	Value	Units
$V_{DS}$	Drain-to-Source Voltage	-60	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
$I_{DM}$	Pulsed Drain Current <sup>(1)</sup>	-320	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>(2)</sup>	100	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ\text{C}$	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.9	$^\circ\text{C/W}$
$T_J, T_{STG}$	Junction & Storage Temperature Range	-55 to 150	$^\circ\text{C}$

**Electrical Characteristics**( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =-250μA,V <sub>GS</sub> =0V	-60	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-60V,V <sub>GS</sub> =0V	-	-	-1.0	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>DS</sub> =0V,V <sub>GS</sub> =±20V	-	-	±100	nA
On Characteristics						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =-250μA	-1.2	-1.8	-2.5	V
R <sub>DS(ON)</sub>	Static Drain- Source ON- Resistance <sup>(3)</sup>	V <sub>GS</sub> =-10V,I <sub>D</sub> =-15A	-	21.0	28.0	mΩ□
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V,V <sub>DS</sub> =-30V, f=1MHz	-	1568	-	pF
C <sub>oss</sub>	Output Capacitance		-	291	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	21	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =0to-10V V <sub>DS</sub> =-30V,I <sub>D</sub> =-3A	-	23	-	nC
Q <sub>gs</sub>	Gate Source Charge		-	4	-	nC
Q <sub>gd</sub>	Gate Drain("Miller")Charge		-	3	-	nC
Switching Characteristics						
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =-10V,V <sub>DD</sub> =-30V I <sub>D</sub> =-4A,RGEN=6Ω	-	7	-	ns
t <sub>r</sub>	Turn-On Rise Time		-	5	-	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		-	65	-	ns
t <sub>f</sub>	Turn-Off Fall Time		-	20	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	-40	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-320	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V,I <sub>S</sub> =-6A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I <sub>F</sub> =-4A,di/dt=100A/us	-	31	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	26	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
  2.  $E_{AS}$  condition: Starting  $T_J=25^{\circ}\text{C}$ ,  $V_{DD}=30\text{V}$ ,  $V_G=10\text{V}$ ,  $R_G=25\text{ohm}$ ,  $L=0.5\text{mH}$ ,  $I_{AS}=20\text{A}$
  3. Pulse Test:  $\text{Pulse Width} \leq 300\mu\text{s}$ ,  $\text{Duty Cycle} \leq 0.5\%$ .

## Test Circuit

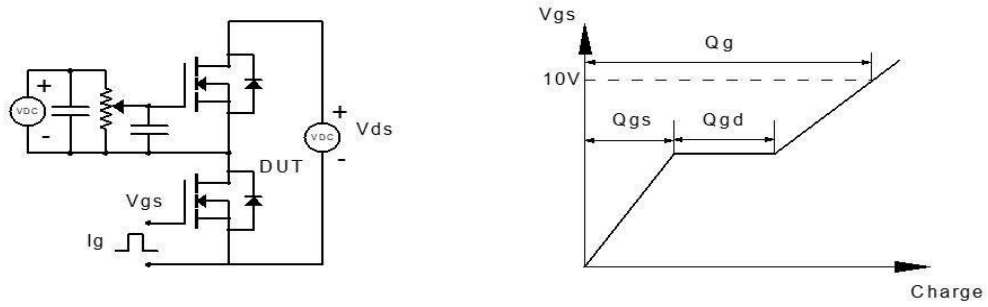


Figure1:GateChargeTestCircuit&Waveform

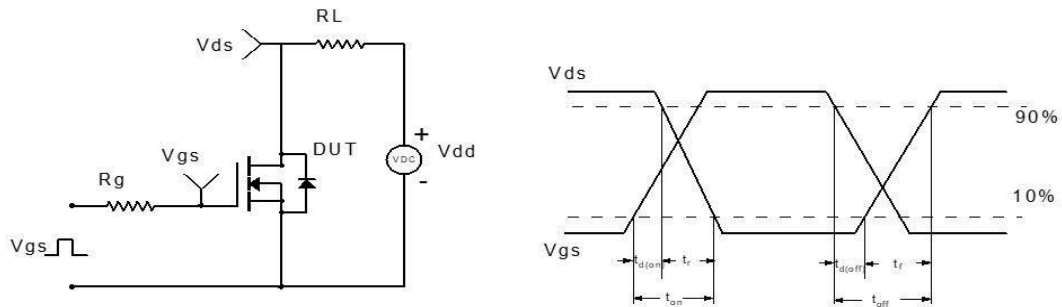


Figure2:ResistiveSwitchingTestCircuit&Waveform

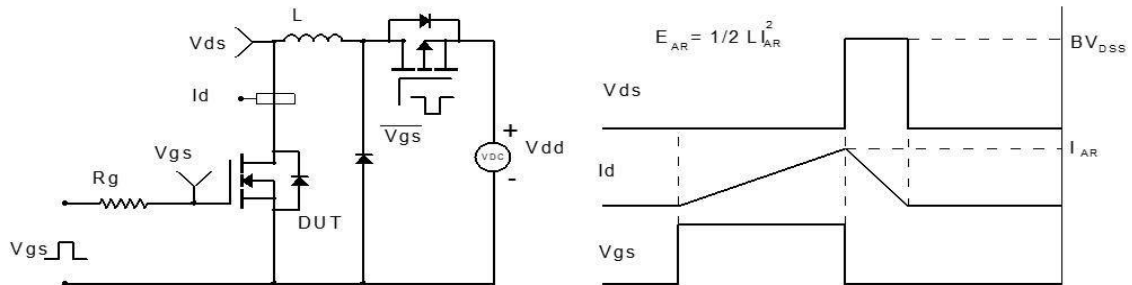


Figure3:UnclampedInductiveSwitchingTestCircuit&Waveform

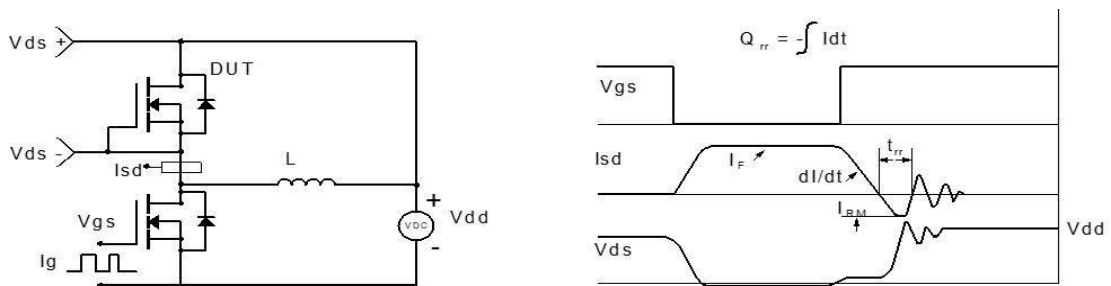
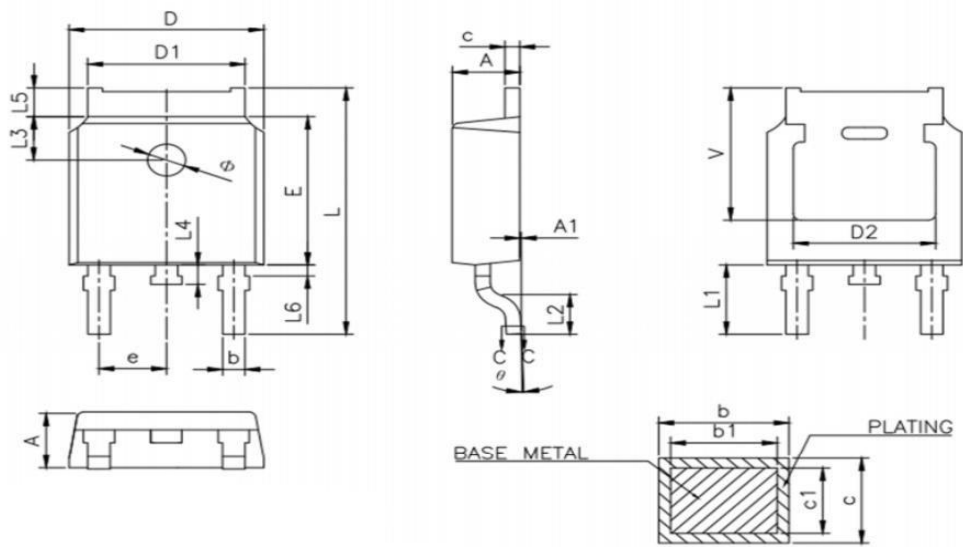


Figure4:DiodeRecoveryTestCircuit&Waveform

Package Mechanical Data(TO-252-3L)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	--	0.127
b	0.66	--	0.86
b1	0.65	0.76	0.81
D	6.50	6.60	6.70
D1	5.10	5.33	5.46
c	0.47	--	0.60
c1	0.46	0.51	0.56
D2	4.83 REF.		
E	6.00	6.10	6.20
e	2.186	2.286	2.386
L	9.80	10.10	10.40
L1	2.90 REF.		
L2	1.40	1.50	1.60
L3	1.80 REF.		
L4	0.60	0.80	1.00
L5	0.90	--	1.25
L6	0.15	--	0.75
Φ	1.10	--	1.30
θ	0°	--	8°
V	5.40 REF.		