

Absolute Maximum Ratings at $T_j=25$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	600	V
Gate-source voltage	V_{GS}	± 30	V
Continuous drain current ¹⁾ , $T_C=25$ °C	I_D	47	A
Continuous drain current ¹⁾ , $T_C=100$ °C		30	
Pulsed drain current ²⁾ , $T_C=25$ °C	$I_{D, pulse}$	141	A
Continuous diode forward current ¹⁾ , $T_C=25$ °C	I_S	47	A
Diode pulsed current ²⁾ , $T_C=25$ °C	$I_{S, pulse}$	141	A
Power dissipation ³⁾ , $T_C=25$ °C	P_D	35	W
Single pulsed avalanche energy ⁵⁾	E_{AS}	1000	mJ
MOSFET dv/dt ruggedness, V_{DS}	dv/dt	50	V/ns
Reverse diode dv/dt, V_{DS}	dv/dt	50	V/ns
Operation and storage temperature	T_{stg}, T_j	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	R	3.6	°C/W
Thermal resistance, junction-ambient ⁴⁾	R	62.5	°C/W

Electrical Characteristics at $T_j=25$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	600			V	$V_{GS}=0$ V, $I_D=1$ mA
		650				$V_{GS}=0$ V, $I_D=1$ mA, $T_j=150$ °C
Gate threshold voltage	$V_{GS(th)}$	3		4.5	V	$V_{DS}=V_{GS}$, $I_D=1$ mA
Drain-source on-state resistance	$R_{DS(ON)}$		0.066	0.074		$V_{GS}=10$ V, $I_D=23.5$ A
			0.16			$V_{GS}=10$ V, $I_D=23.5$ A, $T_j=150$ °C
Gate-source leakage current	I_{GSS}			100	nA	$V_{GS}=30$ V
				-100		$V_{GS}=-30$ V
Drain-source leakage current	I_{DSS}			10	A	$V_{DS}=600$ V, $V_{GS}=0$ V

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		2933		pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, Hz
Output capacitance	C_{oss}		350.1		pF	
Reverse transfer capacitance	C_{rss}		7.04		pF	
Turn-on delay time	$t_{d(on)}$		92.3		ns	$V_{GS}=10\text{ V}$, $V_{DS}=400\text{ V}$, $R_G=25$ $I_D=25\text{ A}$
Rise time	t_r		98.1		ns	
Turn-off delay time	$t_{d(off)}$		75.5		ns	
Fall time	t_f		63.9		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		44.8		nC	$V_{GS}=10\text{ V}$, $V_{DS}=400\text{ V}$, $I_D=25\text{ A}$
Gate-source charge	Q_{gs}		18.2		nC	
Gate-drain charge	Q_{gd}		13.8		nC	
Gate plateau voltage	$V_{plateau}$		5.6		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.4	V	$I_S=47\text{ A}$, $V_{GS}=0\text{ V}$
Reverse recovery time	t_{rr}		167		ns	$I_S=25\text{ A}$,
Reverse recovery charge	Q_{rr}		1.15		uC	
Peak reverse recovery current	I_{rrm}		12.7		A	

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of R_{θ} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a=25\text{ }^\circ\text{C}$.
- 5) $V_{DD}=100\text{ V}$, $V_{GS}=10\text{ V}$, $L=40\text{ mH}$, starting $T_j=25\text{ }^\circ\text{C}$.

Electrical Characteristics Diagrams

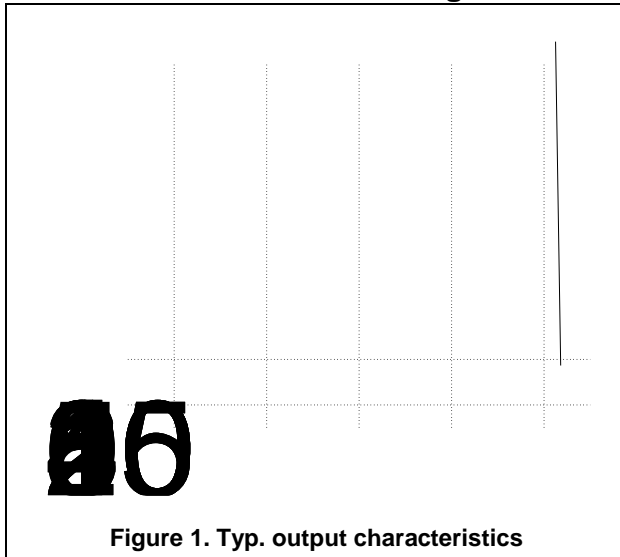


Figure 1. Typ. output characteristics

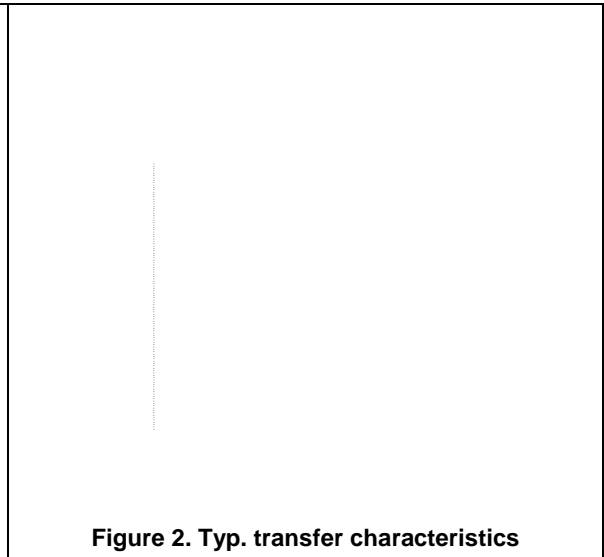


Figure 2. Typ. transfer characteristics

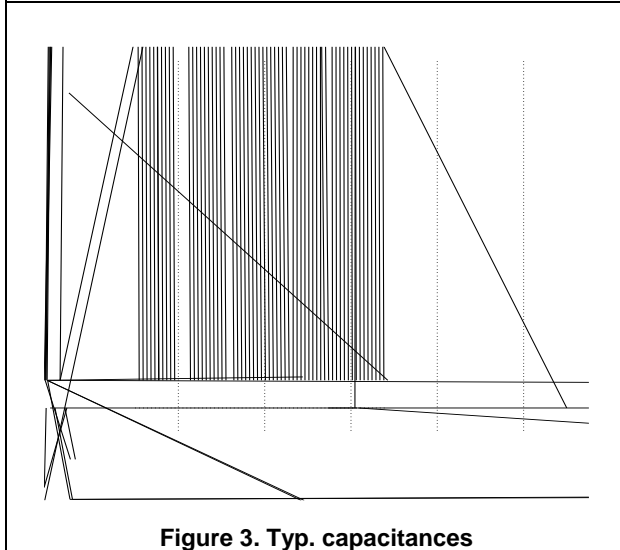


Figure 3. Typ. capacitances

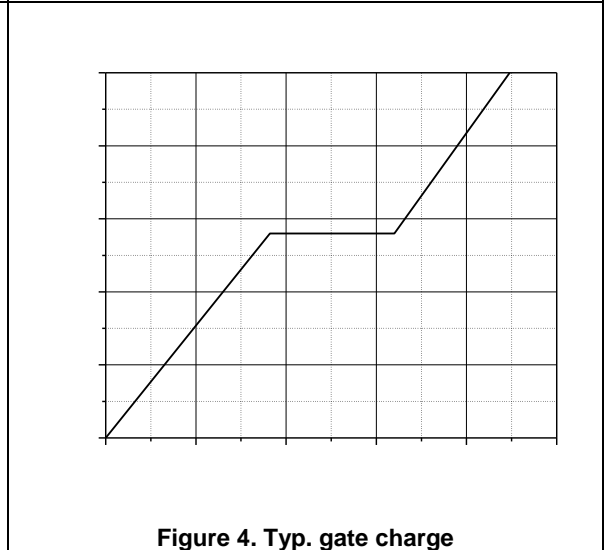


Figure 4. Typ. gate charge

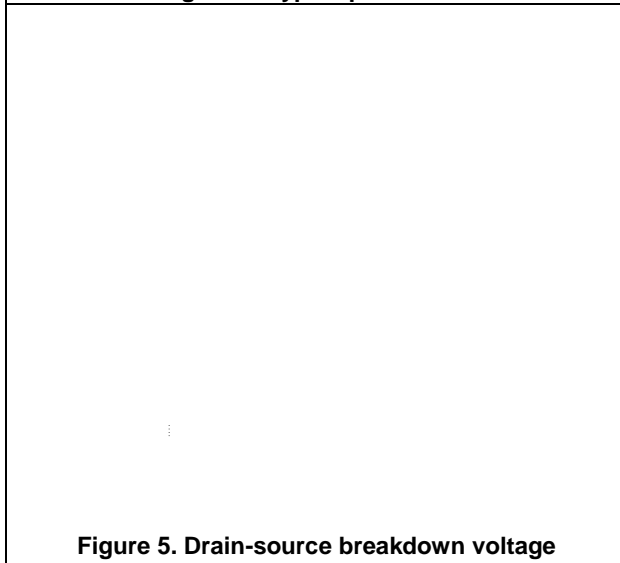


Figure 5. Drain-source breakdown voltage

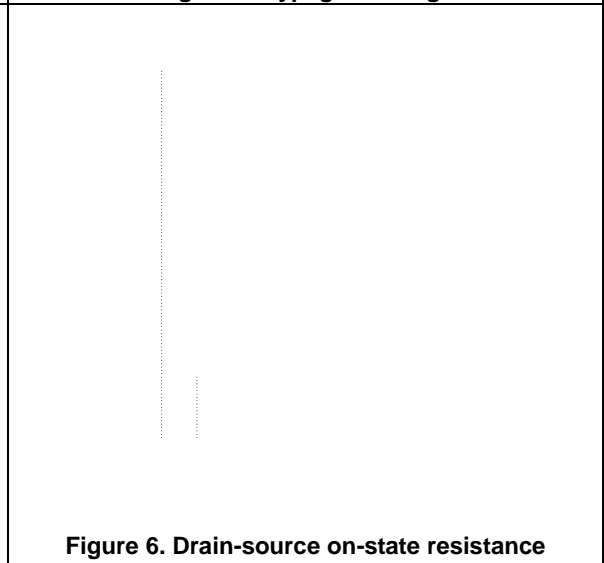


Figure 6. Drain-source on-state resistance

Enhancement Mode N-

Test circuits and waveforms

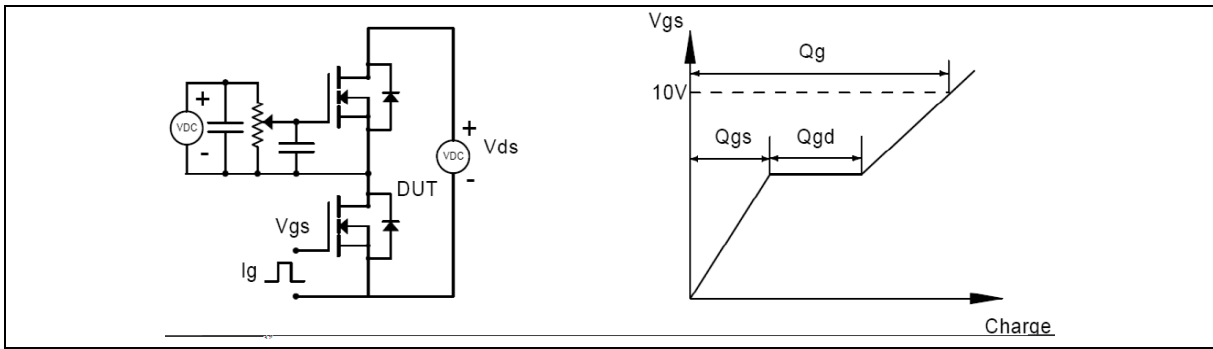


Figure 1. Gate charge test circuit & waveform



Figure 2. Switching time test circuit & waveforms

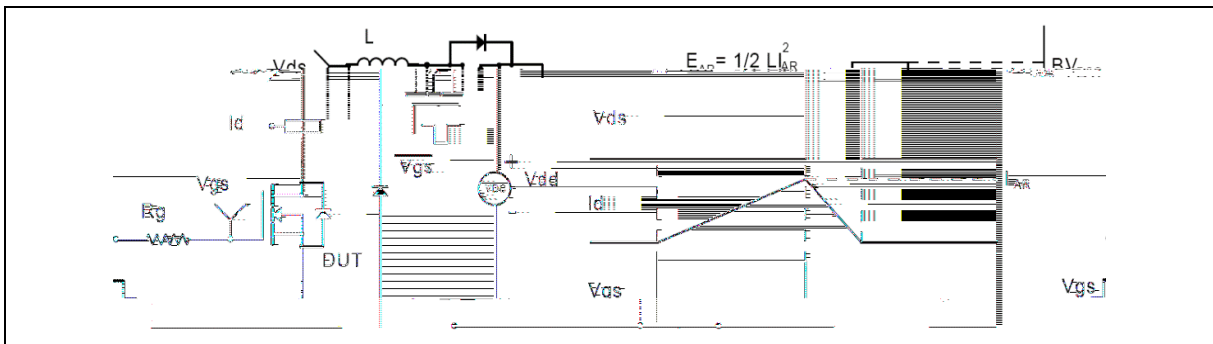


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

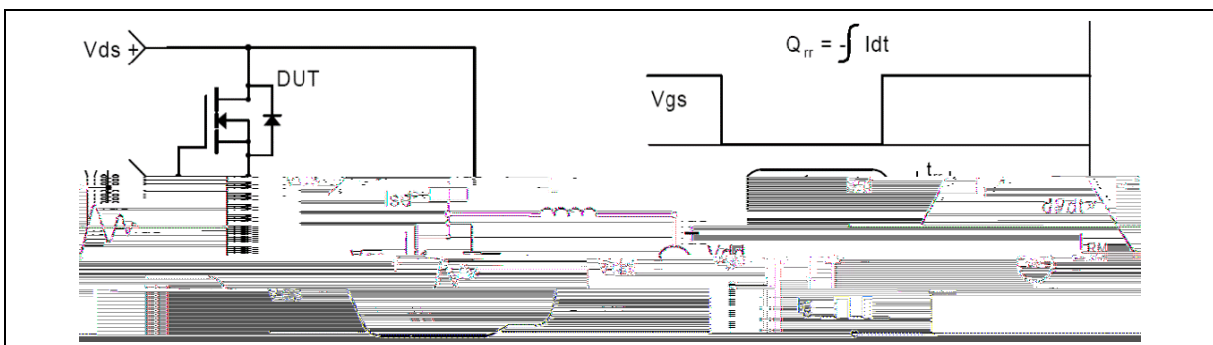
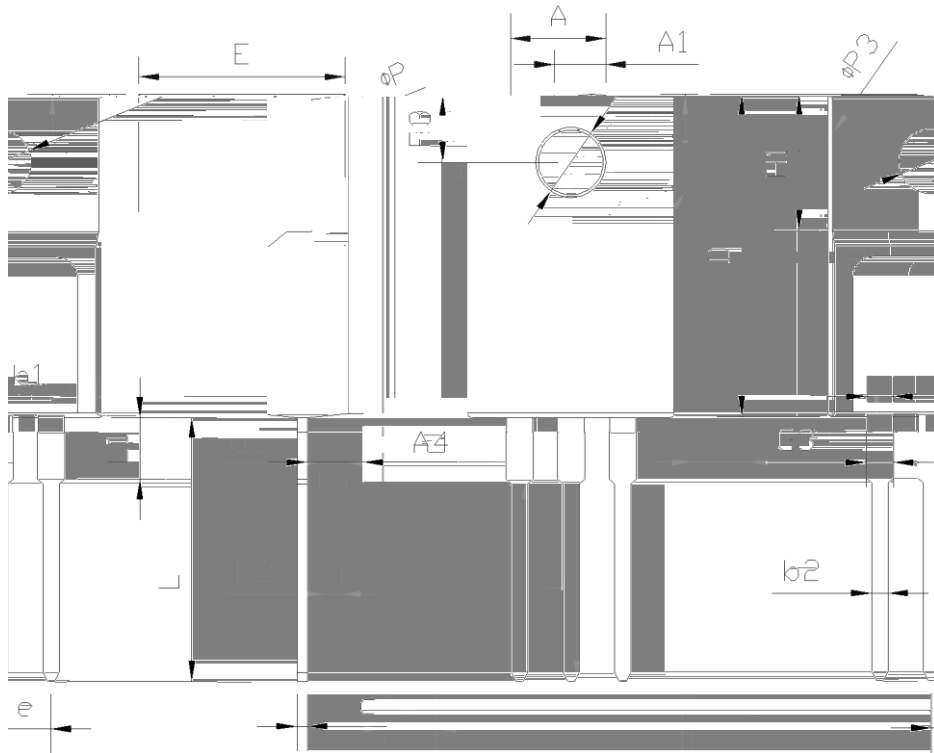


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		
	Min	Nom	Max
E	9.96	10.16	10.36
A	4.50	4.70	4.90
A1	2.34	2.54	2.74
A4	2.56	2.76	2.96
c	0.40	0.50	0.65
D	15.57	15.87	16.17
H1	6.70 REF		
e	2.54 BSC		
L	12.68	12.98	13.28
L1	2.88	3.03	3.18
	3.03	3.18	3.38
	3.15	3.45	3.65
F3	3.15	3.30	3.45
G3	1.25	1.35	1.55
b1	1.18	1.28	1.43
b2	0.70	0.80	0.95

Version 1: TO220F-C outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes / Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO220F-C	50	20	1000	6	6000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG60R074FZF	TO220F	yes	yes	yes