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} SD D	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	$V_{GS(th)}$	3.0		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
Gate resistance	R_G		8			Open drain

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		3982		pF	V_{GS}=0 V, V_{DS}=50 V, Hz
Output capacitance	C_{oss}		354		pF	
Reverse transfer capacitance	C_{rss}		9.3		pF	
Turn-on delay time	$t_{d(on)}$		48.3		ns	V_{GS}=10 V, V_{DS}=400 V, R_G I_D=25 A
Rise time	t_r		88		ns	
Turn-off delay time	$t_{d(off)}$		89.3		ns	
Fall time	t_f		7.2		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		66.8		nC	V_{GS}=10 V, V_{DS}=400 V, I_D=25 A
Gate-source charge	Q_{gs}		24.4		nC	
Gate-drain charge	Q_{gd}		23.5		nC	
Gate plateau voltage	$V_{plateau}$		7.0		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.4	V	I_S=47 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		158.3		ns	I_S=25 A,
Reverse recovery charge	Q_{rr}		1.1		uC	
Peak reverse recovery current	I_{rrm}		12.5		A	

Note

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating; pulse width limited by max. junction temperature.
3) Pd is based on max. junction temperature, using junction-case thermal resistance.
4) The value of R 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 °C.
5) V_{DD}=100 V, V_{GS}=10 V, L=60 mH, starting T_j=25 °C.

Electrical Characteristics Diagrams

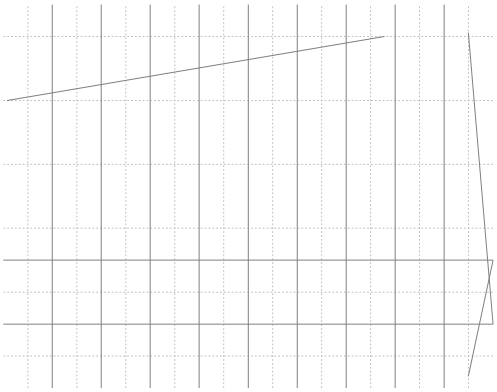


Figure 1. Typ. output characteristics

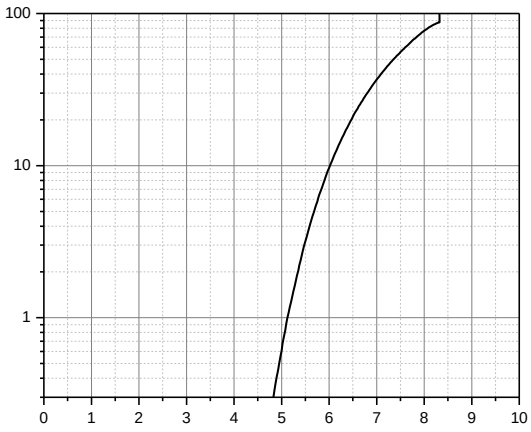


Figure 2. Typ. transfer characteristics

Figure 3. Typ. capacitances

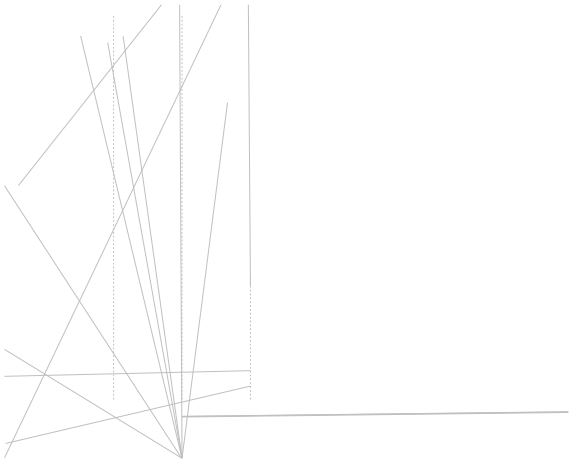


Figure 4. Typ. gate charge

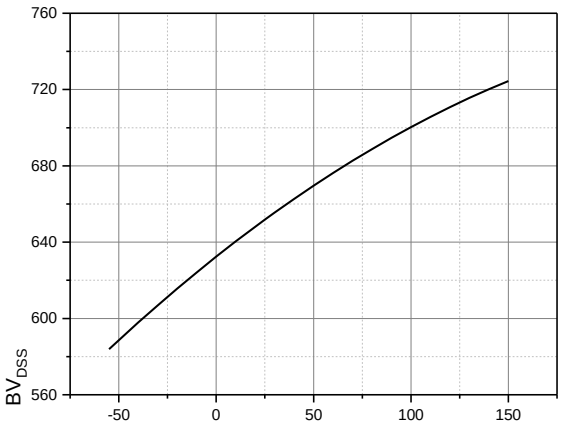


Figure 5. Drain-source breakdown voltage

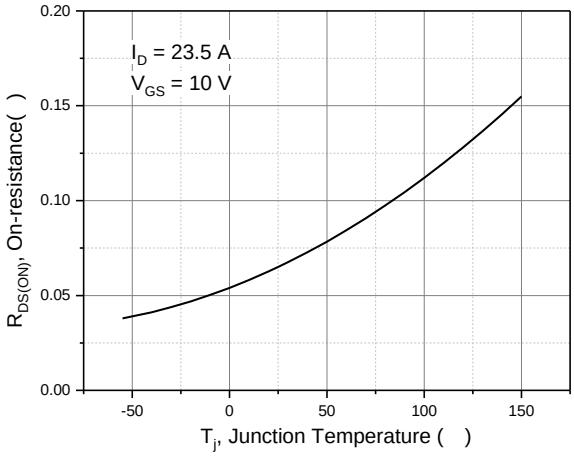


Figure 6. Drain-source on-state resistance

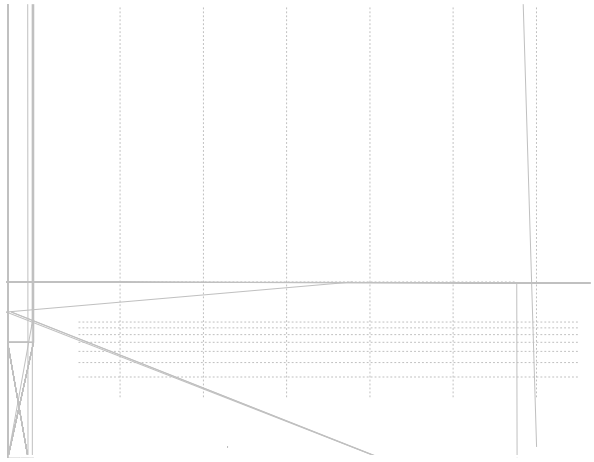


Figure 7. Forward characteristic of body diode

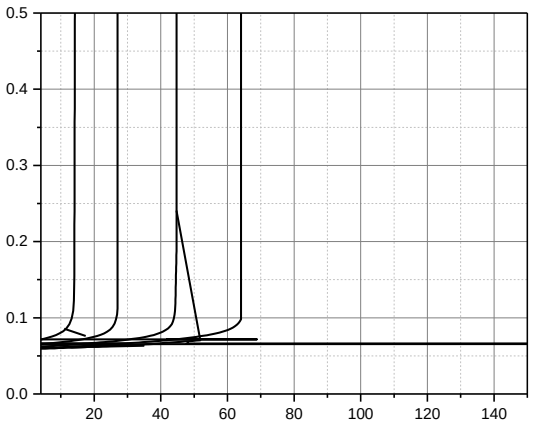


Figure 8. Drain-source on-state resistance

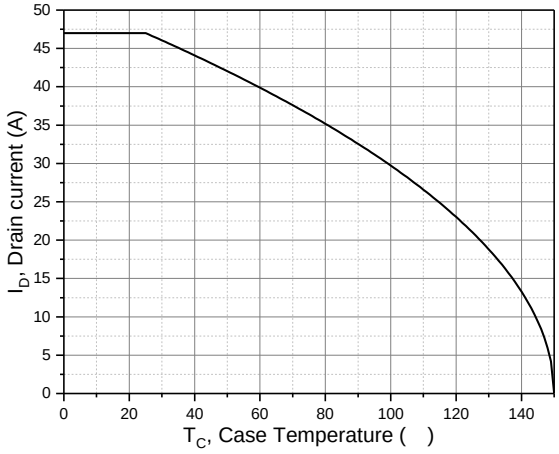


Figure 9. Drain current

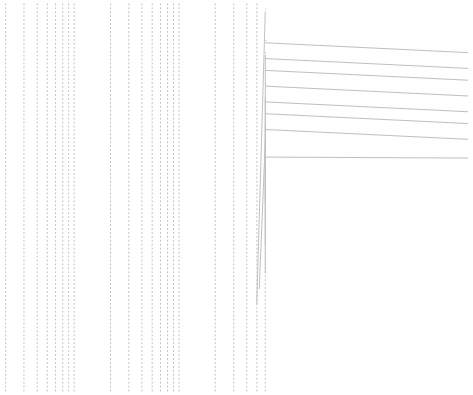


Figure 10. Safe operation area T_C=25 °C

Test circuits and waveforms

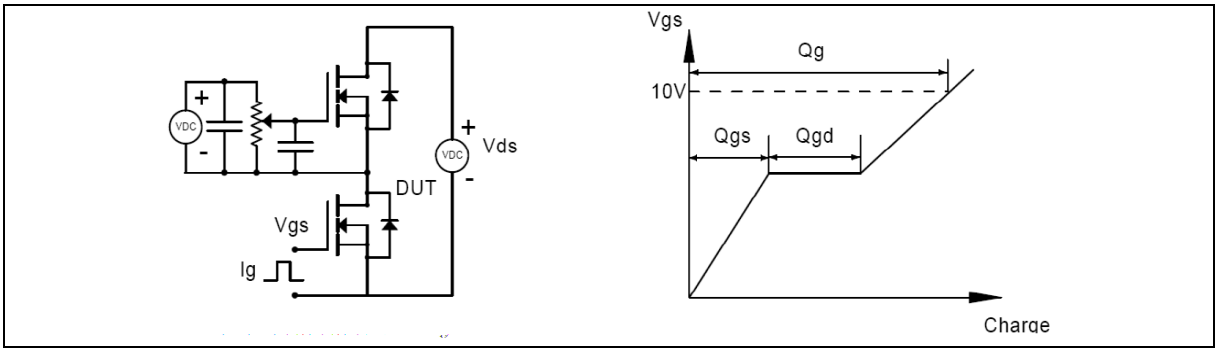


Figure 1. Gate charge test circuit & waveform

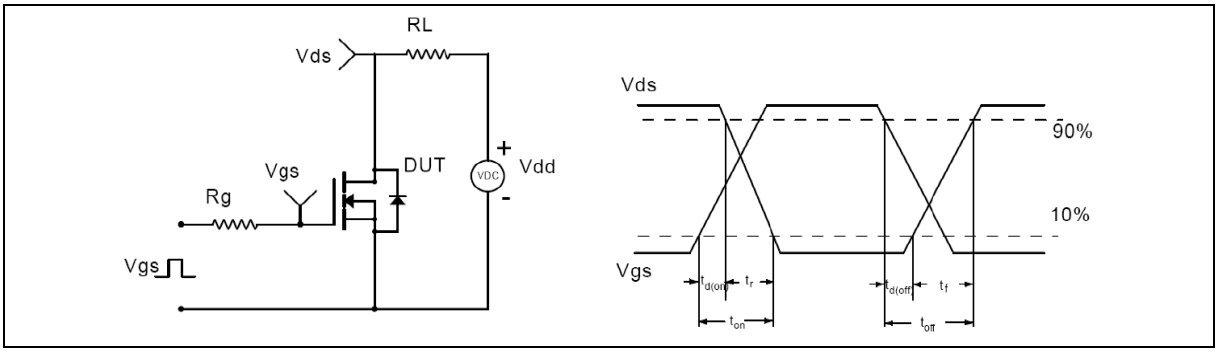


Figure 2. Switching time test circuit & waveforms

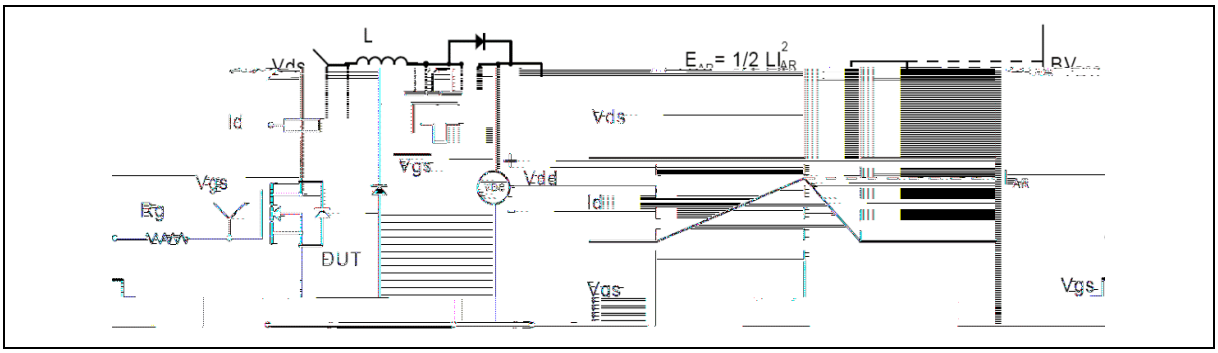


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

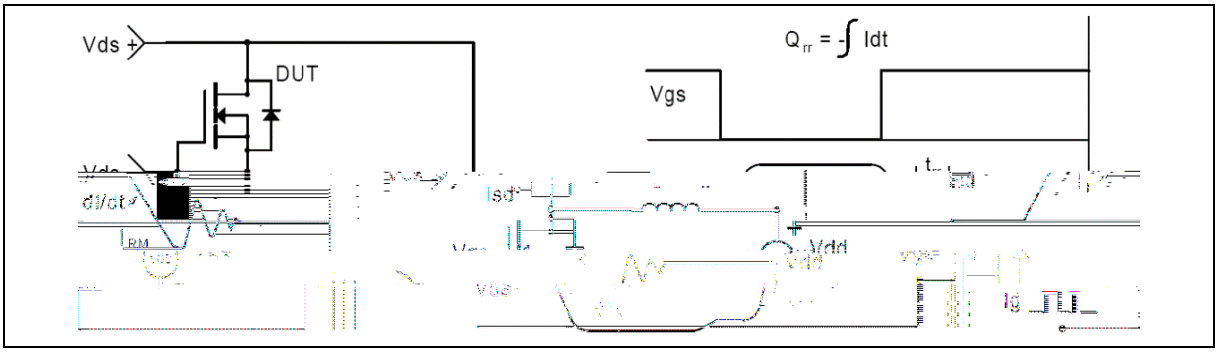
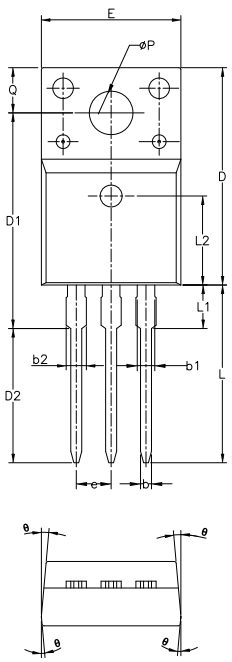
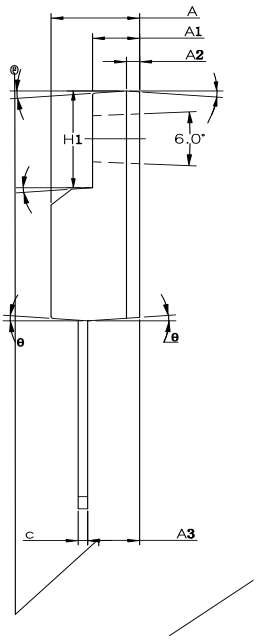


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information

Package Information





Symbol	mm		
	Min	Nom	Max
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2		0.70 REF	
A3	2.56	2.76	2.93
b	0.70	-	0.90
b1	1.18	-	1.38
b2	-	-	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.00
E	9.96	10.16	10.36
e		2.54 BSC	
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	-	-	3.50
L2		6.50 REF	
	3.08	3.18	3.28
Q	3.20	-	3.40
	1º	3º	5º

Version 2: TO220F-J 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
TO220F-J	50	20	1000	5	5000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG60R074FSZF	TO220F	yes	yes	yes