



Features

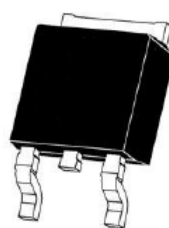
- Uses CRM(CQ) advanced SkyMOS3 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Applications

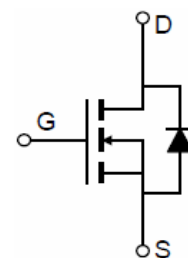
- Synchronous Rectification for AC/DC Quick Charger
- Battery management
- UPS (Uninterruptible Power Supplies)

Product Summary

V_{DS}	150	V
$R_{DS(on), Typ} @ V_{GS}=10\text{ V}$	7.9	mΩ
I_D	75	A



TO-252-2L top view



Schematic diagram

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	150	V
Continuous drain current $T_C = 25^\circ\text{C}$ (Silicon limit) $T_C = 100^\circ\text{C}$ (Silicon limit)	I_D	75 54	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D\ pulse}$	300	A
Avalanche energy, single pulse ($I_{AS}=30\text{A}$, $R_g=25\Omega$)	E_{AS}	225	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	128	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+150	$^\circ\text{C}$
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	T_{sold}	260	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	R_{thJC}	-	1.7	-	$^\circ\text{C/W}$	-
Thermal resistance, junction - ambient(min. footprint)	R_{thJA}	-	54.5	-	$^\circ\text{C/W}$	-

**Electrical Characteristic (at $T_j = 25^\circ\text{C}$, unless otherwise specified)**

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	150	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	1.0	1.8	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	- -	0.1 10	1 100	μA	$V_{DS}=120V, V_{GS}=0V$ $T_j=25^{\circ}C$ $T_j=125^{\circ}C$
Gate-source leakage current	I_{GSS}	-	-	100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	7.9	9.0	m Ω	$V_{GS}=10V, I_D=40A$
		-	9.2	10.6		$V_{GS}=4.5V, I_D=20A$
Transconductance	g_{fs}	-	55	-	S	$V_{DS}=5V, I_D=40A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	3672	-	pF	$V_{GS}=0V, V_{DS}=75V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	634	-		
Reverse Transfer Capacitance	C_{rss}	-	50	-		
Gate Total Charge	Q_G	22.7	34	51.0	nC	$V_{GS}=10V, V_{DS}=75V,$ $I_D=40A, f=1MHz$
Gate-Source charge	Q_{gs}	9.9	14.9	22.4		
Gate-Drain charge	Q_{gd}	4.8	7.2	10.8		
Turn-on delay time	$t_{d(on)}$	7.3	14.6	29.2	ns	$V_{GS}=10V,$ $V_{DD}=75V,$ $I_D=44A, R_{G_ext}=2.7\Omega$
Rise time	t_r	40.3	80.6	161.2		
Turn-off delay time	$t_{d(off)}$	11.15	22.3	44.6		
Fall time	t_f	29.35	58.7	117.4		
Gate resistance	R_G	1	1.45	2.2	Ω	$V_{GS}=0V, V_{DS}=0V,$ $f=1MHz$

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	0.7	1.00	1.30	V	$V_{GS}=0V, I_{SD}=40A$
Body Diode Continuous Forward Current	I_S	-	-	75	A	$TC = 25^\circ C$
Body Diode Pulsed Current	$I_{S \text{ pulse}}$	-	-	300	A	$TC = 25^\circ C$
Body Diode Reverse Recovery Time	t_{rr}	49.26	73.89	110.835	ns	$I_F=40A, dI/dt=100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	114.67	172	258	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

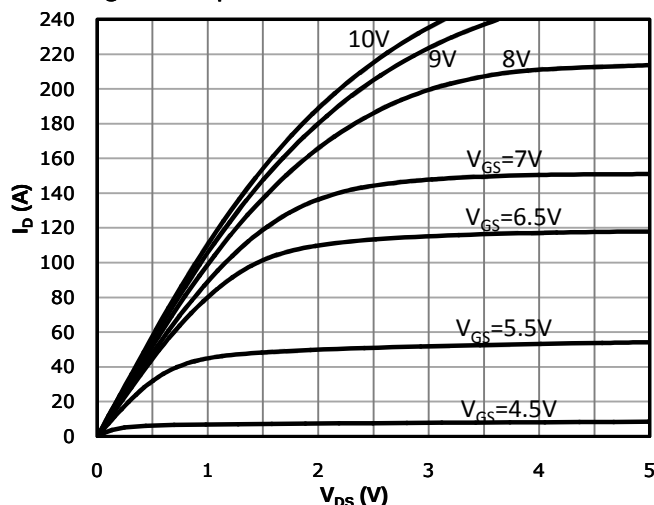


Fig 2: Transfer Characteristics

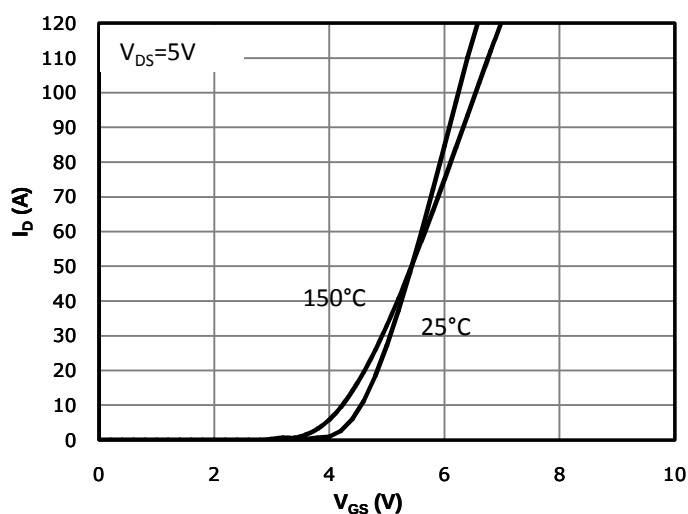


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

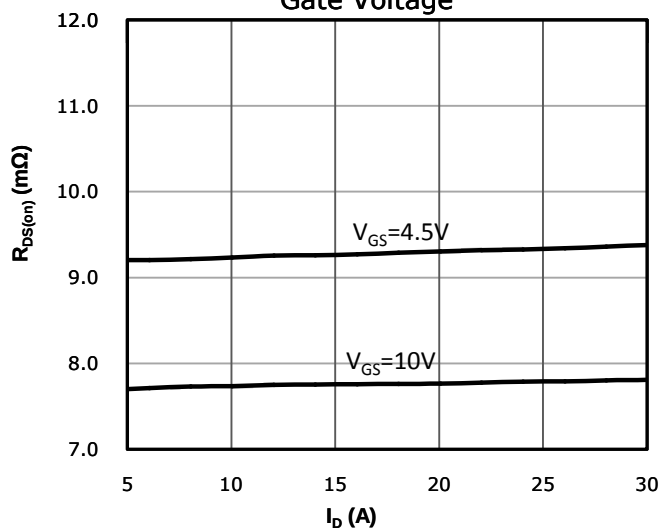


Fig 4: $R_{DS(on)}$ vs Gate Voltage

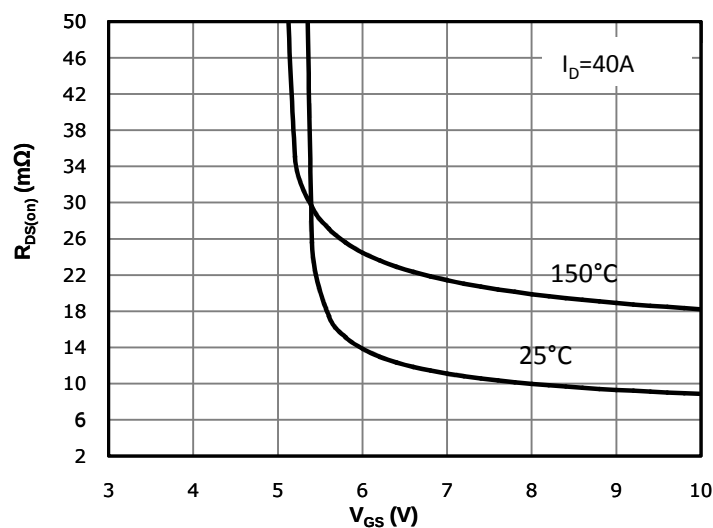


Fig 5: $R_{DS(on)}$ vs. Temperature

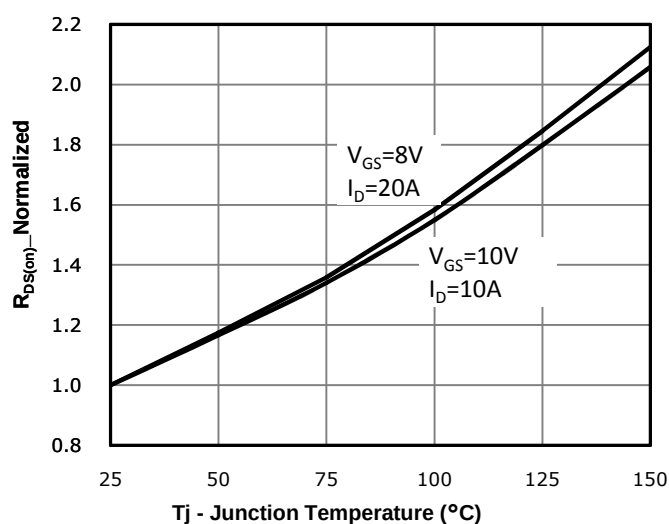


Fig 6: Capacitance Characteristics

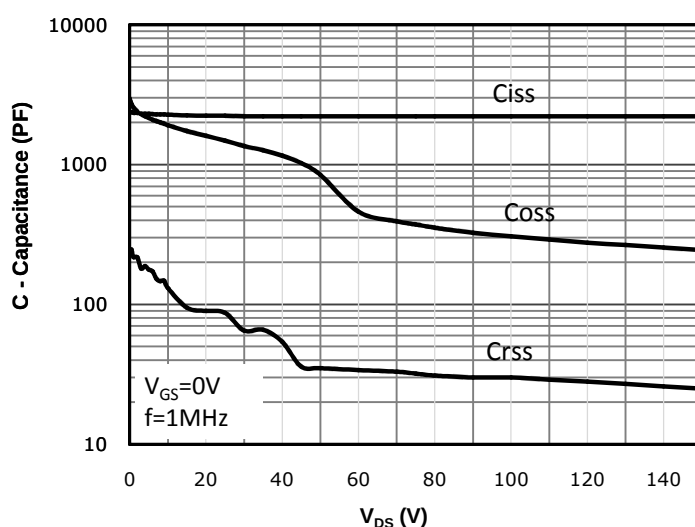


Fig 7: Gate Charge Characteristics

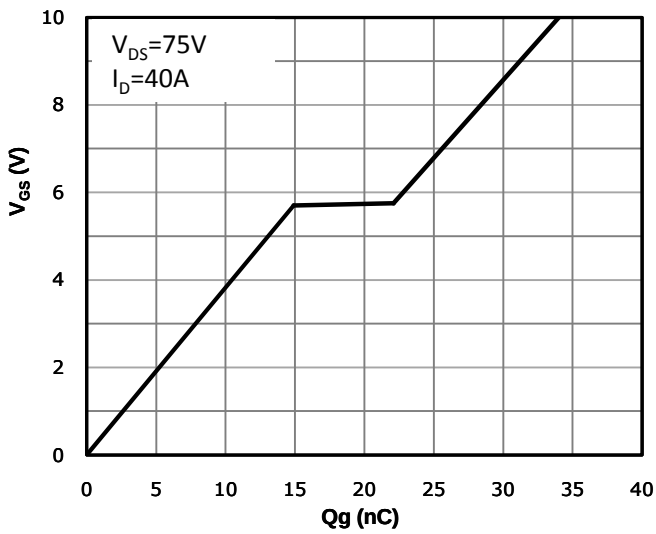


Fig 8: Body-diode Forward Characteristics

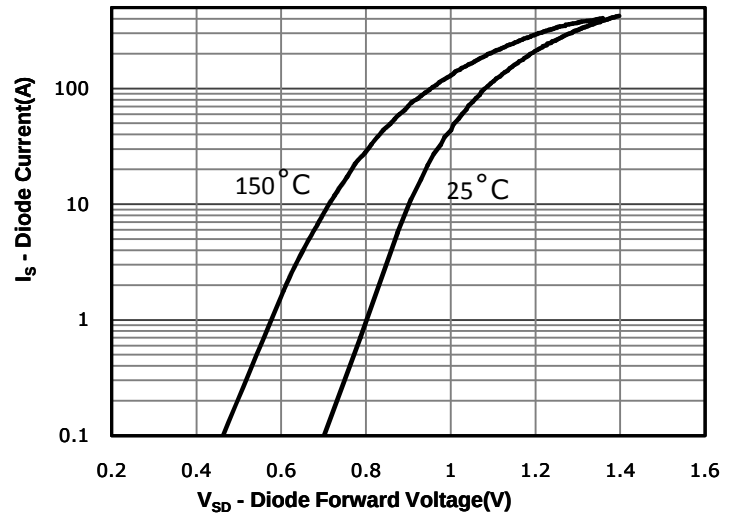


Fig 9: Power Dissipation

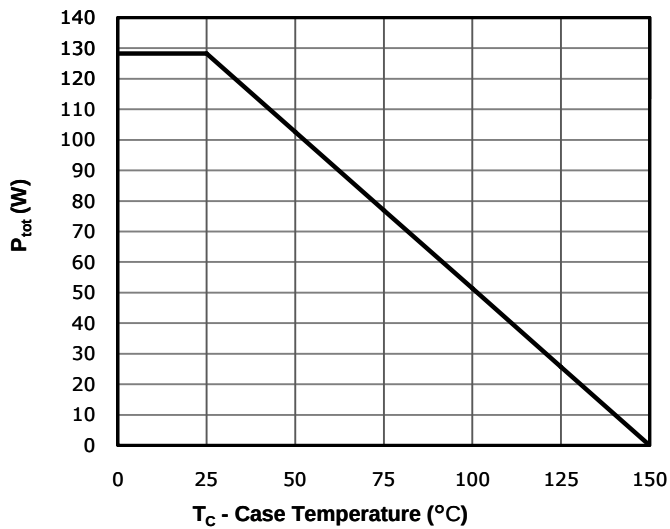


Fig 10: Drain Current Derating

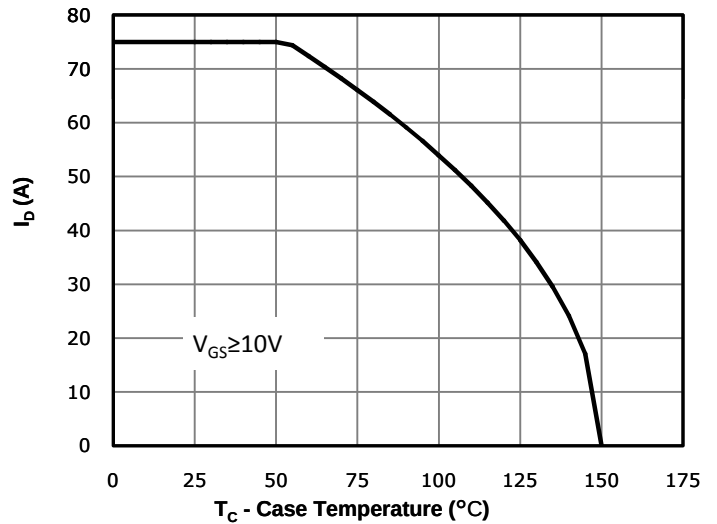


Fig 11: Safe Operating Area

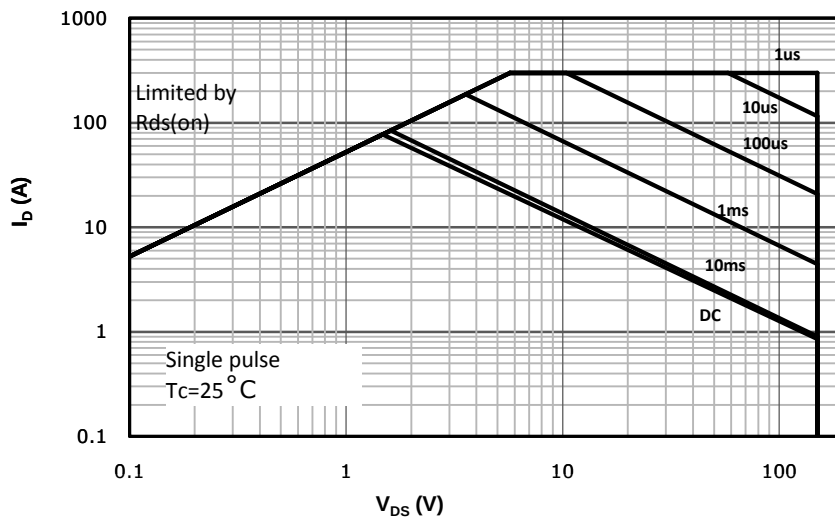
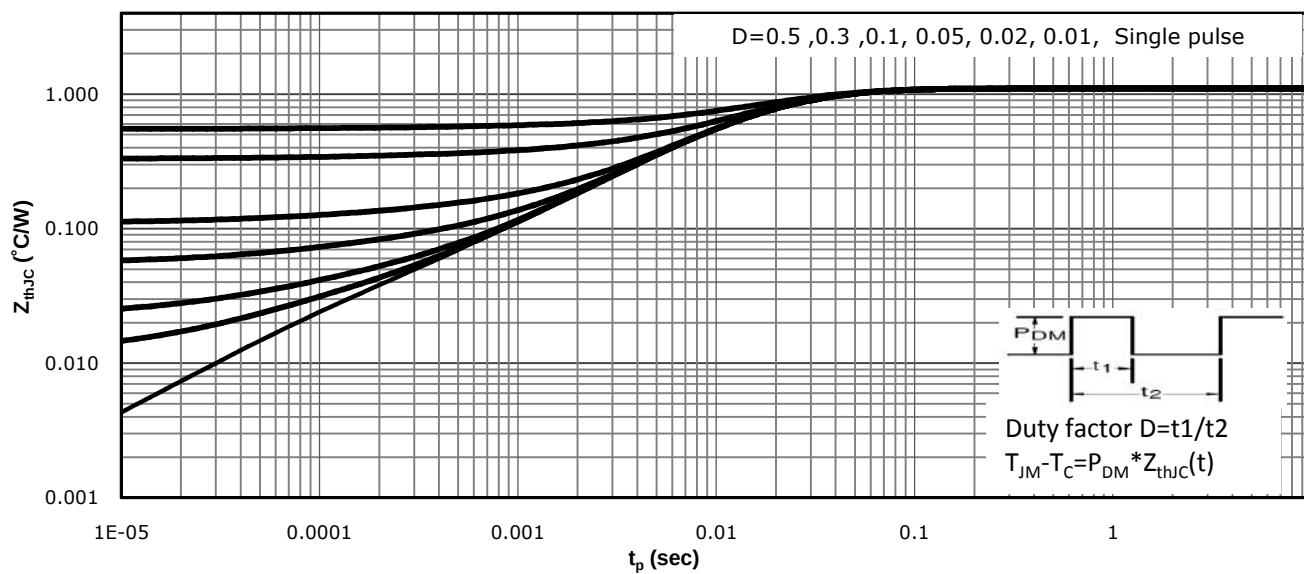
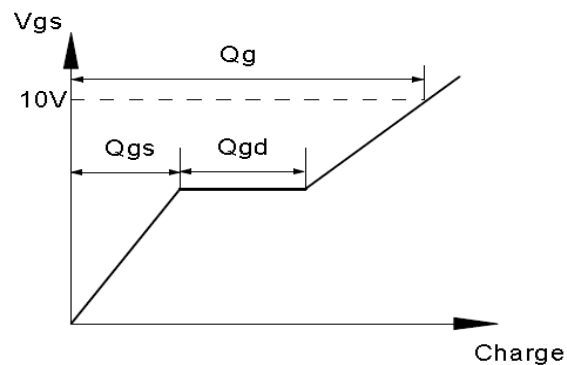
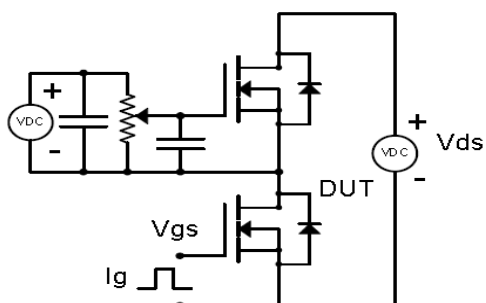


Fig 12: Max. Transient Thermal Impedance

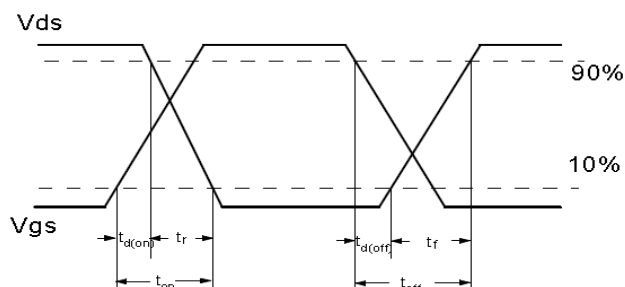
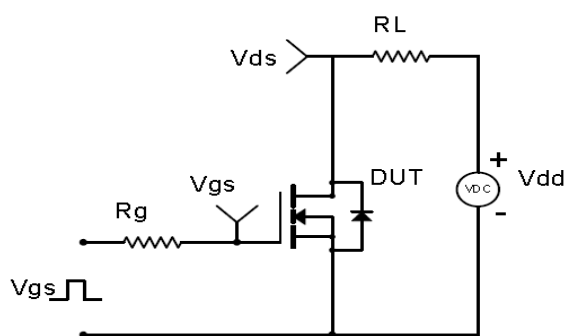


Test Circuit & Waveform

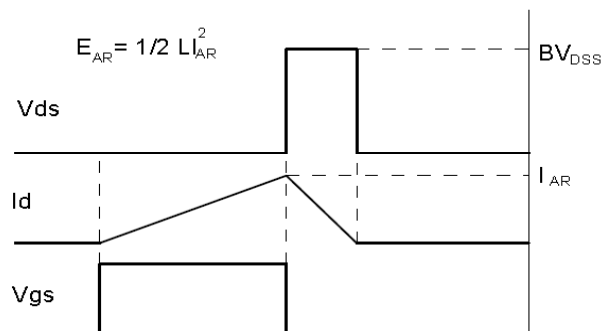
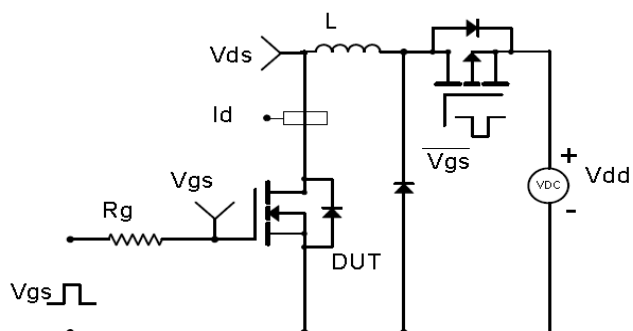
Gate Charge Test Circuit & Waveform



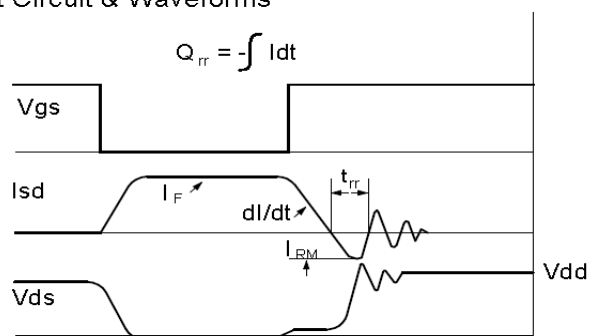
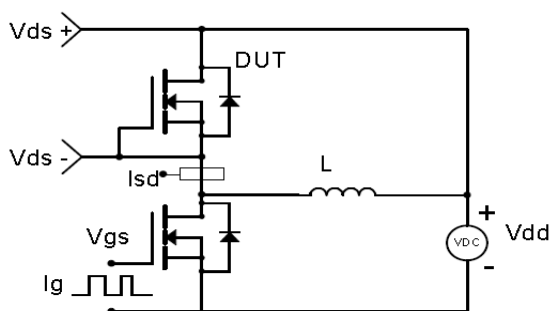
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

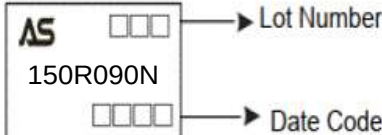


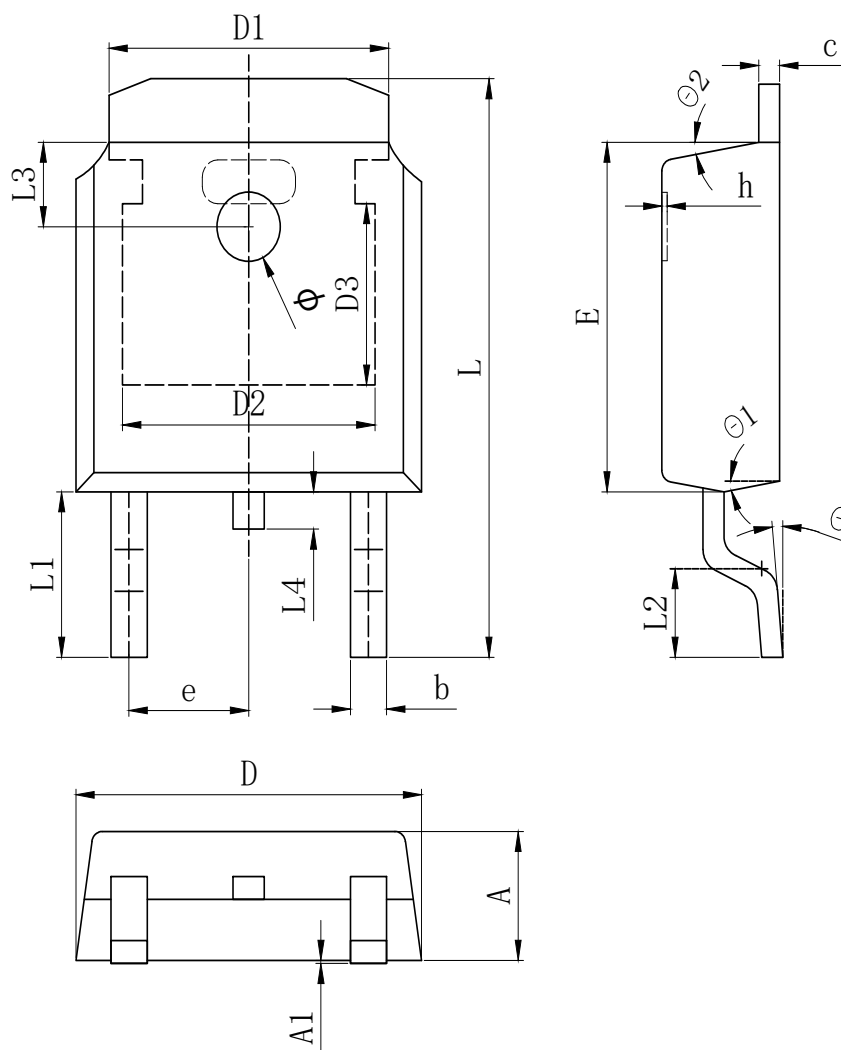
Diode Recovery Test Circuit & Waveforms



Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASDM150R090NKQ-R	150R090N	TO-252	Tape*Reel	2500/Reel

PACKAGE	MARKING
TO-252	 The diagram shows a TO-252 package with the following markings: - Top left: AS (Ascend Semi logo) - Top right: (Lot Number) - Middle: 150R090N - Bottom: (Date Code)



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c (电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
ϕ	1.100	1.200	1.300
θ	0°		8°
θ_1	9° TYP		
θ_2	9° TYP		

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