



### Features

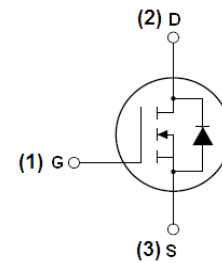
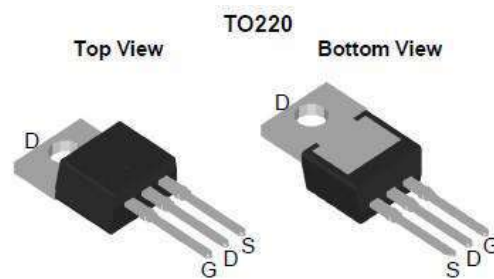
- Uses CRM(CQ) advanced SkyMOS3 technology
- Extremely low on-resistance  $R_{DS(on)}$
- Excellent  $Q_g \times R_{DS(on)}$  product(FOM)
- Qualified according to JEDEC criteria

### 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	m $\Omega$
$I_D$	75	A



### 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	$V_{GS}$	$\pm 20$	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.	RthJC	-	0.75	1.0	$^\circ\text{C}/\text{W}$	-
Thermal resistance, junction - ambient(min. footprint)	RthJA	-	-	60.5	$^\circ\text{C}/\text{W}$	-

**Electrical Characteristic (at T<sub>j</sub> = 25 °C, unless otherwise specified)**

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

**Static Characteristic**

Drain-source breakdown voltage	BV <sub>DSS</sub>	150	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA
Gate threshold voltage	V <sub>GS(th)</sub>	1.0	1.9	2.5	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA
Zero gate voltage drain current	I <sub>DSS</sub>	-	0.1	1	μA	V <sub>DS</sub> =120V, V <sub>GS</sub> =0V T <sub>j</sub> =25°C T <sub>j</sub> =125°C
Gate-source leakage current	I <sub>GSS</sub>	-	-	100	nA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
Drain-source on-state resistance	R <sub>DS(on)</sub>		7.9	10.0	mΩ	V <sub>GS</sub> =10V, I <sub>D</sub> =40A
		-	9.3	11.3		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A
Transconductance	g <sub>fs</sub>	-	55	-	S	V <sub>DS</sub> =5V, I <sub>D</sub> =40A

**Dynamic Characteristic**

Input Capacitance	C <sub>iss</sub>	-	3802	-	pF	V <sub>GS</sub> =0V, V <sub>DS</sub> =75V, f=1MHz
Output Capacitance	C <sub>oss</sub>	-	657	-		
Reverse Transfer Capacitance	C <sub>rss</sub>		52	-		
Gate Total Charge	Q <sub>G</sub>	22.7	34	51.0	nC	V <sub>GS</sub> =10V, V <sub>DS</sub> =75V, I <sub>D</sub> =40A, f=1MHz
Gate-Source charge	Q <sub>gs</sub>	9.9	14.9	22.4		
Gate-Drain charge	Q <sub>gd</sub>	4.8	7.2	10.8		
Turn-on delay time	t <sub>d(on)</sub>	7.3	14.6	29.2	ns	V <sub>GS</sub> =10V, V <sub>DD</sub> =75V, I <sub>D</sub> =44 A, R <sub>G_ext</sub> =2.7Ω
Rise time	t <sub>r</sub>	40.3	80.6	161.2		
Turn-off delay time	t <sub>d(off)</sub>	11.15	22.3	44.6		
Fall time	t <sub>f</sub>	29.35	58.7	117.4		

Gate resistance	$R_G$	1	1.45	2.2	$\Omega$	$V_{GS}=0V, V_{DS}=0V,$ $f=1MHz$
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**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	$I_S$ 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

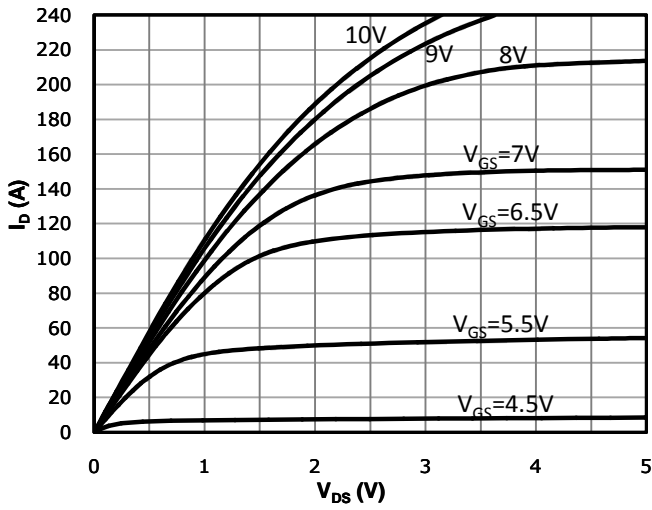


Fig 2: Transfer Characteristics

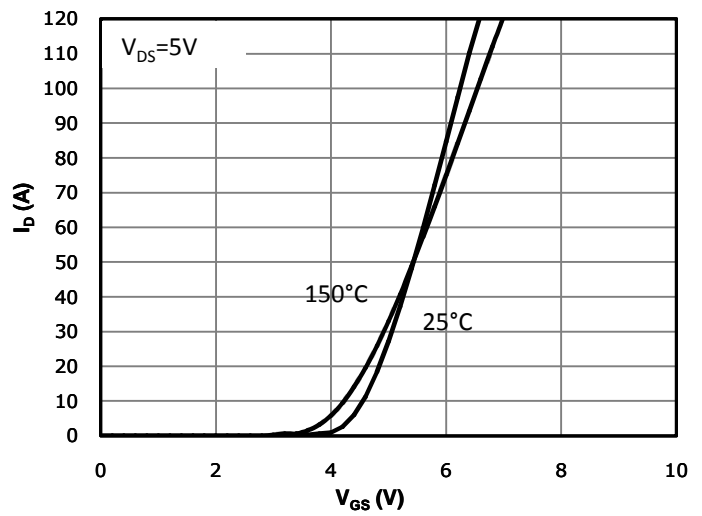


Fig 3: Rds(on) vs Drain Current and Gate Voltage

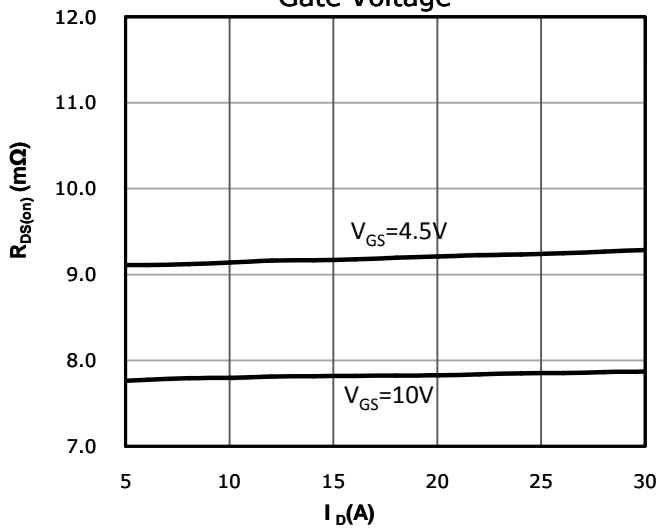


Fig 4: Rds(on) vs Gate Voltage

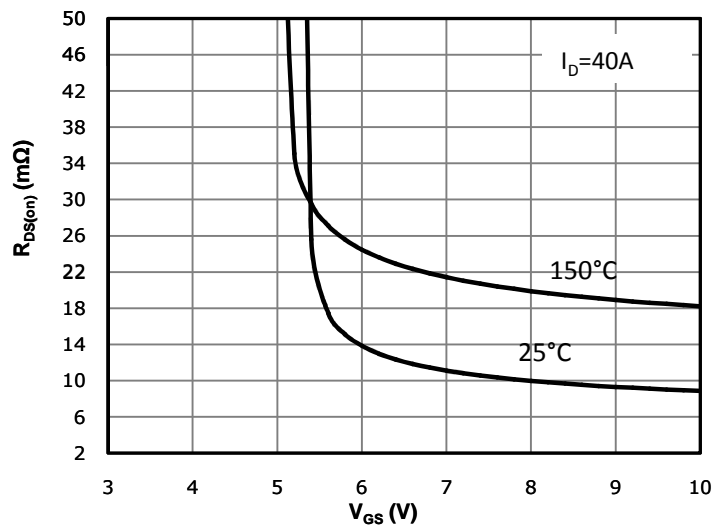


Fig 5: Rds(on) vs. Temperature

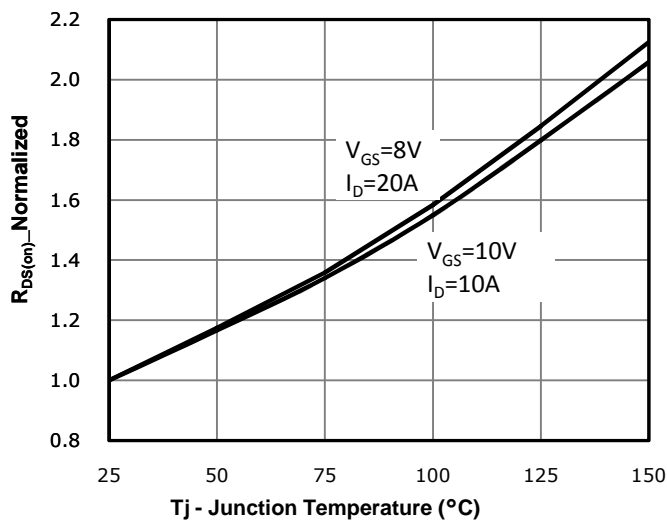


Fig 6: Capacitance Characteristics

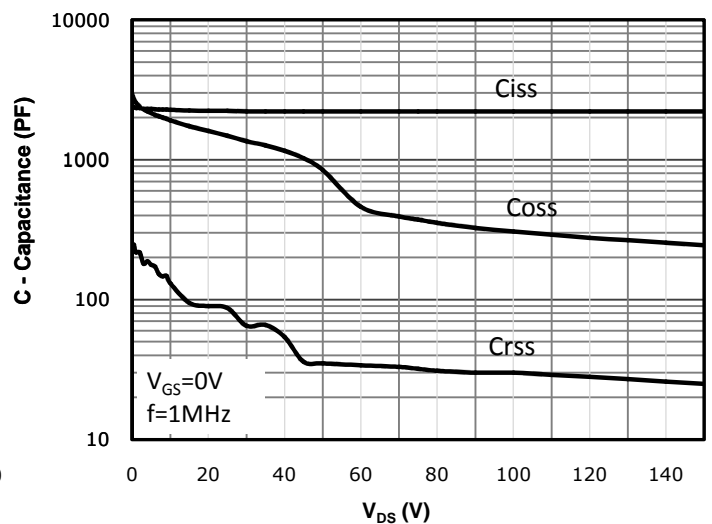


Fig 7: Gate Charge Characteristics

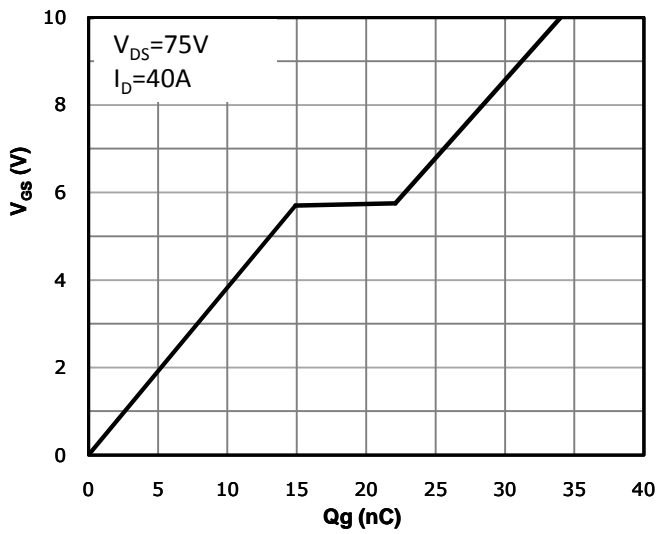


Fig 8: Body-diode Forward Characteristics

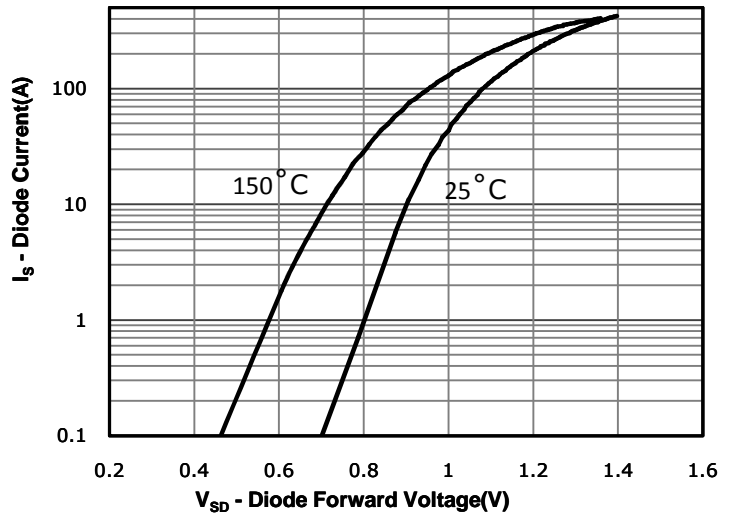


Fig 9: Power Dissipation

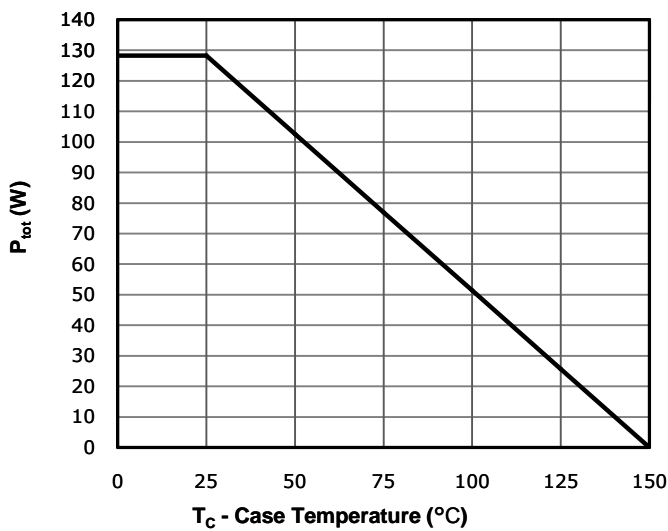


Fig 10: Drain Current Derating

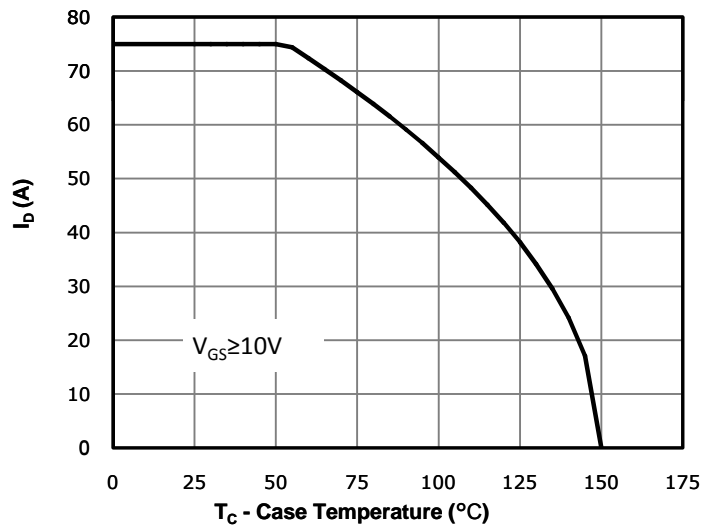


Fig 11: Safe Operating Area

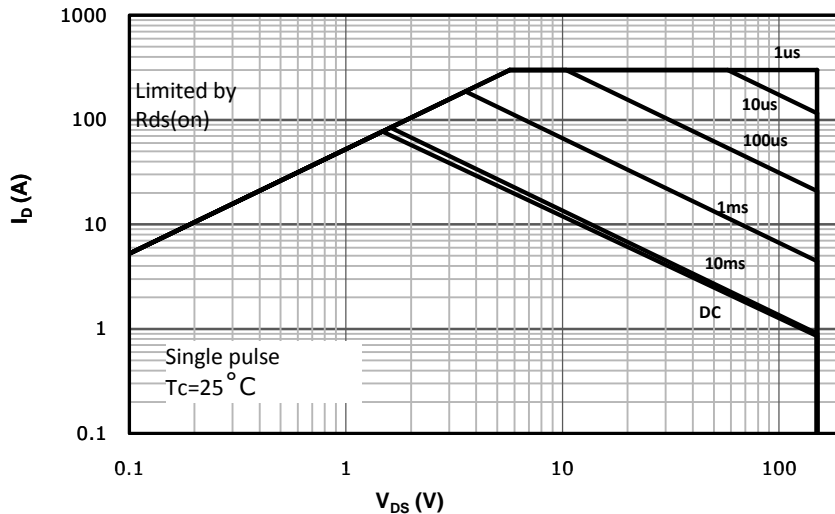
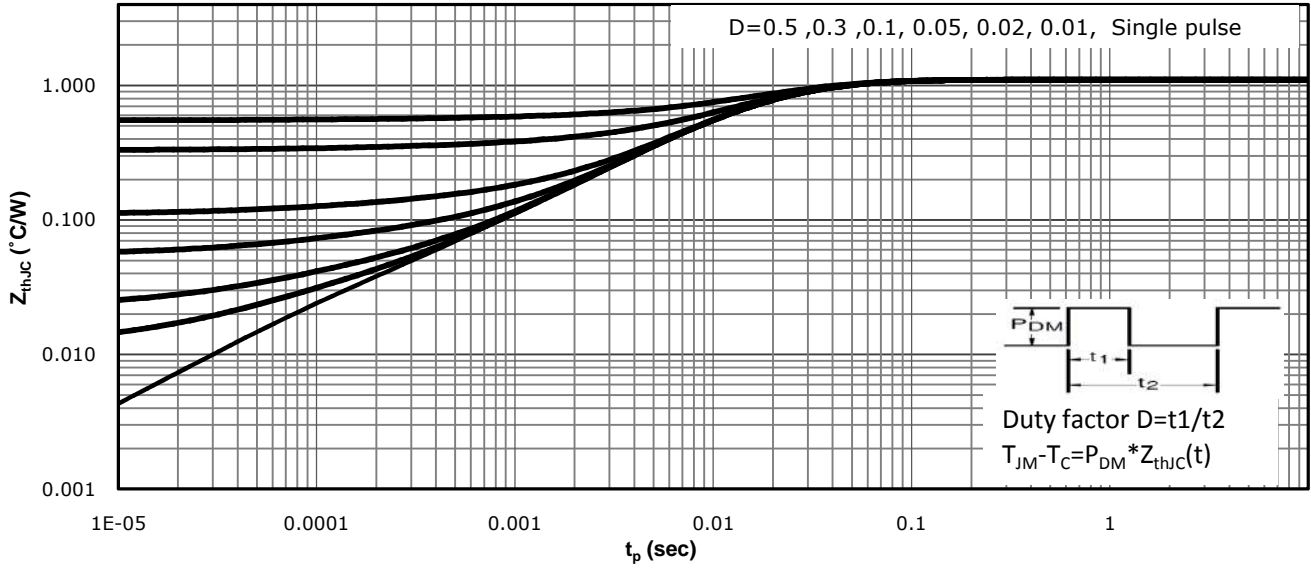
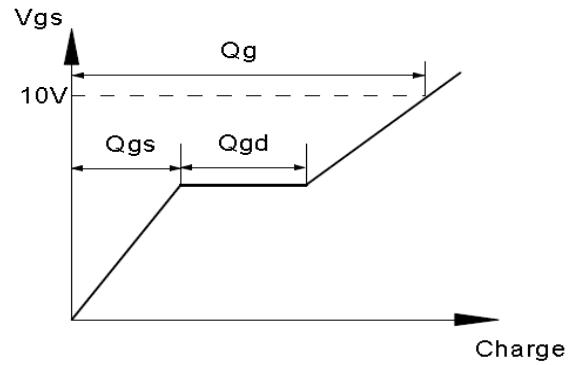
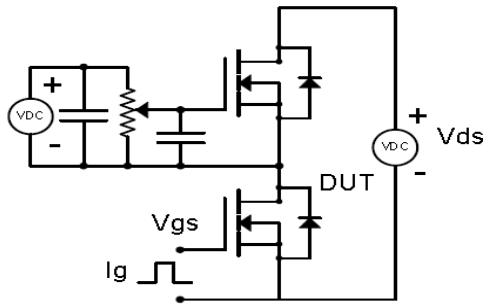


Fig 12: Max. Transient Thermal Impedance

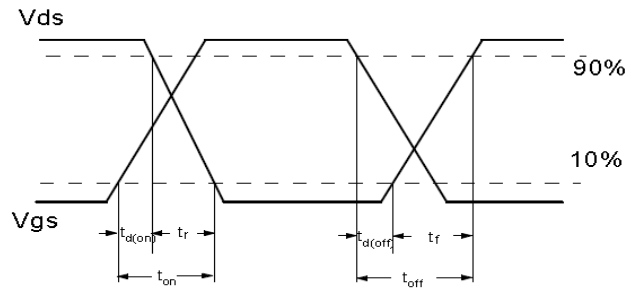
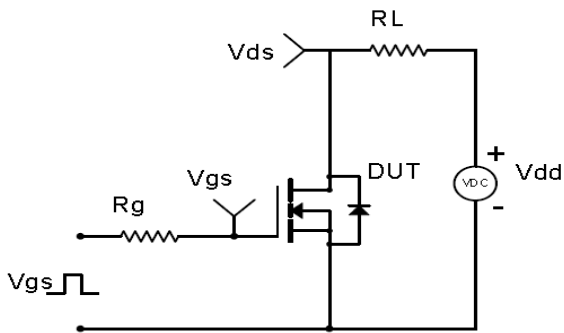


**Test Circuit & Waveform**

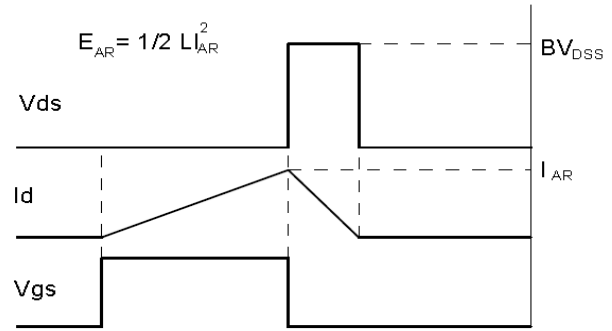
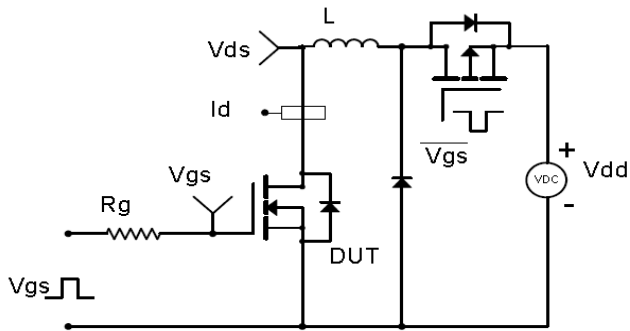
Gate Charge Test Circuit & Waveform



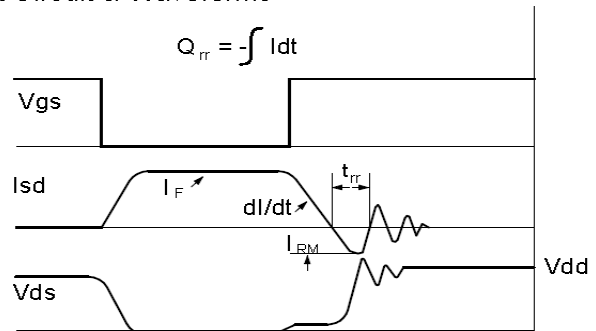
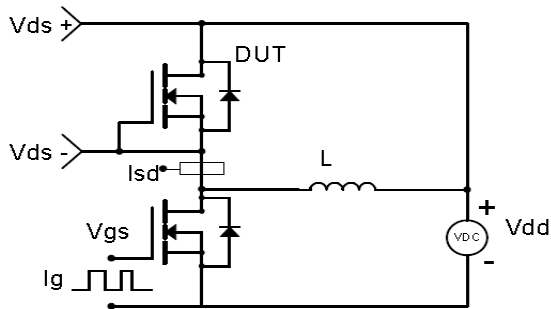
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

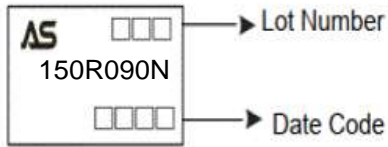


Diode Recovery Test Circuit & Waveforms

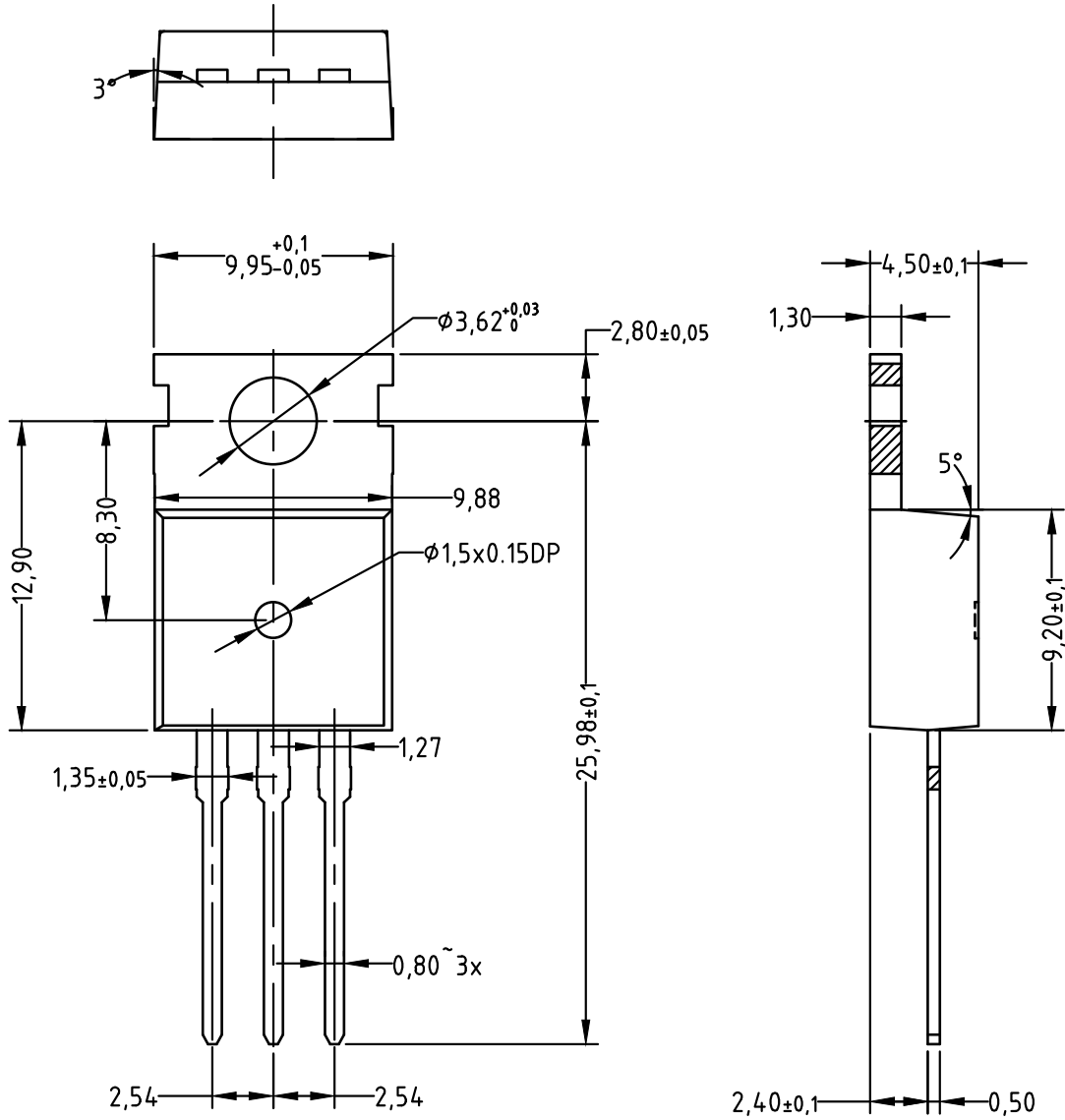


## Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASDM150R090NP-T	150R090N	TO-220	Tube	50/Tube

PACKAGE	MARKING
TO-220	 <p>AS    □□□</p> <p>150R090N</p> <p>□□□□</p> <p>Lot Number</p> <p>Date Code</p>

TO-220



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