Features

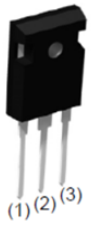
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggednes

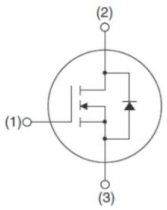
Product Summary

V_{DS}	1200V
$R_{DS(on)\_typ}$	40mΩ
I_D	67A

Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC-DC Converters
- Batterry Chargers





RoHS Halogen Free

Package Marking and Ordering Information

Part #	Marking	Package
T2M40120D	2M40120D	TO-247-3

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1200	V
Continuous drain current T_C = 25°C， V_{GS} = 18V T_C = 100°C， V_{GS} = 18V	I_D	 67 48	A
Source current(Body Diode) T_C = 25°C， V_{GS} = -4V T_C = 100°C， V_{GS} = -4V	I_S	 67 48	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	120	A
Avalanche energy, single pulse (L=10mH)	E_{AS}	1200	mJ
Gate-Source voltage	V_{GS}	-4/+18	V
Gate-Source voltage（Absolute maximum values）	V_{GSmax}	-8/+22	V
Power dissipation (T_C = 25°C)	P_{tot}	340	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C

•Example of acceptable V_{GS} waveform

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	0.45	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	40	

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	1200	-	-	V	V_{GS}=0V, I_D=100uA
Gate threshold voltage	$V_{GS(th)}$	2	3	4	V	V_{DS}=V_{GS},I_D=10mA
Zero gate voltage drain current	I_{DSS}	-	1	5	μA	V_{DS}=1200V,V_{GS}=0V T_C=25°C
		-	5	-		T_C=175°C
Gate-source leakage current	I_{GSS}	-		100	nA	V_{GS}=18V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	35	45	mΩ	V_{GS}=18V, I_D=33A, T_J=25°C
		-	60	-		T_J=175°C
Drain-source on-state resistance	$R_{DS(on)}$	-	40	52	mΩ	V_{GS}=15V, I_D=33A, T_J=25°C
		-	70	-		T_J=175°C
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	2735	-	pF	V_{DS} = 1000V V_{GS} = 0V T_J = 25°C V_{AC}=25mV f = 1MHz
Output Capacitance	C_{oss}	-	101	-		
Reverse Transfer Capacitance	C_{rss}	-	7.5	-		
Gate Total Charge	Q_G	-	73.3	-	nC	V_{DS} = 800V V_{GS} = 0/+15V I_D = 33A I_G=10mA
Gate-Source charge	Q_{gs}	-	13.5	-		
Gate-Drain charge	Q_{gd}	-	19	-		
Turn-On Switching Energy	E_{ON}	-	0.29	-	mJ	V_{DD} = 800V V_{GS} = -4/+15V I_D = 20A R_G = 3.8Ω L = 120uH T_J = 25°C
Turn-Off Switching Energy	E_{OFF}	-	0.08	-		
Turn-on delay time	$t_{d(on)}$	-	26.8	-	ns	
Rise time	t_r	-	25	-		
Turn-off delay time	$t_{d(off)}$	-	29.6	-		
Fall time	t_f	-	12.8	-		
Gate resistance	R_G	-	2.4	-	Ω	V_{AC} = 25mV, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}		3.8		V	V_{GS}=-4V,I_{SD}=20A, T_J=25°C
			4.2			V_{GS}=-4V,I_{SD}=20A, T_J=175°C
Reverse Recovery Time	t_{rr}	-	18.8	-	ns	V_R = 800V I_D = 33A di/dt = 1011A/μS V_{GS}= -5V T_J = 25°C
Reverse Recovery Charge	Q_{rr}	-	120.4	-	nC	
Reverse Recovery Energy	E_{REC}	-	0.9	-	uJ	
Peak Reverse Recovery Current	I_{rrm}	-	11	-	A	
Charge Time	t_A	-	10	-	ns	
DisCharge Time	t_B	-	8.8	-	ns	
Reverse Recovery Time	t_{rr}	-	53	-	ns	V_R = 800V I_D = 33A di/dt = 1011A/μS V_{GS}= -5V T_J = 175°C
Reverse Recovery Charge	Q_{rr}	-	662	-	nC	
Reverse Recovery Energy	E_{REC}	-	161	-	uJ	
Peak Reverse Recovery Current	I_{rrm}	-	19	-	A	
Charge Time	t_A	-	16.4	-	ns	
DisCharge Time	t_B	-	33.8	-	ns	

Typical Performance Characteristics

Fig 1. Output Characteristic (T_J=-55℃)

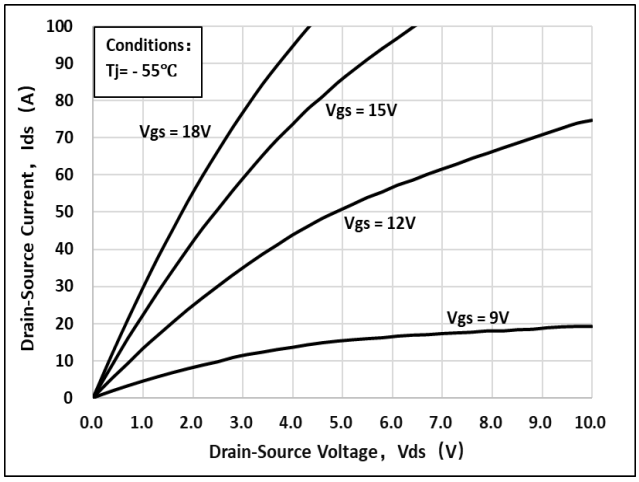


Fig 2. Output Characteristic (T_J=25℃)

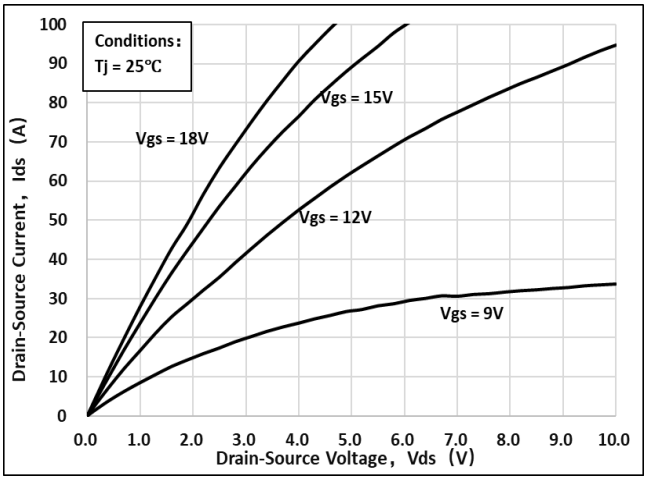


Fig 3. Output Characteristic (T_J=175℃)

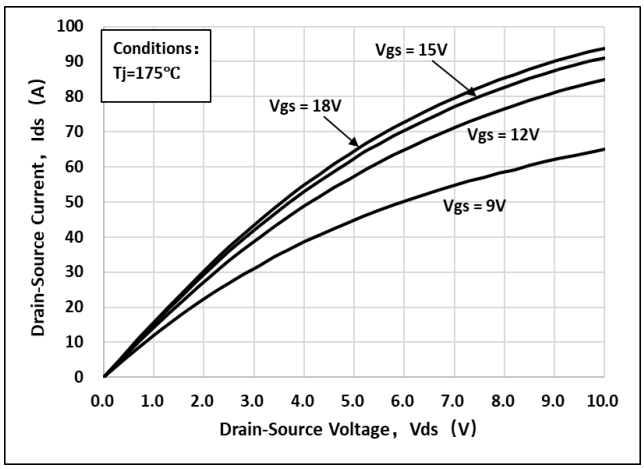


Fig 4: Rdson Vs Ids Characteristic

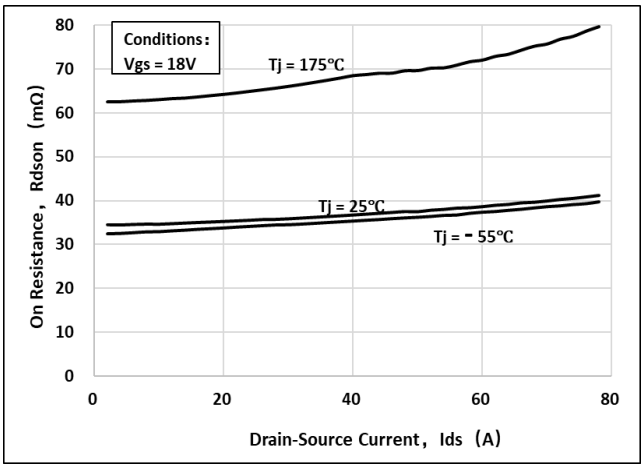


Fig 5: Rds(on) vs. Temperature

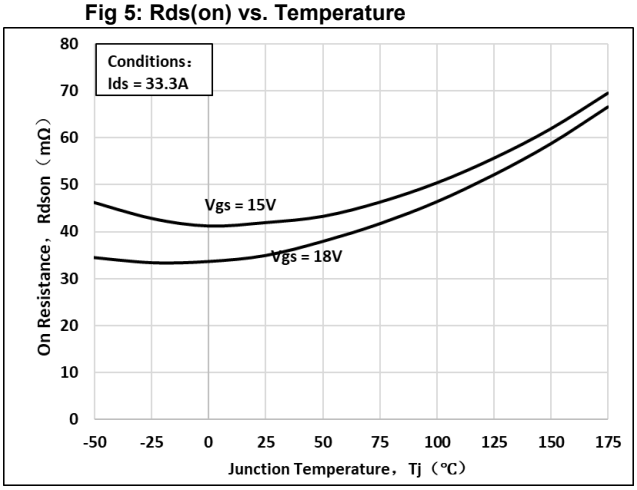


Fig 6: Transfer Characteristic

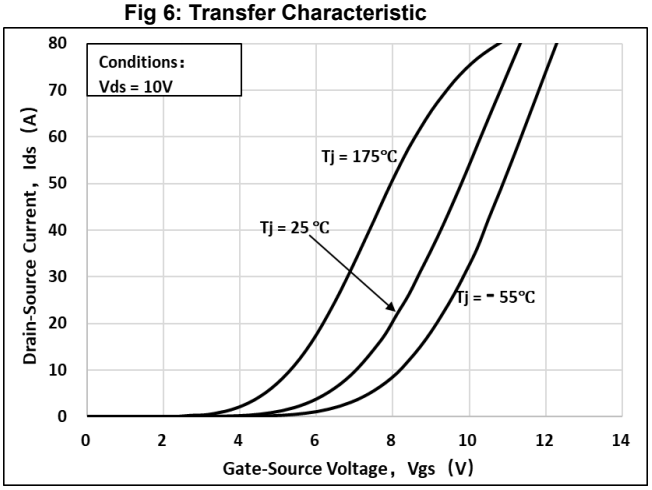


Fig 7: Body-diode Characteristic (T_J=-55℃)

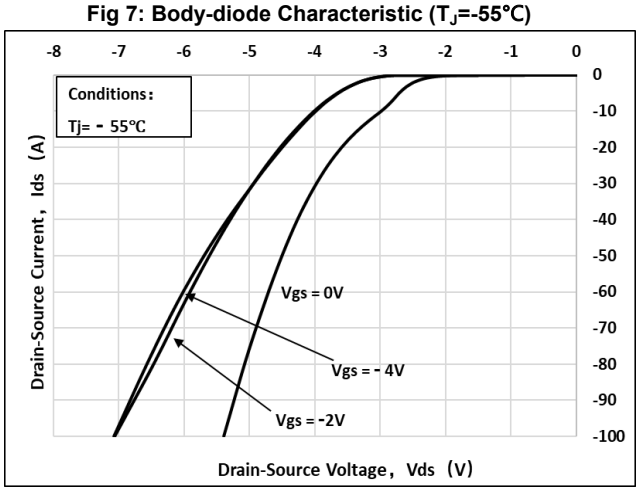


Fig 8: Body-diode Characteristic (T_J=25℃)

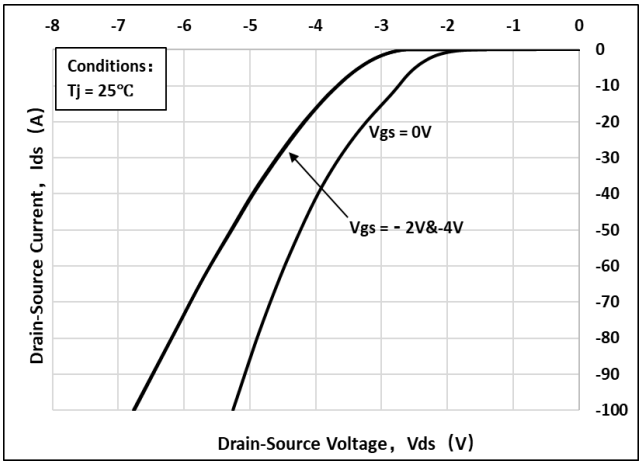


Fig 9: Body-diode Characteristic (T_J=175℃)

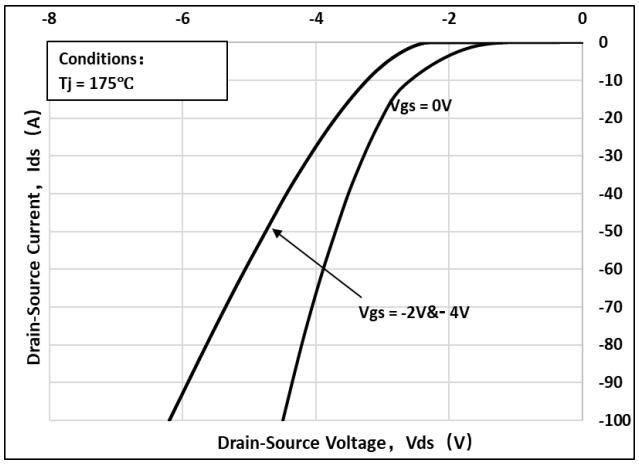


Fig 10: V_{TH} Vs T_J Temperature Characteristic

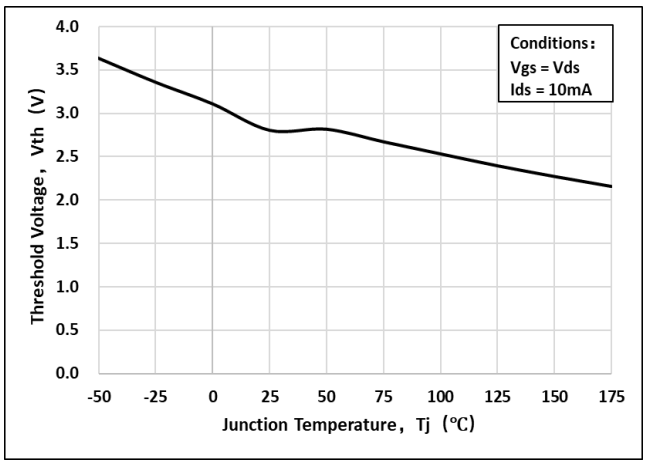


Fig 11: 3rd Quadrant Characteristic(T_J=-55℃)

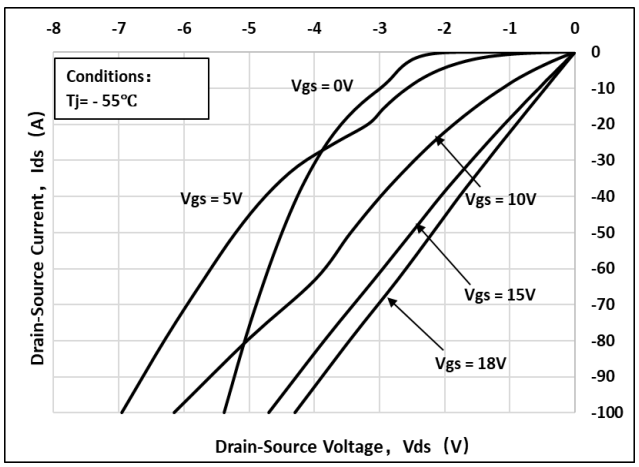


Fig 12: 3rd Quadrant Characteristic(T_J=25℃)

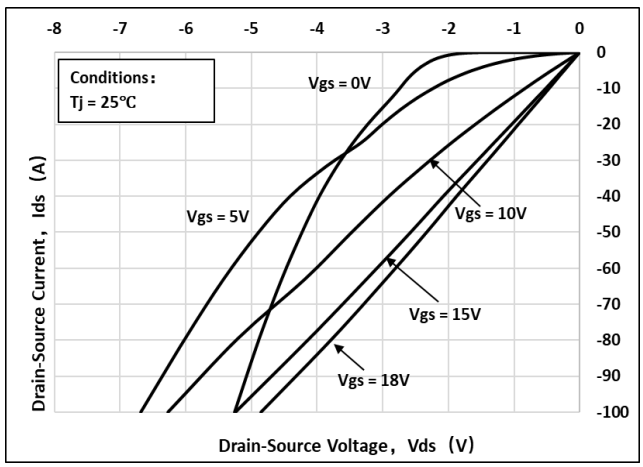


Fig 13: 3rd Quadrant Characteristic(T_J=175℃)

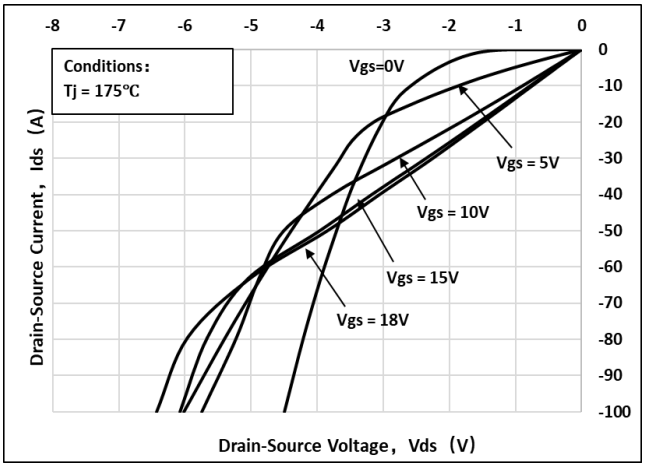


Fig 14: Gate Charge Characteristics

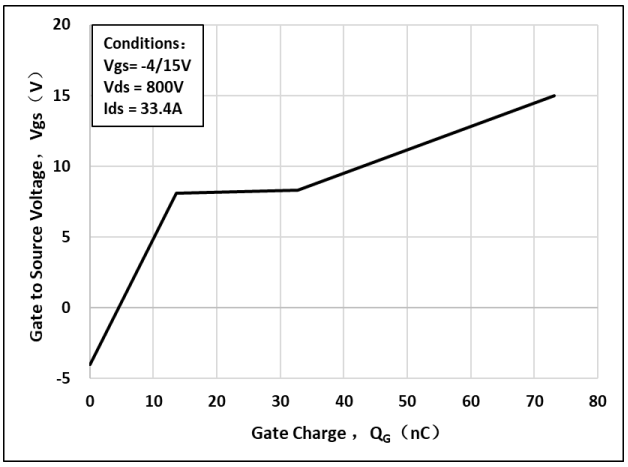


Fig 15: Drain Current vs.Case Temperature

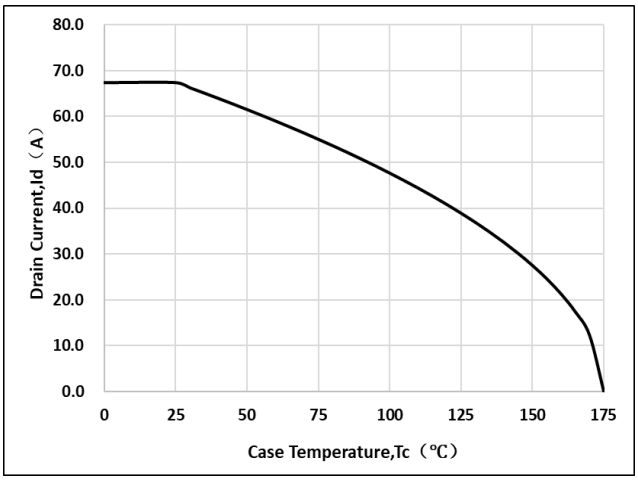


Fig 16: Safe Operating Area

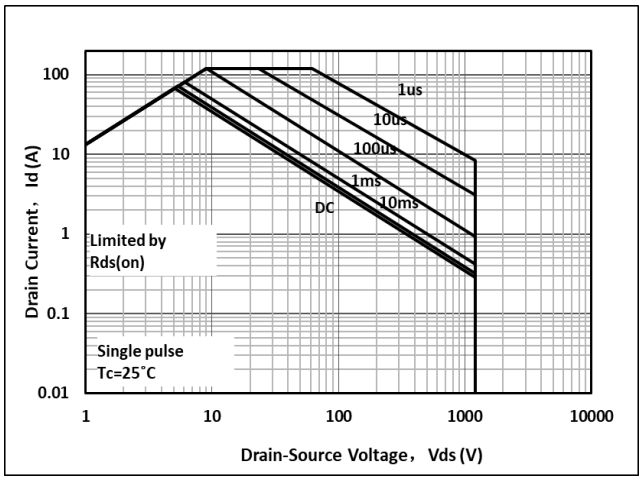


Fig 17: Capacitance Characteristics

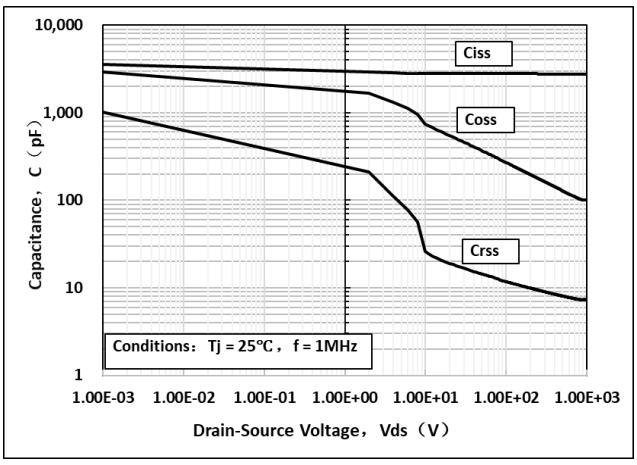
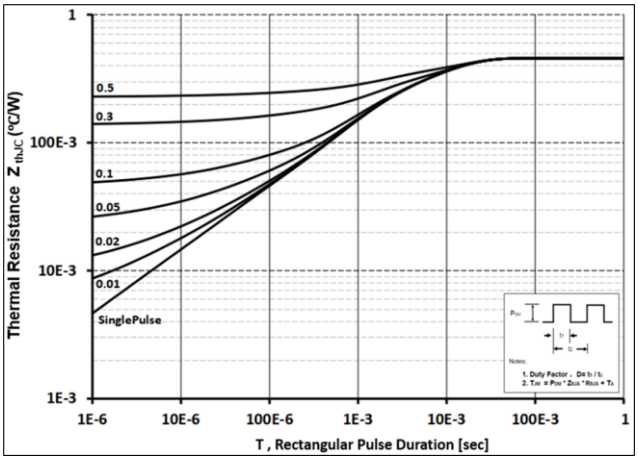


Fig 18: Transient Thermal Impedance



Test Circuit & Waveform

Figure A. Definition of switching times

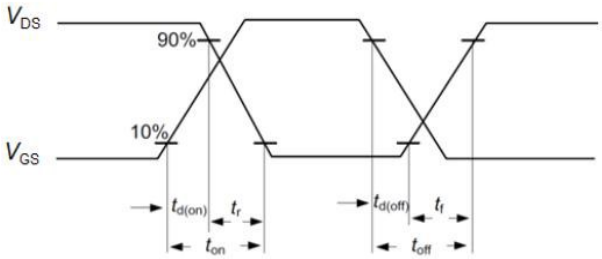


Figure B. Dynamic test circuit

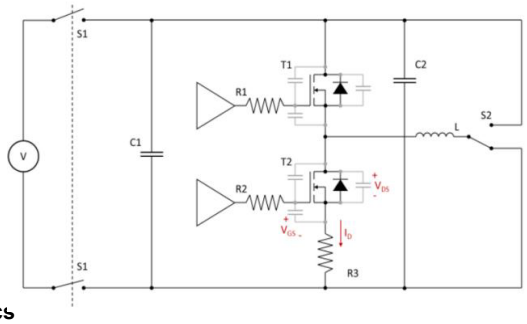


Figure C. Definition of body diodeswitching characteristics

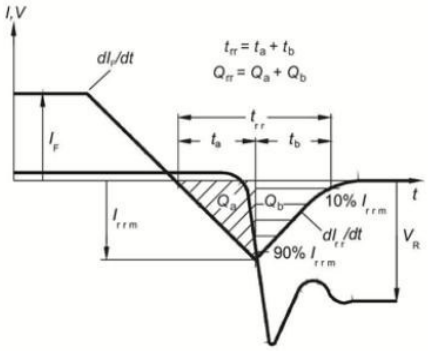
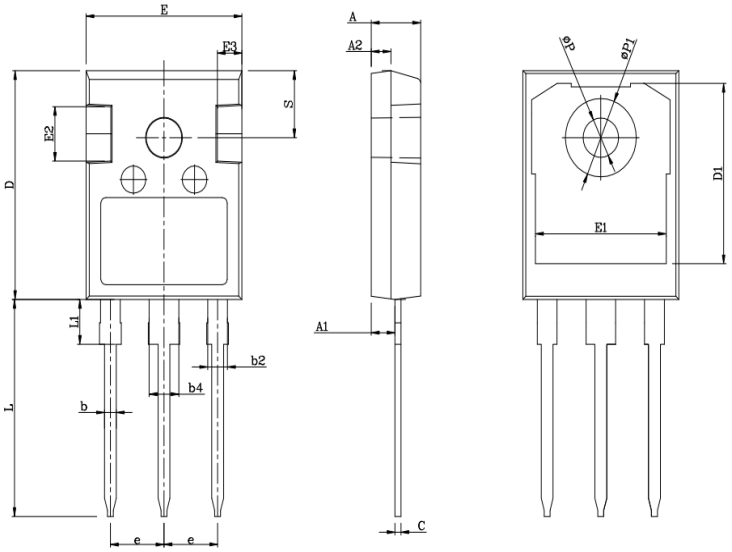


Figure C. **Definition of diode switching characteristics**

Package Outline:



COMMON DIMENSIONS

SYMBOL	mm		
	Min	Nom	Max
A	4.80	5.00	5.20
A1	2.23	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.26	13.56
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.82	19.92	20.22
L1	3.94	4.12	4.30
ØP	3.66	3.68	3.75
ØP1	7.08	7.19	7.30
S	6.15BSC		

Contact Information

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For additional information, please contact your local Sales Representative.

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