

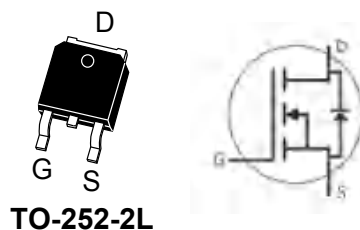
Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive
- 15V / 0V V_{GS} compatible with most flyback controllers

Parameter	Value	Unit
V_{DS}	650	V
$R_{DS(on_typ.)}$ $V_{GS}=18V$	300	m Ω
I_D	10	A

Benefits

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency



Applications

- Solar and UPS inverters
- On Board Charger
- High voltage DC/DC converters
- Switched mode power supplies
- Load switch
- LED/LCD/PDP TV and monitor Lighting



Maximum Ratings ($T_c=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain-Source Voltage	650	V	$V_{GS}=0V, I_D=500\mu A$	
V_{GSmax}	Gate-Source Voltage	-8/+20	V	Absolute maximum values	
V_{GSop}	Gate-Source Voltage	-5...0/+15	V	Recommended operational values	
I_D	Continuous Drain Current	10	A	$V_{GS}=15V, T_c=25^\circ\text{C}$	Fig. 19
		7		$V_{GS}=15V, T_c=100^\circ\text{C}$	
$I_{D(pulse)}$	Pulsed Drain Current	25	A	Pulse width t_p limited by T_{Jmax}	
P_D	Power Dissipation	43	W	$T_c=25^\circ\text{C}, T_J=175^\circ\text{C}$	Fig. 20
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$		
T_L	Solder Temperature, 1.6mm from case for 10s	260	$^\circ\text{C}$		



Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	650	/	/	V	$V_{GS}=0V, I_D=500\mu A$	
$V_{GS(th)}$	Gate Threshold Voltage	2.4	3.2	4.0	V	$V_{DS}=V_{GS}, I_D=1.4mA$	Fig. 11
		/	2.4	/		$V_{DS}=V_{GS}, I_D=1.4mA, T_J=175^{\circ}\text{C}$	
I_{DSS}	Zero Gate Voltage Drain Current	/	/	10	μA	$V_{DS}=650V, V_{GS}=0V$	
I_{GSS+}	Gate-Source Leakage Current	/	/	50	nA	$V_{DS}=0V, V_{GS}=20V$	
I_{GSS-}	Gate-Source Leakage Current	/	/	50	nA	$V_{DS}=0V, V_{GS}=-8V$	
$R_{DS(on)}$	Drain-Source On-State Resistance	/	380	530	m Ω	$V_{GS}=15V, I_D=5A$	Fig. 4,5,6
		/	468	/	m Ω	$V_{GS}=15V, I_D=5A, T_J=175^{\circ}\text{C}$	
		/	300	420	m Ω	$V_{GS}=18V, I_D=5A$	
		/	370	/	m Ω	$V_{GS}=18V, I_D=5A, T_J=175^{\circ}\text{C}$	
g_{fs}	Transconductance	/	3.1	/	S	$V_{DS}=20V, I_{DS}=5A$	Fig. 7
		/	2.8	/		$V_{DS}=20V, I_{DS}=5A, T_J=175^{\circ}\text{C}$	
C_{iss}	Input Capacitance	/	224	/	pF	$V_{GS}=0V$	Fig. 17,18
C_{oss}	Output Capacitance	/	10.5	/		$V_{DS}=400V$	
C_{rss}	Reverse Transfer Capacitance	/	1.1	/		$f=1MHz$	
E_{oss}	C_{oss} Stored Energy	/	1.3	/	μJ	$V_{AC}=25mV$	Fig. 16
E_{ON}	Turn-On Switching Energy	/	12	/	μJ	$V_{DS}=400V, V_{GS}=0V/15V$	
E_{OFF}	Turn-Off Switching Energy	/	8	/		$I_D=5A, R_{G(ext)}=2.5\Omega, L=100\mu H$	
$t_{d(on)}$	Turn-On Delay Time	/	5.5	/	ns	$V_{DS}=400V, V_{GS}=0V/15V, I_D=5A$ $R_{G(ext)}=2.5\Omega, R_L=160\Omega$	
t_r	Rise Time	/	4.3	/			
$t_{d(off)}$	Turn-Off Delay Time	/	9.1	/			
t_f	Fall Time	/	7.3	/			
$R_{G(int)}$	Internal Gate Resistance	/	12	/	Ω	$f=1MHz, V_{AC}=25mV$	
Q_{GS}	Gate to Source Charge	/	2.3	/	nC	$V_{DS}=400V$	Fig. 12
Q_{GD}	Gate to Drain Charge	/	1.9	/		$V_{GS}=0V/15V$	
Q_G	Total Gate Charge	/	6.3	/		$I_D=5A$	

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	4.5	/	V	$V_{GS}=-5V, I_{SD}=2.5A, T_J=25^{\circ}\text{C}$	Fig. 8,9,10
		3.6	/		$V_{GS}=-5V, I_{SD}=2.5A, T_J=175^{\circ}\text{C}$	
I_S	Continuous Diode Forward Current	/	8	A	$T_C=25^{\circ}\text{C}$	
t_{rr}	Reverse Recover Time	8.2	/	ns	$V_R=400V, I_{SD}=2.5A$	
Q_{rr}	Reverse Recovery Charge	14.1	/	nC		
I_{rrm}	Peak Reverse Recovery Current	0.9	/	A		



Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	3.5	/	$^{\circ}\text{C}/\text{W}$		
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	/	40			



Typical Performance

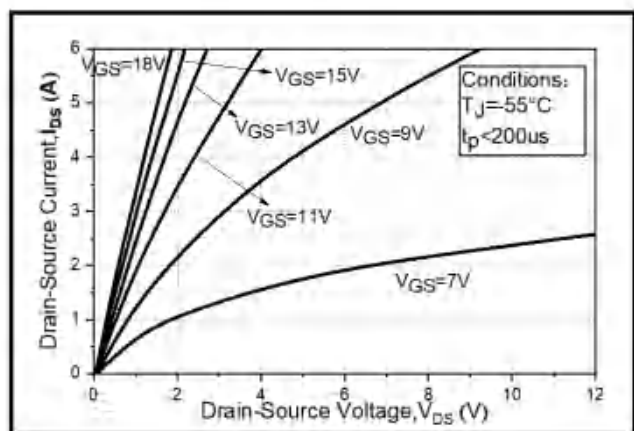


Figure 1. Output Characteristics $T_J = -55^\circ\text{C}$

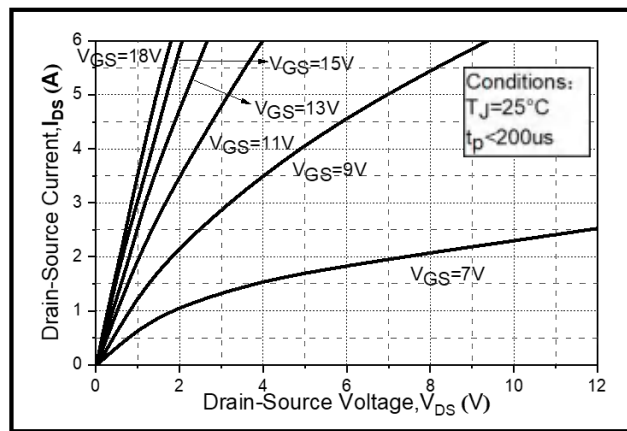


Figure 2. Output Characteristics $T_J = 25^\circ\text{C}$

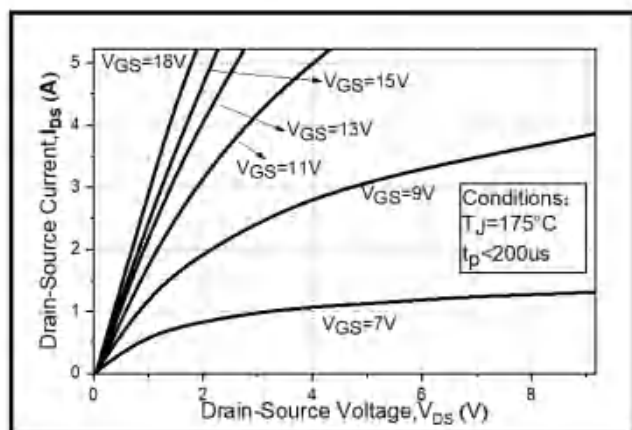


Figure 3. Output Characteristics $T_J = 175^\circ\text{C}$

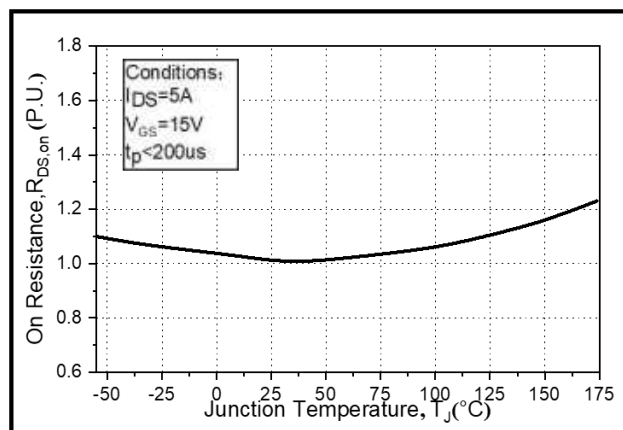


Figure 4. Normalized On-Resistance vs. Temperature

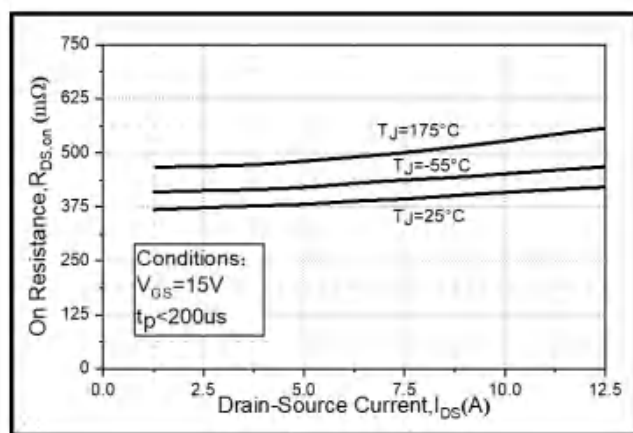


Figure 5. On-Resistance vs. Drain Current For Various Temperatures

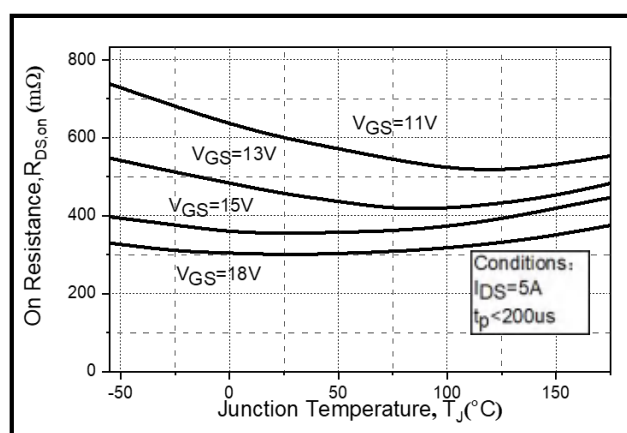


Figure 6. On Resistance vs. Temperature For Various Gate Voltage



Typical Performance

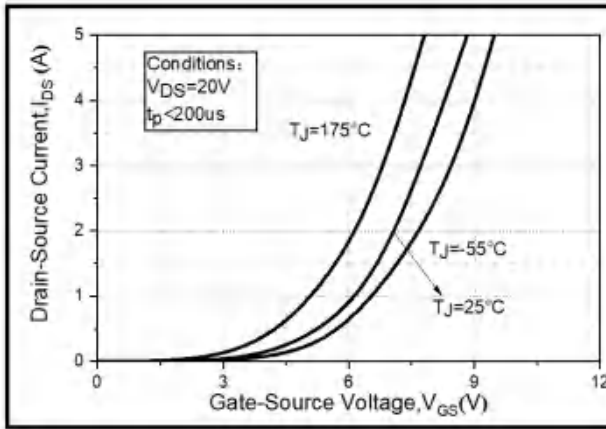


Figure 7. Transfer Characteristic for Various Junction Temperatures

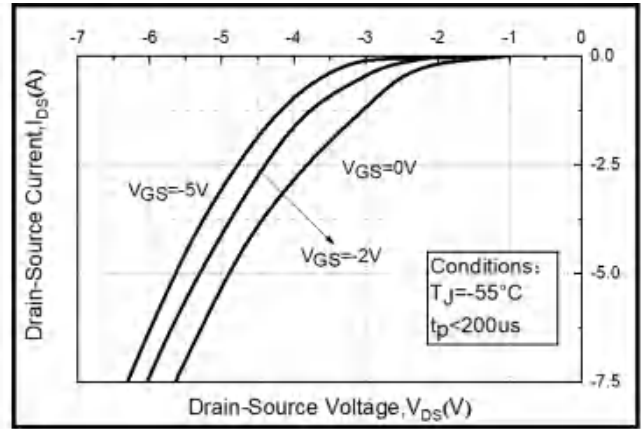


Figure 8. Body Diode Characteristic at -55°C

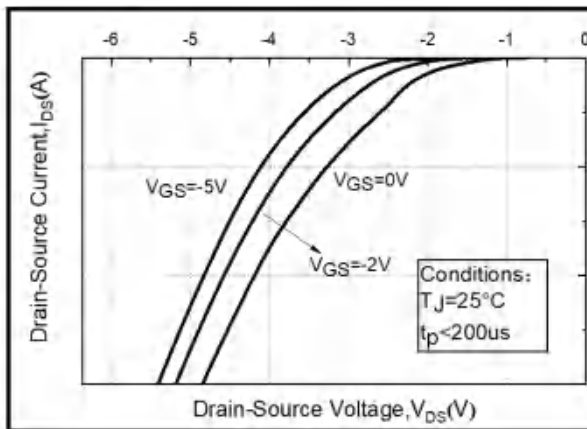


Figure 9. Body Diode Characteristic at 25°C

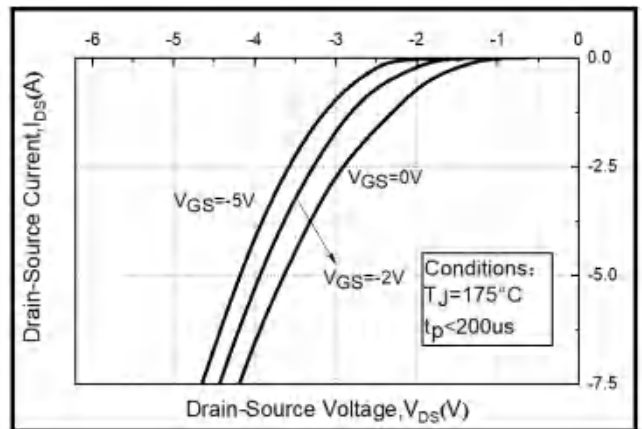


Figure 10. Body Diode Characteristic at 175°C

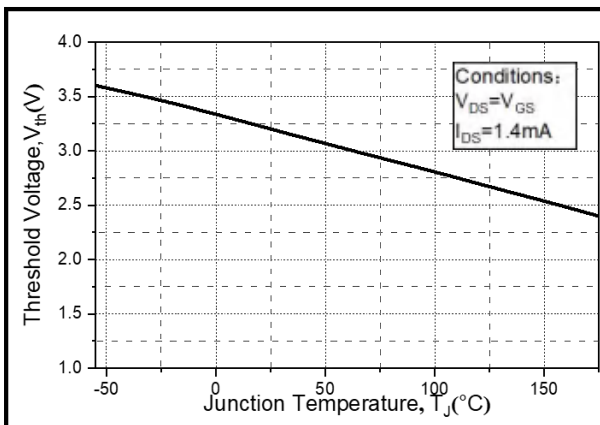


Figure 11. Threshold Voltage vs. Temperature

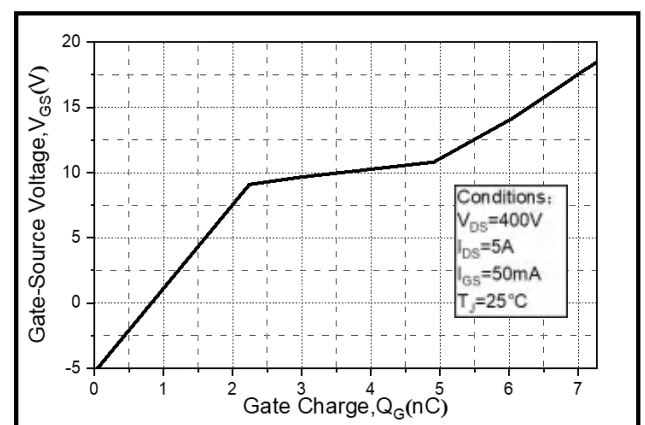


Figure 12. Gate Charge Characteristics



Typical Performance

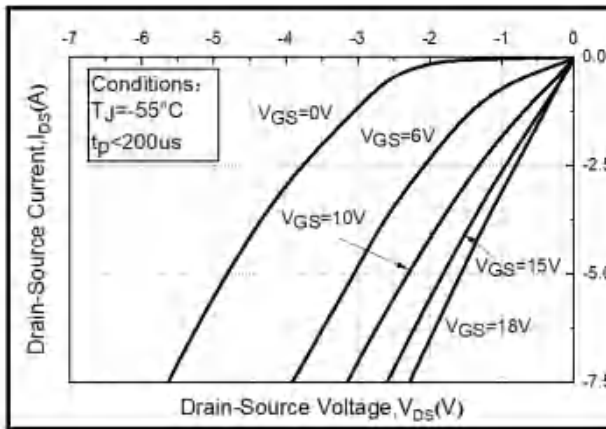


Figure 13. 3rd Quadrant Characteristic at -55°C

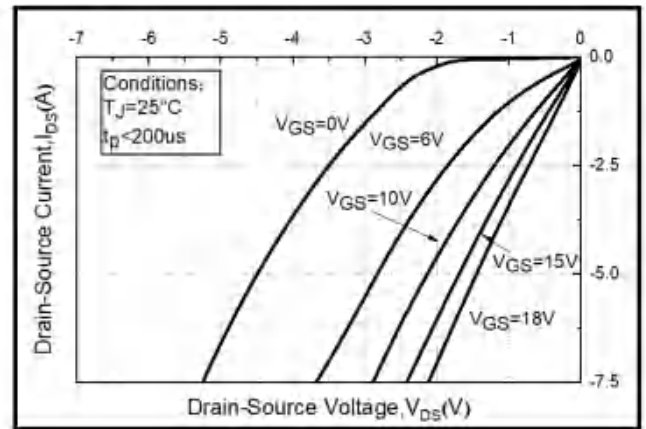


Figure 14. 3rd Quadrant Characteristic at 25°C

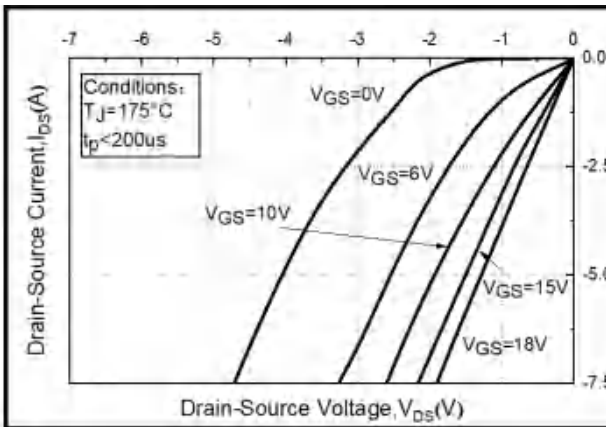


Figure 15. 3rd Quadrant Characteristic at 175°C

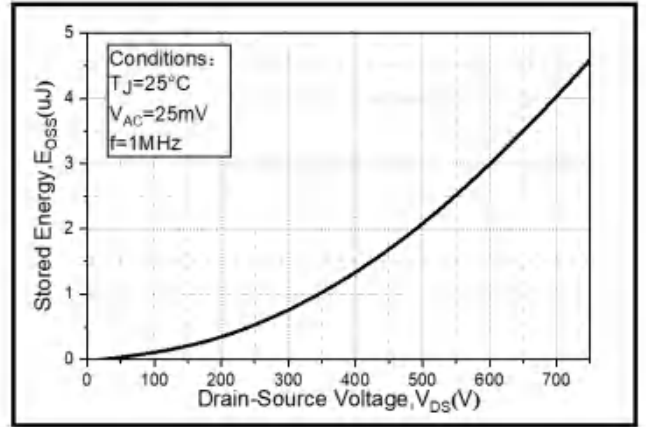


Figure 16. Output Capacitor Stored Energy

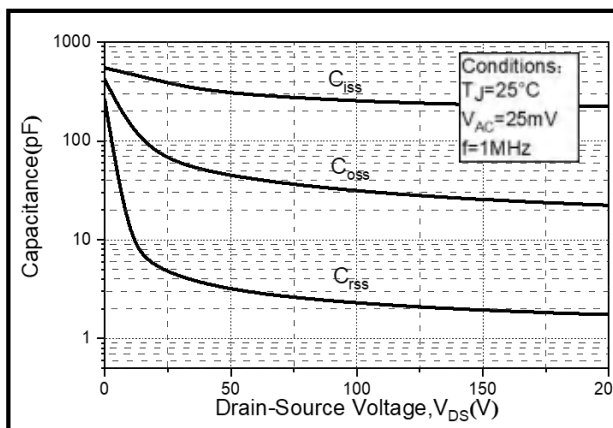


Figure 17. Capacitances vs. Drain-Source Voltage
(0 - 200V)

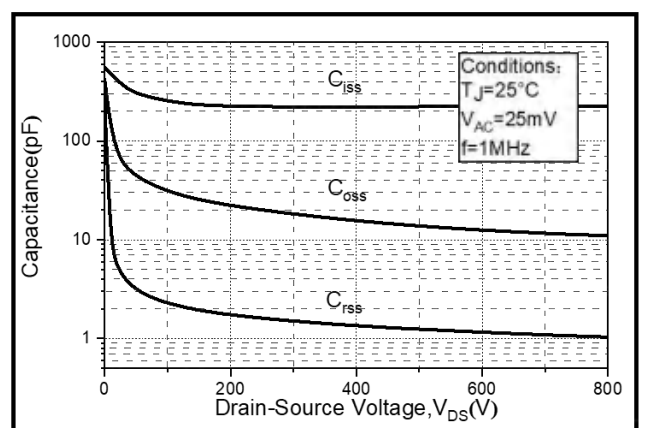


Figure 18. Capacitances vs. Drain-Source Voltage
(0 - 800V)



Typical Performance

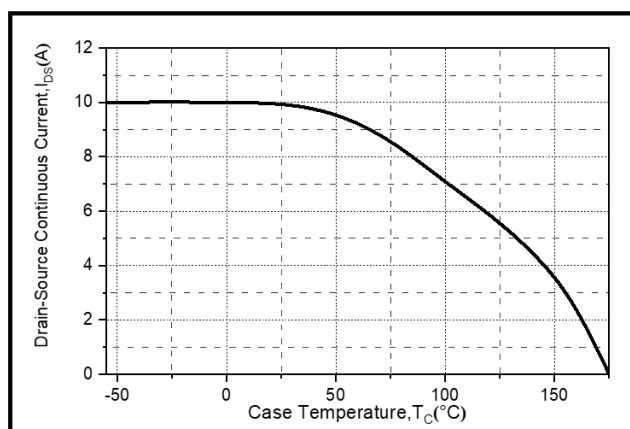


Figure 19. Continuous Drain Current vs. Case Temperature

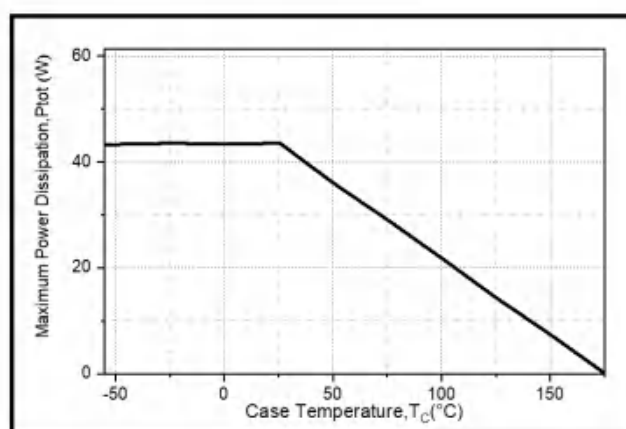


Figure 20. Maximum Power Dissipation vs. Case Temperature



Test Circuit Schematic

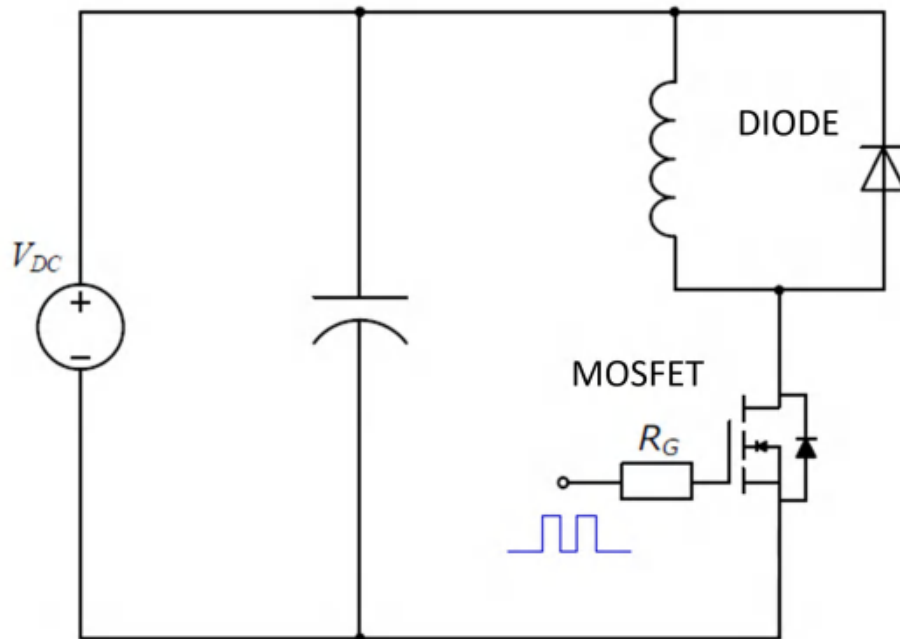
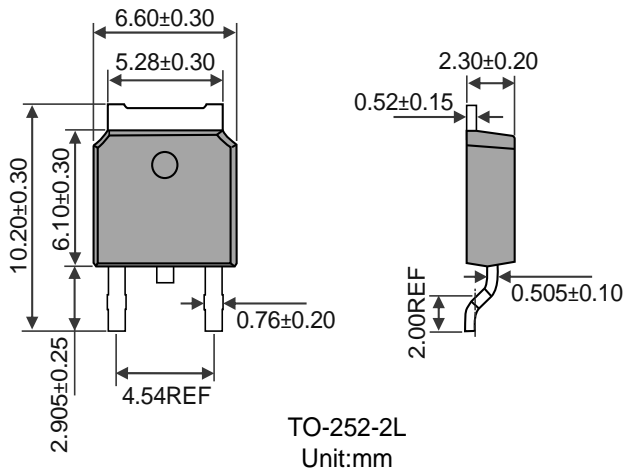


Figure 21. Clamped Inductive Switching
Waveform Test Circuit

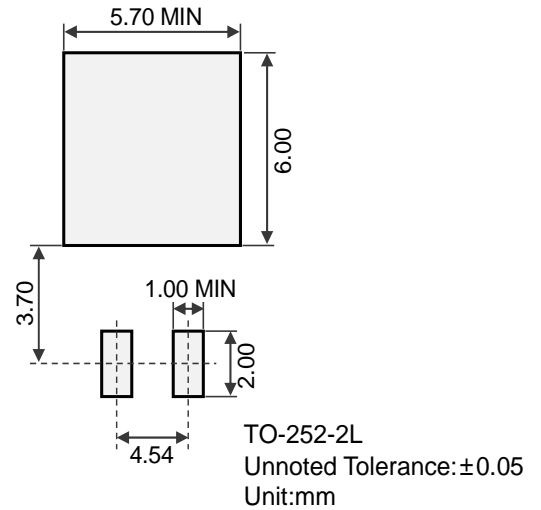


Package Outline Dimensions & Suggested Solder Pad Layout

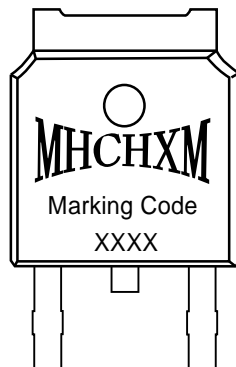
Package Outline Dimensions



Suggested Solder Pad Layout



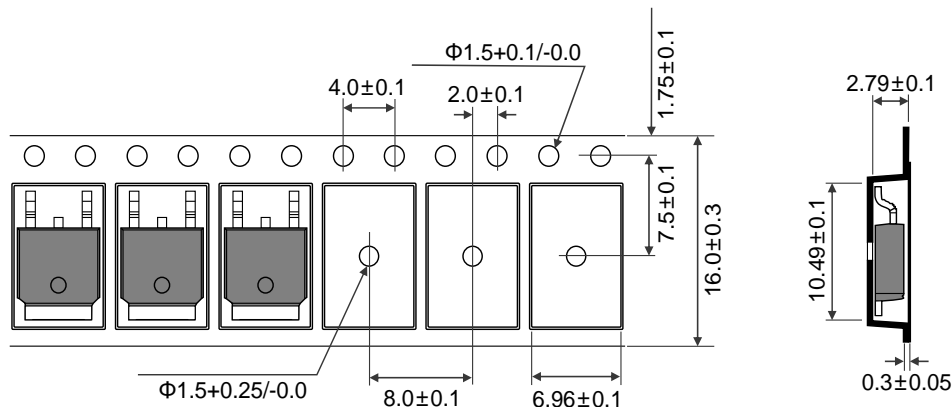
Marking Information



“MHCHXM”= Product Logo
“Marking Code”= The Following
“XXXX”= Date Code Marking

Marking Code	Part Number
C65N300S3	HXMC65N300S3

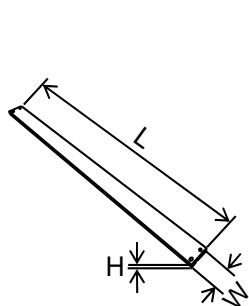
Reel Tape Dimensions (Dimensions in mm)



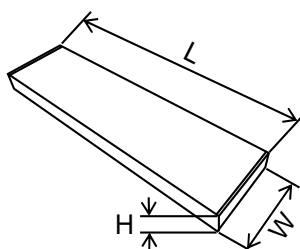
Packing Information

Packaging	Part Number	Quantity(pcs)	Size(mm)
Tube	Tube	80	L540×W20×H5
	Inner Box	4000	L570×W115×H55
	Outer Box	20000	L595×W320×H135
Reel	Reel	3000	Φ330×THK17
	Inner Box	3000	L350×W340×H25
	Outer Box	30000	L355×W300×H360

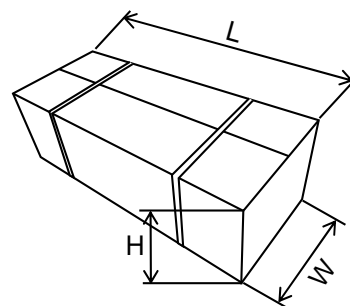
Packaging:Tube



Tube

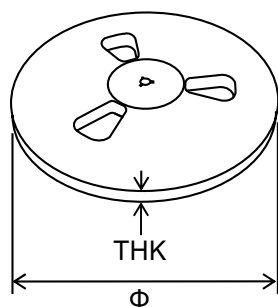


Tube Inner Box

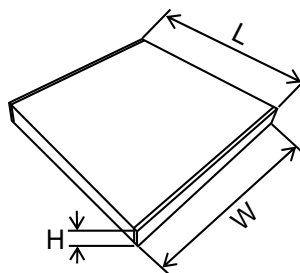


Tube Outer Box

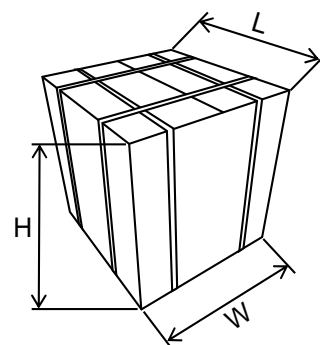
Packaging:Reel



Reel



Reel Inner Box



Reel Outer Box



DISCLAIMER

1. Above specification may be changed without notice. MHCHXM will reserve authority on material change for above specification.
2. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
3. When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets. MHCHXM assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
4. These specification sheets include materials protected under copyright of MHCHXM. Reproduction in any form is prohibited without the specific consent of MHCHXM.
5. This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or life saving applications or any other application which can result in human injury or death. Please contact authorized MHCHXM sales agent for special application request.
6. Statements regarding the suitability of products for certain types of applications are based on MHCHXM's knowledge of typical requirements that are often placed on MHCHXM products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify MHCHXM's terms and conditions of purchase, including but not limited to the warranty expressed therein.
7. This publication supersedes & replaces all information previously supplied. For additional application information, please visit our website <http://www.jshxm.com> , or consult your nearest MHCHXM's sales office for further assistance.

