
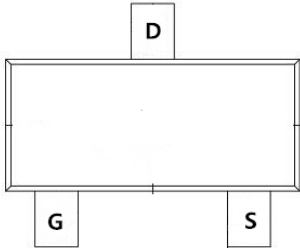


TM07P02MI

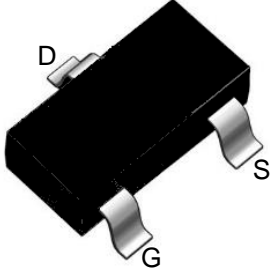
P-Channel Enhancement Mosfet

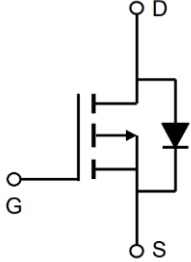
<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul>	<p><b>General Features</b></p> <p><math>V_{DS} = -20V, I_D = -7.0A</math>  <math>R_{DS(ON)} = 20m\Omega @ V_{GS} = -4.5V</math></p> <p>100% UIS Tested                  100% <math>R_g</math> Tested</p> 
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Marking: 20P07

MI:SOT-23-3L





**Absolute Maximum Ratings:** ( $T_C = 25^\circ C$  unless otherwise noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-7.0	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-4.9	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	-25.8	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation <sup>3</sup>	1.5	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	---	115	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	80	$^\circ C/W$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D$		-20	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -12V, V_{GS}=0V,$	-	-	-1	$\mu\text{A}$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS} = \pm 12V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D = -250\mu\text{A}$	-0.4	-0.7	-1.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS} = -4.5V, I_D = -7A$	-	20	25	m $\Omega$
		$V_{GS} = -2.5V, I_D = -5A$	-	26	36	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS} = -6V, V_{GS}=0V,$ $f=1.0\text{MHz}$	-	809	-	pF
$C_{oss}$	Output Capacitance		-	191	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	168	-	pF
$Q_g$	Total Gate Charge	$V_{DS} = -6V, I_D = -7A,$ $V_{GS} = -4.5V$	-	33.7	-	nC
$Q_{gs}$	Gate-Source Charge		-	3.5	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	10.5	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = -6V, I_D = -4A,$ $V_{GS} = -4.5V,$ $R_{GEN}=2.5\Omega$	-	11	-	ns
$t_r$	Turn-on Rise Time		-	35	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	20	-	ns
$t_f$	Turn-off Fall Time		-	10	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	-7	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-20	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S = -7A$	-	-0.8	-1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width $\leq 300\mu\text{s}$ , Duty Cycle $\leq 2\%$

## Typical Performance Characteristics

Figure 1: Output Characteristics

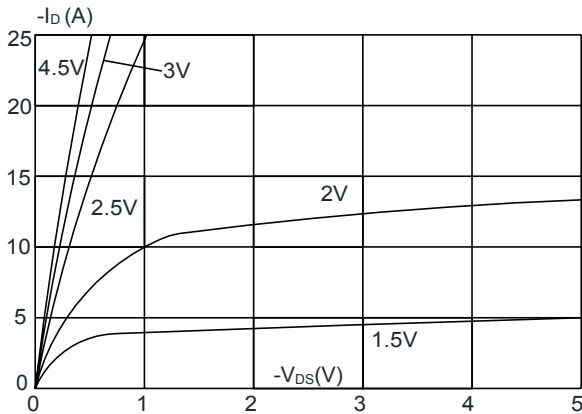


Figure 2: Typical Transfer Characteristics

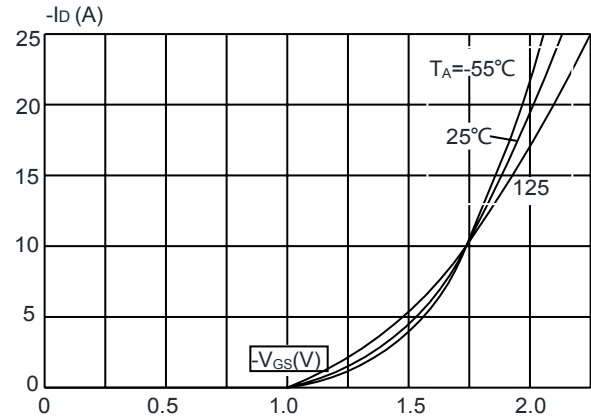


Figure 3: On-resistance vs. Drain Current

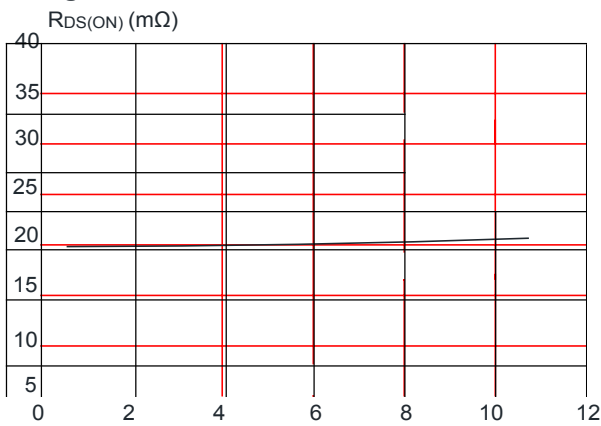


Figure 4: Body Diode Characteristics

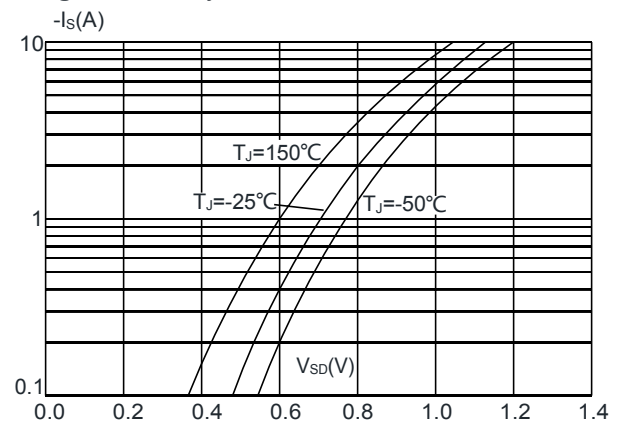


Figure 5: Gate Charge Characteristics

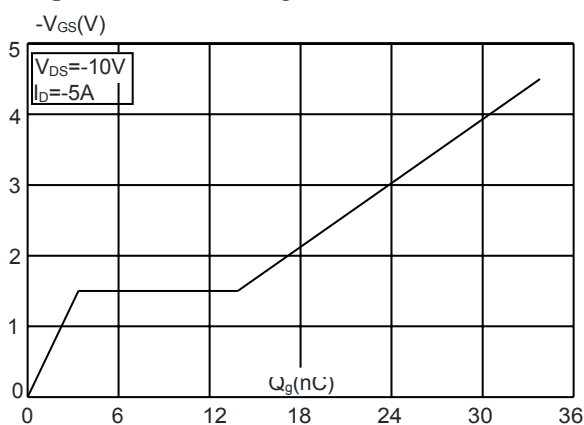
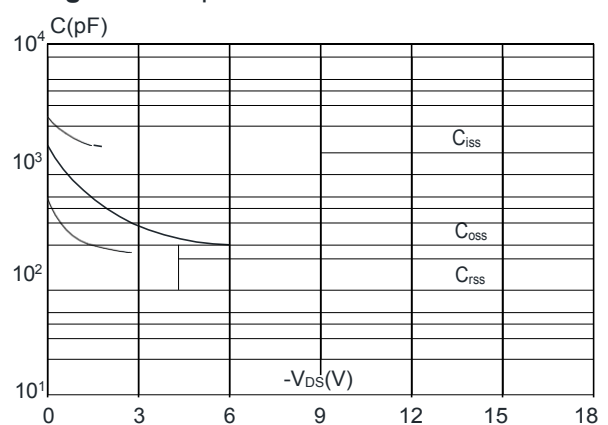


Figure 6: Capacitance Characteristics



TM07P02MI

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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

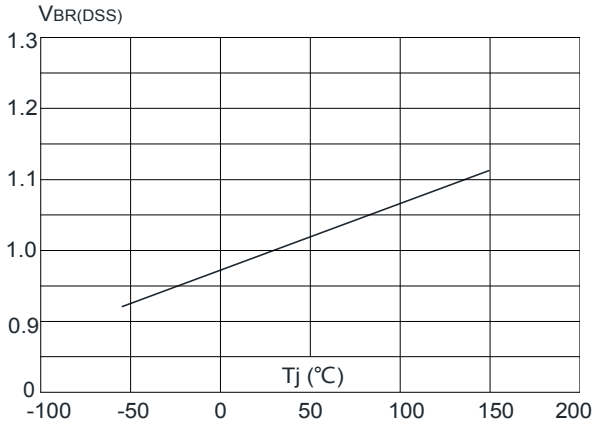


Figure 8: Normalized on Resistance vs. Junction Temperature

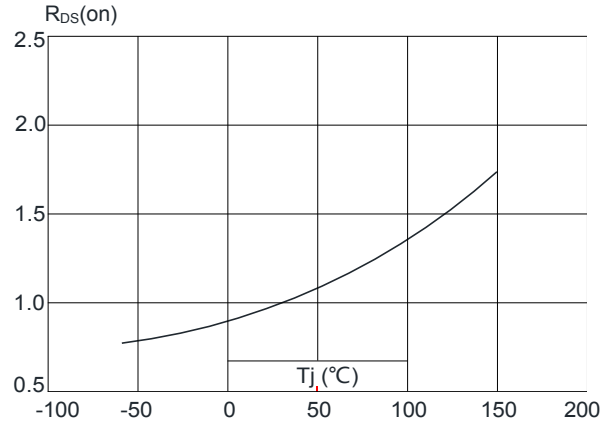


Figure 9: Maximum Safe Operating Area

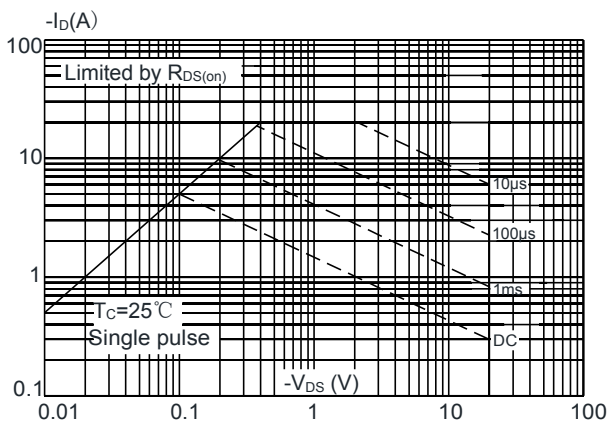


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

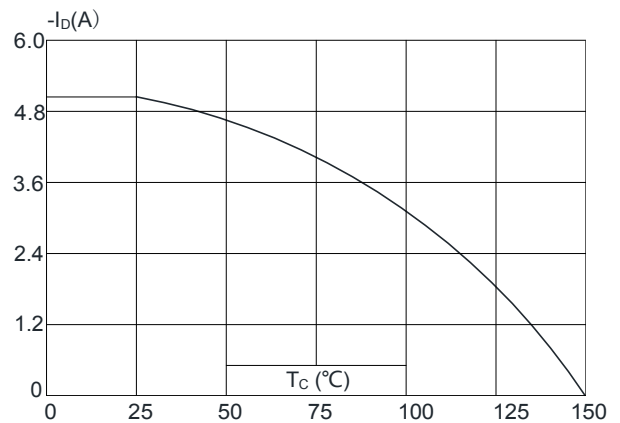
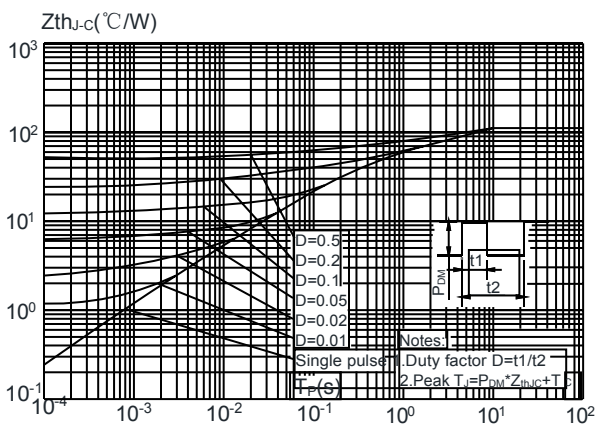
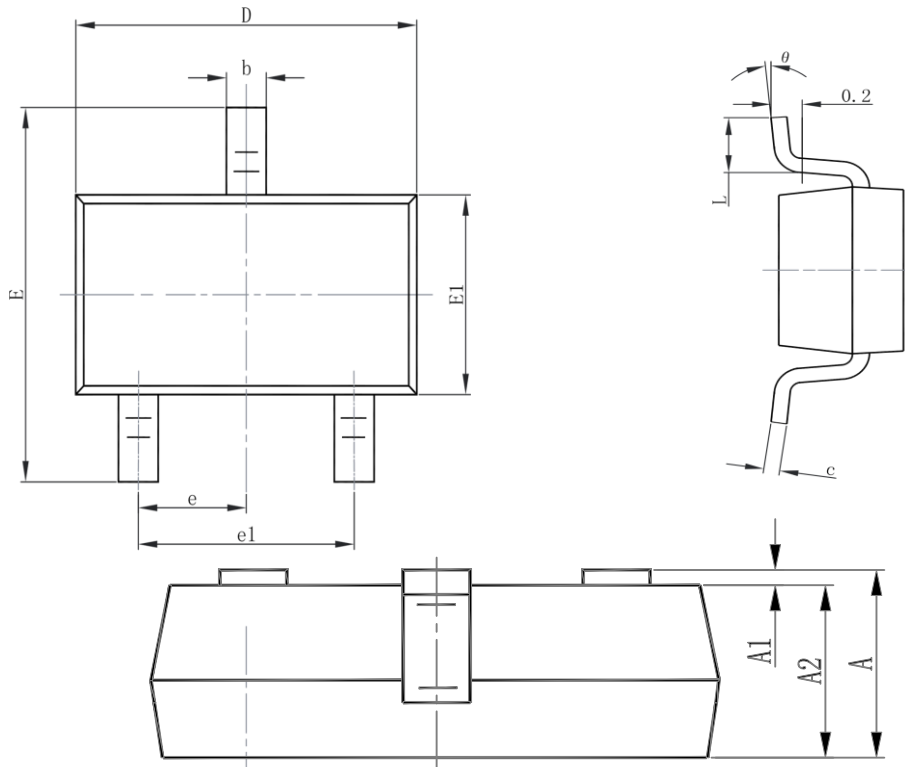


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



# Package Mechanical Data:SOT-23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
theta	0°	8°	0°	8°