



**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	$V_{GS}=0V, I_D=-250\mu A$	-40	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-40V, V_{GS}=0V$	-	-	-1	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.7	-2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance Note2	$V_{GS}=-10V, I_D=-5A$	-	45	54	m $\Omega$
		$V_{GS}=-4.5V, I_D=-4A$	-	55	68	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=-20V, V_{GS}=0V,$ $f=1.0MHz$	-	899	-	pF
$C_{oss}$	Output Capacitance		-	94	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	69	-	pF
$Q_g$	Total Gate Charge	$V_{DS}=-20V, I_D=-4A,$ $V_{GS}=-10V$	-	17.3	-	nC
$Q_{gs}$	Gate-Source Charge		-	3.2	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	4.3	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=-20V, I_D=-4A,$ $V_{GS}=-10V, R_{GEN}=3\Omega$	-	10.3	-	ns
$t_r$	Turn-on Rise Time		-	4.3	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	39	-	ns
$t_f$	Turn-off Fall Time		-	46.5	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	-5.4	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-22	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=-5.5A$	-	-0.8	-1.2	V
$t_{rr}$	Reverse Recovery Time	$V_{GS}=0V, I_S=-5.5A,$ $di/dt=100A/\mu s$	-	17	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	11.5	-	nC

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

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

## Typical Performance Characteristics

Figure 1: Output Characteristics

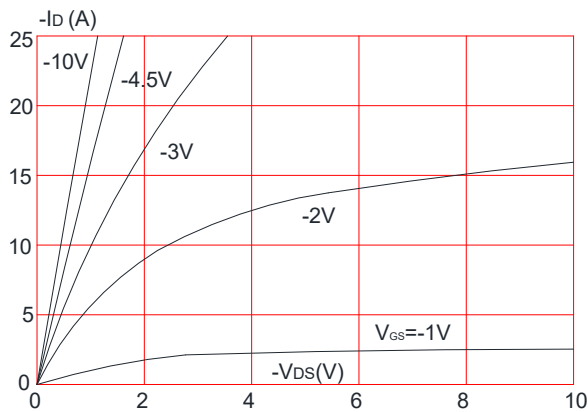


Figure 2: Typical Transfer Characteristics

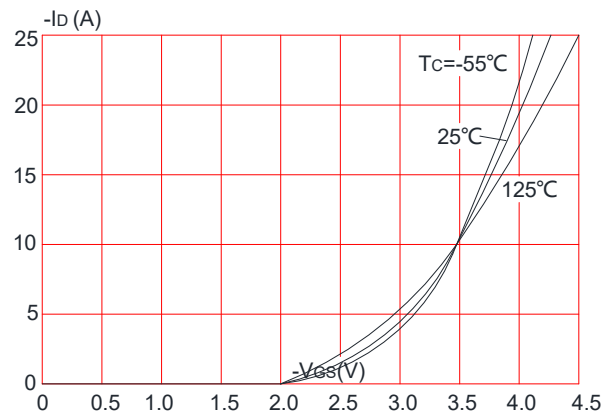


Figure 3: On-resistance vs. Drain Current

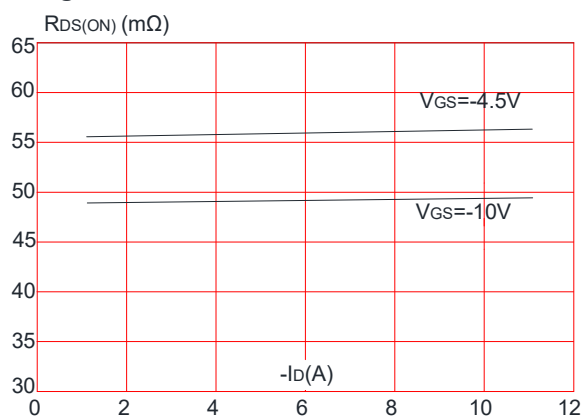


Figure 4: Body Diode Characteristics

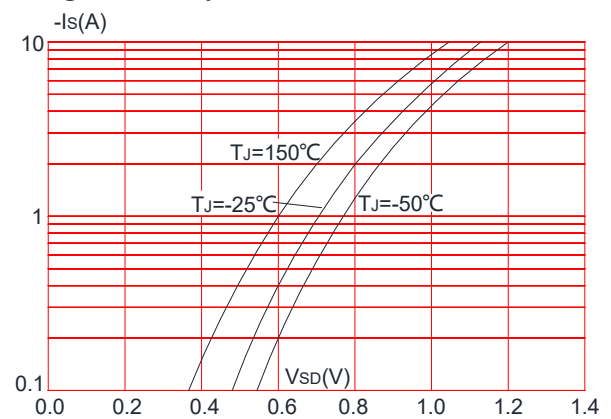


Figure 5: Gate Charge Characteristics

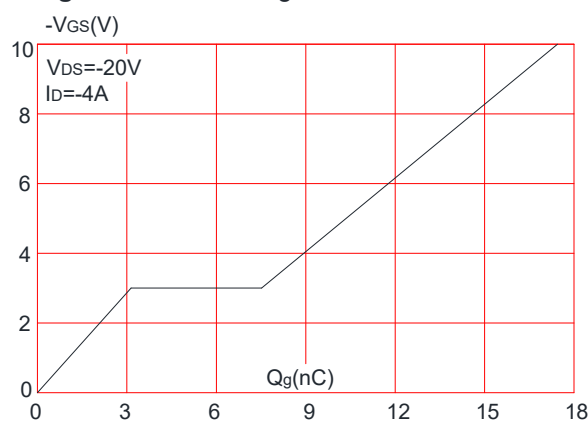
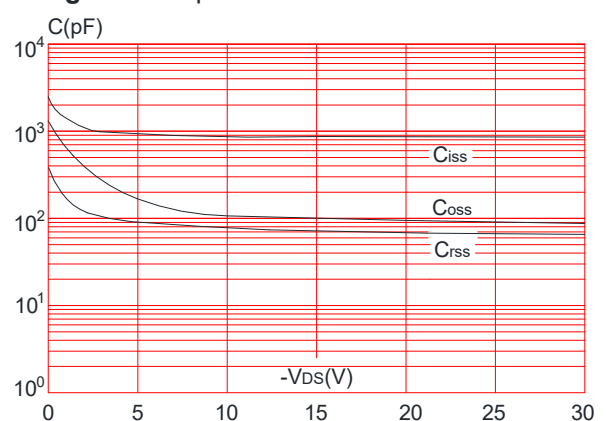


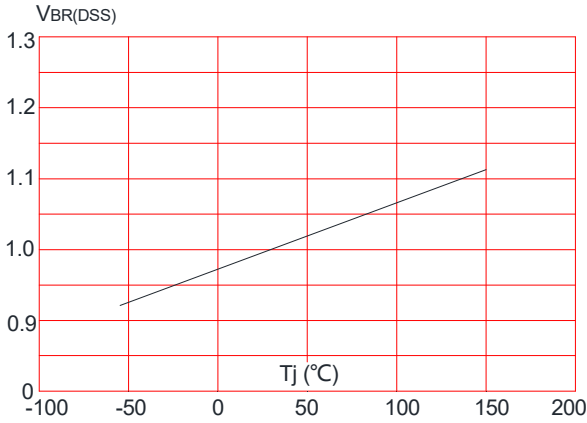
Figure 6: Capacitance Characteristics



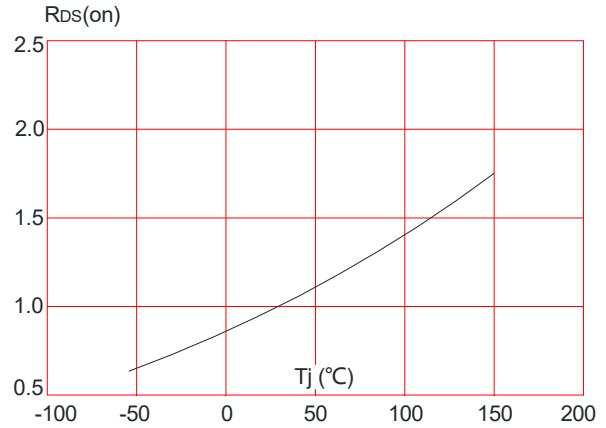
**TM05P04MI**

**P-Channel Enhancement Mosfet**

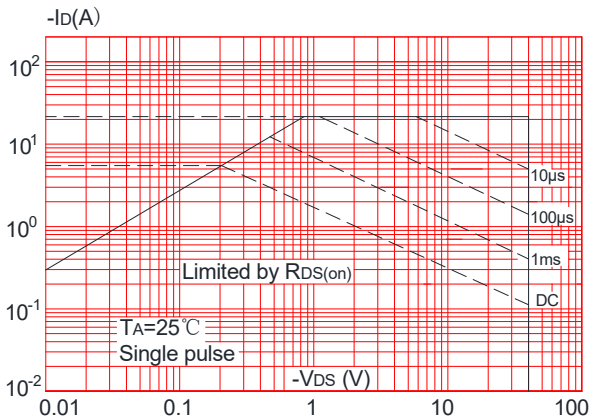
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



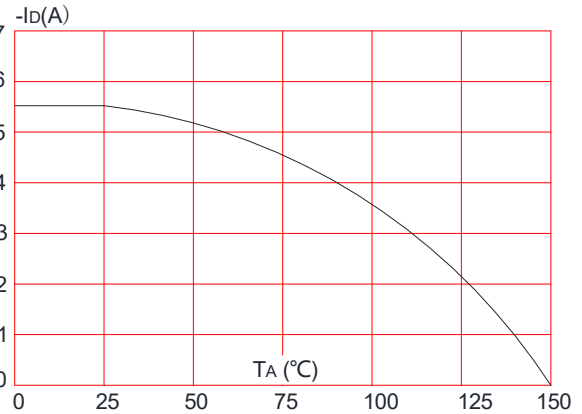
**Figure 8: Normalized on Resistance vs. Junction Temperature**



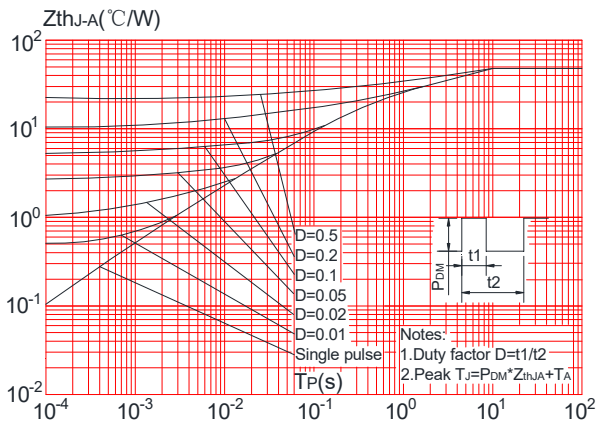
**Figure 9: Maximum Safe Operating Area**



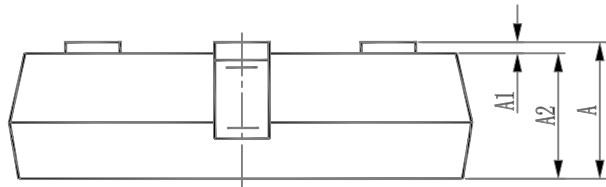
**Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature**



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



Package Mechanical Data :SOT-23-3L



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