



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	500	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 500V,$ $V_{GS} = 0V, T_J = 25^\circ\text{C}$	-	-	1	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{GS} = \pm 30V$	-	-	$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance <small>note3</small>	$V_{GS} = 10V, I_D = 2.5A$	-	1.35	1.6	$\Omega$
$C_{iss}$	Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$	-	462	-	pF
$C_{oss}$	Output Capacitance		-	54.2	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	8.8	-	pF
$Q_g$	Total Gate Charge	$V_{DD} = 400V, I_D = 5A,$ $V_{GS} = 10V$	-	13.5	-	nC
$Q_{gs}$	Gate-Source Charge		-	2	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	6	-	nC
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 250V, I_D = 5A,$ $R_G = 25\Omega$	-	10	-	ns
$t_r$	Turn-On Rise Time		-	25	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	40	-	ns
$t_f$	Turn-Off Fall Time		-	52	-	ns
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	5	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	20	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_{SD} = 5A,$ $T_J = 25^\circ\text{C}$	-	-	1.4	V
$t_{rr}$	Reverse Recovery Time	$V_{GS} = 0V, I_S = 5A,$ $di/dt = 100A/\mu s$	-	220	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	3	-	$\mu C$

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $I_{AS} = 3A, V_{DD} = 50V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width  $\leq 300\mu s, \text{Duty Cycle } \leq 1\%$



### Typical Performance Characteristics

Figure 1: Output Characteristics

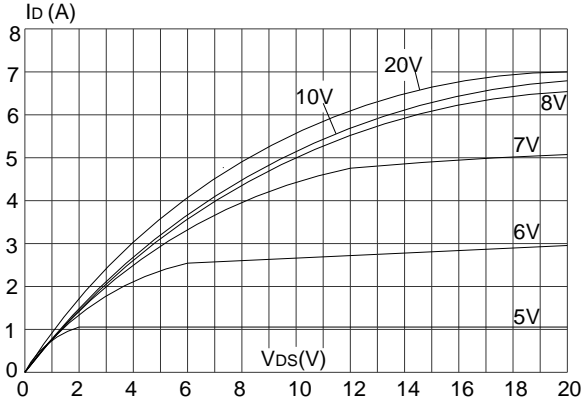


Figure 2: Typical Transfer Characteristics

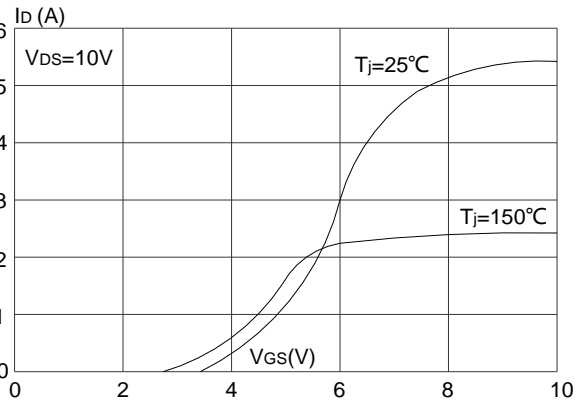


Figure 3: On-resistance vs. Drain Current

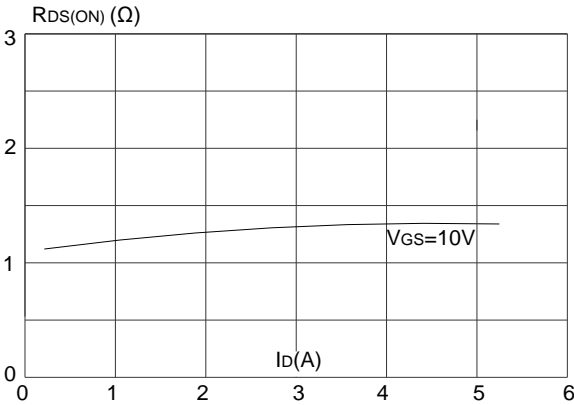


Figure 4: Body Diode Characteristics

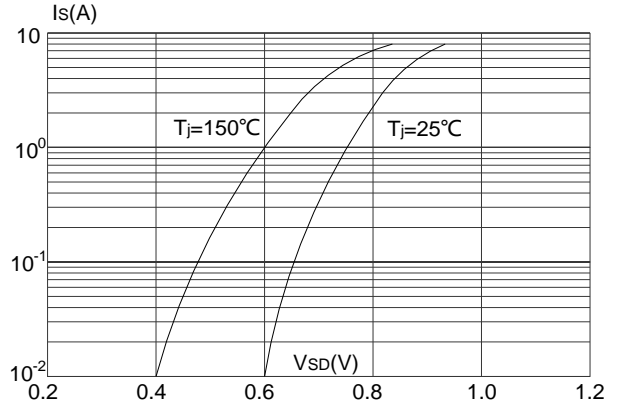


Figure 5: Gate Charge Characteristics

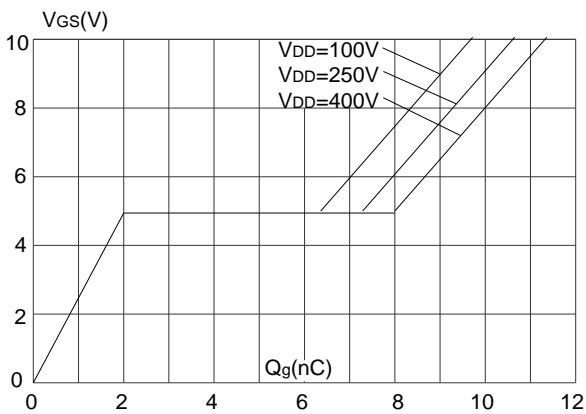
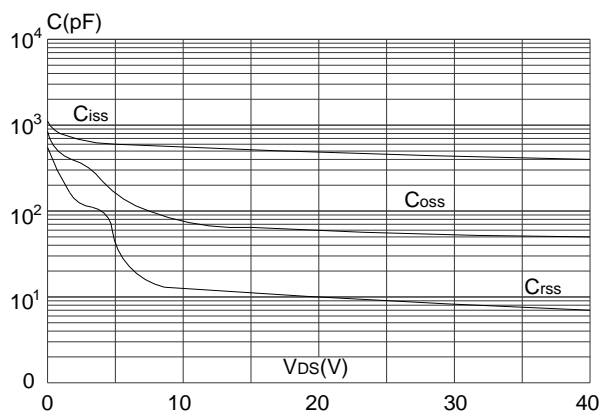


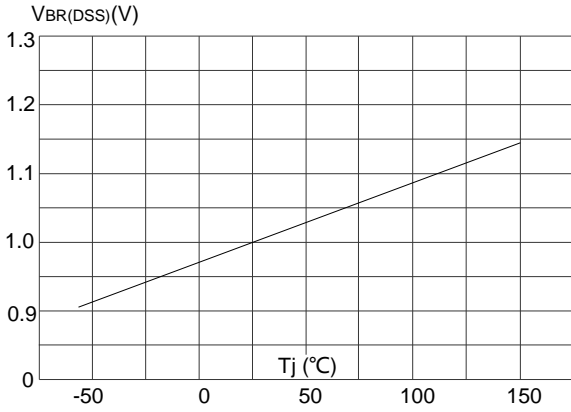
Figure 6: Capacitance Characteristics



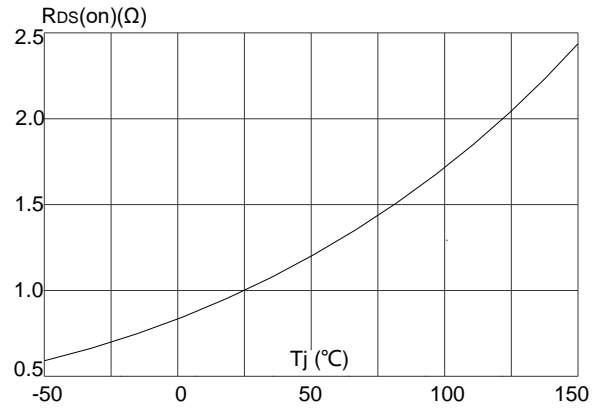
**TM05N50D**

**N-Channel Enhancement Mosfet**

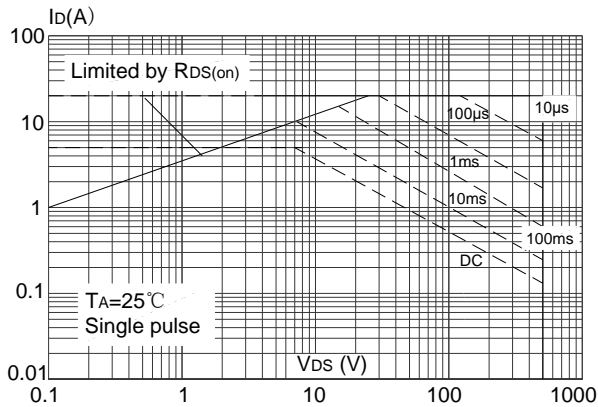
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



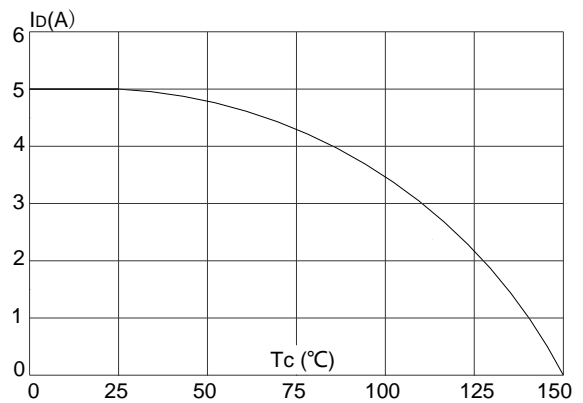
**Figure 8: Normalized on Resistance vs. Junction Temperature**



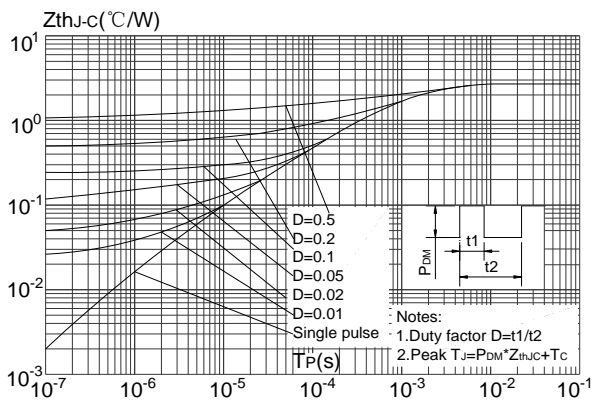
**Figure 9: Maximum Safe Operating Area**



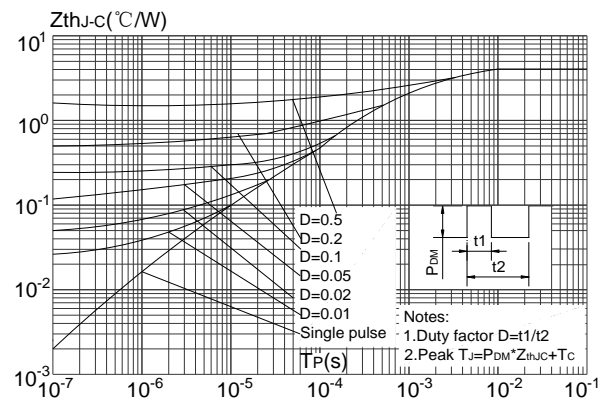
**Figure 10: Maximum Continuous Drain Current vs. Case Temperature**



**Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-220C, TO-251, TO-251S, TO-252)**



**Figure.12: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-220F)**





TM05N50D

N-Channel Enhancement Mosfet

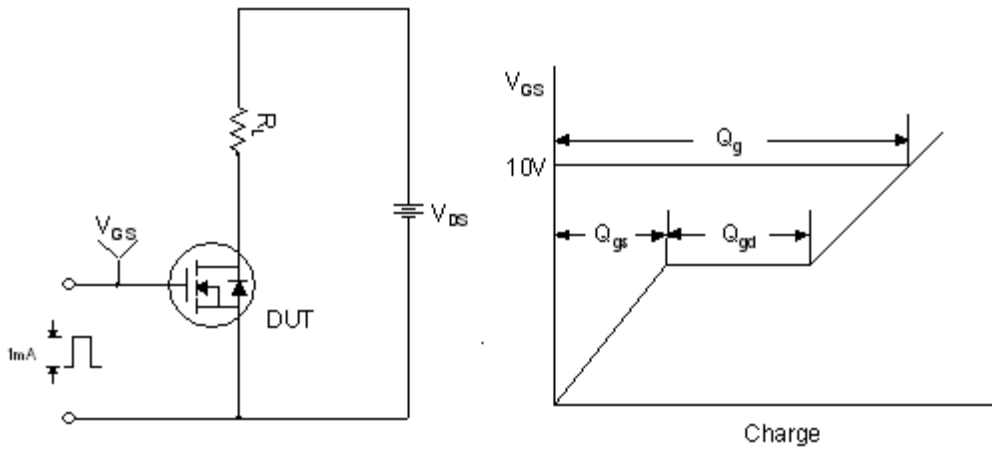


Figure 13. Gate Charge Test Circuit & Waveform

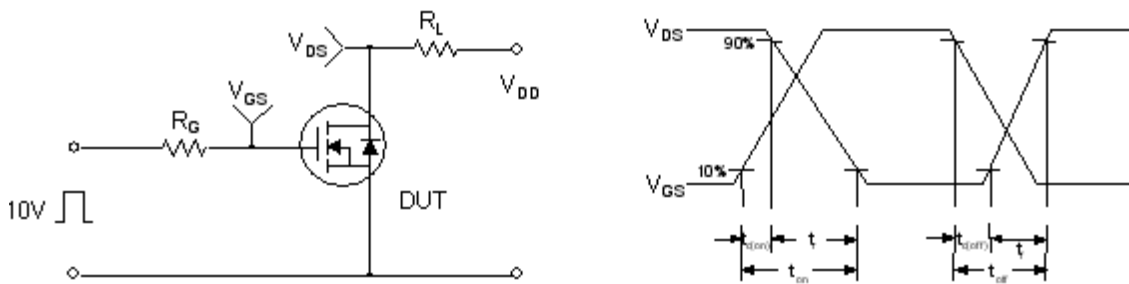


Figure 14. Resistive Switching Test Circuit & Waveforms

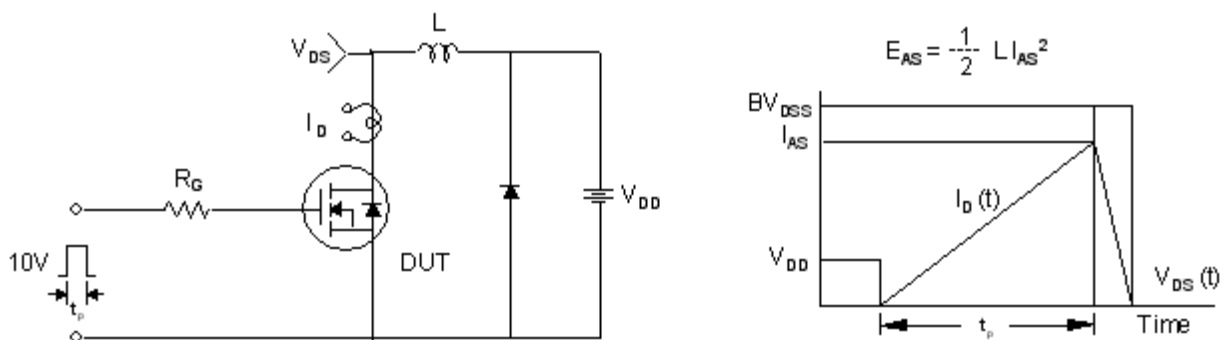


Figure 15. Unclamped Inductive Switching Test Circuit & Waveforms



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