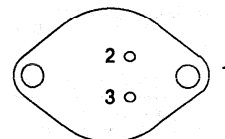
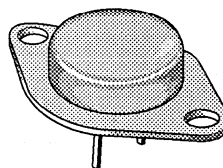


PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)
SMM60N06	60	0.023	60
SMM60N05	50	0.023	60

BOTTOM VIEW

TO-204AE (TO-3)

- 1 DRAIN (CASE)
- 2 GATE
- 3 SOURCE

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	SMM		Units
		60N06	60N05	
Drain-Source Voltage	V_{DS}	60	50	V
Gate-Source Voltage	V_{GS}	± 40	± 40	
Continuous Drain Current	I_D	$T_C = 25^\circ\text{C}$	60	A
		$T_C = 100^\circ\text{C}$	36	
Pulsed Drain Current ¹	I_{DM}	240	240	
Power Dissipation	P_D	$T_C = 25^\circ\text{C}$	150	W
		$T_C = 100^\circ\text{C}$	60	
Operating Junction & Storage Temperature Range	T_J, T_{stg}	-55 to 150		$^\circ\text{C}$
Lead Temperature (1/16" from case for 10 secs.)	T_L	300		

4
THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Case	R_{thJC}	-	0.83	K/W
Junction-to-Ambient	R_{thJA}	-	30	
Case-to-Sink	R_{thCS}	0.1	-	

¹Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage $V_{GS} = 0, I_D = 250 \mu\text{A}$	SMM60N06 SMM60N05	$V_{(BR)DSS}$	60 50	65 55	- -	V
Gate Threshold Voltage $V_{DS} = V_{GS}, I_D = 1000 \mu\text{A}$		$V_{GS(th)}$	2.0	-	4.0	
Gate-Body Leakage $V_{DS} = 0, V_{GS} = \pm 20 \text{ V}$		I_{GSS}	-	-	100	nA
Zero Gate Voltage Drain Current $V_{DS} = V_{(BR)DSS}, V_{GS} = 0$		I_{DSS}	-	-	250	μA
Zero Gate Voltage Drain Current $V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 0, T_J = 125^\circ\text{C}$		I_{DSS}	-	-	1000	
On-State Drain Current ² $V_{DS} = 2.0 \text{ V}, V_{GS} = 10 \text{ V}$		$I_{D(on)}$	60	-	-	A
Drain-Source On-State Resistance ² $V_{GS} = 10 \text{ V}, I_D = 30 \text{ A}$		$r_{DS(on)}$	-	0.019	0.023	Ω
Drain-Source On-State Resistance ² $V_{GS} = 10 \text{ V}, I_D = 30 \text{ A}, T_J = 125^\circ\text{C}$		$r_{DS(on)}$	-	0.025	0.032	
Forward Transconductance ² $V_{DS} = 25 \text{ V}, I_D = 30 \text{ A}$		g_{fs}	15	18	-	$\text{S}(\text{V})$
Input Capacitance	$V_{GS} = 0$ $V_{DS} = 25 \text{ V}$ $f = 1 \text{ MHz}$	C_{iss}	-	2900	3500	pF
Output Capacitance		C_{oss}	-	1500	1600	
Reverse Transfer Capacitance		C_{rss}	-	500	600	
Total Gate Charge	$V_{DS} = 0.5 \times V_{(BR)DSS}$ $V_{GS} = 10 \text{ V}, I_D = 60 \text{ A}$ (Gate charge is essentially independent of operating temperature)	Q_g	-	65	75	nC
Gate-Source Charge		Q_{gs}	-	15	-	
Gate-Drain Charge		Q_{gd}	-	35	-	
Turn-On Delay Time	$V_{DD} = 30 \text{ V}, R_L = 1.0 \Omega$	$t_{d(on)}$	-	20	40	ns
Rise Time	$I_D = 30 \text{ A}, V_{GEN} = 10 \text{ V}$	t_r	-	25	50	
Turn-Off Delay Time	$R_G = 2.5 \Omega$	$t_{d(off)}$	-	30	60	
Fall Time	(Switching time is essentially independent of operating temperature)	t_f	-	20	40	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	-	-	60	A
Pulsed Current ¹	I_{SM}	-	-	240	
Forward Voltage ² $I_F = I_S, V_{GS} = 0$	V_{SD}	-	-	2.5	V
Reverse Recovery Time $I_F = I_S, di_F/dt = 100 \text{ A}/\mu\text{s}$	t_{rr}	-	75	100	ns
Reverse Recovered Charge $I_F = I_S, di_F/dt = 100 \text{ A}/\mu\text{s}$	Q_{rr}	-	0.19	-	μC

¹ Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)

² Pulse test: Pulse width $\leq 300 \mu\text{sec}$, Duty Cycle $\leq 2\%$

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

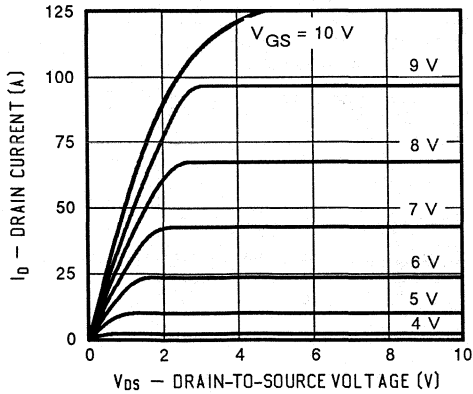


FIGURE 2: Typical Transfer Characteristics

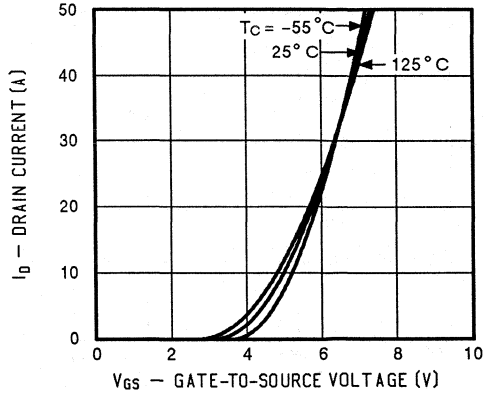


FIGURE 3: Typical Transconductance

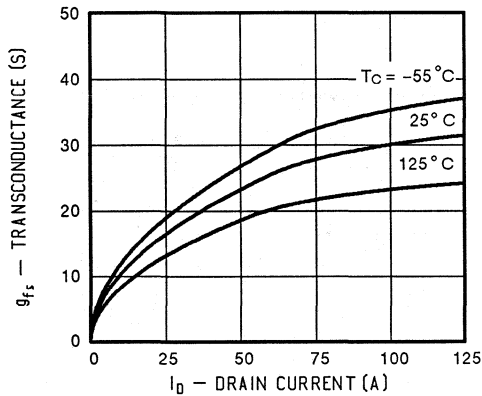


FIGURE 4: Typical On-Resistance

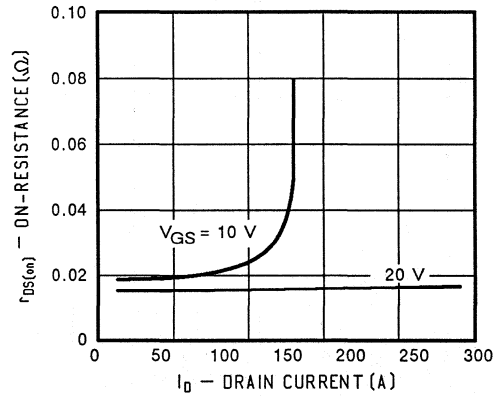


FIGURE 5: Typical Capacitance

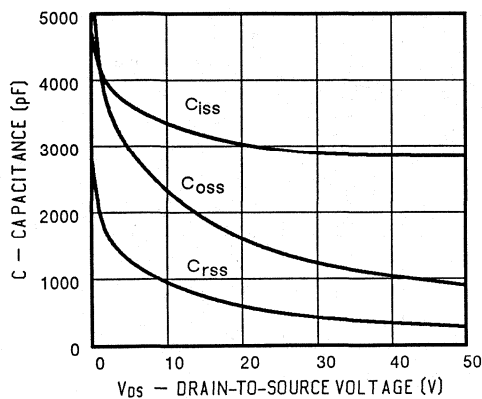
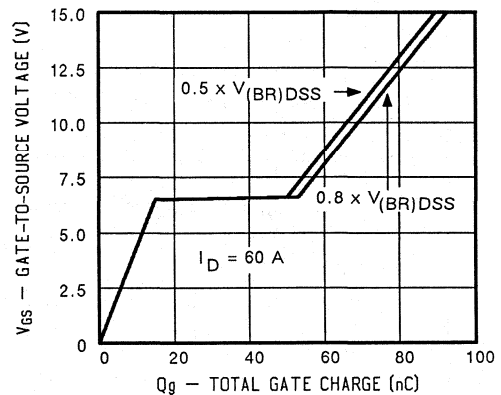


FIGURE 6: Typical Gate Charge



PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

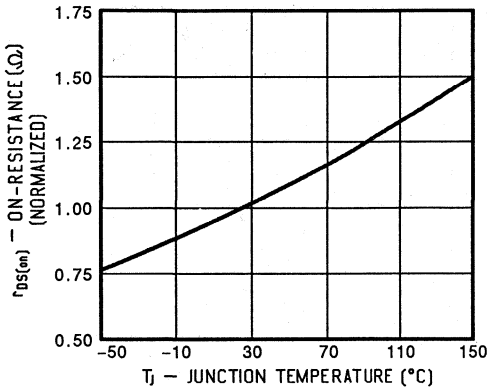


FIGURE 8: Typical Source-Drain Diode Forward Voltage

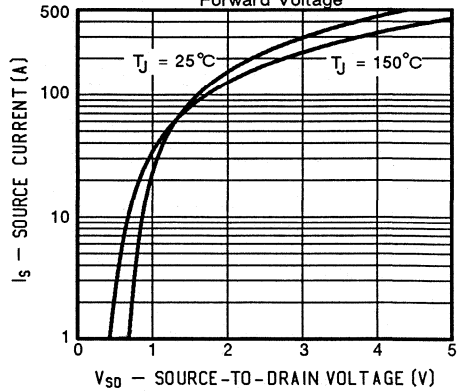


FIGURE 9: Maximum Drain Current vs. Case Temperature

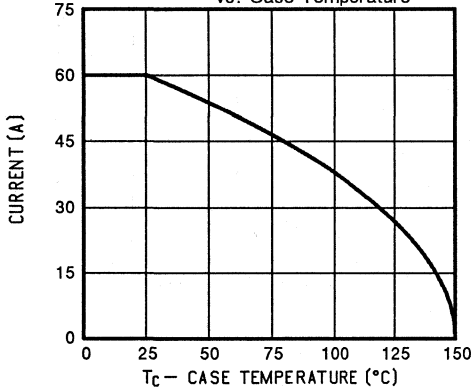


FIGURE 10: Safe Operating Area

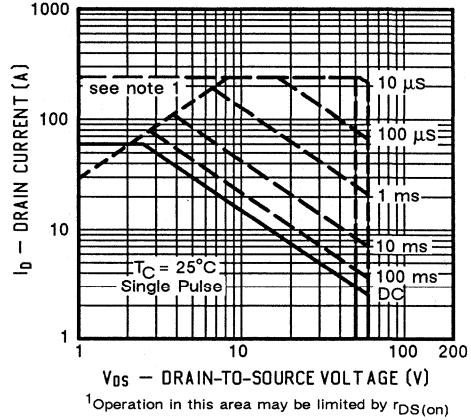


FIGURE 11: Normalized Effective Transient Thermal Impedance, Junction-to-Case

