

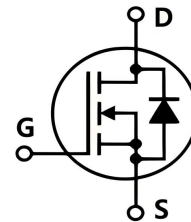
Features

- International standard package
- $R_{DS(ON)}(typ.) = 70m\Omega @ I_C = 10A$
- Avalanche ruggedness
- Low Q_G
- Very low on-resistance



Applications

- Switch-Mode and Resonant-Mode
- Power Supplies
- DC-DC Converters
- PFC Circuits
- AC and DC Motor Driver
- Robotics and Servo Controls



Electrical ratings

Parameter	Symbol	Value	Unit
Drain-source voltage ($V_{GS} = 0$)	V_{DS}	850	V
Gate- source voltage	V_{GS}	± 30	
Drain current (continuous) at $T_C = 25\text{ }^{\circ}\text{C}$	I_D	66	A
Drain current (continuous) at $T_C = 100\text{ }^{\circ}\text{C}$		35	
Drain current (pulsed Width Limited by T_{JM})	I_{DM}	140	
continuous pulse avalanche current	I_{AR}	33	A
Single pulse avalanche energy (starting $T_J = 25\text{ }^{\circ}\text{C}$, $I_D = I_{AR}$, $V_{DD} = 50\text{ V}$)	E_{AS}	2500	mJ
Total dissipation at $T_C = 25\text{ }^{\circ}\text{C}$ TO-264	P_{TOT}	1250	W
Total dissipation at $T_C = 25\text{ }^{\circ}\text{C}$ SOT-227	P_{TOT}	1566	W
Operating junction temperature	T_J	-55 to 150	$^{\circ}\text{C}$
Storage temperature	T_{stg}		
Maximum lead temperature for soldering purpose	T_L	300	
Isolation Voltage for terminal to case	V_{ISO}	3.0	KV

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

On /off states						
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit

Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 1 \text{ mA}, V_{GS} = 0$	850			V
Zero gate voltage drain current ($V_{GS} = 0$)	I_{DSS}	$V_{DS} = \text{Max rating}$			50	μA
		$V_{DS}=\text{Max rating}, T_C=125\text{ }^{\circ}\text{C}$			3000	
Gate-body leakage current ($V_{DS} = 0$)	I_{GSS}	$V_{GS} = \pm 30 \text{ V}$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \text{ }\mu\text{A}$	3.0	3.8	4.6	V
Static drain-source on resistance	$R_{DS(on)}$	$V_{GS} = 15\text{V}, I_D = 10\text{A}$ @25 $^{\circ}\text{C}$		70	83	m Ω
Dynamic						
Input capacitance	C_{iss}	$V_{DS}=25\text{V}, f=1\text{MHz}, V_{GS}=0$		8600		pF
Output capacitance	C_{oss}			8500		
Reverse transfer capacitance	C_{rss}			100		
Gate input resistance	R_g	f=1MHz Gate DC Bias=0 Test signal level=20mV open drain		1.0		Ω
Forward Transconductance	G_{fs}	$V_{DS}=10\text{V}, I_D=33\text{A}$	24	43		S
Total gate charge	Q_g	$V_{DD}=425\text{V}, I_D=25\text{A}$ $V_{GS}=10\text{V}$		220		nC
Gate-source charge	Q_{gs}			50		
Gate-drain charge	Q_{gd}			120		
Switching times						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 425 \text{ V}, I_D = 25\text{A},$ $R_G = 10\Omega, V_{GS} = 10 \text{ V}$		38		ns
Rise time	t_r			45		
Turn-off-delay time	$t_{d(off)}$			98		
Fall time	t_f			18		
Source drain diode						
Forward on voltage	V_{SD}	$I_{SD}= 1\text{A}, V_{GS}= 0\text{V}$		0.66	1.2	V
Reverse recovery time	t_{rr}	$I_{SD}= 33\text{A}, di/dt= 100\text{A}/\mu\text{s}$ $V_R= 100 \text{ V}$		210		ns
Reverse recovery charge	Q_{rr}			2.55		μC
Reverse recovery current	I_{RRM}			18		A

Thermal data

Parameter	Symbol	Value		Unit
		TO-264	SOT-227	
Thermal resistance junction-case max	$R_{thj-case}$	0.10	0.08	°C/W
Thermal resistance junction-ambient max	$R_{thj-amb}$	40	35	

Order information

Marking	Package
MS66N85IDB3	TO-264
MS66N85IDF4	SOT-227

Electrical characteristic curves

Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

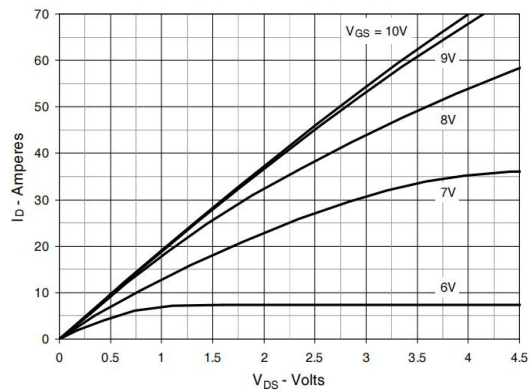


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

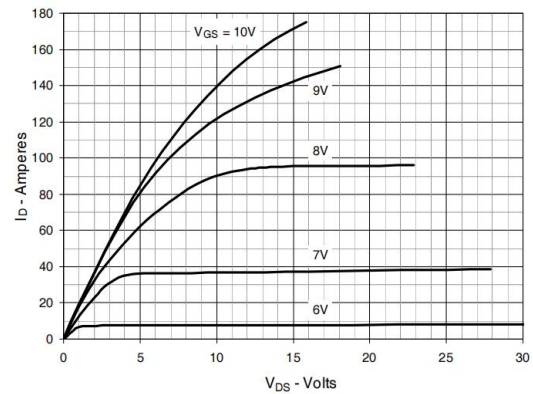


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

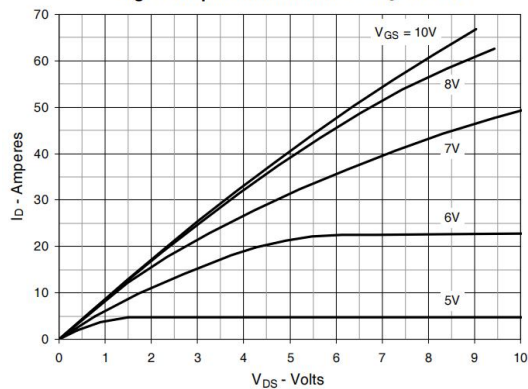


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 33\text{A}$ Value vs. Junction Temperature

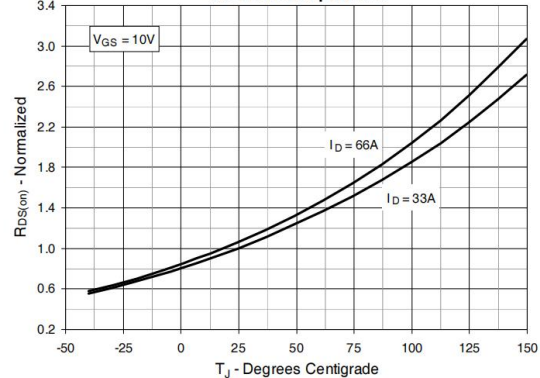


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 33\text{A}$ Value vs. Drain Current

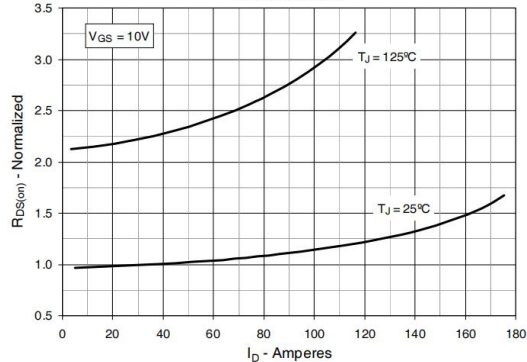


Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature

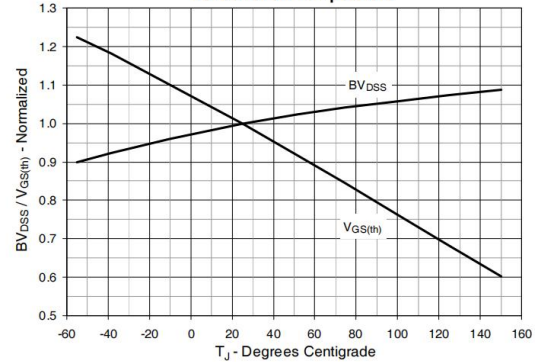


Fig. 7. Maximum Drain Current vs. Case Temperature

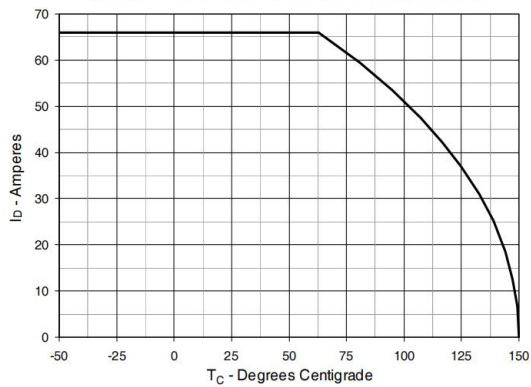


Fig. 8. Input Admittance

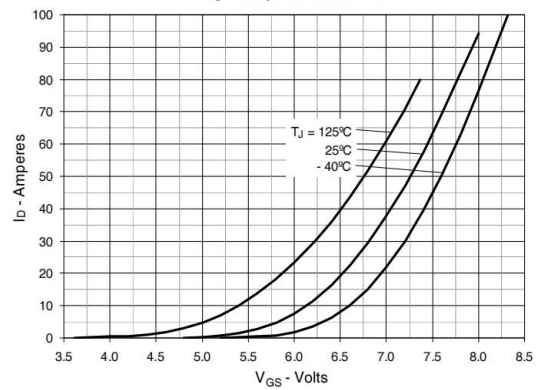


Fig. 9. Transconductance

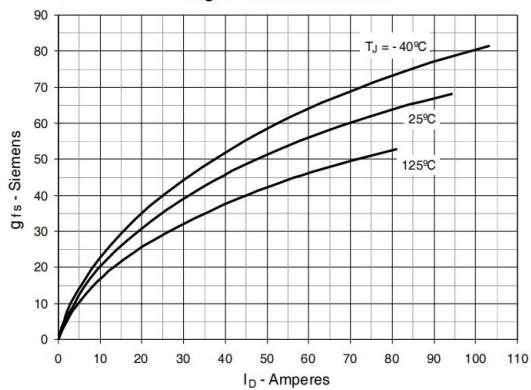


Fig. 10. Forward Voltage Drop of Intrinsic Diode

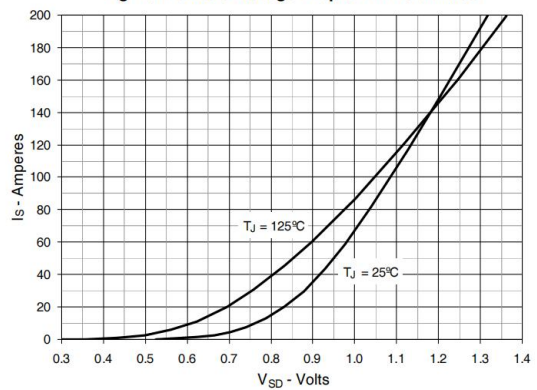


Fig. 11. Gate Charge

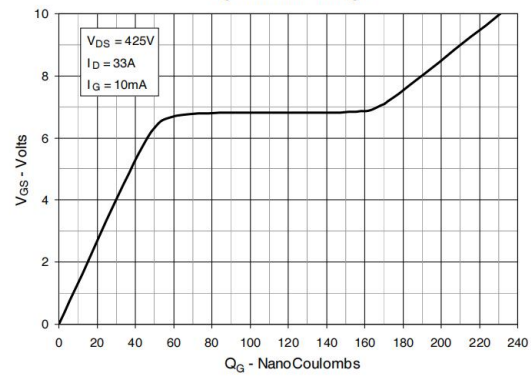


Fig. 12. Capacitance

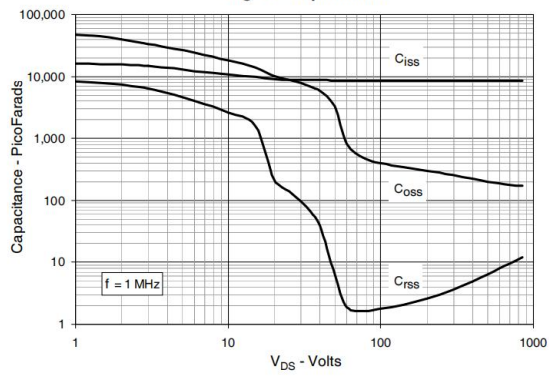


Fig. 13. Output Capacitance Stored Energy

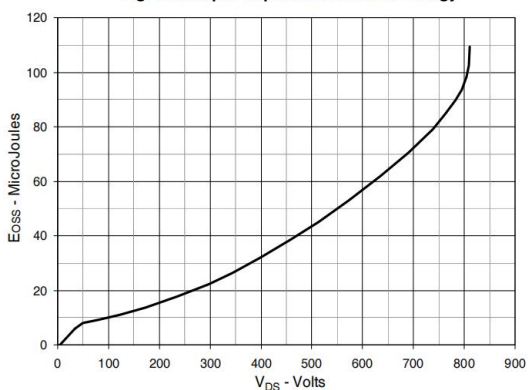


Fig. 14. Safe Operating Area For TO-264

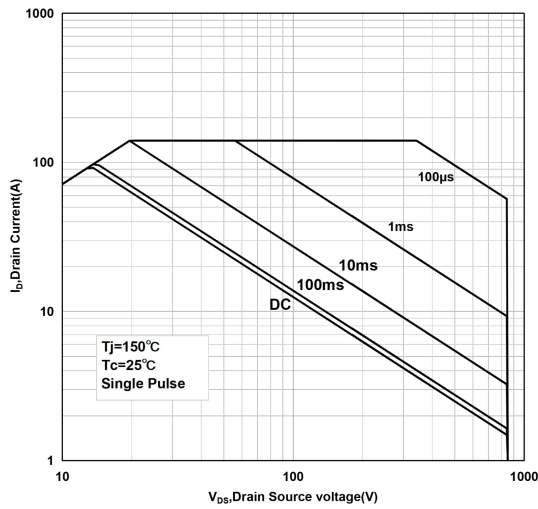


Fig. 15. Transient response Curve For TO-264

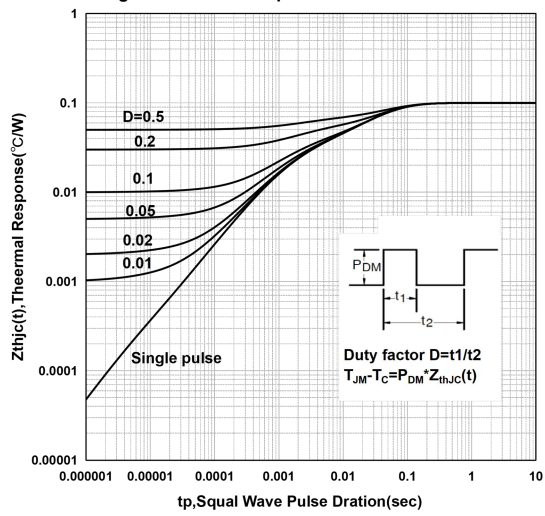


Fig. 16. Safe Operating Area For SOT-227

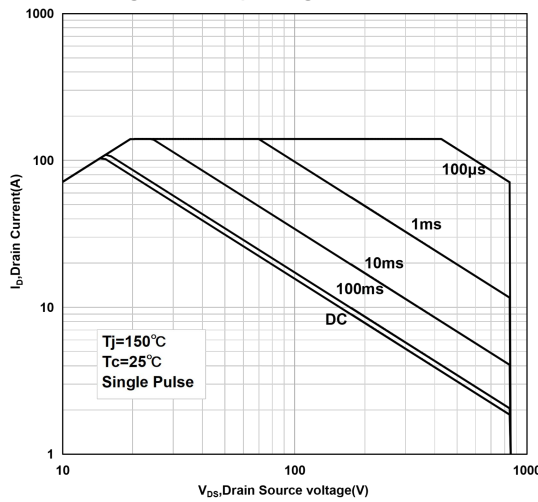
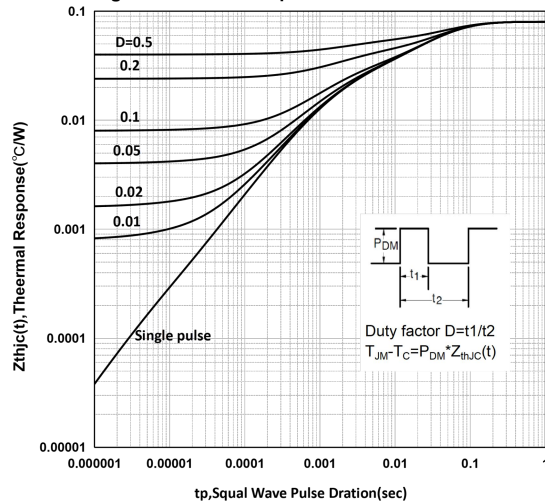


Fig. 17. Transient response Curve For SOT-227



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