Features

- Low $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% R_g Tested
- Pb-free Lead Plating
- Halogen-freeand RoHS-compliant

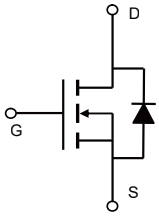
Product Summary

Parameter	Value	Unit
V_{DS}	60	V
$V_{GS(th)}$	1.7	V
I_D (@ V_{GS} = 10V) (1)	25	A
$R_{DS(ON)}$ (@ V_{GS} = 10V)	22	mΩ
$R_{DS(ON)}$ (@ V_{GS} = 4.5V)	28	mΩ

Applications

- Power Managerment in Telecom., Industrial Automation, CE
- Motor Driving in Power Tool, E-vehicle, Robotics
- Current Switching in DC/DC & AC/DC (SR) Sub-systems

DFN5x6



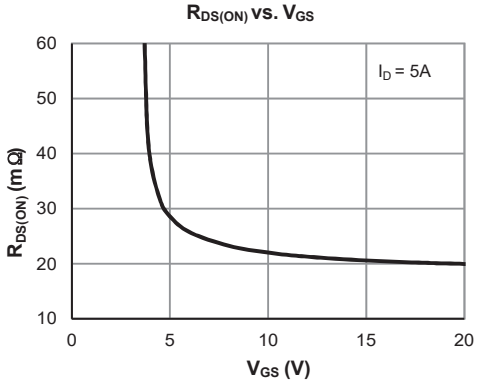
Schematic

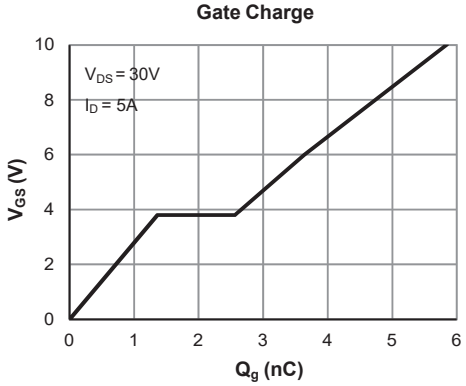
Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
VSM25N06-D56	DFN5x6	8	VSM25N06	1	-55 to 150	13-inch Reel	5000

Absolute Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V_{DS}	60	V
Gate-to-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (1)	T_C = 25°C	I_D	25	A
	T_C = 100°C		16.4	
Pulsed Drain Current (2)		I_{DM}	61	A
Avalanche Energy (3)		E_{AS}	13.5	mJ
Power Dissipation (4)	T_C = 25°C	P_D	35	W
	T_C = 100°C		14.2	
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C





Electrical Characteristics (@ T_J = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 250 μA, V_{GS} = 0V	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 48V, V_{GS} = 0V			1.0	μA
		T_J = 55°C			5.0	
Gate-Body Leakage Current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	1.2	1.7	2.5	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 5A		22	28	mΩ
		V_{GS} = 4.5V, I_D = 3A		28	37	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 5A		17.0		S
Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V		0.75	1.0	V
Diode Continuous Current	I_S	T_C = 25°C			25	A
DYNAMIC PARAMETERS (5)						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 30V, f = 1MHz		288		pF
Output Capacitance	C_{oss}			92		pF
Reverse Transfer Capacitance	C_{rss}			22		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		5.0		Ω
SWITCHING PARAMETERS (5)						
Total Gate Charge (@ V_{GS} = 10V)	Q_g	V_{GS} = 0 to 10V V_{DS} = 30V, I_D = 5A		5.8		nC
Total Gate Charge (@ V_{GS} = 4.5V)	Q_g			2.9		nC
Gate Source Charge	Q_{gs}			1.4		nC
Gate Drain Charge	Q_{gd}			1.2		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS} = 10V, V_{DS} = 30V R_L = 6Ω, R_{GEN} = 6Ω		6.0		ns
Turn-On Rise Time	t_r			62		ns
Turn-Off DelayTime	$t_{D(off)}$			18.5		ns
Turn-Off Fall Time	t_f			97		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F = 5A, dI_F/dt = 100A/μs		13.0		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 5A, dI_F/dt = 100A/μs		6.0		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	55	63	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.5	4.0	°C/W

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T_{J_Max} = 150°C.
3. E_{AS} of 13.5 mJ is based on starting T_J = 25°C, L = 3.0mH, I_{AS} = 3.0A, V_{GS} = 10V, V_{DD} = 30V; 100% test at L = 0.1mH, I_{AS} = 12A. T_{J_Max} = 150°C.
4. The power dissipation P_D is based on T_{J_Max} = 150°C.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical & Thermal Characteristics

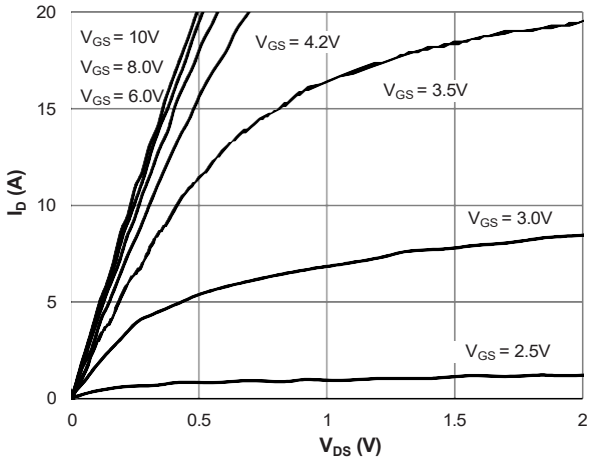


Figure 1: Saturation Characteristics

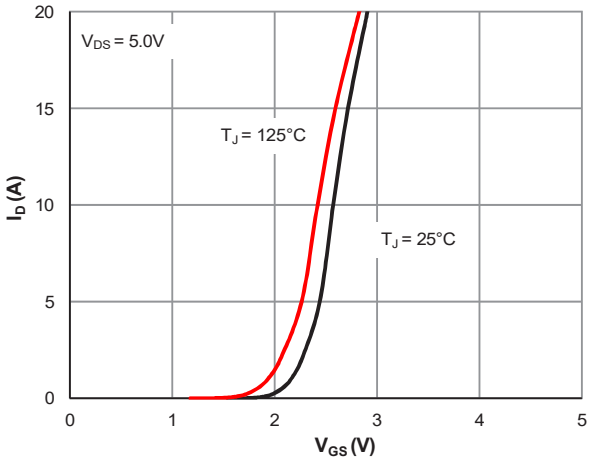


Figure 2: Transfer Characteristics

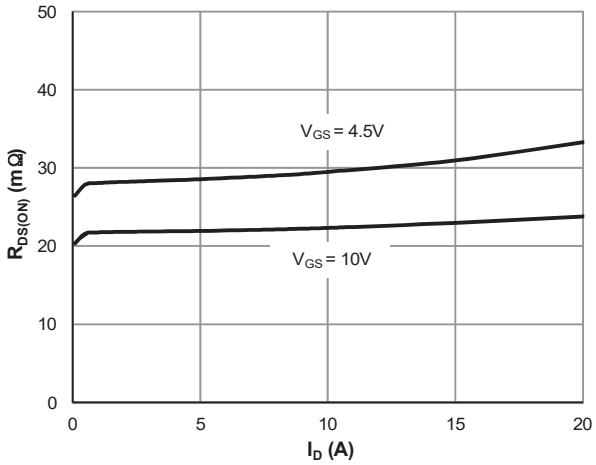


Figure 3: $R_{DS(ON)}$ vs. Drain Current

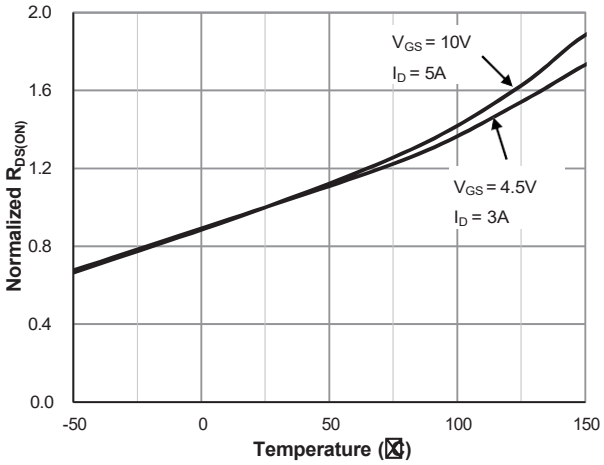


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

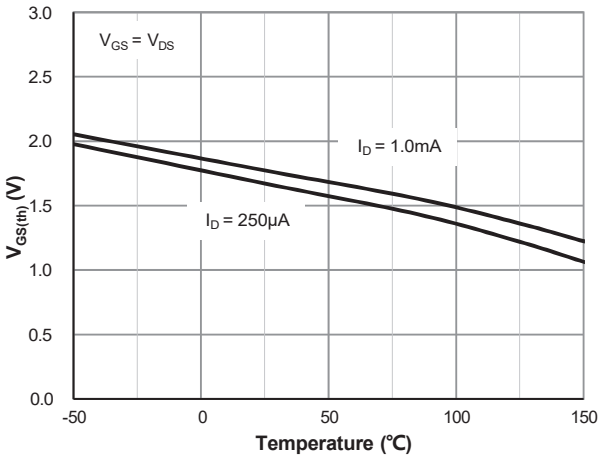


Figure 5: VGS(th) vs. Junction Temperature

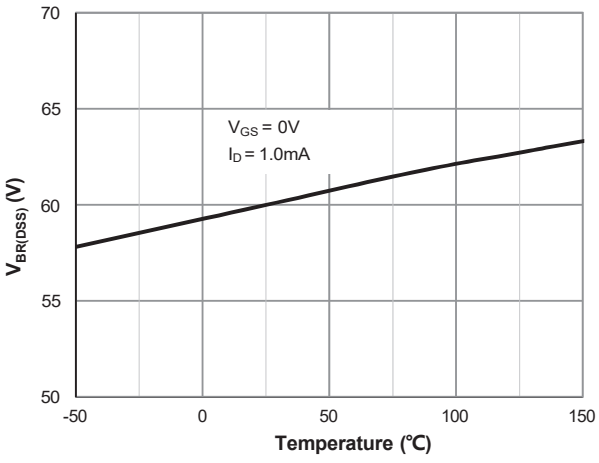


Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

Typical Electrical & Thermal Characteristics

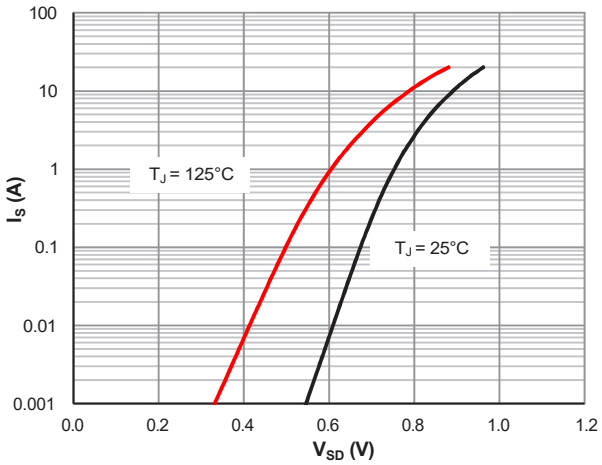


Figure 7: Body-Diode Characteristics

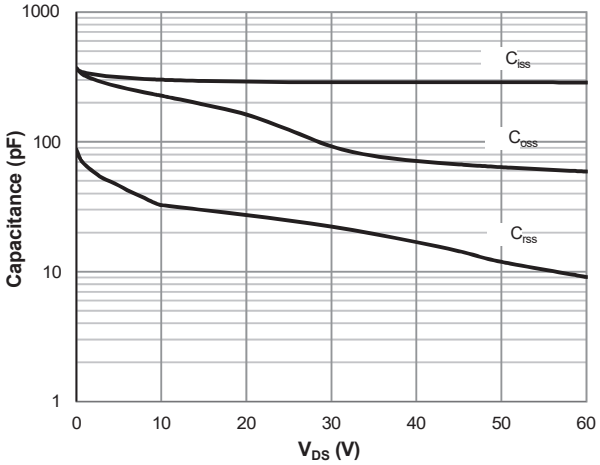


Figure 8: Capacitance Characteristics

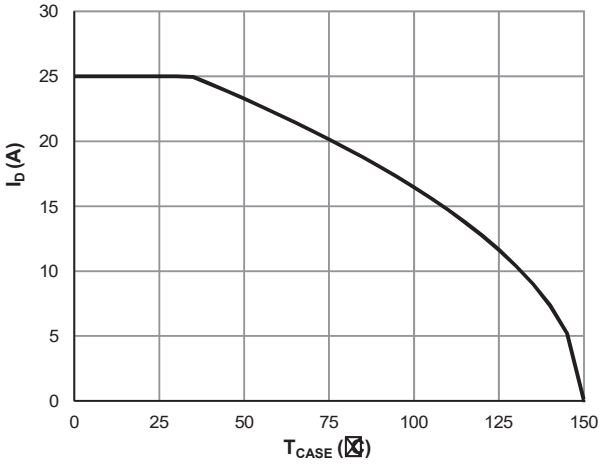


Figure 9: Current De-rating

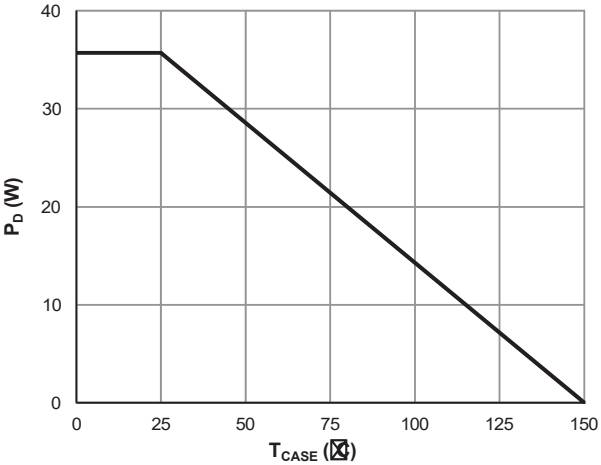


Figure 10: Power De-rating

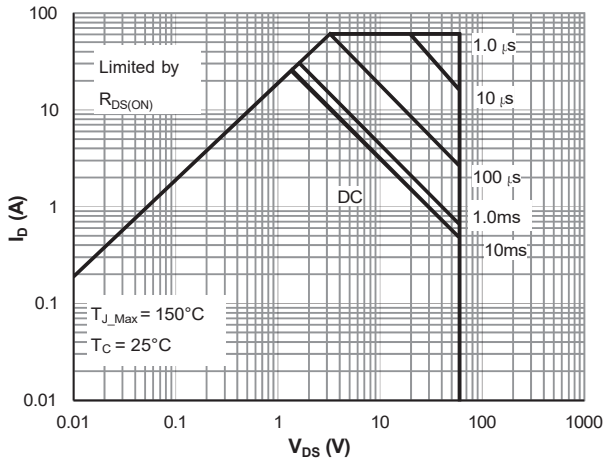


Figure 11: Maximum Safe Operating Area

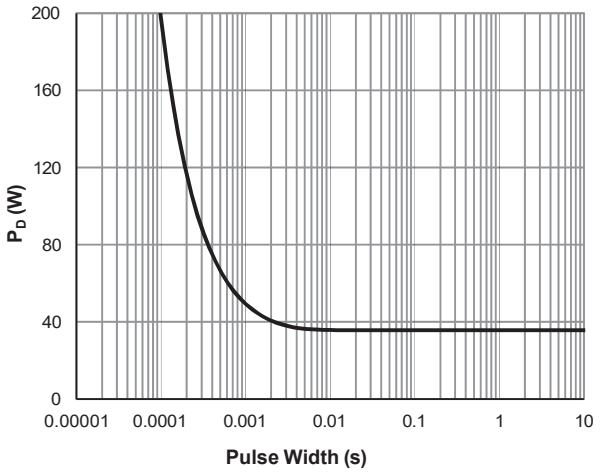


Figure 12: Single Pulse Power Rating, Junction-to-Case

Typical Electrical & Thermal Characteristics

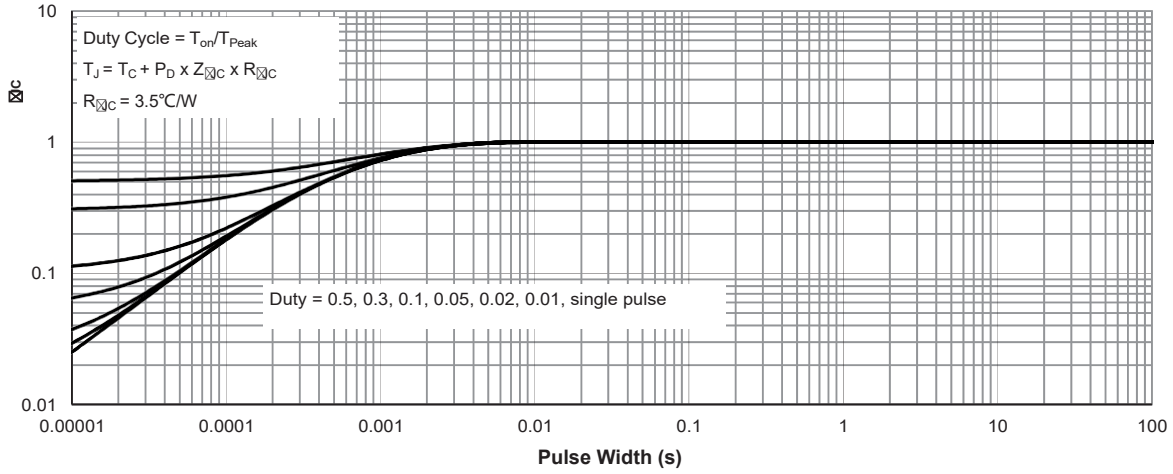


Figure 13: Normalized Maximum Transient Thermal Impedance