

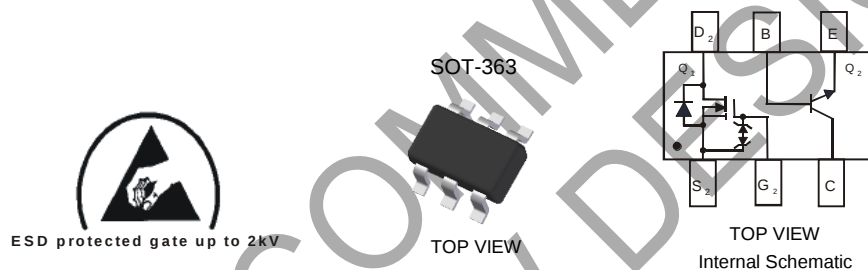
N-CHANNEL ENHANCEMENT MODE MOSFET PLUS NPN TRANSISTOR

Features

- N-Channel MOSFET and NPN Transistor in One Package
- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V Max
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- ESD Protected MOSFET Gate up to 2kV
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.
- This part is qualified to JEDEC standards (as references in AEC-Q101) for High Reliability.
<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Package: SOT-363
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Alloy 42 Lead frame. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 5
- Ordering Information: See Page 5
- Weight: 0.006 grams (Approximate)



Maximum Ratings – MOSFET, Q1 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	50	V
Gate-Source Voltage	V _{GSS}	±12	V
Drain Current (Note 4)	I _D	160	mA
Pulsed Drain Current (Note 4)	I _{DM}	560	mA

Maximum Ratings – NPN Transistor, Q2 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	45	V
Emitter-Base Voltage	V _{EBO}	6.0	V
Collector Current	I _C	100	mA

Thermal Characteristics, Total Device (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 4)	P _D	250	mW
Thermal Resistance, Junction to Ambient (Note 4)	R _{θJA}	500	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Incorporated's suggested pad layout document, which can be found on our website at <http://www.diodes.com/package-outlines.html>.

Electrical Characteristics - MOSFET (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)						
Drain-Source Breakdown Voltage	BV _{DSS}	50	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	10	μA	V _{DS} = 50V, V _{GS} = 0V
Gate-Body Leakage	I _{GSS}	—	—	1.0 5.0	μA	V _{GS} = ±8V, V _{DS} = 0V V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	V _{GS(TH)}	0.7	0.8	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	3.1	4	Ω	V _{GS} = 4V, I _D = 100mA
		—	4	5		V _{GS} = 2.5V, I _D = 80mA
Forward Transconductance	g _{FS}	180	—	—	ms	V _{DS} = 10V, I _D = 100mA, f = 1.0kHz
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{iss}	—	25	—	pF	V _{DS} = 10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	5	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	2.1	—	pF	

Electrical Characteristics - NPN Transistor (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage (Note 5)	V _{(BR)CBO}	50	—	—	V	I _C = 10μA, I _B = 0
Collector-Emitter Breakdown Voltage (Note 5)	V _{(BR)CEO}	45	—	—	V	I _C = 10mA, I _B = 0
Emitter-Base Breakdown Voltage (Note 5)	V _{(BR)EBO}	6	—	—	V	I _E = 1μA, I _C = 0
DC Current Gain (Note 5)	h _{FE}	200	290	450	—	V _{CE} = 5.0V, I _C = 2.0mA
Collector-Emitter Saturation Voltage (Note 5)	V _{CE(SAT)}	—	—	100 300	mV	I _C = 10mA, I _B = 0.5mA I _C = 100mA, I _B = 5.0mA
Base-Emitter Saturation Voltage (Note 5)	V _{BE(SAT)}	—	700 900	—	mV	I _C = 10mA, I _B = 0.5mA I _C = 100mA, I _B = 5.0mA
Base-Emitter Voltage (Note 5)	V _{BE}	580	660	700 770	mV	V _{CE} = 5.0V, I _C = 2.0mA V _{CE} = 5.0V, I _C = 10mA
Collector Cut-Off Current (Note 5)	I _{CBO}	—	—	15 5.0	nA μA	V _{CB} = 30V V _{CB} = 30V, T _A = +150°C
Collector-Emitter Cut-Off Current (Note 5)	I _{CES}	—	—	-100	nA	V _{CE} = -45V
Gain Bandwidth Product	f _T	100	—	—	MHz	V _{CE} = 5.0V, I _C = 10mA, f = 100MHz
Output Capacitance	C _{OBO}	—	—	4.5	pF	V _{CB} = 10V, f = 1.0MHz
Noise Figure	NF	—	—	10	dB	V _{CE} = 5V, R _S = 2.0kΩ, f = 1.0kHz, BW = 200Hz

Note: 5. Short duration pulse test used to minimize self-heating effect.

MOSFET

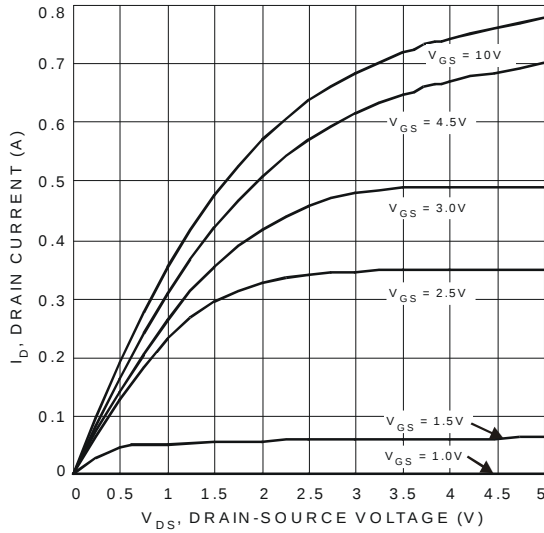


Fig. 1 Typical Output Characteristics

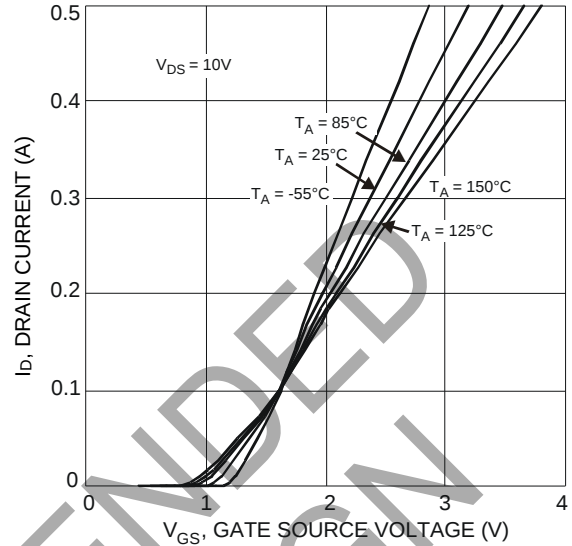


Fig. 2 Typical Transfer Characteristics

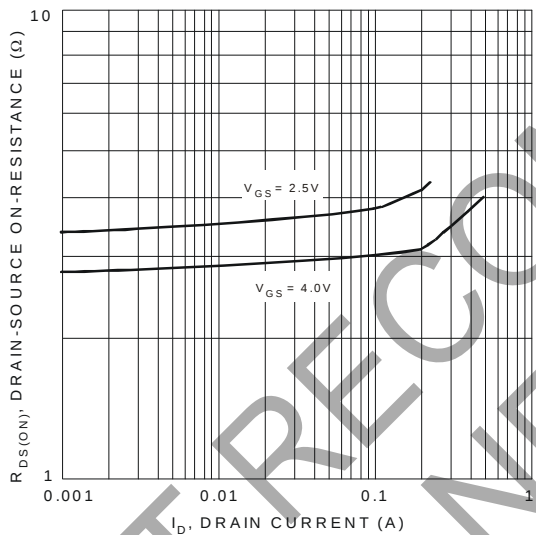


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

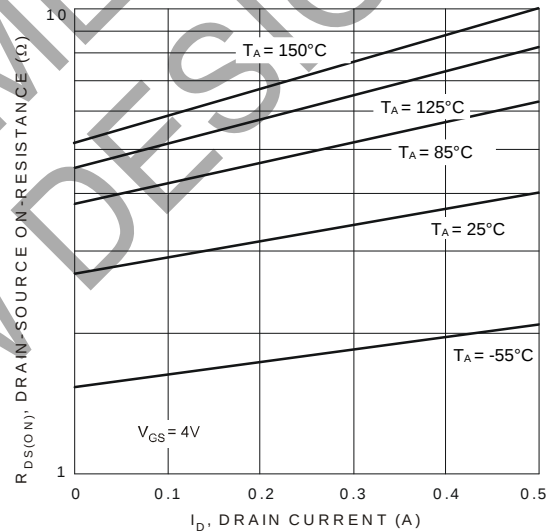


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

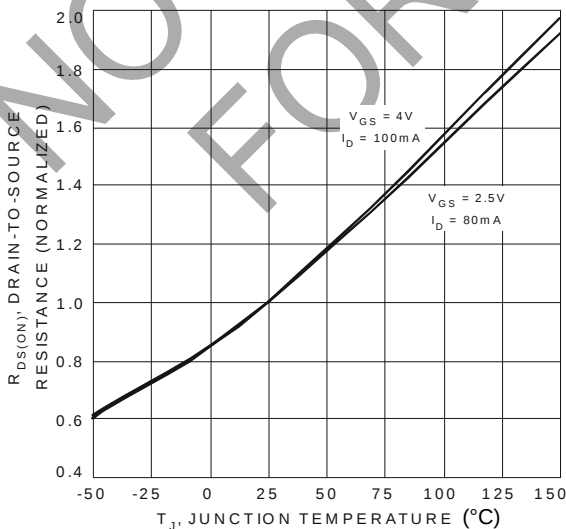


Fig. 5 On-Resistance Variation with Temperature

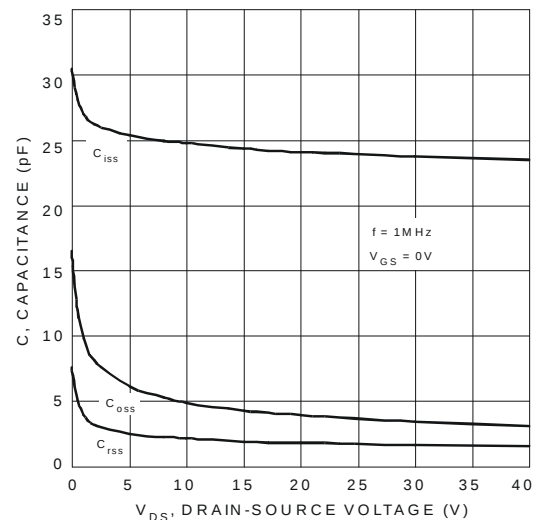
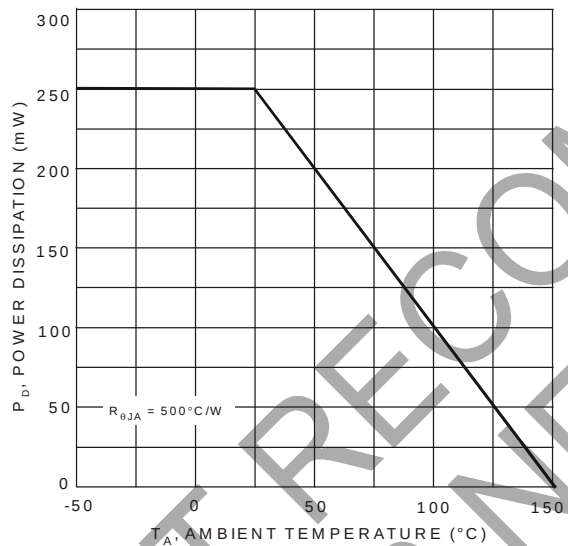
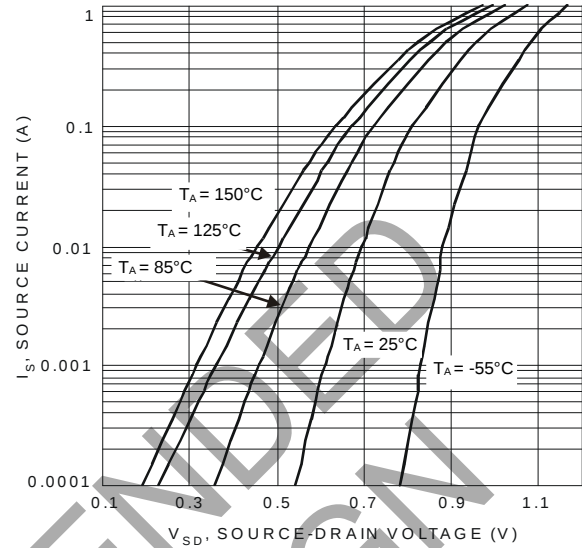
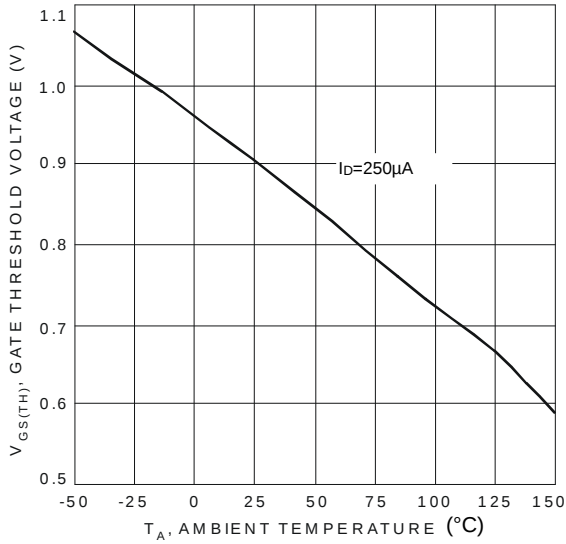


Fig. 6 Typical Capacitance

MOSFET (continued)



NPN Transistor

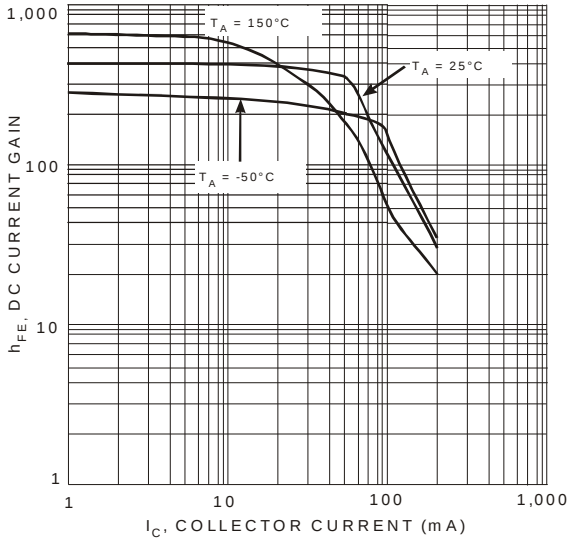


Fig. 10 Typical DC Current Gain vs. Collector Current

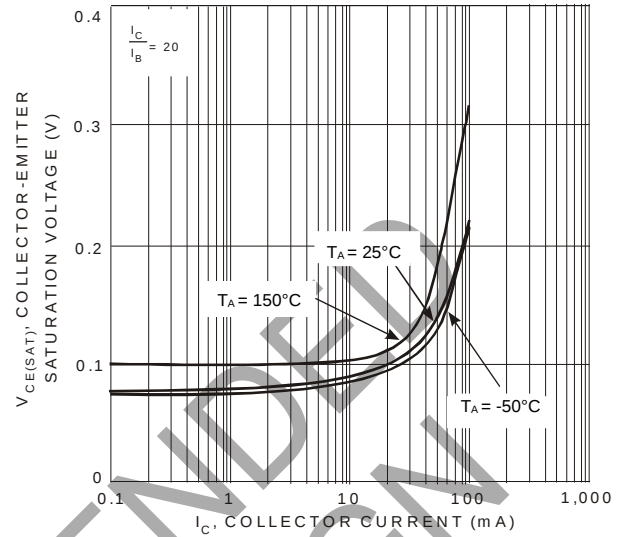


Fig. 11 Typical Collector-Emitter Saturation Voltage vs. Collector Current

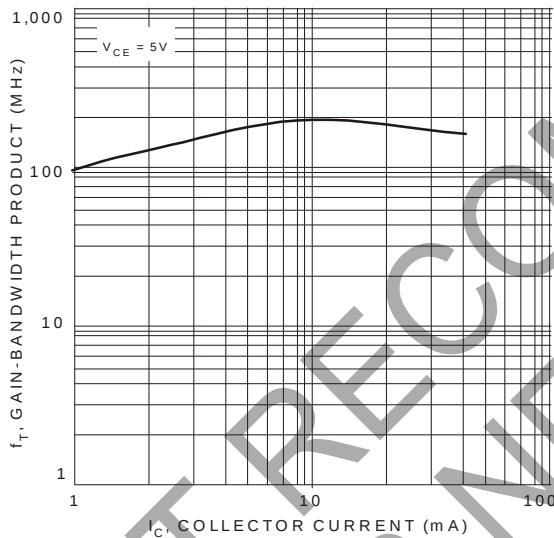


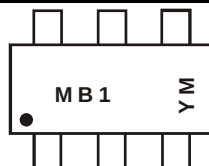
Fig. 12 Typical Gain-Bandwidth Product vs. Collector Current

Ordering Information (Note 6)

Part Number	Package	Packing	
		Qty.	Carrier
DMB53D0UDW-7	SOT-363	3000	Tape & Reel

Note: 6. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



MB1 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: J = 2022)
M = Month (ex: 5 = May)

Date Code Key

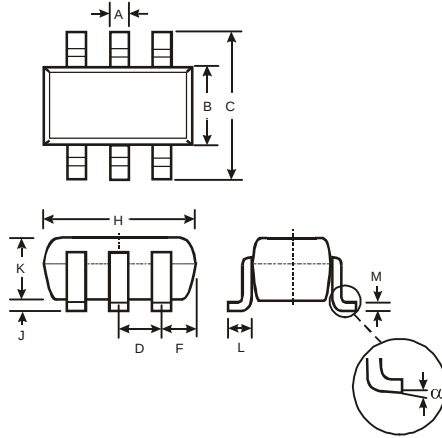
Year	2008	...	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	V	...	J	K	L	M	N	O	P	R	S	T

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT-363

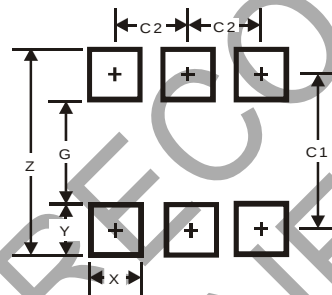


SOT-363		
Dim	Min	Max
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Typ	
F	0.40	0.45
H	1.80	2.20
J	0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.22
α	0°	8°
All Dimensions in mm		

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT-363



Dimensions	Value (in mm)
Z	2.5
G	1.3
X	0.42
Y	0.6
C1	1.9
C2	0.65

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