VEC2415

Power MOSFET
60V, 80mΩ, 3A, Dual N-Channel

ON Semiconductor®

www.onsemi.com

This Power MOSFET is produced using ON Semiconductor's trench technology, which is specifically designed to minimize gate charge and low on resistance. This device is suitable for applications with low gate charge driving or low on resistance requirements.

Features

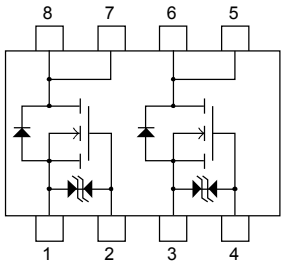
- Low On-Resistance
- 4V drive
- Low-Profile Package
- ESD Diode-Protected Gate
- Pb-Free and RoHS compliance
- Halogen Free compliance : VEC2415-TL-W

Typical Applications

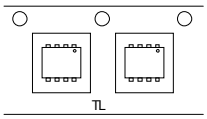
- Motor Driver
- DC/DC Converter

V_{DSS}	R_{DS}(on) Max	I_D Max
60V	80mΩ@ 10V	3A
	106mΩ@ 4.5V	
	116mΩ@ 4V	

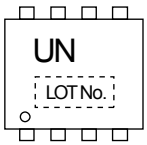
ELECTRICAL CONNECTION
N-Channel



PACKING TYPE : TL



MARKING



ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

SPECIFICATIONS

ABSOLUTE MAXIMUM RATING at Ta = 25°C (Note 1)

Parameter	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	60	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	I_D	3	A
Drain Current (Pulse) PW ≤ 10μs, duty cycle ≤ 1%	I_{DP}	12	A
Power Dissipation When mounted on ceramic substrate (900mm^2 × 0.8mm) 1unit	P_D	0.9	W
Total Dissipation When mounted on ceramic substrate (900mm^2 × 0.8mm)	P_T	1.0	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 to +150	°C

Note 1 : Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction to Ambient When mounted on ceramic substrate (900mm^2 × 0.8mm) 1unit	$R_{\theta JA}$	138.8	°C/W

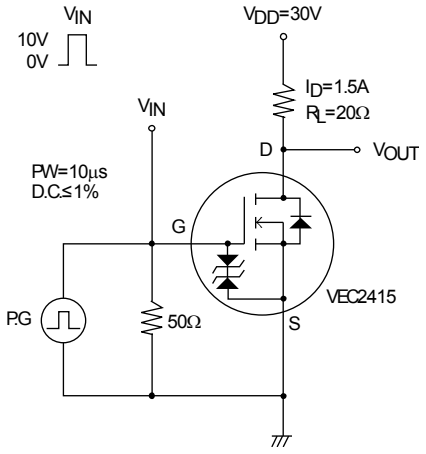
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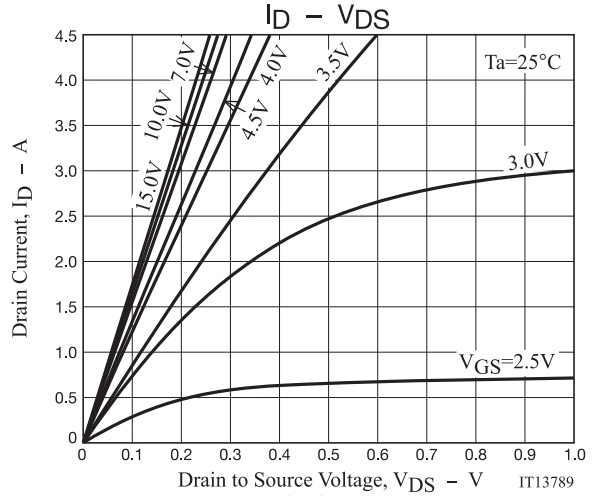
ELECTRICAL CHARACTERISTICS at Ta = 25°C (Note 2)

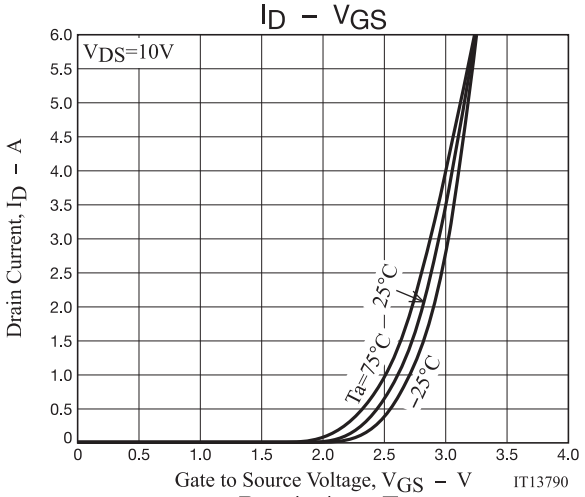
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	60			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Gate Threshold Voltage	$V_{GS}(th)$	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=1.5A		2.6		S
Static Drain to Source On-State Resistance	$R_{DS}(on)1$	I_D=1.5A, V_{GS}=10V		62	80	mΩ
	$R_{DS}(on)2$	I_D=0.75A, V_{GS}=4.5V		76	106	mΩ
	$R_{DS}(on)3$	I_D=0.75A, V_{GS}=4V		83	116	mΩ
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		505		pF
Output Capacitance	Coss			57		pF
Reverse Transfer Capacitance	Crss			37		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit		7.3		ns
Rise Time	t_r			7.5		ns
Turn-OFF Delay Time	$t_d(off)$			41		ns
Fall Time	t_f			22		ns
Total Gate Charge	Qg	V_{DS}=30V, V_{GS}=10V, I_D=3A		10		nC
Gate to Source Charge	Qgs			1.6		nC
Gate to Drain “Miller” Charge	Qgd			2.1		nC
Forward Diode Voltage	V_{SD}	I_S=3A, V_{GS}=0V		0.81	1.2	V

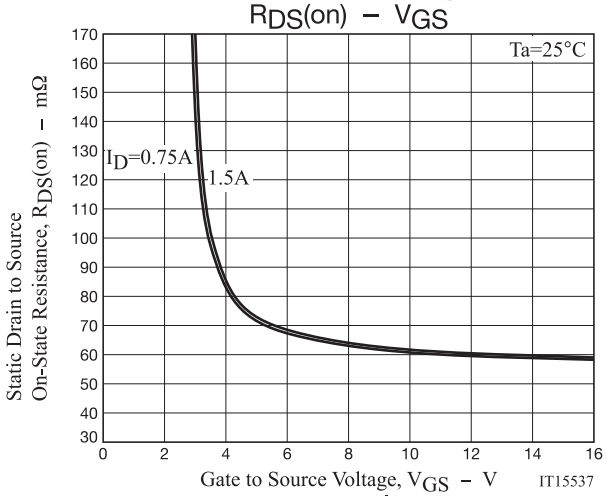
Note 2 : Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

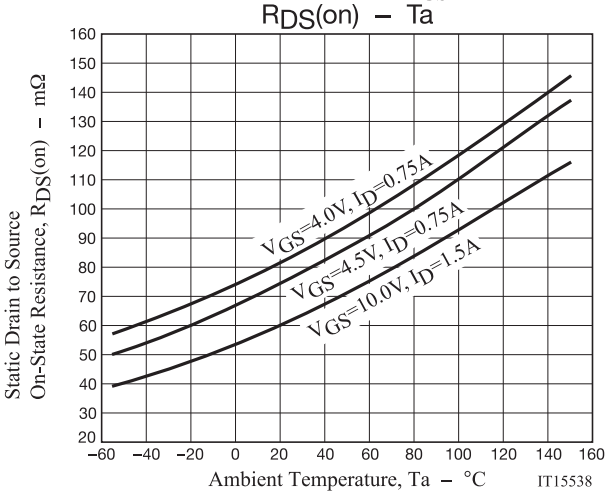
Switching Time Test Circuit

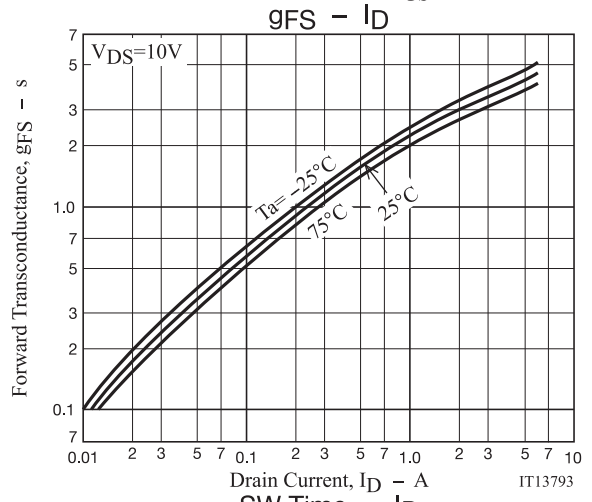


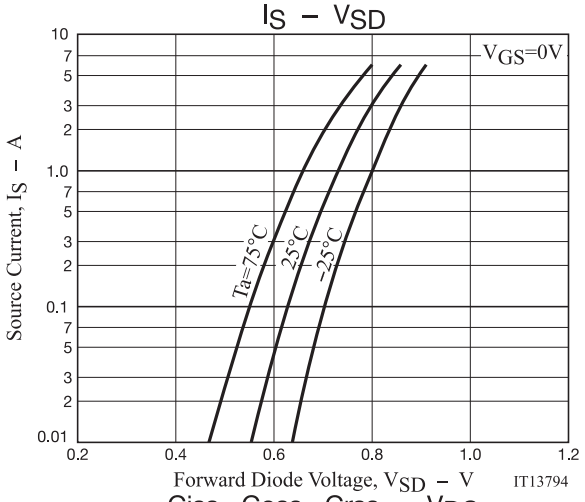

ID – VDS
Ta=25°C
10.0V
7.0V
4.0V
3.5V
4.5V
15.0V
3.0V
VGS=2.5V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT13789

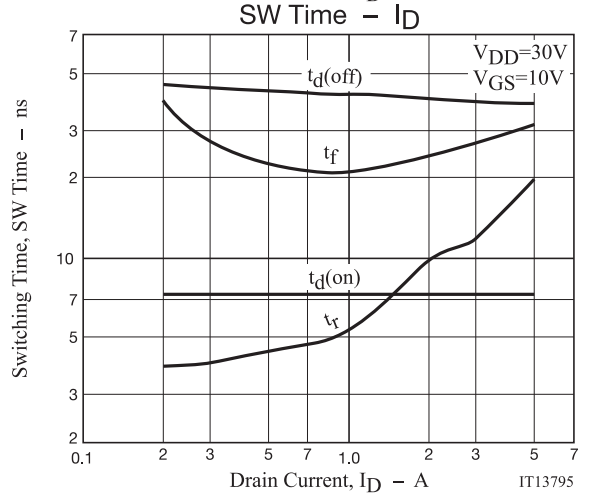

ID – VGS
VDS=10V
Ta=75°C
25°C
–25°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT13790

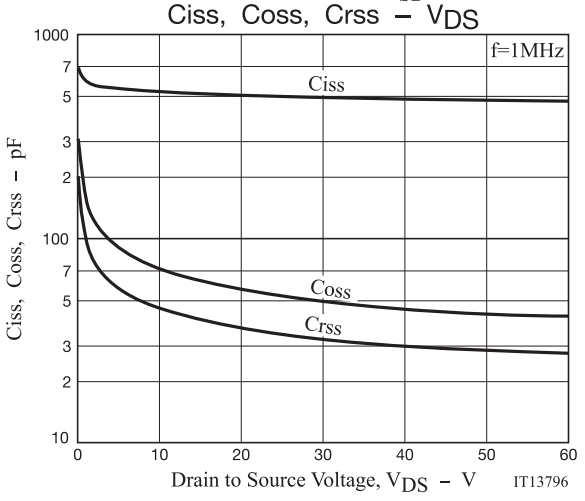

RDS(on) – VGS
Ta=25°C
ID=0.75A
1.5A
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT15537

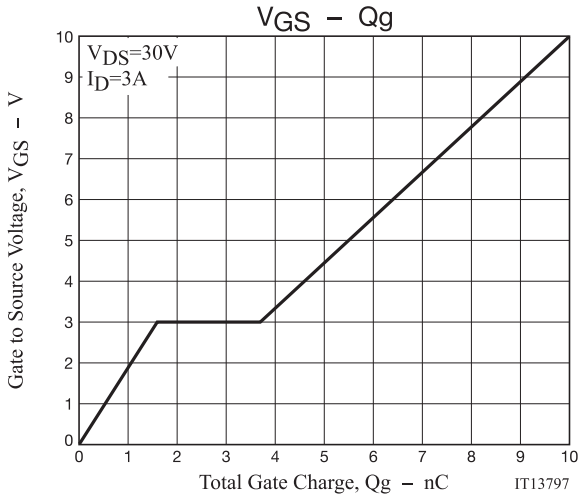

RDS(on) – Ta
VGS=4.0V, ID=0.75A
VGS=4.5V, ID=0.75A
VGS=10.0V, ID=1.5A
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT15538

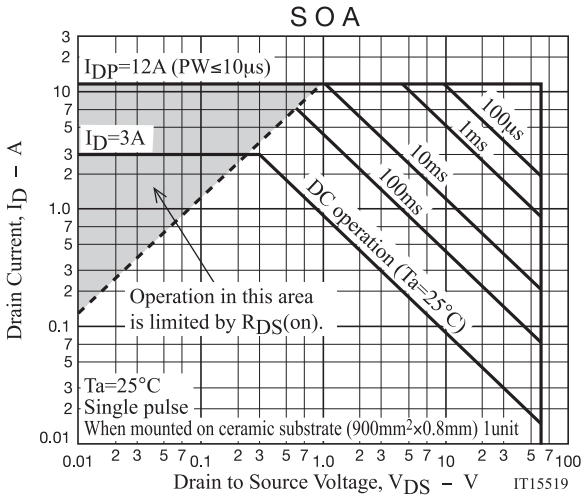

gFS – ID
VDS=10V
Ta=–25°C
75°C
25°C
Forward Transconductance, gFS – s
Drain Current, ID – A
IT13793

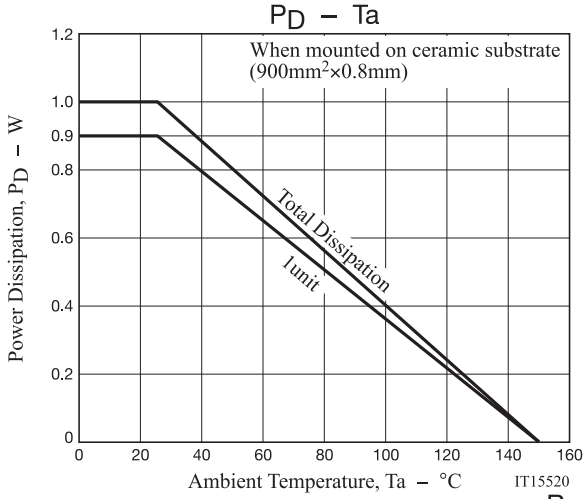

IS – VSD
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Forward Diode Voltage, VSD – V
IT13794

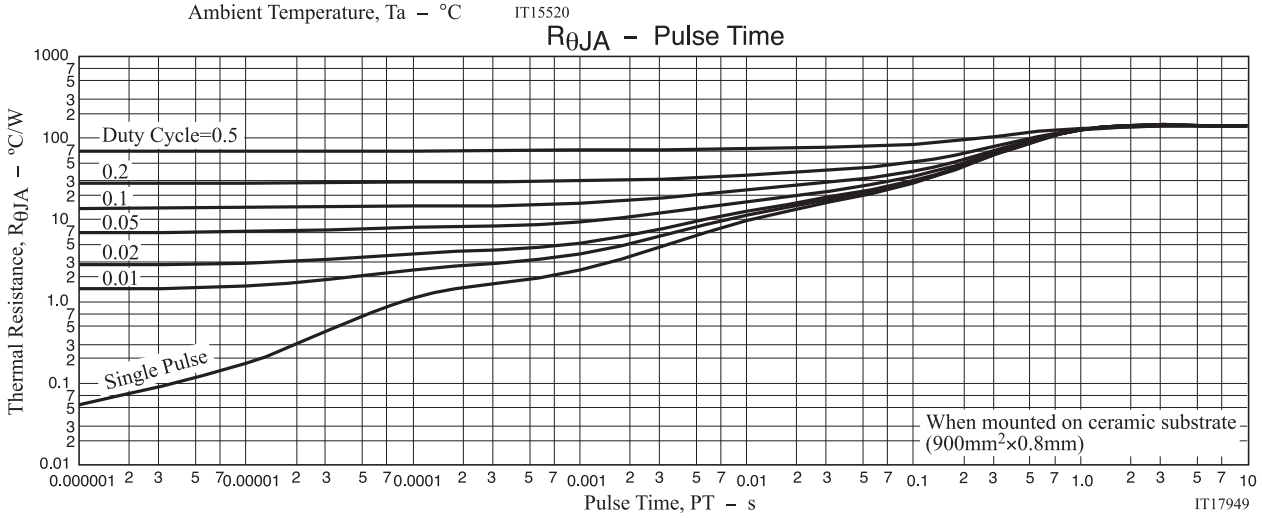

SW Time – ID
VDD=30V
VGS=10V
td(off)
tf
td(on)
tr
Switching Time, SW Time – ns
Drain Current, ID – A
IT13795


Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT13796


VGS – Qg
VDS=30V
ID=3A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT13797


S O A
IDP=12A (PW≤10μs)
ID=3A
100μs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this area
is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (900mm2×0.8mm) 1unit
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT15519

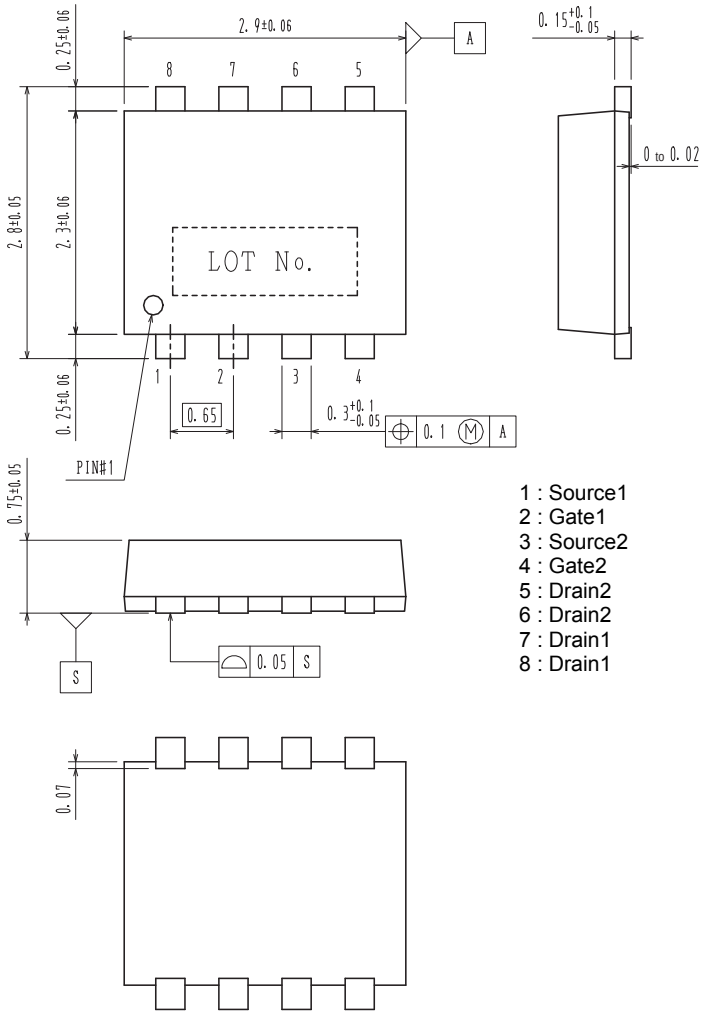

PD – Ta
When mounted on ceramic substrate
(900mm2×0.8mm)
Total Dissipation
1unit
Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT15520


RθJA – Pulse Time
Duty Cycle=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
When mounted on ceramic substrate
(900mm2×0.8mm)
Thermal Resistance, RθJA – °C/W
Pulse Time, PT – s
IT17949

PACKAGE DIMENSIONS

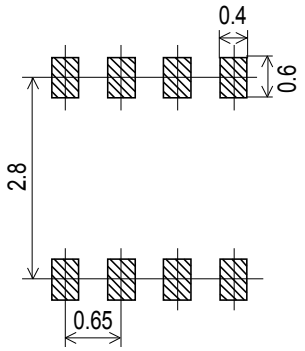
unit : mm

SOT-28FL / VEC8
CASE 318AH
ISSUE O



1 : Source1
2 : Gate1
3 : Source2
4 : Gate2
5 : Drain2
6 : Drain2
7 : Drain1
8 : Drain1

Recommended Soldering Footprint



ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
VEC2415-TL-E	UN	SOT-28FL / VEC8 (Pb-Free)	3,000 / Tape & Reel
VEC2415-TL-W		SOT-28FL / VEC8 (Pb-Free / Halogen Free)	

† For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D. http://www.onsemi.com/pub_link/Collateral/BRD8011-D.PDF

Note on usage : Since the VEC2415 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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